DESIGNING READING MATERIALS FOR TELECOMMUNICATIONS ENGINEERING AT TELKOM ACADEMY JAKARTA

HAMZAH PUADI ILYAS
NIM : 0808066007

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The Thesis Committee and Oral Defense Committee have approved this Thesis as partial fulfillment of the requirements of the Master of Education degree in English.

Thesis Advisors

Dr. Gunawan Suryoputro, M.Hum

Prof. Drs. Nurachman Hanafi, MA., Ph.D.

Oral Defense Committee

Hartoyo, MA., Ph.D.

Ujang Suparman, MA., Ph.D.

Chair of the Master of Education Program in English

Dr. Gunawan Suryoputro, M.Hum

Jakarta, 20 August 2010

Graduate School
University of Muhammadiyah Prof. DR. HAMKA
Director

Prof. Dr. H.R. Santosa Murwani

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As a young lecturer at some campuses, I am demanded to get both higher degree for professional development and well-mannered attitude of a teaching practitioner. Both are useful to equip myself in the extremely vast ocean of knowledge. The deeper we dive into it, the smaller we feel as a human being. The ocean of knowledge will never be enough to explore till we meet our death.

UHAMKA, one of higher institutions offering Master's degree in English education, knows how to provide students studying there with not only basic knowledge for further personal and professional development but also religious values to embrace for self-control. This aims to produce graduates who do not serve solely for the science itself, but more importantly to the well being of other living things.

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ABSTRACT

This study attempted to design reading materials for telecommunications engineering at TELKOM academy Jakarta. To produce satisfactory teaching materials, the researcher did the following steps: doing needs analysis, reviewing the principles of materials design and reading in a foreign language, designing course framework, designing syllabus, designing the reading materials, and implementing the sample lessons.

The researcher employed qualitative methods in gathering the data. The instruments used were questionnaire and interview. The questionnaire was addressed to students, alumni, the institution where the students study. The interview was done to collect information from the companies or users that have ever recruited the academy's graduates. The needs analysis was carried out by distributing questionnaires and telephone call. The results were then analyzed.

The results of needs analysis, along with the principles of material design and reading in a foreign language, became the basis for the researcher to design course framework. The course framework was then developed into a syllabus. Finally the syllabus became the basis for designing reading materials.

The reading materials for telecommunications engineering applied a topical syllabus. Each lesson or unit had different topics, raging from internet, satellite, computer, optical fiber, radar, antenna, cellular phone, modem, and GSM and CDMA technology. Each lesson also adopted various reading skills or strategies. They were skimming, scanning, guessing meaning from context, recognizing word referent, and making inferences.

When the materials had been designed, the researcher implemented six out of ten units of the coursebook. The results were satisfactory. Most students mentioned that the coursebook was related to their field of study. The majority of students also said that the materials were understandable and interesting. They also said they were satisfied with the reading materials.

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CHAPTER I

INTRODUCTION

A. Background of the Study

English has been pervasive in any field of study, ranging from natural to social sciences. The pervasiveness of English is due to, among other, the language's increasing role as a medium for communication. Its existence is already unavoidable by the global community to interact one another, share ideas, express opinion, spread cultures, and transfer knowledge and technology.

As a means of transferring knowledge and technology, English language learning is a must, especially for countries whose native language is not English, to grasp the advancement of science and technology. Without understanding the language thoroughly, people of the countries will not raise their competence and skills in order to be on a par with what is so called modern society.

Indonesia, one of developing countries, has realized the importance of learning English to not only get knowledge, science, and technology but also communicate with foreign people and promote cultures. That is why the language has been taught at formal schools, starting from elementary to university levels. Besides, the language has also been used widely by Indonesians coming from different walks of life, such as businessmen doing business transactions with their foreign counterparts, artists collaborating in their art performances, government officials exchanging bilateral

cooperation, or non-governmental organizations sharing latest human rights issues or humanitarian aids.

The trend concerning English language teaching and learning in Indonesia is growing. English language courses keep appearing. Universities offering studies in English language and literature and English education for the levels of bachelor and master's degree spring up. Even, some play groups and kindergartens in big cities offer English as a complementary subject. It all proves that awareness of the language mastery has prevailed among societies.

One characteristic of successful English learning that is widely perceived by many people is speaking ability. Ur[1] states that "of all the four skills (listening, speaking, reading and writing), speaking seems intuitively the most important: people who know a language are referred to as 'speakers' of that language, as if speaking included all other kinds of knowing; and many if not most foreign language learners are primarily interested in a learning to speak." This seems to be believed as something true, especially to beginners. Actually they are not correct, and the viewpoint is not absolutely true.

As a matter of fact, the mastery of speaking skill solely is not sufficient for global communication. Speaking skill cannot be deprived from other skills. Reading skill, for example, greatly contributes to speaking ability. In the field of public speaking, one who plans to give a speech needs to really understand the topic of his speech. To dig more information about the topic, he has to read a lot in order that he could deliver

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[1] Penny Ur. 2000. *A Course in Language Teaching: Practice and Theory.* United Kingdom: Cambridge. p. 120

the speech eloquently after the audience. Almost all well-known public speakers such as Soekarno, Margaret Thatcher, and Barrack Obama are avid readers.

The role of reading texts as models and input for speaking as one of productive skills is acknowledged by some experts in TEFL. One of them is Jeremy Harmer. Reading texts can truly play as a stimulus. The written texts can be used to stimulate students into some other kinds of work. Harmer[2] states that "much language production work grows out of texts that students see or hear. A controversial reading passage may be the springboard for discussion." It proves that there is a relationship between speaking and reading.

Actually, to really master the language, one needs to be good at three other skills: reading, writing, and listening. Reading, for example, is one of the language skills that may not be forgotten and neglected. Reading is very powerful since there are lots of advantages students can obtain from this activity. They can improve their vocabularies and expand their knowledge. Komiyama[3] says that "reading is an important skill for English language learners in today's world; it supports the development of overall proficiency and provides access to crucial information at work and in school."

At a university level, reading in English as a foreign language is taught mostly for the purpose of making students able to read textbooks written in English. This happens to two other institutions at which the researcher teaches. To be able to support their research when writing a thesis or doing a final project as one of the requirements to

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[2] Jeremy Harmer. 2004. *The Practice of English Language Teaching*. United Kingdom: Cambridge. p.267

[3] Reiko Komiyama. 2009. *"CAR: A Means for Motivating Students to Read"*: English Teaching Forum. Volume 47 Number 3, 2009. p. 32-37

finish their education, they need to read more books or scientific journals to find the underlying theory. In this step they usually start to realize that English is actually very important.

A number of ready made English textbooks that focus on reading are a lot. Some big publishers abroad such as Longman, Cambridge, and Pearson have published English books for all fields of study, ranging from economics to engineering. English lecturers just pick one and apply it in the classroom. They just take it for granted. They do not have to worry about framework since most English textbooks are written by the experts, and ready made textbooks usually provide very clear framework. One of the advantages of using ready made material is practicality. Crawford[4] (in Jack C. Richards and Willy A. Renandya) mentions that "ready made textbooks save teachers' time, enabling teachers to devote time to teaching rather than materials production."

Apart from their advantages, ready made materials also have drawbacks. One of many drawbacks of rigidly using commercial materials is they do not always fulfill what the English learners need. As we know, English proficiency of learners, especially at a university level, is diverse and varied. Mostly ready made or commercial materials are not capable of catering the diversity. This is similar to what Nunan[5] says that "one of the major concerns is that any given coursebook will be incapable of catering for the diversity of needs which exists in most language classrooms."

In the field of English for Specific Purposes (ESP), the problems are similar. Commercial textbooks are mostly incapable of catering the learners' need. Very often

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[4] Jack C. Richards and Willy A. Renandya (Eds.). 2002. *Methodology in Language Teaching: An Anthology of Current Practice*. United Kingdom: Cambridge. p. 66

[5] David Nunan. 1995. *Language Teaching Methodology: A Textbook for Teachers*. Maryland: Phoenix ELT. p. 209

the content of commercial ESP textbooks does not match certain conditions such as the needs of students and the level of difficulty. The textbooks do not meet what the teacher and language learners really expect. Bouzidi[6] states that "an important component of an effective ESP course is a textbook that contains job-related English lessons. However, there is often a mismatch between the content of ESP textbooks and actual workplace language demands."

B. Identification of the Problem

Teaching reading to students majoring in telecommunications engineering absolutely needs the materials. Ideally, the materials can equip the students to make them able to read the textbooks for the sake of their study and professional development. Unfortunately, the researcher does not find materials that really focus on reading skills in telecommunications engineering. Commercial materials available in the market are mostly in the field of engineering in general.

Using commercial materials for teaching-learning process that are not really related to the field of study seems to be ineffective. This is actually what Ur[7] says concerning commercial materials, "the topics dealt in the coursebook may not necessarily be relevant or interesting for your class. Every class – in fact, every learner – has their own learning needs: no one coursebook can possibly supply these satisfactorily." Therefore, the researcher feels challenged to design reading materials that fulfill the needs of the students majoring in telecommunications engineering. The

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[6] Hassan Bouzidi. 2009. *"Between the ESP Classroom and the Workplace: Bridging the Gap"*. English Teaching Forum. Volume 47 Number 3, 2009. p. 10-17

[7] Penny Ur. 2000. *A Course in Language Teaching: Practice and Theory*. United Kingdom: Cambridge. p. 185

reading materials are expected to be able to provide the students studying telecommunications engineering with sufficient vocabularies and skills in reading English textbooks.

In short, there are some problems encountered in teaching English for students majoring in telecommunications engineering at TELKOM academy Jakarta. Those problems are firstly students of TELKOM academy need reading skills in a foreign language to have a good capability of reading English textbooks. Secondly, reading materials or coursebooks in the field of telecommunications engineering are not available in the market. Thirdly, commercial materials available in the market are mostly for engineering in general.

Besides, other problems include time spent for teaching English at TELKOM academy is 100 minutes (2 SKS) per week, and the meeting sessions in one semester are only 14 times. The institution does not have a language laboratory or learning center for its students to improve their English competence outside classroom. Finally, half of the students' English proficiency is still not satisfactory since most of them coming from mediocre high schools around Jakarta.

C. Limitation of the Problem

When it comes to teaching, there are many kinds of teaching materials. Basically, everything a teacher brings into the classroom used as a medium for teaching and learning process can be categorized as materials. In general, people will associate the

term 'material' with coursebook even though it is not completely wrong. Tomlinson[8] states that "materials could obviously be cassettes, videos, CD-Roms, dictionaries, grammar books, readers, workbooks or photocopied exercises. They could also be newspapers, food packages, photographs, live talks by invited native speakers, instructions given by a teacher, tasks written on cards or discussions between learners. In other words, they can be anything which is deliberately used to increase the learners' knowledge and/or experience of the language."

Referring to the concept of teaching material proposed by Tomlinson, this research will focus only on designing a conventional course material in the form of coursebook that will be used for teaching reading to the students majoring in telecommunications engineering. Preceding the reading materials design, there will be an investigation to find out the needs of students, alumni, and stakeholders.

Upon completing the coursebook, the researcher will do the implementation. The implementation will be done through piloting the sample lessons. Richard[9] asserts that "the next step in the process was to have the sample lesson taught to see if it worked, to find out whether teachers and students liked it, and to identify what strengths and weaknesses were."

For the researcher, the goals of doing the implementation by piloting the sample lessons are to know whether the materials are suitable for the students' field of study, the instructions in the materials are easy to understand, the materials are interesting for

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[8] Brian Tomlinson. 2008. *Materials Development in Language Teaching*. United Kingdom: Cambridge University Press. p.2

[9] Jack C. Richards. 2001. *Curriculum Development in Language Teaching*. Cambridge: Cambridge University Press. p. 280

the students, the students feel satisfied with materials, and the materials still need some revision or not.

D. Research Questions

Knowing the unavailability of reading materials for students majoring in telecommunications engineering and realizing that commercial materials cannot fully satisfy and cater the needs of students and teacher, the researcher intends to design the reading materials used in the classroom.

This research is concerned primarily with finding the students' needs concerning reading materials, finding the stakeholders and alumni's needs regarding the teaching of English, finding the principles of materials design in language teaching, finding the principles of reading in a foreign language, and finding the processes of designing reading materials.

Five research questions are formulated as follows:

1. What do the students need in reading materials that will be designed?
2. What do the stakeholders and alumni need from the teaching of English?
3. What are the principles of materials design in language teaching?
4. What are the principles of reading in a foreign language?
5. What are the processes of designing reading materials?

E. Objectives of the Study

Referring the above-mentioned research questions, the objectives of the research are then formulated as follows:

1. To find out what the students need in reading materials through needs analysis.
2. To find out what the stakeholders and alumni need concerning the teaching of English through needs analysis.
3. To review the principles of materials design in language teaching.
4. To review the principles of reading in a foreign language.
5. To design reading materials for classroom use.

F. Significance of the Study

Many experts have acknowledged the drawbacks of using ready made or commercial materials. As previously mentioned, the commercial materials may not be relevant for our class inasmuch as every class has its own needs. Knowing the problem, materials design needs to be done. There are three points of significance by doing this study.

Fist of all, this research is expected to be beneficial for English teachers or lecturers teaching reading to students majoring in telecommunications engineering. As a matter of fact, market provides limited textbooks in the field of telecommunications engineering while this field of study is growing up like mushroom in a rainy season. In the near future, telecommunication technology will be an inseparable part of our life since everything seems to be more wired.

Second, the materials can equip the students studying telecommunications engineering to be able to read and understand the textbooks of their field of study. By having sufficient reading skills, together with linguistic concepts, the students can develop their knowledge to grasp the development of science and technology. So,

eventually our country will be in a par with what we recently refer to as modern countries of the world.

Third, theoretically the study is expected to give a valuable contribution for those who are interested in designing teaching materials of English for Specific Purposes. Since job specialization keeps increasing, people need to equip them with English needed in their field of job. In the future, English materials specializing in certain profession are very much needed. This is similar to what Hutchinso and Waters[10] who assert that "...the demand was growing for English courses tailored to specific needs."

[10] Tom Hutchinso and Alan Waters. 1987. *English for Specific Purposes*. Scotland: Cambridge University Press. p. 7

CHAPTER II

THEORETICAL FRAMEWORK

A. Review of the Related Literature

Studies on materials design have been done by many English language teaching professionals (Hussin, 2002; Widodo, 2007; Chen, 2008; Bouzidi, 2009). Most studies mention the mismatch of available textbooks or coursebooks to the needs of English learners as the main reason. Therefore, they cannot fully depend on the textbooks for carrying out teaching learning process in the classroom. There should be a textbook that can cater the needs of the learners to reach an optimum result in learning English as a second or foreign language. One way of fulfilling the needs is through designing teaching materials by the teacher himself.

The emergence of materials design is partly due to the development of English for Specific Purposes (ESP). This stems from the concern over unsuitable materials used for specific students learning English. Johns[11] (in Marianne Celce-Murcia) asserts that "a second major ESP contribution is its work in syllabus or curriculum design. It can be argued that most of the creative work in developing materials for ESL/EFL classrooms originates with ESP practitioners, people concerned with appropriate discourse and activities for specific populations."

Unfortunately, up to now the researcher could not find the study concerning designing reading materials for telecommunications engineering. One of the studies

[11] Ann M. Johns. 1991. English for Specific Purpose: Its History and Contributions. In Marianne Celce-Murcia (eds.) *Teaching English as a Second or Foreign Language.* The USA: Heinle and Heinle Publisher. p. 73

with respect to materials design of engineering field the researcher puts forward here is designing teaching materials for architects and civil engineers.

The following are studies conducted by EFL professionals in designing materials for English courses in the field of ESP:

1. English for Nursing

Hussin[12] conducted a study to design a course for ESP program. He focused on ESP for students of nursing at Flinders University in Australia to prepare migrant nurses of language backgrounds other than English for registration as nurses in the country and entry into the workforce. Before entry, applicants require approval from the Nurse Board of South Australia, the professional registering body that assesses the status of nursing qualification from the countries of origin.

To design the ESP program, Hussin conducted a target situation need analysis by doing consultation with various stakeholders such as nursing lecturers, hospital staff, and the Nurses Board of South Australia. He also interviewed nurses, observed them at work, and observed data collection from documents and nursing texts. Through this process, Hussin could find out the main language tasks and skills that formed the basis of a curriculum document.

From the results of interview and observation, Hussin then made skills inventories. The first skills inventory is informational use of English. In this informational use of English, Hussin focused on interactions of a nurse with patients and their families. She noted down uttered expressions, such as giving instruction,

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[12] Virginia Hussin. 2002. An ESP Program for Students of Nursing. In Thomas Orr (ed.) *English for Specific Purposes*. Virginia: TESOL, Inc. p. 25-39

opportunities to learn and practice the language skills necessary to engage in learning practice.

In designing teaching materials, Hussin used authentic materials. Authentic materials, according to Richards[13], refer to "the use in teaching of texts, photographs, video selections, and other teaching resources that were not specially prepared for pedagogical purposes." The advantage of using authentic materials is asserted by Melvin and Stout[14] as "give students direct access to the culture and help them use the new language authentically themselves, to communicate meaning in meaningful situations rather than for demonstrating knowledge of a grammar point."

The authentic materials used by Hussin are genuine samples of language-in-use that were collected from hospitals and clinics. They include audiotapes of phone messages and oral reports on patients; videotapes of patient interviews and team meeting; and written documents such as nursing care plans, case notes, and discharge summaries.

To sum up, there are some steps Hussin did in designing materials for students of nursing: doing needs analysis to find out what the students need, transforming the results of needs analysis into materials, and incorporating authentic materials in the teaching process.

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[13] Jack C. Richards. 2007. *Curriculum Development in Language Teaching*. Cambridge: Cambridge University Press. p. 252

[14] Bernice S. Melvin and David F. Stout. 1988. Motivating language learners through authentic materials. In Wilga M. Rivers (ed.) *Interactive Language Teaching*. The USA: Cambridge University Press. p. 44

requesting cooperation, explaining procedures, explaining medical ideas in easy language, seeking permission, and giving feedback.

Another point in informational use of English that Hussin recorded was interactions with colleagues. As we know, a nurse must interact and communicate with her colleagues or co-workers in a workplace. Those interactions recorded by Hussin included comprehending directions, giving instructions and directions, asking for repetition and clarification, comprehending and presenting verbal information, answering and placing telephone calls, reading and interpreting routine forms, charts, and instructions, reading and interpreting notes and summaries, reading and interpreting nursing care plans, reading and interpreting letters and reports, and writing letters and reports.

The second skills inventory was interpersonal use of English. Hussin recorded some expressions used by the nurses. They were expressions used for expressing empathy, expressing personal opinion, using paraphrasing responses, and formulating assertive responses. Besides that, Hussin also paid attention to non verbal communication.

The skills inventory was furthermore developed into teaching materials for English lesson. As a matter of fact, English lesson is only one part of nursing curriculum. In the first semester, English is taught together with nursing theory classes taught by nursing lecturers. In the second semester, students take professional practicum, which include an eight-week clinical placement in a hospital. In this semester English is also given to provide the students with

2. Designing a Model of Business English Materials

Widodo[15] conducted a study on designing a model of business English materials using a communicative approach (CA). His main reason of conducting the study was encouraged by the fact that – according to him - "in Indonesia, many English teachers, who are teaching in ESP areas, have difficulty designing such teaching syllabi and materials for some purposes. For example, ESP books are rarely available in bookstore. In addition, they have trouble deciding themes/topics involved in their specialist students."

The first step Widodo proposed is doing needs analysis. He quoted Robinson (1991) in terms of needs analysis that belongs to two categories: TSA (Target Situation Analysis) and Present Situation Analysis (PSA). TSA focuses on learners' needs and expectations at the end of the course, and PSA has something to do with what the learners should start in learning the language. Hutchinson, Water and Robinson (in Widodo[16], 2007) state that "Practically, the needs analysis can be carried out through various instruments. The following are the commonly used instruments: tests, questionnaires, observations, interviews, case studies, and informal consultations with sponsors, learners, or stakeholder."

Hutchinson and Water (in Widodo[17]) propose a model of needs analysis questions that is categorized into two frameworks: PSA analysis framework and learning analysis framework. PSA analysis framework covers questions such as why the language is needed, how the language will be used, what the content areas will

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[15] Handoyo Puji Widodo. 2007. 'Designing a Model of Business English Materials Using a Communicative Approach (CA). http://sastra.um.ac.id/wp.content

[16] *ibid*

[17] *ibid*

be, who the learners use the language with, where the language will be used, and when the language will be used.

For the question of why the language is needed, there are some points that should be taken into account. The points include whether the language is used for study, for work, for training, or for on-the-job training. Besides, the question can also refer to whether the language will be used for other purposes.

Regarding the question of how the language will be used, there are two points that are put forward: the skills involved and the activities applied. The skill involved refer to what skills that will be included. The skills can be listening, speaking reading, writing, pronunciation, spelling, etc. The activities applied refer to the kinds of activities that will be carried out. The activities can cover oral presentation, role-playing, discussion, debate, etc.

For the question referring to what content areas will be, there are three points of focus. Those points are subject, theme or topic, and level. The subject stresses to the target lesson such as medicine, biology, agricultural, engineering, economics, etc. Level in this context refers to the language users such as students, technicians, teachers, administration, etc.

In light of learning analysis framework, there are some questions to ask. The questions comprise why the learners are taking the course, how the learners learn, what resources are available, what the learners are, where the ESP course will take place, and when the ESP course will be conducted.

To find out why the learners are taking the course, we can see from some points such as whether the course is compulsory or optional for the learners, whether the

course is to fulfill their needs, or whether the course is for their promotion, etc. In terms of the question how the learners learn, there are some points that we need to know such as what the learners' learning background is, what the learners' concept of teaching is, what methodology will appeal to them, etc.

The next step Widodo proposed to do is determining syllabus. He stated that a framework of syllabus can be categorized into: *situational* that is based on different situation and communicative skills, *topical* that is on the basis of certain topic to be applied to target language, *functional* that is based upon particular language functions, *structural* that is related to sentence patterns (language focus), *skill* that is on the basis of certain language skills, and *task-based* that is based on various activities to meet language target learned.

After that, Widodo[18] asserted that "designing materials should be based on the existing syllabus, and materials should cover specialist language and content. If possible, ESP teachers and content teachers should cooperate with each other in designing ESP materials."

Then, since the goal of the study was to have learners become communicatively competent based on their specialist area, i.e business, Widodo proposed to apply communicative approach. In the communicative approach, communicative competence is taken into account. Learners are expected to be able to use the language appropriately to a given social context.

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[18] *ibid*

Finally, Widodo[19] stated that "to design the materials using the communicative approach, it is crucial to set up a syllabus most suitably called "functional". This syllabus focuses heavily on some expressions of target language. In the model business English materials, a speaking skill is of great focus. This material uses a role-play activity to boost communicative activities."

In conclusion, to design materials for ESP in Business English, Widodo did some step: (1) doing needs analysis using PSA and TSA; (2) developing a syllabus; and finally (3) designing materials based on the syllabus.

3. English for Architects and Civil Engineers

Chen[20] conducted a study on material production of an ESP course in an English training program for architects and civil engineers. The program was specially designed for the construction professionals since the fast development of economy and technology in China demands professionals with sufficient English skills. Those professional, according to Chen, need to read, write, and speak English at their jobs to communicate with their work partners or to obtain information in English.

Similar to Hussin and Widodo, Chen started his study by doing needs analysis. First of all, Chen reviewed literature research. Then based on the study, he investigated and identified target audience group as their business processes and communication needs in English.

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[19] *ibid*

[20] Yong Chen. 2008. 'Material Production for an EST Course: Coursebook Design for the English Training Programme for Architects and Civil Engineers. http://www.sdutsj.edus.si/ScriptaManent/2008-3-2/Chen.pdf

Based on the literature research, Chen[21] (cited Mackay and Mountford, 1978:21) states that "in order to design and teach effective courses, the teacher and planner must investigate the uses to which the language will be put. After adequate investigation into learners' needs, the teacher is one step nearer being able to translate these needs into linguistic and pedagogic terms in order to produce and teach an effective course. Therefore, it can be conceived that the needs analysis is an initial and an important step to ESP program."

The next step Chen identified the target audience group and their needs. He found out that the main participants of the course were post-experienced architects and engineers from different designing institutes and construction companies. They were all undergraduates and postgraduates who had a command of general English at intermediate level.

Chen got the students' needs by doing interview with potential learners and sponsors, distributing questionnaires to some organizations and some pre-course tests which were taken by the learners to find their basic linguistic elements or lacks. The following are the results of identified needs:

a. Why is English Needed for the Learners' Profession?

Since China became committed to reformation and opening up, the building and construction sector has been facing up to fresh challenges. One of the solutions to meet the challenge is to provide courses to enable architects to get National and International Accreditation, which requires English language competence. Besides some of the design institutes and construction companies have begun to

[21] *ibid*

tender internationally for projects. Therefore, English as a lingua franca is needed when they are entering the world market.

b. The Architects and Their Business Process

According to Chen, there are different kinds of architects and engineers working on the design of certain projects. These include architects, structural engineers, service engineers (water, gas, electricity supply, heating, ventilation and air-conditioning), cost analysts, city planners, landscape architects and interior designers. Their design or work processes mainly involve some stages. Those stages are site analysis and planning, cost analysis of design and construction planning, design procedures, structural engineering, and project management.

c. The Basic Communication Needs

Chen found out that there were three broad communicative areas that required coverage. They are design or technical, contractual or business, and product or commercial and technical.

Design or technical is related to some activities such as working drawings and related design literature, case studies, codes, specifications and regulations. Contractual or business covers some activities such as the contract administration literature and the language of meetings, negotiations, etc. Finally product/commercial and technical relates to product information, for example, product descriptions for CAD software, HVAC units, the technology of lift or elevator, etc.

These in turn, according to Chen, require the architects and engineers to be able to describe site plans, to sketch, to outline proposals, and to outline working drawings such as plan, elevations, axonometrics, isometric, etc.

The architects and engineers are also required to be able to answer and ask questions related to all the above points, discuss design concepts and matters of architectural style, present design work and understand the intention of other specialists' critical comments, react appropriately to the comments, understand authentic articles and texts related to codes, modern trends, techniques, standards and performance specifications, and take an effective part in technical or business type meetings and negotiations.

Based on the above-mentioned needs analysis, Chen then identified the global aims of the course such as enhancing the participants' listening, speaking, reading, and writing skills in general English, bridging the gap between general English and common core technical English, introducing element input along with specialist subject input, and activating the learners' interests, awareness, confidence, autonomy, and exploitability in learning by the way of employing communicative classroom activities.

In the next stage, Chen designed the program framework and EST course syllabus. EST stands for English for Science and Technology and is a branch of ESP. Program framework designed by Chen was divided into three stages. The stages are preparatory courses, core courses, and project course. This division aimed to prepare the learners with adequate linguistic competence by gradual training inputs. The three-stage program framework is as follows:

considered some aspects to be taken into account. His consideration of EST text selection included authenticity, content, and language input.

In terms of authenticity, Chen used authentic materials which were taken form journals, newspapers, research articles, reports, newsletters, and subject content books. The reason of using authentic materials, according to Chen, was because the original texts supply participants with authentic language interaction.

In identifying the content for his material, Chen adopted what Hutchinson and Waters (1987: 108-109) proposed that "a material design model consists of four elements: input, content focus, language focus, and tasks." Those four elements are the basis for supplementing contents of the cousebook that he would design.

With respect to language, Chen adopted the concept proposed by Hutchinson and Waters (1987:109) who assert that "language is the other focus in a coursebook, in which learners have the chance to take the language to pieces, study how it works, and practice putting it back together." He also adopted what Wright and Bolitho (1993) state that "lexical input enables participants to learn and master the expressions to communicate on their subject. The text also focuses on a variety of structural items, such as word formation, use of V-ed and V-ing words. The input of these items offers the participants an opportunity to generate language awareness."

In short, in designing a coursebook for architecture and civil engineers, Chen did some steps. Those steps are doing needs analysis for both theoretical

Program Framework

Stage: Preparatory

1. Speaking: *general topics of conversation, greeting, informal discussion practice, etc*
2. Listening: *focus on general topics to enable the participants to understand aural variations*
3. Reading: *general English review*
4. Writing: *review on general topics*

Stage: Core Course

1. Speaking: *effective communication (meetings, negotiations, and presentations)*
2. Listening: *practical and conversational listening (top-down skills)*
3. Reading: *technical description and reading general EST-English for Science and Technology (nucleus: architecture and building construction)*
4. Writing: *focus on commercial and business writing social program*

Stage: Project Course

1. Speaking: *talking about architecture/buildings (activities specifically designed for architects and designers*
2. Listening: *authentic and on-site conversation, aural variations*
3. Reading: *EST (authentic material package about care studies, working details, and codes)*
4. Writing: *commercial English*

The program framework is the basis for designing EST course syllabus or framework of the coursebook. When it comes to writing the materials, Chen

background and the learners of English or target audience group, designing the program framework based on the results of first activity, designing the syllabus based on the program framework, and finally selecting the input for materials by considering three points: authenticity, content, and language.

4. English for Hospitality Industry

In line with ESP, Bouzidi conducted a study on bridging the gap between ESP classroom and workplace in Morocco. He focused his study on English for tourism industry professionals since the hospitality industry in Morocco needs employees who can communicate effectively in English with tourists coming to their hotels, resorts, or restaurants. Indeed, English proficiency is required to carry out business.

Finding out the gap between the content of available ESP textbooks and the needs of the learners spur the study. Bouzidi[22] asserts that "preparing students for careers in the hospitality industry and improving the language skills of current employees requires an ESP textbook that teachers can use to teach particular language skills and the forms of communication." He conducted his study by doing a method in three steps. The steps were surveying employers and employees, evaluating the ESP textbook, and supplementing the ESP textbook. In surveying employers and employees, Bouzidi interviewed employers and surveyed as well as observed employees. The information he got from the activity was used to create a framework by which to evaluate the ESP textbook and supplement it.

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[22] Hassan Bouzidi. 2009. *Between the ESP Classroom and the Workplace: Bridging the Gap.* English Teaching FORUM. Volume 47 Number 3, 2009. p. 10-17

There were some important results of Bouzidi's interviewing employers. First, many managers preferred hiring applicants with foreign language skills to better serve the growing influx of travelers from abroad. Second, most employers (87%) said English skills would be plus in applying for a job and would earn them a higher starting salary. Third, receptionists, telephone operators, staff at information desks, and administrators who know some English provide better service to guests, and fourth, the majority of managers (73%) stated that they encouraged their staff to enroll in ESP courses.

After interviewing employers, Bouzidi then administered a questionnaire to employees in the hospitality industry. The employees were from three main travel and tourism sub sectors such as hotels, travel agencies, and Agadir international airport. There are four important results of questionnaire.

First result is almost all of the employees view English either necessary or very important for carrying out their jobs. Second, the most important uses of English occur in face-to-face conversations, then followed by a telephone call. Third, speaking and listening skills are far more important than reading and writing skills in the hospitality industry. Fourth, the employees in the hospitality industry who most often use English are personnel in the hotel reception area, tour guides, and ground hosts/hostesses at airports.

The second step Bouzidi did after data on the language needs of employees and employers had been collected was evaluating the ESP textbook. He took one of the commercially available textbooks frequently used by local English instructors. His goal was to evaluate the degree to which this textbook met the English language

instructional needs as identified by the employers and employees in the local hospitality industry.

Bouzidi then developed five questions to evaluate the suitability of the book for teaching the English skills needed by employers and employees in the hospitality industry. The questions are whether the textbook covers the language functions learners are likely to use in their future professional environment, whether the textbook covers the topics or situations learners are likely to encounter in their future professional environment, whether the textbook emphasizes the linguistic skills most needed in the travel and tourism industry, whether the textbook content adequately reflects local and target language cultures, and whether the textbook takes into account local teaching or learning styles.

The last step Bouzidi did was supplementing the ESP textbook. Based on the data collected from employer and employee surveys, many chapters of the textbook need to be supplemented with rewritten or adapted materials. It was done in order to meet the needs of the English language learners in the hospitality industry. According to Bouzidi, teacher can take advantage of English language newspaper, magazines, and internet content to supplement the textbook.

What Bouzidi suggests are the textbook can be supplemented with additional topics and language functions applicable to the local hospitality industry, the writing of the authentic dialogs for group work and role plays is strongly advisable since speaking skill in hospitality industry is important, while the textbook does not provide sufficient dialogs, and the exercises in the textbook can be adapted as

necessary for practice in reading, writing, and translating promotional material and business correspondence.

Indeed, similar to previous materials designers, Bouzidi proposes that firstly there should be needs analysis to make teaching methods correspond with employment needs. The analysis can be done through observation, interviews, and questionnaires to describe the specific workplace language context. Secondly, there should be an evaluation of available commercial textbooks whether they fulfill the students and stakeholders' needs or not. Finally there should be supplements to the textbooks with authentic materials to a certain degree based on the learners' specific needs.

The four above-mentioned studies give the researcher clear explanation about designing materials in the field of ESP. To summarize, those four researchers do the same steps to produce teaching materials that are really useful for English learners. The steps are doing needs analysis of target learners, designing the course framework which contains the framework of a course program, and designing a syllabus. This is done by incorporating the principles of language skills that want to be taught, syllabus category, language authenticity, and the principles of materials design in the field of ESP. The final step is designing teaching materials.

B. Theoretical Framework

Before designing reading materials, there must be some principles or concepts as underlying theories that have to be understood. The materials suddenly emerging seem

to be out of the question. The theories act as a basis as to why the materials should be designed in certain ways.

In connection with the reading materials design for telecommunications engineering, the researcher would like to firstly put forward aspects contributing to the concept of design. Those aspects are curriculum and syllabus design, ESP and course materials design, and principles of reading in a foreign language.

1. Curriculum and Syllabus Design

What is curriculum? According to Johnson[23] "'Curriculum' is used in the British sense to include all the factors which contribute to the teaching and learning situation." It is like an umbrella of all the teaching-learning process. The idea that curriculum exists in the top of teaching-learning process is also stated by Richards. Richards[24] states that "Curriculum includes the processes that are used to determine the needs of a group of learners, to develop aims or objectives for a program to address those needs, to determine an appropriate syllabus, course structure, teaching methods, and materials, and to carry out an evaluation of the language program that results from these processes."

From Richards' point of view, it is clear that the position of syllabus is below curriculum. In general, curriculum is a broad concept that covers all teaching-learning activities. It is similar to what Rogers defined the syllabus/curriculum

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[23] Robert Keith Johnson. 1994. *The Second Language Curriculum*. Cambridge: Press Syndicate of the University of Cambridge. p. xi

[24] Jack C. Richards. 2007. *Curriculum Development in Language Teaching*. Cambridge: Cambridge University Press. p. 2

distinction as seen in Malaysia in the mid 1970s. Rogers (in Rodgers)[25] states that "the assumption implicit in the formulation of syllabi, as a basis for school programs, has been that syllabi and curriculum are synonymous. Syllabi, which prescribe the content to be covered by a given course, form only a small part of the total school program. Curriculum is a far broader concept. Curriculum is all those activities in which children engage under the auspices of the school. This includes not only what pupils learn, but how they learn it, and how teachers help them learn, using what supporting materials, styles and methods of assessment, and in what kind of facilities."

Johnson, Richards, and Rodgers clearly put syllabus under curriculum that is defined as a bigger concept. Since this research focuses on materials design, and designing materials must be preceded by program framework (program blueprint) and course syllabus, the researcher needs to mainly explore the underlying theories of syllabus design.

There are five assumptions underlying early approaches to syllabus design. Those approaches to syllabus design, according to Richards, emerged in the first part of the twentieth century. Up to now, the assumptions partly still become the guideline for materials design and development.

First assumption of approaches to syllabus design is the basic units of language are vocabulary and grammar. Richards[26] states that "the traditions approached the teaching of English largely through its vocabulary and grammar. Although the role

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[25] Theodore S. Rodgers. 1994. Syllabus Design, Curriculum Deveopment and Polity Determination. In Robert Keith Johnson (ed.) *The Second Language Curriculum*. Cambridge: Press Syndicate of the University of Cambridge. p. 26

[26] Jack C. Richards. 2007. *Curriculum Development in Language Teaching*. Cambridge: Cambridge University Press. p. 15

of speaking and pronunciation were not ignored during the actual teaching of the language, the priority in planning was vocabulary and grammar and these were seen as the main building blocks of language development."

Second assumption is learners everywhere have the same needs. Language teaching mainly focuses on GE (General English). So it was believed that core vocabulary of GE, combined with grammatical syllabus, would serve as the basis for almost all language courses.

Third assumption is learners' needs are identified exclusively in terms of language needs. Syllabus design is solely based on language needs of learners. By grasping the language competency, the learners are expected to be able to solve their language barriers.

Richards[27] asserts that "no matter who the learners are or the circumstances of their learning, it is assumed that mastery of English will solve their problems. The goal of English teaching is to teach them English – not to teach them how to solve their problems through English."

Fourth assumption is the process of learning a language is largely determined by the textbook. Textbooks are believed to be the primary input for learners to get from the language learning process. So, the principles of selection and gradation as the ways of controlling the textbooks' context and facilitating the language learners are considered important.

Fifth assumption is regarding to the context of teaching. The context of teaching is English as a foreign language. This underlying assumption of syllabus design is

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[27] *ibid*

similar to the condition in Indonesia. As a foreign language, English is rarely spoken among Indonesians. So, this factor should be taken into account in designing the syllabus.

Richards[28] states that "most of the early work by Palmer, West, and Hornby on the development of lexical and grammatical syllabuses was done in contexts where English was a foreign language, that is, where students studied English as a formal subject in school but had no immediate need for it outside of the classroom. The classroom and the textbook provided the primary input to the language learning process, hence the goal of syllabus developers was to simplify and rationalize this input as far as possible through the processes of selection and gradation."

Compared to curriculum, syllabus nowadays becomes the central point of teaching-learning activities. Rodgers[29] states that "at the heart of the educational enterprise is the educational program offered. Until fairly recently most educational authorities have considered the *syllabus* to be the educational program. It has been the syllabus which has received the most attention in educational design and implementation. It has been syllabus reform which has been seen as central to educational reform. When new educational goals are sought or old goals are felt to have been inadequately realized, specification of a new syllabus has been the typically favored solution."

As previously mentioned in the study conducted by Widodo, there are some ways – according to McKay - to categorize the syllabus. The categories of syllabus

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[28] *ibid*

[29] Theodore S. Rodgers. 1994. Syllabus design, curriculum dvelopment and polity determination. In Robert Keith Johnson (ed.) *The Second Language Curriculum*. Cambride: The Press Syndicate of the University of Cambridge. p. 25

are structural, situational, topical, functional, skills, and task. Since the teaching materials the researcher designs is reading for telecommunications engineering, the syllabus concerning 'topical' seems to be the most appropriate. The reason is due to there are lots of topics in light of telecommunications such as history of telecommunications, radio and television, computer networks and internet, and telegraph and telephone, satellite, modem, etc. So, the reading syllabus will be designed based on topics or themes.

Topical syllabus, according to Brown[30], is "topical syllabuses are organized by topics or theme, rather than situations. Typically, the topics are selected by the textbook author on the basis of his or her sense of the importance of the topics or theme to the lives of the students for whom the text is designed. The topics can also be sequenced on the basis of the relative difficulty of the reading passage involved."

To sum up, syllabus is part of curriculum. To design a syllabus, there are some structural syllabuses as the choices. To choose a certain approach of syllabus is through careful consideration based on our purpose in designing teaching materials. In designing a syllabus in the field of ESP, there must be needs analysis. Because the researcher designs reading materials for telecommunications engineering that is categorized as ESP, the aspect then moves to second point: ESP and course materials design.

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[30] J.D. Brown. 1995. *The Element of Language Curriculum*. Boston: Heinle and Heinle Publishers. p. 9

2. ESP and Course Materials Design

a. What is ESP?

ESP stands for English for Specific Purpose. Syllabus in ESP is developed from the needs analysis of the target learners. The characteristics of ESP, according to Dudley-Evan and St John[31] are absolute characteristics and variable characteristics.

Absolute characteristics cover many points. Those points are ESP is designed to meet specific needs of the learner, ESP makes use of the underlying methodology and activities of the disciplines it serves, and ESP is centered on the language (grammar, lexis, register), skills, discourse and genres appropriate to these activities.

Variable characteristics also cover many points. The points are ESP may be related to or designed for a specific discipline, ESP may use, in specific teaching situation, a different methodology from that of general English, ESP is likely to be designed for adult learners, either at a tertiary level institution or in a professional work situation. It could, however, be used for learners at secondary school level. The last is ESP is generally designed for intermediate or advanced students. Most ESP courses assume basic knowledge of the language system, but it can be used with beginners.

Hutchinson and Waters (in Dudley-Evans and St John, 2002) give opinion about ESP. Dudley-Evans and St John[32] wrote that "Hutchinson and

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[31] Tony Dudley-Evans and Maggie Jo St John. 2002. *Developments in ESP: A multi-disciplinary approach*. Cambridge: The Press Syndicate of the University of Cambridge. p. 4-5

[32] Tony Dudley-Evans and Maggie Jo St John. 2002. *Developments in ESP: A multy-disciplinary approach*. Cambridge: The Press Syndicate of the University of Cambridge. p. 2-3

Water see ESP as an approach, rather than a product, by which they mean that ESP does not involve a particular kind of language, teaching material or methodology. They suggest that the foundation of ESP is the simple question: why does this learner need to learn a foreign language? The answer to this question relates to the learners, the language required and the learning context, and thus establishes the primacy of need in ESP."

In designing ESP material, Steven (in Dudley-Evans and St John[33], 2002) proposed two absolute characteristics: *four absolute characteristics* and *two variable characteristics.* These two characteristics can be the focus of attention to anybody who would like to design and develop ESP materials.

Four absolute characteristics of ESP are it is designed to meet specified needs of the learner, is related in content (that is in themes and topics) to particular disciplines, occupations, and activities, is centered on language appropriate to those activities in syntax, lexis, discourse, semantics, and so on, and is in contrast with 'General English'.

As regards variable characteristic, there are two points of variable characteristics of ESP. First, ESP may be restricted as the learning skills to be learned. For example, it can only focus on reading. Second, ESP may not be taught according to any pre-ordained methodology.

To summarize, ESP is concerned with English for special purpose. The syllabus of ESP is designed to meet the specific needs of the learners. That is why there should be needs analysis.

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[33] *ibid*

b. Needs Analysis

Needs analysis is the key in ESP course design. Today's concept of needs analysis, according to Dudley-Evans and St. John[34], includes some aspects. First aspect is professional information about the learners. This is to find out the task and activities learners are/will be using English for. Second aspect is personal information about the learners. This is to see factors which may affect the way learners learn. Those factors encompass previous learning experiences, cultural information, reasons for attending the course and expectation of it, and attitude to English.

Third aspect is English language information about the learners. The information the researcher would like to find out is what learners' current skills and language use are. Fourth aspect is language learning information. This is done to find out the effective ways of learning the skills and language. Fifth aspect is professional communication information about knowledge of how language and skills are used in the target situation. Sixth aspect is to find out what is wanted from the course, and final aspect is information about the environment in which the course will be run.

Graves[35] proposes the process of needs assessment. She states that "the process of needs assessment involves a set of decisions, actions, and reflections that are cyclical in nature. The cyclical process starts from deciding what information to gather and why, deciding the best way to gather it: when, how and from whom, gathering the information, acting on information,

[34] *ibid*

[35] Kathleen Graves. 2000. *Designing Language Course: A Guide for Teachers*. Canada: Heinle & Heinle Publishers. p. 100

evaluating the effect and effectiveness of the action, and finally back to number one to decide on further or new information to gather."

The questions appearing now is who provides the data and how? Dudley-Evans and St John[36] suggest that for needs analysis the main sources to collect data are the learners, people working or studying in the field, ex-students, documents relevant to the field, clients, employers, colleagues, and ESP research in the field.

To collect the data, the methods that can be done are questionnaires, analysis of authentic spoken and written texts, discussions, structured interviews, observations, and assessments.

To summarize, needs analysis is a must in designing teaching materials for ESP. The purposes are to find out what the learners really need or expect concerning English language learning, to find their previous English learning, and to find out the expectation of the institution. The main sources are mainly the learners and stakeholders by using questionnaires, interview and observation. The results of the needs analysis are furthermore used to design syllabus before being transformed into teaching materials. Then, something the researcher needs to discuss is the concept of materials design.

c. Materials Design

From the previously mentioned concept, curriculum covers everything concerning education. Inside it, there is a syllabus whose design requires needs

[36] Tony Dudley-Evans and Maggie Jo St John. 2002. *Developments in ESP: A multi-disciplinary approach.* Cambridge: The Press Syndicate of the University of Cambridge. p. 132

analysis combined with principles of language teaching and learning. The syllabus is then used as the basis for materials design.

Brown[37] (1995) states that "*materials* is defined as any systematic description of the techniques and exercises to be used in the classroom teaching. The key in developing sound materials is to ensure that they are described and organized well enough so that teachers can use them with no confusion and with a minimum of preparation time." From Brown's definition, materials are not simply restricted to the paper-based coursebook. As a matter of fact, the researcher limits the materials design in this research only to paper-based concept.

In ESP context, materials play an important role. Apart from becoming a teaching-learning source, materials can act as reference. Dudley-Evans and St John[38] (2002) assert that there are four reasons for using materials which seem significant in the ESP context. First reason is materials act as a source of language. In some situation in which English is a foreign language, not a second language like in Indonesia, English is the only source. In this context materials play a crucial role in exposing learners to the language.

Second reason is materials have a role as a learning support. As a learning support, according to Dudley-Evan and St John (2002)[39], "materials need to be reliable, that is, to work, to be consistent and to have some recognizable pattern."

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[37] J.D. Brown. 1995. *The Element of Language Curriculum*. Boston: Heinle and Heinle Publishers. p. 139

[38] Tony Dudley-Evans and Maggie Jo St John. 2002. *Developments in ESP: A multi-disciplinary approach*. Cambridge: The Press Syndicate of the University of Cambridge. p. 170-172

[39] *ibid*

Third, materials can be for motivation and stimulation. Dudley-Evan and St John[40] states that "to stimulate and motivate, materials need to be challenging yet achievable; to offer new ideas and information whilst being grounded in the learners' experience and knowledge; to encourage fun and creativity. The input must contain knowledge that is familiar but it must also offer something new."

Fourth, materials can be for reference. It means - for reference purposes - materials need to be complete, well laid out, and self-explanatory.

Due to the characteristics of ESP which is focusing on specialist subjects, and due to unavailable commercial materials, very often ESP teachers need to design or develop the materials themselves. In fact, there are some advantages of creating our own teaching materials.

Richards[41] mentions four advantages of creating our own teaching materials. First advantage is relevance. It means materials can be produced that are directly relevant to students' and institutional needs. Using available commercial textbook does not guarantee this relevance.

Second advantage is developing expertise. Creating our own materials can help develop expertise among staff. Third advantage is reputation. What it means by reputation is it can enhance the reputation of the institution. The institution that creates its own materials will be more acknowledged than the institution that uses commercial materials available in the market.

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[40] *ibid*

[41] Jack C. Richards. 2007. *Curriculum Development in Language Teaching.* Cambridge: Cambridge University Press. p. 261

Fourth advantage of creating our own materials according to Richards is flexibility. Of course materials produced within the institution can be revised or adapted as needed. It gives them greater flexibility than a commercial course book.

Almost similar to what Richards says, Howard and Major[42] also state the advantages of why English language teachers may choose to design their own materials. First advantage, according to Howard and Major, is contextualization. For many teachers, designing their own teaching materials enables them to take into account their particular learning environment and to overcome the lack of 'fit' of the commercial coursebook.

Second advantage is individual needs. Howard and Major[43] assert that "modern teaching methodology increasingly emphasizes the importance of identifying and teaching to the individual needs of learners. English language classrooms are diverse, and teacher-designed materials can be responsive to the heterogeneity inherent in the classroom." It can be concluded that by designing our won materials, we can cater more students, especially in the class having students with various background.

Third advantage is personalization. This is another advantage of teacher-designed materials because, according to Block (in Howard and Major), 'home-made' materials add personal touch to teaching that students appreciate.

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[42] Jocelyn Howard and Jae Major. 'Guideline for Designing Effective English Language Teaching Materials'. http://www.paaljapan.org/resources/proceeding/PAAL9/pdf. (accessed February 6, 2010)

[43] *ibid*

The last advantage why English language teachers may choose to design their own materials, according to Howard and Major, is timeless. It means that teachers designing their own materials can respond to local and international events with up-to-date and relevant topics.

Howard and Major[44] also suggest some guidelines for designing effective English teaching materials. First guideline is English language teaching materials should be contextualized. Materials should link explicitly to what the learners already know, to their first language and cultures, and very importantly, should alert learners to any areas of significant cultural difference. In addition, materials should be contextualized to topics and themes that provide meaningful as well as purposeful uses for target language.

Second guideline for designing effective English teaching materials is materials should stimulate interaction and be generative in terms of language. Third guideline is English language teaching materials should encourage learners to develop learning skills and strategies. It is impossible for a teacher to teach his students all the languages they need to know in the short time. It is essential that language teaching materials also teach their target learners how to learn and help them to take advantage of language learning opportunities outside the classroom.

Fourth guideline is English language teaching materials should be flexible, while fifth guideline is English language teaching materials should be authentic. It is imperative for second language learners to be regularly exposed

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[44] *ibid*

in the classroom to real, unscripted language-to passages that have not been produced specifically for language learning purposes.

In term of authentic materials, Fathi[45] states that "one of the important issues in looking at the role of materials in ESP is that of authenticity. Authenticity is a key concept within the communicative approach. We should be looking not for some abstract concept of "authenticity", but rather what we have to do is to see the text as part of teaching/learning process and the suitability of the text for learning purpose."

Richard[46] mentions that "some have argued that authentic materials are preferred over created materials, because they contain authentic language and reflect real-world uses of language compared with the contrived content of much created material."

Advantages of using authentic material in materials design are proposed by some experts such as Phillips and Shettlesworth (1978), Clarke (1989), and Peacock (1997) in Richards[47] (2007). According to them, authentic materials have a positive effect on learner motivation, provide authentic cultural information about the target culture, provide exposure to real language, relate more closely to learners' needs, and support a more creative approach to teaching.

To sum up, in designing teaching materials, there are some points as previously mentioned that should be taken into account. One important thing is

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[45] Vida Fathi. 'The Imporance of Materials Design in ESP and EST'. http://faculty. ksu. edu.sa/ aljarf/Document. (accessed Febaruary 4, 2010)

[46] Jack C. Richards. 2007. *Curriculum Development in Language Teaching*. Cambridge: Cambridge University Press. p. 252

[47] *ibid*

using authentic materials. Since the researcher would like to design reading materials for telecommunications engineering, and the information of this subject is mostly written in English, using authentic materials taken form real sources such as textbooks, internet articles, journals, and newspaper articles are worth trying.

3. Principles of Reading in a Foreign Language

Reading is absolutely powerful. To understand the textbooks in their field of study, the students of TELKOM academy must have reading skills. The materials the researcher designs are expected to provide them with such skills. Therefore it is essential to look into some principles of reading in a foreign language in order that the materials the researcher design have the underlying theories and be useful for the learners.

Luckily, reading skills are something that can be learned as Eskey[48] states that "…the good news is that: anyone can *learn* to read, and/or to read more effectively. Human beings are preprogrammed to perform language acts, like listening, speaking, reading, and writing, and if provided with real opportunities, and a minimum guidance, in a stimulating, non threatening context, they can learn to do these things with relative ease."

a. Approaches of Reading in a Foreign Language

There are some approaches regarding reading in a foreign language. They are bottom-up approach, top-down approach, and interactive approach.

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[48] David E. Eskey. 1986. *Teaching Second Language Reading for Academic Purposes*. The USA: Addison-Wesley Publishing Company, Inc. p. 5

Bottom-up approach in reading can be illustrated as a person who tries to understand an area by discovering every part and checking what is inside. After roaming the whole area, he/she will understand what it looks like.

Hudson[49] states that "bottom-up approaches, which correspond to cognitive and information-processing psychological concerns, assume that a reader construct meaning from letters, words, phrases, clauses, and sentences by processing the text into phonemic units that represent lexical meaning, and then builds meaning in a linear manner." It is clear that in this approach, a reader will do a series of stages to comprehend reading texts.

Another statement concerning bottom-up approach is proposed by Nuttal. Nuttal[50] asserts that "in bottom-up process, the reader builds up meaning from the black marks on the page: recognizing letters and words, working out sentence structure."

Top-down approach is the contrary of bottom-up approach. Top-down approach can be illustrated as a person who tries to understand an area from the air. He or she could be described as a person getting on balloon flying around in the sky. He or she will understand the nature of the area by getting a picture of it.

In line with top-down approach, Hudson[51] mentions that "the top-down approaches, on the other hand, which are generally more sympathetic with the

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[49] Thom Hudson. 2007. *Teaching Second Language Reading*. Oxford: Oxford University Press. p. 33

[50] Christine Nuttal. 2000. *Teaching Reading Skills in a Foreign Language*. UK: Macmillan Education. p. 17

[51] Thom Hudson. 2007. *Teaching Second Language Reading*. Oxford: Oxford University Press. p. 33 - 34

psycholinguistic and sociological perspective assume that a reader approaches a text with conceptualizations above the textual level already in operation and then works down to the text itself. Consequently, according to these approaches, the reader does not necessarily read each word in the text."

The same opinion is also expressed by Nuttal. Nuttal[52] mentions that "in top-down processing, we draw on our intelligence and experience –the prediction we can make, based on the schemata we have acquired– to understand the text."

The last approach is interactive. Interactive approach is the combination of those two approaches. Nuttal[53] states that "in practice a reader continually shifts from one focus to another, now adopting a top-down approach to predict the probable meaning, then moving to the bottom-up approach to check whether that is really what the writer says. This has become known as interactive reading."

b. Standard Reading Exercises

It is clear that the combination of bottom-up and top-down approach will give more benefit to the students. Therefore, the reading materials the researcher designs adopt the interactive approach.

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[52] Christine Nuttal. 2000. *Teaching Reading Skills in a Foreign Language*. UK: Macmillan Education. p. 18

[53] *ibid*

Based on interactive approach, Axbey (1989) cited by McGrath[54] proposes standard reading exercises. Axbey's framework is divided into three stages: pre-reading, while reading, and post reading.

Before reading activities, according to Axbey, include drawing upon existing knowledge, exploiting areas of interest, and encouraging prediction of content, language and function.

While-reading activities can consist of two stages. The first stages are confirming and checking, understanding global meaning and shape. The second stages are understanding main points, dealing with vocabulary, and being aware of writer's purpose. For after reading activities, the students can be asked to give a personal response and encourage self-awareness of difficulties

Similar to Axbey, Grabe[55] (1986) states that "the types of materials for reading instruction should include guessing from context, skimming and scanning (skimming is reading quickly for main idea, while scanning is looking for specific information in the passage), vocabulary development, and extensive outside reading materials."

Not really different from two above-mentioned opinions, Seright and Thomson[56] also suggest some activities pertaining to reading skills and strategies to enable students to develop skills or strategies which facilitate

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[54] Ian McGrath. 2006. *Materials Evaluation and Design for Language Teaching*. Edinburgh: Edinburgh University Press Ltd. p. 146.

[55] William Grabe. 1986. The Transition from Theory to Practice in Teaching Reading. In David E. Eskey (ed). *Teaching Second Language Reading for Academic Purpose*. The USA: Addison-Wesley Publishing Company, inc. p. 46

[56] Linda Seright and Joan Thompson. *Developing Reading Materials for Advanced ESL Learners*. http://www.teslcanadajournal.co/index.php/tesl/article (accessed February 3, 2010)

reading comprehension. The strategies are guessing the meaning of unfamiliar words through the use of context clues and analysis of component parts (stems and affixes), locating core elements in long, complex sentences, understanding cohesive devices such as pronoun reference and logical connectors, identifying the main idea and supporting details, determining the sequence of steps or events, predicting text content, skimming, scanning for specific facts, making inferences, and distinguishing between fact and opinion or supposition.

To summarize, there are some strategies and techniques in order to facilitate reading in a foreign language. The concepts of the strategies and approaches above will be the researcher's consideration in designing the reading materials. So, the finished product that is in the form of coursebook will be more beneficial for the learners.

CHAPTER III

METHODOLOGY

A. Setting and Time

The research was conducted at Academy of Telecommunications Engineering TELKOM (TELKOM academy), Jl. Daan Mogot West Jakarta. This academy gives educational service in the field of telecommunications engineering for Sekolah Menengah Atas (SMA) and Sekolah Menengah Kejuruan (SMK) graduates. They can finish their education within three years (6 semesters). Upon completing the education, they are expected to be mid-level employees in business enterprises or organizations. Most graduates work for telecommunication companies such as TELKOM, TELKOMSEL, SATELINDO, INDOSAT, ESIA, etc as technicians.

Even though this institution belongs to educational foundation of TELKOM, the physical infrastructure of the institution is not fully satisfactory. Furthermore, the library is not representative, let alone learning center for English. This is partly caused by the institution that is still relatively new. In fact, there is a willingness from management to improve all aspects so as to produce more qualified graduates that can work for both local and international telecommunication companies.

The researcher chose this institution owing to some reasons. First, the goal of teaching English at the institution is to make the students able to read English textbooks of their field of study. This is related to the research having been conducted.

Second, there is no reading coursebook available in the market emphasizing on telecommunications engineering that can be used by the students of the institution. Third, the researcher teaches English at the institutions and feels in need of a coursebook that can fulfill the students' needs.

In conducting the research, the researcher gathered data through questionnaires, analyzed the data, then designed course framework, syllabus, and materials. The research started from March 22 to May 4, 2010. The research activities stemmed from administering questionnaires for students, alumni, stakeholders (institution and companies), analyzing the data from those questionnaires, designing course framework, designing syllabus, designing reading materials, and implementing sample lessons. The complete research schedule can bee seen in Table 1.

The coursebook consists of ten (10) lessons. Since the reading skills are repeated in lesson 6 – 10, the implementation was only done for 6 lessons as piloting sample units.

B. Research Design

The goal of this research was designing reading materials for telecommunication engineering that would be used at TELKOM academy, and the final product of the research was reading materials in the form of a conventional material or coursebook. The research applied qualitative inquiry.

Based on five qualitative traditions of inquiry (a biography, a phenomenological study, a grounded theory study, an ethnography, and a case study), this research adopted a case study. Since this was a case study, the research was bounded by time and place

and used interviews and questionnaire as sources of information. Cresswell[57] states that "a case study is an exploration of a 'bounded system' or a case (or multiple cases) over time through detailed, in-depth data collection involving multiple sources of information rich in context. This bounded system is bounded by time and place, and it is the case of being studied – a program, an event, an activity, or individual. Multiple sources of information include observation, interviews, audio-visual material, and documents and reports."

Referring to the conceptual theory of a case study, the researcher conducted four steps in order to produce reading materials. The steps were doing needs analysis, designing course framework, designing syllabus, designing reading materials, and implementing (piloting) the sample lessons.

Needs analysis was done to the students of TELKOM academy (20 students), the alumni of the institution (10 people), the institution itself, and the users or companies (3 companies) that have ever recruited the institution's graduates. The main purpose was to find out what they really needed with respect to reading materials design and English lesson.

On the next page, there is the illustration or flowchart of steps in research design the researcher conducted.

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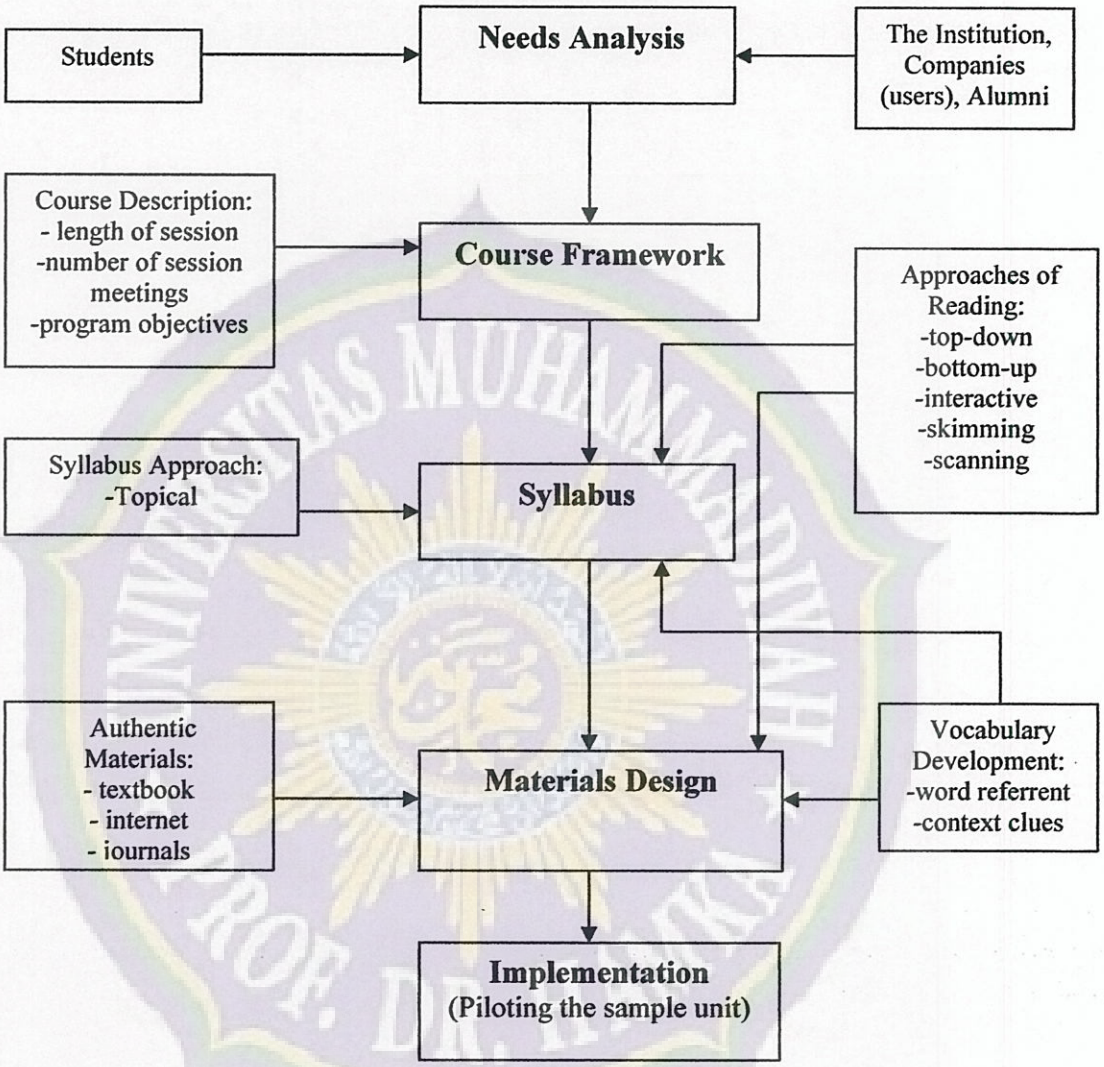
[57] John W. Cresswell. 1998. *Qualitative Inquiry and Research Design: Choosing Among Five Traditions*. California: Saga Publication, Inc. p. 61

Flowchart of Research Design



1. Doing Needs Analysis

By doing needs analysis, the researcher intended to find out what the students needed and to find out the subjects the students learned from the institution in order to produce adequate reading materials. Finding out the subject matters was

important since the content of reading materials was about telecommunications, and the researcher needed to know what the students were learning from this major.

Besides doing needs analysis to students, the researcher also administered questionnaires to alumni and stakeholders. Finding out what alumni and stakeholders want from English lesson could benefit in designing the teaching materials. At least the researcher knew the expectation of other parties - apart from the students themselves - and could cater that expectation.

There are some purposes of doing the needs analysis. Richards states that "needs analysis in language teaching may be used for a number of purposes such as to collect information about a particular information and about a particular problem learners are experiencing, and to identify a gap between what students are able to do and what they need to be able to do."

The points the researcher wanted to find out from needs analysis activity for students are problems the students faced in understanding and interpreting the text, how important English was for the students' success in their study, how important English was for the students' future, how difficult the English texts (journal, newspaper article, internet article, textbook) were for the students, what kinds of texts students wanted to learn in the classroom, and what strategies (skimming, scanning, guessing meaning from context, making inferences) the students usually did in understanding English texts.

In doing needs analysis for alumni, the point the researcher wanted to find out are how often they found difficulty in reading, writing, speaking, and listening in English, how important language skills (reading, writing, speaking, listening) were

for their success in career, what difficulties they found when reading English texts, what difficulties they found when speaking in English, and what difficulties they found when writing in English.

Information the researcher wanted to find out by conducting needs analysis for the institution are what the purposes were of giving English lesson, especially reading, to the students, and how important the English texts (journals, newspaper articles, internet articles, textbooks, and fiction) were for the students.

Finally, needs analysis for companies is done to find out what kinds of job TELKOM academy graduates were posted, whether English was needed in their job, what language skills were expected from TELKOM academy graduates, what the company needed in terms of reading skill, what the company needed in terms of writing skill, and what the company needed in terms of speaking skill.

2. Designing Course Framework

Based on the needs analysis, the researcher then identified the global aims of the course, namely enhancing reading skills and introducing the elements of linguistic input and subject input. Thereby, the researcher designed course framework. This course framework contained general points of reading themes and topics, information of classroom activities that followed up reading, the length of study session, the number of the course meetings, and the number of participants. The course framework became the basis to write the syllabus. The Course Framework can be seen in Appendix 1.

3. Designing a Syllabus

Based on course framework, the researcher designed a reading syllabus. The syllabus outlined coursebook in detail concerning reading texts and classroom activities and strategies. The syllabus also acted as guidance for producing reading materials. The syllabus can be seen in Appendix 2.

4. Designing Materials for Reading

Based on the syllabus, the researcher designed materials that can be used by the students of TELKOM academy Jakarta. In designing the materials, the principles of materials design and the principles of reading in a foreign language that have been elaborated above became the main priority and the focus of attention.

The materials consisted of ten lessons. Each lesson covered 4 parts. They were topic, reading skill objective, building vocabulary, and expansion. Reading skills involved skimming, scanning, guessing word meaning from context, recognizing word referent, and making inferences. Building vocabulary took in exercises of matching, filling in the blanks, and finding the synonym. Expansion encompassed discussion, presentation, and essay writing related to the topic having been discussed. The materials were designed in such a way that they suited the principles of reading proposed by Axbey and Grabe.

Since the topical syllabus approach was adopted by the researcher, each lesson covered different topics in the field of telecommunications engineering. The topics included the introduction of telecommunications and a means of communications

(telegraph, telephone, radio, television), internet, satellite, computer, optical fiber, radar, antenna, cellular phone, GSM and CDMA technology, and modem.

For reading strategies, the researcher included four reading skills. The reason why the researcher put those four skills was because they are most important skills in order to understand reading texts in English. Those skills were skimming, scanning, guessing word meaning in context, recognizing word referent, and making inferences.

By the end of each chapter, the researcher put the expansion. Some activities in the expansion were speaking and writing such as discussion, presentation, debate, and essay and report writing. The expansion was aimed to cater the needs of alumni and companies that needed the skills in their workplace.

Based on the needs analysis, the researcher put texts taken from internet, newspaper, and textbook by adapting and adopting. The researcher preferred adopting to adapting the texts since the researcher wanted to keep the authenticity of the texts. The researcher only adapted the texts when they were suited to the reading activities. The finished materials design (coursebook) can be seen in Appendix 3.

5. Implementation

After designing the lessons, the researcher did the implementation by piloting the sample unit (see Table 1 for the Research Schedule). The purpose of doing the implementation was to find out the responses of the students toward the materials having been designed.

The researcher only implemented six (6) lessons, namely 1 – 6. The reason of only implementing 6 lessons was because lessons 7 – 10 were only repetition, meaning that the reading skills had been discussed and practiced in the previous lessons. Implementing six lessons, in the researcher's opinion, already represented the whole coursebook.

The researcher distributed the questionnaires after implementing certain lesson. The points of questionnaires were whether the material was suitable to the students' field of study or not, whether the material was understandable or not, whether the material was interesting for the students or not, whether, in general, the material was satisfactory or not, and comments for material improvement (if there is any). The questionnaires of implementation can be seen in Appendix 5.

C. Informants

The researchers took four kinds of informants. The first informants for the research were the students of TELKOM academy at second semester. The reason of choosing second semester students because they were was the lowest semester up to now, and in the second semester they still got English lesson, which was English 2. Besides, the coursebook can be used by new students that will register this coming September, 2010.

There were two classes at second semester: A and B. Each class consisted of some 30-35 students dominated by male students. For samples, the researcher took 10 students from class A and 10 students from class B. So, total informants were 20 students. Half of the informants was female students, and the informants were chosen randomly.

The questionnaires were distributed after class on Friday since the day was only for English lesson and the students no longer had lecture after the lesson. So, it did not disrupt the students' busy schedule that was full of practicum for almost all subjects they had in the semester.

The reason of taking random sampling was because the researcher had the assumption that every member of the population had an equal chance of being selected. Besides that, based on the researcher's experience in teaching the two classes at first semester, the students' English competence was relatively similar. This was also owing to the selection process in which the prospective students had to take English test. So, whoever chosen as a sample would be representative enough.

The age of second semester students was between 18-20 years old. They were all SMA graduates coming from middle economic status and below. Their reason of studying at the academy was mostly to get a job easily. Most students came from Jakarta and its surrounding areas such as Bogor, Tangerang, Bekasi, and Depok.

The second informants were alumni. The reason of giving them questionnaires was to know what language skills they need in their workplace, so at least the researcher could cater that need. Somehow, the students who are still learning at TELKOM academy will graduate from the institution and will work for a company.

The researcher distributed questionnaires to only 10 graduates. It was done during an event of meeting between active students and alumni. At that time, there were only ten (10) alumni coming to the meeting. Besides, the researcher thought that ten people could represent the needs of alumni as a whole.

The third informant was the stakeholder. The first stakeholder was the institution. Since the policy of giving reading skills for English subject was enacted by the institution, the researcher asked the questions such as the purposes of giving English, especially reading, to the students, and the kinds of reading texts that were given to the students.

Finally, the fourth informants were companies or the users. There were three (3) companies the researcher asked questions. They were PT. Benang Komunika Infotama, PT. Ciptakarya Mitra Mandiri, and PT. Persada. They are all business enterprises focusing on providing services in telecommunication. Those companies have recruited TELKOM academy graduates for various positions, but mostly technicians. The research was done through telephone conversation.

D. Data Collection

1. Instrument

The researcher used questionnaires as an instrument to collect the data. There were four kinds of questionnaires: for students, alumni, institution, and users. The questionnaires for the students were distributed to 20 people. The questionnaires for alumni were 10 people. For the institution there was only one questionnaire and the companies (users) totaled three (3) questionnaires.

The questionnaires were also done in the implementation process. Since there were six lessons that were implemented, the researcher distributed six kinds of questionnaires. The number of questionnaires was different, depending on the number of students coming to the classroom. There were 31 pieces of the

questionnaire for lesson 1, 30 for lesson 2, 25 for lesson 3, 27 for lesson 4, 27 for lesson 5, and 26 for lesson 6.

2. Technique of Data Collection

Data collection was gathered by distributing the questionnaires to the informants. The researcher informed them the purpose of giving questionnaire to make them serious in giving information.

The questionnaires for the students were given after the class. Ten students for class A and 10 students from class B were chosen randomly. As previously mentioned, the language proficiency of the students was almost similar, so ten students adequately represented the whole class.

Prior to the questionnaire distribution to the students, the researcher did the piloting for the questionnaire. The piloting was done to five (5) students of TELKOM academy. After that they were asked to answer the questions whether the questionnaire was understandable or not. They were also asked to give more comment about the questionnaires for improvement.

The questionnaires' distribution for alumni was done during the meeting. Unfortunately there were only ten (10) people coming to the meeting. The researcher also told them the purpose of giving questionnaire by saying that the research was to produce reading materials in the field of telecommunications engineering that could cater students' needs, and the materials would be used by their juniors.

The academic coordinator answered the questionnaire for the institution. Fortunately she was very enthusiastic with the idea of designing materials for reading. So far, according to her, the students of Akatel who were in the process of writing a final project found difficulty in finding sources since most textbooks are written in English.

For the questionnaires for companies or users, the researcher used telephone conversation. Since those companies put the job vacancy on the campus, the researcher could get their phone number. The researcher talked to the Personnel Manager or a person in charge of Human Resource Department. The interview was done during the office hour.

The technique of data collection in the implementation stage was done after certain lesson was taught or piloted. Every students coming to the classroom was given a questionnaire to find out whether the material was interested to them, easy to understand, interesting, or needed improvement. The researcher asked them to answer honestly by saying that their answer did not have anything to do with their English score.

There were two classes (A and B) in the second semester. The number of students was some 28 - 33 people. Class A got odd lessons (1, 3, 5), and class B got even lessons (2, 4, 6). Each lesson had different topic since the researcher adopted topical syllabus in this material design. In fact not all students came during the implementation.

The questionnaires as well as interview were done in Indonesian language. This was to make people answering the questionnaires express what they have in their

mind freely. If it was done in English, the researcher was certain that the informants, especially students and alumni, would find difficulties.

3. Triangulation of the Data

After the data was obtained, the researcher did the data triangulation to classify the informants' needs for further analysis.

a. Questionnaire for Students

There were some points the researcher put in the questionnaire for students. They were how often the students found difficulty in using English, how important English was for the students' success in their study, how important English was for their success in career later, and some questions related to reading skills. The number of informants was 20. The complete result can be seen in Table 2.

b. Questionnaire for Alumni

The questionnaires for alumni were in the form of closed and open-ended questions. The points of the questionnaire were how often they found difficulty in using English, how important English was for their success in career; and the kinds of difficulty they found in reading, speaking, and writing. There were ten (10) informants (respondents). The data can be seen in Table 3.

c. Questionnaire for the Institution

The researcher asked some questions to the academic coordinator of TELKOM academy concerning English language teaching. The questionnaire was the

combination between open-ended and close questions. The data of the questionnaire result can be seen in Table 4.

d. Questionnaire for Companies or Users

The researcher managed to collect the data from three companies that have recruited TELKOM academy graduates. The data collection was done through telephone conversation. The questionnaire intended to find out certain information concerning jobs filled by TELKOM academy graduates, whether they were expected to have English skills, etc. The complete result of the questionnaire can be seen in Table 5.

e. Questionnaires for Implementation

The researcher administered the questionnaires after implementing (piloting) six lessons – out of ten (10) lessons – as sample units. The result of implementation can be seen in Table 6.

E. Data Analysis

From the data triangulation, the researcher did data analysis. The analysis started from the data collected from students, alumni, institution, and companies. Finally the analysis is done based on the data collected after implementing the reading materials.

The results of questionnaire from the students showed that the majority of the students sometimes found difficulty in using English for reading, writing, speaking, and listening. However, they said that those four skills were important for their study and for their future career.

important for them in expanding their knowledge in the field of telecommunications engineering.

The questionnaire for companies gave information that English was needed, and TELKOM academy graduates were expected to have ability in reading, writing, and speaking, depending on the job they did. For example, a person working as a technician is expected to be able to read the manual of machine.

From the implementation, the researcher could analyze that the six lessons piloted were satisfactory. Of course there are some comments related to the reading materials, and the comments became the researcher's consideration in revising the materials for later use.

CHAPTER IV

RESEACH FINDINGS AND DISCUSSIONS

A. Findings

This chapter discusses the important findings of the research that covers collected data and literature. The research findings in this chapter are arranged based on the research questions put forward in chapter one. Those questions are (1) what do the students need in reading materials; (2) what do the alumni and stakeholders need from the teaching of English; (3) what are the principles of material design in language teaching; (4) what are the principles of reading in a foreign language; and (5) what are the processes of designing reading materials.

(1) What do the students need in reading materials that will be designed?

The research shows that the students need firstly to learn English since they still find difficulty in using it. Secondly, they need to learn four skills with the emphasis on reading and speaking. Thirdly, they need reading texts taken from textbooks, newspaper, and internet to broaden their knowledge. Finally, they need to know and understand reading strategies such as skimming, scanning, guessing word meaning from context, finding word referent, and making inferences. The strategies are important to help them read English texts.

The questionnaire gives information that the students have difficulty in using four skills (reading, listening, writing, and speaking) in English. The questionnaire also

informs that the students think those four language skills are important for their success in study and career. That indirectly concludes that the students are aware of the importance of English for both their education and their future career.

The difficulty faced by the students becomes the focus of attention by the researcher. In designing the teaching materials - even though the focus is on reading – the researcher also put speaking and writing activities. In the reading materials, by the end of each lesson, the researcher put 'expansion'. The expansion consists of speaking and writing activities. For speaking, the activities are mostly discussion and presentation. For writing, the activities are mostly report and essay writing.

Concerning the reading texts the students want to learn in the classroom, the questionnaire gives the information that the students want to learn journals, internet articles, newspaper articles, and textbooks. The students also inform that those kinds of reading passage are difficult enough. That informs that there is willingness as well as awareness from the students to learn reading texts that will be beneficial for their mastering science and technology.

The information gives the researcher the idea to include such reading texts in the reading materials the researcher designs. Besides, all the passages are related to the subject the students are learning. Those passages are adopted and adapted from many sources, and those passages are varied. It is done to expose the students with various kinds of text, and make them accustomed to the text genre.

The last point of questionnaire for the students informs that they are not quite accustomed to the reading strategies or skills in understanding reading texts. This could be one of the reasons why they feel texts are difficult. They do not know the strategies

to attack reading texts to get the information needed. In fact, the institution also complains that the students do not have adequate underlying theories when writing their final project.

Knowing this, the researcher includes some reading strategies that are mostly used by experience readers. Those strategies are skimming, scanning, guessing meaning from context, pronoun referent, and making inferences. This is also similar to what Grabe (1986, 46) states about reading instruction previously mentioned. He suggests that reading instruction should include guessing, skimming, scanning, and vocabulary. Hadley (2001, 208) also states that skilled readers do scanning and skimming all together in understanding a text. So, those strategies are worth including in all reading activities, and that is what the researcher applies in the reading materials.

With respect to vocabulary, the researcher put the exercise for developing vocabulary in each lesson of the reading materials coursebook. The exercises are about not only words in general but also specialist words related to the terms found in the field of telecommunications engineering.

In short, what the students need from reading materials the researcher designs has been fulfilled. The coursebook caters what the students expect to learn, and it also pays attention to the reading strategies proposed by the experts in understanding passages.

(2) What do the alumni and stakeholders need from the teaching of English?

The research reveals that the alumni need English in their job. They need to understand four skills well. The institution needs its students have a good ability in

reading English texts since most books in telecommunications are written in English. For the companies or users, they need graduates who have good skills in reading and writing. This is because most TELKOM academy graduates work as technicians. They need to be able to read manual of the telecommunication tools, and then they sometimes have to write a report.

The research finds that the alumni think all four skills in English are important for their success in their job, especially speaking. However, most of them say that they still find difficulty in using those four skills. This indicates to the researcher that English skills are still needed by TELKOM academy graduates. That is why in designing reading materials, the researcher includes speaking and writing activities.

The research also finds that the difficulties most alumni find are they are not sure how to pronounce words correctly, they have difficulty in starting and expressing ideas, they feel nervous to start conversation, and they think they lack vocabularies to express their opinion. To compensate the lack of vocabulary, the researcher spares vocabulary exercises in the reading materials.

Concerning writing, most alumni said that they sometimes find difficulty. They say that most difficulties they find in writing are they do not know how to use words concisely, they do not know how to use correct grammar, they often use and follow Indonesian patterns in writing, they do not know how to arrange words for sentences, they do not know the spelling, and finally they lack English vocabulary.

The reading materials the researcher designs include writing activities. However, the materials do not teach grammar specifically since the focus is on reading. As

previously mentioned, the writing activities only focus on essay writing and report writing.

In terms of reading, half of the alumni inform that they sometimes find difficulty in reading. The problems of reading they find are they feel they are difficult to understand the text, and they say they lack vocabularies. Those two problems are the reasons why they think reading is difficult. This gives the researcher an idea of incorporating reading strategies – as previously written – to equip the students to have sufficient skills in reading in a foreign language.

From the questionnaire for the institution, the research finds some purposes of giving English lesson focusing on reading. First, it is to make students have the ability to read textbooks in order that they can find resources for underlying theories when they do their final project. Second, it is to make students accustomed to English textbooks, so indirectly it will improve their speaking and writing skill. Finally, it is to make students active in using English.

Clearly, this gives information to the researcher that the institution expects the students to be able to read English textbooks and passages related to the subject of telecommunications engineering. The skill is very important for the students to expand their knowledge and to base their theory when writing their final project as one of the prerequisites to graduate from the institution. It is also hoped that by exposing students to reading texts, they can improve their speaking and writing skills.

Regarding the reading texts to be taught in the classroom, the institution expected that the students be taught English texts taken from journals, newspaper

articles, internet articles, and textbooks. That is why the researcher includes such texts in the reading materials.

To find out what another stakeholder needs, the researcher addresses the questionnaire to the companies that have ever recruited TELKOM academy graduates. It is done to collect information about what the companies need in order that the researcher could cater those needs in the reading materials. Eventually, the materials are expected to be really beneficial for all sides although the main purpose is to make the students have an ability to read English textbooks.

The research finds that most TELKOM academy graduates work as a technician. Some work as a customer service and marketing support officer. The position of customer service officers are filled by female graduates. They are put in the position since their subject is telecommunications engineering so that the job is relatively easy, compared to customer service officers graduating from different subjects.

Those companies give the information that they need employees having skills in English. English can support their job. In fact, English skills are needed not only for those working as a customer service or marketing support officer but also for those working as a technician. No wonder the companies do the language test for recruiting new employees.

For employees working as a customer service and marketing support officer, the language skills needed are speaking and writing skills, while a technician needs reading and writing skills. In speaking, the employees are expected to be able to communicate with customers. In writing, the employees are expected to be able to write a report. For

reading, the employees working as a technician are expected to be able to read the manuals of telecommunication machines.

After all, all companies require their employees to have the skills of reading, writing, and speaking. Especially for reading skill, it is needed by TELKOM academy graduates to be able to read the manual of telecommunication machines. This gives the researcher the information to put passages related to the field of telecommunications in reading materials since such texts are very much demanded.

To conclude, alumni and stakeholders put forward ideas that English is important. Three skills that need emphasizing are reading, writing, and speaking. Reading becomes the focus of attention from the institution and companies employing TELKOM academy graduates as a technician. So, the researcher really focuses on designing reading materials by supplementing the materials with speaking and writing activities.

(3)What are the principles of materials design in language teaching?

Brown (1995, 138) states that everything contributing to classroom teaching can be categorized as materials, so it is not restricted to coursebook. As a matter of fact, the researcher limits the materials design in this research only to a paper-based concept. The researcher designs reading materials for being used in the classroom by the students majoring in telecommunications engineering.

Why are materials important in teaching-learning context? As previously mentioned, there are four reasons. First, they function as a source of language. Second,

they function as a learning support. Third, they function as motivation and stimulation. Fourth, they function as a reference.

The research finds out that there are also five advantages of creating our own teaching materials. Those advantages are materials can be produced that are directly relevant to students' and institutional needs, materials can help develop expertise among staff, materials can enhance the reputation of the institution, materials produced within the institution can be revised or adapted as needed, so it is more flexible than commercial coursebooks, and finally for many teachers, designing their own teaching materials enables them to consider their particular learning environment so as to overcomes the lack of commercial coursebooks.

The literature research finds that there are some principles of designing teaching materials. Firstly, English language teaching materials should be contextualized. It means that materials should link explicitly to what the learners/students already know, their first language and cultures, and be able to alert the learners to any areas of significant cultural difference. In addition, materials should be contextualized to topics and themes that provide meaningful, purposeful uses for target language.

Secondly, materials should stimulate interaction and be generative in terms of language. It means that materials can be the media for the interaction between students and students, and between students and the teacher.

Thirdly, English language teaching materials should encourage learners to develop learning skills and strategies. It is impossible for teachers to teach their learners all the language they need to know in the short time. It is essential that language

teaching materials also teach their target learners how to learn and help them to take advantage of language learning opportunities outside the classroom.

Fourthly, English language teaching materials should be authentic. It is beneficial for second language learners to be regularly exposed in the classroom to real and unscripted languages and texts that have not been produced specifically for language learning purposes.

With respect to authentic materials, the research finds some advantages. Authentic materials have a positive effect on learner motivation, provide authentic cultural information about the target culture, provide exposure to real language, relate more closely to learners' needs, and support a more creative approach to teaching.

From the above-mentioned points, the researcher relates the principles of teaching materials design to reading materials the researcher designs. In designing reading materials, the researcher includes authentic texts. All texts are taken from textbook, internet articles, and newspaper articles. In some lessons, the texts are adapted to the questions the researcher makes.

Referring to the second principle saying materials should stimulate interaction, the researcher put pre-reading activities in the form of questions. After that, by the end of the lesson, the researcher put 'expansion' for speaking and writing activities. Speaking activities can be in the form of presentation and debate that surely can stimulate interaction among students.

Reading strategies and skills that exist in the reading materials the researcher designs prove that the materials fulfill the third principle of designing teaching materials. The principle says that English language teaching materials should encourage

learners to develop learning skills and strategies. It is hoped that the students can develop the strategies and skills outside the classroom.

To conclude, the reading materials the researcher design have fulfilled the principles of designing teaching material that cover authentic texts, interaction, and strategies. The reading materials have also been implemented with satisfying comments and responses from the students. So, they are ready to use.

(4) What are the principles of reading in a foreign language?

The research finds that there are three approaches regarding reading in a foreign language. They are bottom-up approach, top-down approach, and interactive approach. Those three reading approaches are acknowledged effective in understanding reading texts.

Bottom-up approach corresponds to cognitive and information-processing psychological concerns. It assumes that a reader constructs meaning from letters, words, phrases, clauses, and sentences by processing the text into phonemic units that represent lexical meaning. Then the reader builds meaning in a linear manner. It is clear that in this approach, a reader will do a series of stages to comprehend reading texts, starting from recognizing letters and words to working out sentence structure.

Contrary to bottom-up, top-down approach assumes that a reader approaches a text with conceptualizations above the textual level already in operation and then works down to the text itself. Consequently, according to these approaches, the reader does not necessarily read each word in the text. In top-down processing, the reader draws on his

intelligence and experience. The prediction he can make is based on the schemata he has acquired in order to understand texts.

Another approach is the combination of those two approaches. It is called interactive approach. In practice, a reader continually shifts from one focus to another. He could adopt a top-down approach to predict the probable meaning, and then move to the bottom-up approach to check whether that is really what the writer says. This has become known as interactive reading.

Concerning those three approaches, there are some exercises to do in reading activities. The exercises are divided into three stages: pre-reading, while reading, and post reading.

Pre-reading activities could be in the forms of drawing upon existing knowledge, exploiting areas of interest, encouraging prediction of content, language and function. While-reading activities are, for example, confirming and checking, understanding global meaning, and dealing with vocabulary. And after-reading activities could be giving personal response and encouraging self-awareness of difficulties.

Apart from those activities, there are some other reading strategies that should be included. Those reading strategies are quiet important in understanding reading texts. Those strategies are guessing word meaning from context, finding pronoun referent, skimming, scanning, making inferences, and vocabulary development.

To conclude, the reading materials the researcher designs follow the principles of reading in a foreign language. Each lesson talks about reading strategies and provides manifold exercises for the strategies learned. The materials also provide exercises to

develop the students' vocabulary. Besides, the materials provide pre-reading activities and post-reading activities. The researcher thinks that the materials fulfill the principle of reading in a foreign language.

(5) What are the processes of designing reading materials?

There are some steps the researcher does in designing reading materials for telecommunications engineering. Those steps are doing needs analysis, designing course framework, designing a syllabus, designing the materials, and implementing (piloting) sample unit.

Needs analysis is done to four parties: students, alumni, institution, and companies (users). Needs analysis for students is done to find out what the students need and to find out the subjects the students learn from the institution in order to produce adequate reading materials. Finding out the subject matters is important since the content of reading materials is about telecommunications, and the researcher needs to know what the students are learning before making the teaching materials.

The needs analysis for alumni and stakeholder is done to find out what alumni and stakeholders want from English lesson. It could benefit in designing the teaching materials. At least the researcher knows the expectation of other parties - apart from the students themselves - and could cater that expectation.

Some purposes of doing the needs analysis are collecting information about particular information and problem learners are experiencing and identifying a gap between what students are able to do and what they need to be able to do.

After needs analysis is done and the data have been collected, the next step is designing course framework. In course framework the researcher identifies the global aims of the course, namely enhancing reading skills and introducing the elements of linguistic input and subject input. This course framework contains general points of reading themes and topics, information of classroom activities that follow up reading, the length of study session, the number of the course meetings, and the number of participants.

The course framework becomes the basis for designing a syllabus. The syllabus outlines coursebook in detail concerning reading texts, classroom activities, and classroom strategies. The syllabus also acts as guidance for producing reading materials for telecommunications engineering.

The next step is designing reading materials that can be used by the students of TELKOM academy Jakarta. In designing the materials, the principles of materials design and the principles of reading in a foreign language that have been elaborated above, together with the results of needs analysis, become the main priority and the focus of attention.

The final step is implementation. It is done by piloting the sample unit. The purpose of doing the implementation is to find out the responses of the students toward the materials having been designed. The responses give information to the researcher concerning whether the material is suitable to the students' field of study, whether the material is understandable, whether the material is interesting for the students, and whether the material is satisfactory or not.

To conclude, there are some steps to do to design teaching materials. The step starts from finding what the students and stakeholder need, designing course framework, designing the syllabus, designing the material, and implementing the material (sample lessons).

B. Discussions

Paying much attention to the results of questionnaire from the students, it can be concluded that 55% of informants sometimes found difficulty in using English for reading. 30% of the informants often found difficulty in reading, and only 15% of the informants seldom found difficulty in understanding English texts.

In terms of writing in English, 60% of the informants answered that they sometimes got difficulty, while 5% of the informants answered that they got difficulty in writing very often. This is contrary to speaking in English in which 40% of the informants said that they sometimes found difficulty, while 10% of the informants answered that they seldom found difficulty in speaking in English.

The majority of informants answered that listening was difficult. 35% of the informants said that they found difficulty in listening very often. 30% of the informants said they sometimes found difficulty in listening. The same percentage was also similar to the students saying that they sometimes found difficulty in understanding listening. Only 5% of the informants said that they seldom found difficulty in listening.

Since the researcher designed reading materials, the researcher focused on reading skills. Based on the data, the majority of informants said that they sometimes found difficulty in reading. For the researcher, the figure gave information that reading

was not really difficult for the students, and the researcher could adopt reading texts from many sources as authentic materials.

When asked about how important English was for the students' success in study, the majority of informants said that reading, writing, speaking, and listening were very important (55% for reading, 55% for writing, 80% for speaking, and 60% for listening). Since 80% of informants said that speaking was very important, the researcher included speaking activities in designing reading materials.

Incorporating speaking activities in the reading materials the researcher designed was also due to the third point of questionnaire that asked the students' opinion about how important English was for them when they work later. 90% of informants said that speaking was important for their success in career later. 50% of the informants said that reading was very important, while 45% of the informants said writing was very important. For listening, 55% of the informants said it was very important for their success in career. This proves that the students are aware of the importance of English for their successful career in the future.

When asked about how difficult it was to read the English journal, 35% of informants mentioned that journal was difficult enough. 30% of the informants said journal was very difficult, and another 30% said journal was difficult. Compared to internet article, only 5% of the informants said that it was very difficult, while 45% of the informants said internet article was easy.

Newspaper article for the students was not a problem. 45% of the informants said that newspaper article was easy. Only 10% said it was very difficult. In terms of textbook, 10% of the informants said it was easy. Another 10% said it was very

difficult. But majority of informants (50%) said textbook was difficult, and 30% said that textbook was difficult.

In short, majority of the informants stated that English texts such as journals, newspaper articles, internet articles, and textbooks were difficult and difficult enough. For the researcher as well as the designer of the reading material, this gives information that the students need to be exposed with such reading texts. The researcher included those kinds of text in the reading materials.

Another point the researcher put in the questionnaire for students is what kinds of reading texts they wanted to learn in the classroom. The majority of the informants said that they wanted to learn the passages taken from journal, newspaper article, internet article, and textbook (journal 75%, newspaper article 70%, internet article 90%, and textbook 90%). Half of the informants said they wanted to read fiction.

In designing the reading materials, the researcher did not include fiction. The reason was it was not part of the telecommunications. Besides, based on the questionnaire for the stakeholder (the institution), it was said that fiction was not really important for the students.

The last point of the questionnaire for the students was how often the students did reading strategies. The strategies the researcher included were finding main idea, skimming, scanning, guessing word, understanding text structure, understanding specialist vocabulary, responding critically to the text, and making summary.

The answers were varied, but the majority of informants said that they seldom did those strategies in understanding the reading texts. 45% of the informants said they seldom did the strategy of finding main ideas when reading. 60% of the informants said

they seldom did skimming. However, the percentage of the informants who seldom and often did scanning was similar (40%).

The reading strategy that was mostly done by the informants was guessing words. 55% of the informants often did that strategy, but 40% of the informants seldom did that strategy. The percentage was contrary to the strategy of understanding text structure. 55% of the informants seldom did that strategy in understanding reading texts.

50% of the informants said that they seldom did the strategy of understanding specialist vocabulary in reading texts, while 30% of the informants often did the reading strategy. Only 20% of the informants said that they did this strategy very often when reading texts.

The surprising percentage was on the reading strategy of responding critically to the text. 55% of the informants said that they did this reading strategy. 30% of them said they seldom did the strategy. 10% of the informants said they never did this strategy, and only 5% said they did the strategy very often.

In terms of the reading strategy of making summary, 60% of the informants said that they seldom did this when reading. 20% of the informants said they never did summarizing. 10% of the informants said they often did the strategy, and the percentage was similar to the informants who did this strategy very often.

To summarize, the majority of the students sometimes found difficulty in using four skills (reading, listening, writing, and speaking) in English. They also said that those skills were important for their success in study and career. So, in designing the reading materials, the researcher included two other skills, namely speaking and writing, in the coursebook.

The reading texts the researcher included in the coursebook were internet articles, newspaper articles, and textbook. And the reading strategies the researcher included were skimming, scanning, guessing meaning from contexts, and making inferences. Those skills were seldom done by the students in understanding reading texts, and those were the most important strategies in reading in a foreign language.

Now, let's move to the questionnaire for alumni. When asked about how often the alumni found difficulty in using four skills of English, most answers referred to speaking as the most difficult skill. 60% of the informants said that they often found difficulty in speaking. 20% said they sometimes found difficulty in speaking. Only 10% of informants said that they seldom and often found difficulty in speaking.

The most difficult speaking difficulty the informants informed was they were not sure how to pronounce words correctly. Other difficulties in speaking were having difficulty in starting and expressing ideas, being nervous to start conversation, and having lack of vocabulary.

Half of the informants said that they sometimes found difficulty in reading. 30% of the informants seldom found difficulty in reading. 10% often found difficulty in reading, and the same percentage also belonged to the informants who never found difficulty in reading. The problems the informants found in reading were understanding the texts in general and having lack of vocabulary.

For writing, 60% of informants said that they sometimes found difficulty. 30% said they seldom found difficulty, and 10% often found difficulty in writing. Most difficulties in writing, based on the respondents' answers, were they did not know how to use concise words, they did not know how to use correct grammar, they often used

Indonesian patterns, they did not know how to arrange words for sentences, they did not know the spelling, and they lacked vocabulary.

In terms of listening, 50% of the informants said that they sometimes found difficulty in listening, while 30% often found difficulty in listening. The percentage for the informants who seldom and often found difficulty in listening was similar, 10%.

The next point the researcher put in the questionnaire for alumni was how important English was for their success in career. Most informants' answers concerning four language skills (reading, listening, writing, and speaking) were between important and very important.

For reading, 50% of the informants said that it was important, and 30% said it was important enough. Only 20% of the informants said that reading was very important. For writing, 50% of the informants said that it was important enough. 30% said that writing was important, and 20% said it was very important.

Speaking got the highest percentage for those saying 'very important'. 60% of the informants said so. 30% said speaking was important, while 10% answered it was important enough. In terms of listening, 40% of the informants said it was very important. 30% said listening was important, and another 30% said listening was important enough.

To conclude, all alumni said that all skills (reading, listening, writing, and speaking) are important. It, more or less, describes what they need in their work of place. To accommodate the needs, in designing reading materials, the researcher included speaking and writing activities.

The next questionnaire is for the institution. When asked about what the purposes were of giving English - especially reading - to the students, the informant mentioned some reasons: to make students able to read textbooks in order that they can find resources for underlying theories when doing their final project, to make students accustomed to English textbook, so indirectly it will improve their speaking and writing skill, and to make students active in using English.

Regarding the reading texts the institution expected the students to be taught in the classroom. The informant said that journals, newspaper articles, internet articles, and textbooks were all very important. One reading text that was not important – according to the informant – was fiction.

To conclude, the institution greatly expects that reading skill be taught to the students in order that they are accustomed to English and have the capability to read English textbooks to catch the development of science and technology. Based on this expectation, the researcher included the previously mentioned reading texts in designing reading materials for telecommunications engineering.

The last questionnaire is for companies. Questionnaire for companies was done to collect information about what they needed and expected from TELKOM academy graduates, so the researcher could cater those needs in the reading materials and make the materials really beneficial for all parties even though the main purpose was to make the students of the academy have an ability to read English textbooks.

The first point the researcher put in the questionnaire was what kinds of job that were filled by TELKOM academy graduates in their organization. Informants of two companies said that all the graduates worked as a technician for telecommunications

tools or machine. An informant from another company mentioned that TELKOM academy graduates worked not only as a technician but also as a customer service and marketing support officer. The position of customer service officers was filled by mostly female graduates. They were relatively easy to understand telecommunications concept since this was their educational background, compared to customer service officer graduating from different subjects.

The second point the researcher asked in the questionnaire for companies was whether English skill was needed from TELKOM academy graduates. All informants from three companies said that English was needed. English could support their job. Surprisingly, English skill was not only needed for those working as a customer service or marketing support officer but also needed for those working as a technician. That was why those companies always included English as testing materials in recruiting employees.

The third point the researcher put in the questionnaire was what language skills were mostly needed from TELKOM academy graduates. In fact, reading, speaking, and writing skills were needed. One informant mentioned that it depended on the job. Since his company employed graduates for different kinds of job, particular skill in English was needed. For example, a customer service and marketing support officer need speaking and writing skills, while a technician needs reading and writing skills.

When asked about what aspects of reading the companies needed from TELKOM academy graduates, all informants said that since the graduates worked as technicians, they were expected to be able to read manuals of telecommunication

machines. The ability of reading and understanding the manuals was very much beneficial in doing their job as a technician.

In writing, the aspect needed was being able to write a report. Two companies required this skill. One informant mentioned that apart from being able to read the manual, TELKOM academy graduates had to be able to make the report in English. Another informant mentioned writing a memo and report for those who worked as customer service and marketing support officers.

With respect to speaking, an informant of one company said that this skill was needed to communicate with customers. Another informant from different company said that the skill was needed to communicate with expatriate supervisors. Only one company that employed all TELKOM academy graduates as a technician did not require them to be very good at speaking.

To conclude, all companies needed the skills of reading, writing, and speaking. Especially for reading skill, it was needed by TELKOM academy graduates to be able to read the manual of telecommunication machines. This gave the researcher an idea that reading materials that covered passages in the field of telecommunications was greatly demanded.

Fifth is the questionnaire for teaching materials. After designing reading materials, the researcher did an implementation or piloting some sample units. As previously mentioned, the researcher implemented six (6) lessons out of ten (10) lessons having been made.

The researcher put four (4) items in the questionnaire that had to be answered based on the informants' personal opinion. Those four items were whether the lesson

was related to the subject of telecommunications, whether the lesson was understandable, meaning the instructions in the materials were clear, whether the lesson was interesting for the informants, and whether the informants were satisfied with the lesson.

All respondents (31 students) said that lesson 1 was related to telecommunications engineering. 83% of the students said that the lesson was understandable. 67% said that the lesson was interesting, and 67% mentioned that they were satisfied with the lesson.

96% of the students said lesson two (2) was related to their field of study, and only 4% said that it was not related. 73% of the students said lesson 2 was understandable. 93% said it was interesting, and 73% of the students said that they were satisfied with lesson 2.

For lesson 3, all students said that it was related to the subject they were learning. 64% of the students said it was understandable. 88% of the students said it was interesting, and 68% of the students said that they were satisfied with lesson 3.

With respect to lesson 4, all students also said that the lesson was related to telecommunications engineering. 88% of the students said this lesson was understandable. 77% of the students said that it was interesting, and 74% mentioned that the lesson was satisfying, meaning that they were satisfied with lesson 4.

As regards lesson 5, 100% of the students said it was related to the subject they were studying. 85% of the students said the lesson was understandable and interesting. 74% of the students said lesson 5 was satisfactory.

For lesson 6, similar to previous lessons, all students said it was related to their subject. 88% said it was understandable. 77% of the students mentioned that lesson 6 was interesting, and they were satisfied with that lesson.

To conclude, majority of the students said that the six lessons were related to their field of study, were understandable, were interesting, and satisfactory. It proves that the reading materials the researcher designed was successful.

CHAPTER V

CONCLUSIONS AND SUGGESTIONS

A. Conclusions

Based on the findings and discussions on previous chapters, the researcher draws some points in conclusions. The points are the researcher's self-reflection of what he has done, and hopefully they can give a 'valuable' contribution for the readers of this research.

The first step to do in designing teaching materials is finding out the needs of the students or users of the materials that will be designed. This is done to find out what they really need, what problems they are facing in learning English, what language competency they have got, and what they really expect from the teaching materials. This is done to make the teaching materials more effective and reach the goals and purposes.

The research reveals that the students of TELKOM academy need some things. First of all, they need to learn four skills with the emphasis on reading and speaking. Then, they need to read English texts taken from textbooks, internet, and newspaper. Finally, they need reading skills and strategies to understand English texts.

The second step in designing teaching materials for university students is finding out the needs of stakeholders. The stakeholders can be alumni, the institution, and the companies. The alumni can give the information about the real situation when later the students graduate from the institution. The institution can inform what it needs to

improve the quality of its graduate, and the company can tell about what specific skills the employee should possess to be able to work more effectively. All these become the basis for designing the teaching materials.

The research reveals that the institution needs its students to be able to read and understand English textbooks, while the alumni need some points. First, they need four skills since they say the skills are important for their job. Second, they need sufficient vocabularies to be able to communicate and read. For the users or companies, the research reveals that they require the academy's graduates who have reading and writing skills since most graduates work as technicians. They are expected to understand manuals of machines and make a report in English.

Third, the principles of materials design and the principles of reading in a foreign language must be the focus of attention for those who want to design or develop teaching materials. The purpose is to make the teaching materials run on the right track based on the underlying theories. Those principles, along with the results of needs analysis, become the foundation for developing course framework and syllabus.

The research reveals that there are some principles in materials design. First principle is materials should be contextualized. Then, materials should stimulate interaction. The interaction includes students and students as well as students and a teacher. Next, materials should encourage learners to develop learning skills and strategies. And finally materials should be authentic.

With respect to reading in a foreign language, the research reveals two points: reading approaches and reading strategies or skills. The reading approaches acknowledged by ELT experts are bottom-up, top-down, and interactive. Reading

strategies cover skimming, scanning, guessing meaning from context, finding pronoun referent, making inferences, and vocabulary development.

Fourth, in designing framework, there are some points to be taken into account. Those points cover the global aims of the course, general points of reading themes and topics, information of classroom activities, the length of study session, the number of the course meetings, and the number of participants. The information can surely contribute to the making of syllabus.

Fifth, syllabus design is another step that is crucial enough in designing teaching materials. The syllabus outlines teaching materials in detail concerning reading texts, topics, and classroom activities and strategies. In designing the teaching materials, the syllabus must be the reference and guidance.

Sixth, the last step in designing teaching materials is implementation. Implementation is piloting the sample unit. This is to know whether the materials we have designed successful or not. Besides, this is done to see the comments and responses from the students. After all, they are the ones who will learn from that teaching material.

B. Suggestions

Based on the findings of research, materials design, and implementation, the researcher suggests some points for other researcher who would like to do the research on this topic. The suggestion is expected to able to give any contribution to the field of material design or material development, especially in designing reading materials in the context of English for Specific Purposes.

First, in making questionnaire for needs analysis, the questions must be very clear to the respondents and must ask questions that are related to the planned materials. The questions can cover the background information of the respondents, the present information of the respondents, what the respondents expect recently, and what the respondents expect in the future. If those points can be covered, at least the needs analysis can give sufficient data for the basis of decision making.

Second, stakeholders must also be the priority, especially in the field of English for Specific Purposes (ESP). The information they give will surely be beneficial for designing teaching materials. Their presence cannot be ignored since they are the ones who will recruit or use the students. There must be a link between what they learn in the classroom with what they will do later in their work place. If possible, cater all the needs from all parties to make the teaching materials more useful.

Third, in designing reading materials for telecommunications engineering, the underlying theories and principles of reading in a foreign language and the principles of designing teaching materials must be highlighted very seriously. Based on the results of the questionnaire, the students expect to learn reading texts taken from journals, textbooks, internet articles, and newspaper articles. So, combining the principles of reading in a foreign language and principles of material design with the findings from needs analysis becomes something challenging but interesting. The finished materials will be the proof whether the materials are really interesting and can satisfy the students or not.

Fourth, take the implementation very seriously. Through this activity, the designer of the teaching materials can see whether the materials are successful or not in

catering the needs of the students. During this activity, the designer not only sees the results of questionnaire given back after the lesson but also pay attention to the students' reaction, comments, and responses. Sometimes such responses can give more information rather than what the students write on a piece of paper.

Finally, material design is an on-going process. There is always revision, starting from needs analysis to implementation. Even, when the materials are used later, still there must be revision in accordance with the development of science and technology. In terms of telecommunications engineering in which the subject and new invention change very quickly, the materials must also change and be revised. So, the materials can keep up with the development of science and technology.

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Tables

Table 1: Research Schedule

Date	Event
March 22 – 27, 2010	Administering questionnaires for students, alumni, stakeholders (institution and companies).
March 29, 2010	Analyzing the data from questionnaires.
March 30, 2010	Designing course framework.
March 31 – April 3, 2010	Designing syllabus.
April 4 – May 4, 2010	Designing reading materials.
April 23, 2010	Implementing lesson 1 in class A. Implementing lesson 2 in class B. Collecting the response sheets.
April 27, 2010	Implementing lesson 3 in class A. Implementing lesson 4 in class B. Collecting the response sheets.
April 30, 2010	Implementing lesson 5 in class A. Implementing lesson 6 in class B. Collecting the response sheets.

Table 2: The Result of Needs Analysis Questionnaire for Students

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A. How often do you find difficulty in using English?

Reading:

Very often	= 0
Often	= 6
Sometimes	= 11
Seldom	= 3
Never	= 0

Writing:

Very often	= 1
Often	= 2
Sometimes	= 12
Seldom	= 5
Never	= 0

Speaking:

Very often	= 5
Often	= 5
Sometimes	= 8
Seldom	= 2
Never	= 0

Listening:

Very often	= 7
Often	= 6
Sometimes	= 6
Seldom	= 1
Never	= 0

B. How important is English for your success in study?

Reading:

Very important	= 11
Important	= 7
Important enough	= 2
Not important	= 0

Not important at all = 0

Writing:

Very important = 11
Important = 6
Important enough = 3
Not important = 0
Not important at all = 0

Speaking:

Very important = 16
Important = 4
Important enough = 0
Not important = 0
Not important at all = 0

Listening:

Very important = 12
Important = 7
Important enough = 1
Not important = 0
Not important at all = 0

C. In your opinion, how important is English for you when you work later?

Reading:

Very important = 10
Important = 7
Important enough = 3
Not important = 0
Not important at all = 0

Writing:

Very important = 9
Important = 8
Important enough = 3
Not important = 0
Not important at all = 0

Speaking:

Very important	= 18
Important	= 2
Important enough	= 0
Not important	= 0
Not important at all	= 0

Listening:

Very important	= 11
Important	= 7
Important enough	= 2
Not important	= 0
Not important at all	= 0

D. In your opinion, how difficult the following texts?

	Very Difficult	Difficult	Difficult Enough	Easy
1. Journal	6	6	7	1
2. Newspaper Article	2	4	5	9
3. Internet Article	1	3	11	5
4. Textbook	2	10	6	2
5. Fiction	1	7	4	8

E. From the following texts, which one do you want to study in the classroom?

	Yes	No
1. Journal	15	5
2. Newspaper article	14	6
3. Internet article	18	2
4. Textbook	18	2
5. Fiction	10	10

F. How often do you do the following strategies to understand a text?

	Very Often	Often	Seldom	Never
1. Find main idea	5	6	9	0
2. Skimming	0	5	12	3
3. Scanning	4	8	8	0
4. Guessing word	0	11	8	1
5. Understand Text Structure	1	6	11	2
6. Understand Specialist Vocabulary	4	6	10	0
7. Respond Critically	1	11	6	2
8. Make Summary	2	2	12	4

Table 3: The Result of Needs Analysis Questionnaire for Alumni

A. How often do you find difficulty in using English?

	Very Often	Often	Sometimes	Seldom	Never
Reading	0	1	5	3	1
Writing	0	1	6	3	0
Speaking	1	6	2	1	0
Listening	1	3	5	1	0

B. In your opinion, how important is English for your success in career?

	Very Important	Important	Important Enough	Not Important	Not Important at all
Reading	2	5	3	0	0
Writing	2	3	5	0	0
Speaking	6	3	1	0	0
Listening	4	3	3	0	0

C. What difficulties do you find when reading?

1. Understanding the text = 8
2. Lack of vocabulary = 2

D. What difficulties do you find when speaking?

1. Don't know how to pronounce the word = 4

2. Difficult to start = 3

3. Feel nervous = 1

4. Lack of vocabulary = 2

5. Difficult to express ideas = 2

E. What difficulties do you find when writing?

1. Use concise words = 1

2. Use correct grammar = 4

3. Often use Indonesia pattern = 1

4. Arrange words for sentences = 1

5. Don't know the spelling = 4

6. Difficult to express idea = 1

7. Lack vocabulary = 1

Table 4: The Result of Needs Analysis Questionnaire for the Institution

A. What are the purposes of giving English, especially reading, to the students?

1. To make students to be able to read textbooks.
2. To make students accustomed to English textbook, so indirectly it will improve their speaking skill.
3. To make students active in using English.

B. How important are the following texts to be given to the students?

1. Journal = very important
2. Newspaper article = very important
3. Internet article = very important
4. Textbook = very important
5. Fiction = not important

Table 5: The Result of Needs Analysis Questionnaire for Companies

A. What kinds of job that are filled by Akatel graduates?

Two companies mentioned 'technician'.
One company mentioned 'technician, customer service, marketing support'.

B. Is English skill needed from them?

All companies mentioned 'yes'.

C. What language skill is mostly needed from Akatel graduates?

Two companies mentioned 'reading and writing'.
One company mentioned 'speaking'.

D. What do you expect from Akatel graduates in terms of reading?

All companies mentioned that Akatel graduates could be able to read the manual of machines.

E. What do you expect from Akatel graduates in terms of writing?

Two companies mentioned 'making a report'.
One company did not require writing skill.

F. What do you expect from Akatel graduates in term of speaking?

One company mentioned 'communicate with customers'.
One company mentioned 'communicate with the expatriate supervisor'.
One company did not require speaking skill.

Table 6: The Result of Questionnaire for Implementing Teaching Materials

A. Lesson 1 Respondents: 31	Yes	No
1. Is lesson 1 related to your subject?	31	0
2. Is lesson 1 understandable?	26	5
3. Is lesson 1 interesting?	21	10
4. In general, are you satisfied with lesson 1?	21	10
B. Lesson 2 Respondents: 30	Yes	No
1. Is lesson 2 related to your subject?	29	1
2. Is lesson 2 understandable?	22	8
3. Is lesson 2 interesting?	28	2
4. In general, are you satisfied with lesson 2?	22	8
C. Lesson 3 Respondents: 25	Yes	No
1. Is lesson 3 related to your subject?	25	0
2. Is lesson 3 understandable?	16	9
3. Is lesson 3 interesting?	22	3
4. In general, are you satisfied with lesson 3?	17	8
D. Lesson 4 Respondents: 27	Yes	No
1. Is lesson 4 related to your subject?	27	0
2. Is lesson 4 understandable?	24	3
3. Is lesson 4 interesting?	21	6
4. In general, are you satisfied with lesson 4?	20	7

E. Lesson 5

Respondents: 27	Yes	No
1. Is lesson 5 related to your subject?	27	0
2. Is lesson 5 understandable?	23	4
3. Is lesson 5 interesting?	23	4
4. In general, are you satisfied with lesson 5?	20	7

F. Lesson 6

Respondents: 26	Yes	No
1. Is lesson 6 related to your subject?	26	0
2. Is lesson 6 understandable?	18	8
3. Is lesson 6 interesting?	21	5
4. In general, are you satisfied with lesson 6?	21	5

Appendices

Appendix 1

COURSE FRAMEWORK

DEFINITION: English for Telecommunications Engineering.

"English for Telecommunications Engineering" aims for equipping students of Academy of Telecommunications Engineering (Akatel) Jakarta to be able to read English textbooks. By having reading skills, they are expected to get broader knowledge about their field of study and find sources to support their research for a final project. The course also gives chances for the students to practice speaking and writing.

DELIVERY: Discussion, Lecture, Practice

In delivering the course, the lecturer starts with eliciting the students' knowledge about the topic. Then the students are exposed with the reading passage to know more about the topic being discussed. To understand the reading passage, the lecturer explains the reading strategy/skill. After that the students are asked to practice the skill. After the reading skills are practiced, the students are given speaking and writing activities as follow up activities.

INTENSITY:

The materials are for one semester (16 meetings). Each meeting lasts for 100 minutes (2 SKS) that is done once a week. There is Mid-Term Test (UTS) on the eighth meeting and Final Test (UAS) on the sixteenth meeting, so there are 14 meetings for study. The quiz is given before UTS and UAS to check the students' understanding of the materials having been learned.

PARTICIPANTS:

The participants are first-semester students of Akatel. They are all high school graduates who have known basic knowledge of English. Overall their language proficiency is considered between basic and pre-intermediate level. There two classes in each semester. In one class there are about 35-40 students.

CONTENT: Topics of Telecommunications Engineering

The materials include various topics in the field of telecommunications engineering. The topics cover:

- Meaning of telecommunications
- Telegraph
- Telephone
- Radio
- Television
- Internet
- Satellite
- Computer
- Optical Fiber
- Radar
- Antenna
- GSM and CDMA Technology
- Modem

For reading skills, the materials include

- Skimming
- Scanning
- Guessing word meaning in context
- Making inferences
- Building vocabulary

Besides, by the end of the lesson, there is 'Expansion'. This includes speaking and writing activities.

OUTCOME: Students should be able to:

- Know skimming skill to understand English texts.
- Know scanning skill to understand English texts.
- Guess meaning of words in English texts.
- Recognize word referent.
- Make inferences from English texts.
- Build their vocabulary
- Express their ideas.
- Write a report.

Appendix 2

SYLLABUS
English for Telecommunications Engineering

Lesson and Topic	Reading Skill Objective	Building Vocabulary	Expansion
1 Introduction to Telecommunication and Means of Communication (Telegraph, Telephone, Radio, Television)	Skimming	Matching	Discussion and Presentation
2 Internet	Scanning	Filling in the Blanks	Discussion and Presentation
3 Satellite	Guessing Word Meaning from context and Recognizing Word Referent	-	Writing an Essay
4 Computer	Making Inferences	Filling in the Blanks	Giving Presentation about Computer
5 Optical Fiber	Skimming	Finding the Synonym of Words	Group Presentation
6 Radar	Scanning	Filling in the Blanks	Writing an Essay about Radar

7 Antenna	Guessing Word Meaning in Context and Recognizing Word Referent	Filling in the Blanks	Writing a Report about Antenna
8 Cellular Phone	Making Inferences	Matching the Terms of Cellular Phone	Writing Discussing Debating
9 GSM and CDMA Technology	Skimming and Scanning	-	Writing Discussing Presenting
10 Modem	Guessing Word Meaning in Context & Recognizing Word Referent and Making Inferences	Filling in the Blanks	Writing an Essay about Modem

Appendix 3

Reading Materials for Telecommunications Engineering (a coursebook)

Lesson 1

Telecommunications: Telegraph, Telephone, Radio and Television

GENERAL OBJECTIVE

After learning this lesson, the students are expected to understand 'skimming' skill.

SPECIFIC OBJECTIVES

After learning this lesson, the students are able to:

(1) use 'skimming' skill in reading English texts
(2) explain about telecommunication and means of communication in English
(3) talk about negative effects of television programs for kids

A. Discuss the Following Questions

1. What do you understand about *telecommunication*?
2. Can you name some traditional means of communication?
3. Why do people no longer use those means of communication?
4. What do you know about telegraph?
5. What do you know about telephone?
6. What do you understand about radio and television?

B. Reading Skill: Skimming

Skimming is the technique to help you catch the main idea of a paragraph/passage quickly or to get the general sense/ideas of a paragraph, passage, article, or book. When you skim, always work as quickly as you can and do not worry about specific details.

For example, answer this question: what is the paragraph about?

> *The telecommunications industry is divided into four main sectors: wired, wireless, satellite, and other telecommunications establishments. The largest sector of the telecommunications industry continues to be made up of wired telecommunications carriers. Establishments in this sector mainly provide telecommunications services such as wired (landline) telephone, digital subscriber line (DSL) internet, and cable TV and internet services. These organizations route TV, voice,*

internet, data, and other content over a network of wires and cables, and control access to this content. They may own and maintain networks, share networks with other organizations, or lease network capacity from other companies. Establishments in the telecommunications industry, however, do not create the content that is transmitted over their networks, such as TV programs. Wired telecommunications also includes direct-to-home satellite television distributors and a variety of other businesses. (adopted from http://www.bls.gov/oco/cg/cgs020.htm)

The first sentence of the paragraph states '*The telecommunications industry is divided into four main sectors: wired, wireless, satellite, and other telecommunications establishments.*' The next sentences mostly talk about 'wired telecommunications' that is part of telecommunication industry. So, we can conclude that 'the paragraph is about telecommunication industry'.

C. Reading

1. Read these questions and then skim passage 1.

1. What is telecommunications?

   _____

   _____

2. How did people communicate in the Middle Ages?

   _____

   _____

3. How do people communicate in this modern age?

   _____

   _____

4. How did telecommunication revolutionize?

   _____

   _____

Passage 1

What is Telecommunication?

Telecommunication is the *transmission* of messages over significant distances for the purpose of communication. In earlier times, telecommunications involved the use of visual smoke signals, *semaphores*, signal flags, the optical *heliograph*, or audio coded messages sent by drumbeats, messages sent with lung-blown horns, or messages sent by loud whistles, for example.

Native Americans are communicating by creating a smoke signal

In the Middle Ages, chains of *beacons* were commonly used on hilltops as a means of relaying a signal. Beacon chains suffered the drawback that they could only pass a single bit of information, so the meaning of the message such as "the enemy has been sighted" had to be agreed upon in advance. One notable instance of their use was during the Spanish Armada, when a beacon chain relayed a signal from Plymouth to London that signaled the arrival of the Spanish warships.

In the modern age of electricity and electronics, telecommunications has typically involved the use of electric means such as the telegraph, the telephone, the *teletype*, the use of *microwave communications*, the use of fiber optics and their associated electronics, and/or the use of the internet. The first breakthrough into modern electrical telecommunications came with the development of the telegraph during the 1830s and 1840s. The use of these electrical means of communications exploded into use on all of the continents of the world during the 19th century, and these also connected the continents via cables on the floors of the ocean.

A revolution in telecommunications into wireless communications began in the first decade of the 20th Century, and in fact, Guglielmo Marconi, who was of Italian and British descent won the Nobel Prize in Physics in 1909 in recognition of his pioneering developments in wireless radio communications. Other early inventors and developers in the field of electrical and electronic telecommunications include Samuel F.B. Morse and Joseph Henry of the United States, Alexander Graham Bell of Canada, Lee de Forest of the U.S. -who invented the amplifying vacuum tube called the triode- Edwin Armstrong of the U.S., and John Logie Baird of England.

adopted from http://en.wikipedia.org/wiki/Telecommunication

2. Read these questions and then skim passage 2.

1. What do you know about the first electrical telegraph? _____

   _____

2. What did Morse and Henry do regarding the telegraph? _____

   _____

3. What is the effect of permanent transatlantic telegraph? _____

   _____

4. What caused transatlantic cable fail? _____

   _____

5. Who is Alexander Graham Bell? _____

   _____

Passage 2

The Telegraph and the Telephone

The first commercial *electrical telegraph* was constructed by Sir Charles Wheatstone and Sir William Fothergill Cooke, and its use began on April 9, 1839. Both Wheatstone and Cooke viewed their device as "an improvement to the [already-existing, so-called] electromagnetic telegraph" not as a new device.

The businessman Samuel F.B. Morse and the physicist Joseph Henry of the United States developed their own, simpler version of the electrical telegraph, independently. Morse successfully demonstrated this system on September 2, 1837. Morse's most important technical contribution to this telegraph was the rather simple and highly-efficient Morse Code, which was an important advance over Wheatstone's telegraph system. The communications efficiency of the Morse Code anticipated that of the Huffman code in digital communications by over 100 years, but Morse had developed his code purely empirically, unlike Huffman, who gave a detailed theoretical explanation of how his method worked.

The first permanent transatlantic telegraph cable was successfully completed on 27 July 1866, allowing transatlantic electrical communication for the first time. An earlier transatlantic cable had operated for a few months in 1859, and among other things, it carried messages of greeting back and forth between President James Buchanan of the United States and Queen Victoria of the United Kingdom.

However, this transatlantic cable failed soon, and the project to lay a replacement line was delayed for five years by the war between the states in the U.S. Also, note that these transatlantic cables would have been completely incapable of carrying telephone calls even if the telephone had been invented by then. The first transatlantic telephone cable (which incorporated hundreds of *electronic amplifiers*) was not ready to be used until 1956.

The conventional telephone now in use worldwide was first patented by Alexander Graham Bell in March 1876. That first patent by Bell was the *master patent* of the telephone, from which all other patents for electric telephone devices and features flowed. Credit for the invention of the electric telephone has been frequently disputed, and new controversies over the issue have arisen from time-to-time. As with other great inventions such as radio, television, the light bulb, and the digital computer, there were several inventors who did pioneering experimental work on *voice transmission over a wire*, and then improved on each other's ideas. However, the really important innovator was Mr. Bell, who first made the telephone utility into a big business with his Bell Telephone Company in the United States, and with Bell Canada.

adopted from http://en.wikipedia.org/wiki/Telecommunication

3. Read these questions and then skim passage 3.

1. How can people communicate through analog telephone? _____

   _____

2. How does analog telephone work? _____

   _____

3. How is the development of mobile phones in the world? _____

   _____

4. What is the benefit of communicating with optic fibers? _____

   _____

5. What is ATM protocol suitable for? _____

   _____

Passage 3

Telephone

In an analog telephone network, the caller is connected to the person he wants to talk to by switches at various *telephone exchanges*. The switches form an electrical connection between the two users and the setting of these switches is determined electronically when the caller dials the number. Once the connection is made, the caller's voice is transformed to an electrical signal using a small microphone in the caller's handset. This electrical signal is then sent through the network to the user at the other end where it is transformed back into sound by a small speaker in that person's handset. There is a separate electrical connection that works in reverse, allowing the users to converse.

The *fixed-line* telephones in most residential homes are analog — that is, the speaker's voice directly determines the signal's voltage. Although short-distance calls may be handled from end-to-end as analog signals, increasingly telephone service providers are transparently converting the signals to digital for transmission before converting them back to analog for reception. The advantage of this is that digitized voice data can travel side-by-side with data from the internet and can be perfectly reproduced in long distance communication (as opposed to analog signals that are inevitably impacted by noise).

Mobile phones have had a significant impact on telephone networks. Mobile phone subscriptions now outnumber fixed-line subscriptions in many markets. Sales of mobile phones in 2005 totaled 816.6 million with that figure being almost equally shared amongst the markets of Asia/Pacific (204 m), Western Europe (164 m), CEMEA (Central Europe, the Middle East and Africa) (153.5 m), North America (148 m) and Latin America (102 m). In terms of new subscriptions over the five years from 1999, Africa has outpaced other markets with 58.2% growth. Increasingly these phones are being serviced by systems where the voice content is transmitted digitally such as *GSM* or *W-CDMA* with many markets choosing to depreciate analog systems such as AMPS.

There have also been dramatic changes in telephone communication behind the scenes. Starting with the operation of TAT-8 in 1988, the 1990s saw the widespread adoption of systems based on optic fibers. The benefit of communicating with optic fibers is that they offer a drastic increase in data capacity. TAT-8 itself was able to carry 10 times as many telephone calls as the last copper cable laid at that time and today's optic fiber cables are able to carry 25 times as many telephone calls as TAT-8. This increase in data capacity is due to several factors. First, optic fibers are physically much smaller than competing technologies. Second, they do not suffer from crosstalk which means several hundred of them can be easily bundled together in a single cable. Lastly, improvements in *multiplexing* have led to an exponential growth in the data capacity of a single fiber.

Assisting communication across many modern optic fiber networks is a protocol known as *Asynchronous Transfer Mode (ATM)*. The ATM protocol allows for the side-by-side data transmission mentioned in the second paragraph. It is suitable for public telephone networks because it establishes a pathway for data through the network and associates a *traffic contract* with that pathway. The traffic contract is essentially an agreement between the client and the network about how the network is to handle the data; if the network cannot meet the conditions of the traffic contract, it does not accept the connection. This is important because telephone calls can negotiate a contract so as to guarantee themselves a constant bit rate, something that will ensure a caller's voice is not delayed in parts or cut-off completely. There are competitors to ATM, such as *Multiprotocol Label Switching (MPLS)*, that perform a similar task and are expected to supplant ATM in the future.

adopted from http://en.wikipedia.org/wiki/Multiprotocol_Label_Switching

4. Read these questions and then skim passage 4.

1. How does a broadcast system work? _____

   _____

2. What is the main advantage of digital compared to analog broadcasts? _____

   _____

3. What do the three digital broadcasting standards have in common? _____

   _____

4. Which country has ended analog television transmission? _____

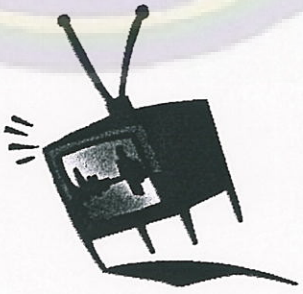
   _____

Passage 4

Radio and Television

In a broadcast system, the central high-powered broadcast tower transmits a high-frequency electromagnetic wave to numerous low-powered receivers. The high-frequency wave sent by the tower is modulated with a signal containing visual or audio information. The receiver is then tuned so as to pick up the high-frequency wave. A demodulator is used to retrieve the signal containing the visual or audio information. The broadcast signal can be either analog (signal is varied continuously with respect to the information) or digital (information is encoded as a set of discrete values).

The broadcast media industry is at a critical turning point in its development, with many countries moving from analog to digital broadcasts. This move is made possible by the production of cheaper, faster and more capable integrated circuits. The chief advantage of digital broadcasts is that they prevent a number of complaints with traditional analog broadcasts. For television, this includes the elimination of problems such as snowy pictures, ghosting, and other distortion. These occur because of the nature of analog transmission, which means that perturbations due to noise will be evident in the final output. Digital transmission overcomes this problem because digital signals are reduced to discrete values upon reception and hence small perturbations do not affect the final output. In a simplified example, if a binary message 1011 was transmitted with signal amplitudes [1.0 0.0 1.0 1.0] and received with signal amplitudes [0.9 0.2 1.1 0.9] it would still decode to the binary message 1011 — a perfect reproduction of what was sent. From this example, a problem with digital transmissions can also be seen in that if the noise is great enough it can significantly alter the decoded message. Using forward error correction a receiver can correct a handful of bit errors in the resulting message but too much noise will lead to incomprehensible output and hence a breakdown of the transmission.



In digital television broadcasting, there are three competing standards that are likely to be adopted worldwide. These are the ATSC, DVB and ISDB standards. All three standards use MPEG-2 for video compression. ATSC uses Dolby Digital AC-3 for audio compression, ISDB uses Advanced Audio Coding (MPEG-2 Part 7) and DVB has no standard for audio compression but typically uses MPEG-1 Part 3

Layer 2. The choice of modulation also varies between the schemes. In digital audio broadcasting, standards are much more unified with practically all countries choosing to adopt the Digital Audio Broadcasting standard (also known as the Eureka 147 standard). The exception is the United States which has chosen to adopt HD Radio. HD Radio, unlike Eureka 147, is based upon a transmission method known as in-band on-channel transmission that allows digital information to "piggyback" on normal AM or FM analog transmissions.

However, despite the pending switch to digital, analog television remains being transmitted in most countries. An exception is the United States that ended analog television transmission (by all but the very low-power TV stations) on the 12th of June 2009 after twice delaying the switch over deadline. For analog television, there are three standards in use for broadcasting color TV. These are known as PAL (British designed), NTSC (North American designed), and SECAM (French designed). It is important to understand that these are the ways from sending color TV, and they do not have anything to do with the standards for black & white TV, which also vary from country to country. For analog radio, the switch to digital radio is made more difficult by the fact that analog receivers are sold at a small fraction of the price of digital receivers. The choice of modulation for analog radio is typically between amplitude modulation (**AM**) or frequency modulation (**FM**). To achieve stereo playback, an amplitude modulated subcarrier is used for stereo FM.

adopted from http://en.wikipedia.org/wiki/Telecommunication#Radio_and_television

D. Vocabulary

Match part 'A' and part 'B'. Write down a letter in part A to the bracket in part B.

Passage 1:

Part A

A. Transmission
B. Semaphore
C. Heliograph
D. Beacon
E. Microwave communications
F. Teletype

Part B

1. A system of conveying information by means of visual signals such as flags. ( )
2. A wireless solar telegraph that signals using Morse code flashes of sunlight reflected by a mirror. ( )
3. The process of sending, propagating and receiving an analogue or digital information signal over a physical point-to-point or point-to-multipoint transmission medium. ( )
4. It is a now largely obsolete electromechanical typewriter that can be used to communicate typed messages from point to point and point to multipoint over a variety of communications channels. ( )
5. An intentionally conspicuous device designed to attract attention to a specific location. ( )
6. It refers to the technology of transmitting information by the use of the radio waves whose wavelengths are conveniently measured in small numbers of centimeters, by using various electronic technologies. ( )

Passage 2:

Part A

A. Electrical telegraph

B. Electronic amplifier

Part B

1. A device for increasing the power of a signal. ( )
2. A telegraph that uses electrical signals. ( )

Passage 3:

Part A

A. W-CDMA (Wideband Code Division Multiple Access)

B. GSM (Global System for Mobile Communications)

C. Asynchronous Transfer Mode (ATM)

D. Traffic contract

E. Multiprotocol Label Switching (MPLS)

D. Multiplexing

E. Telephone exchange

F. Fixed-line

Part B

1. It refers to a telephone line which travels through a solid medium, either metal wire or optical fiber. ( )

2. It is a system of electronic components that connects telephone calls, also called telephone switch. ( )

3. Originally from *Groupe Spécial Mobile,* it is the most popular standard for mobile telephony systems in the world. ( )
4. It is an air interface standard found in 3G mobile telecommunications networks. ( )

5. It is a standardized digital data transmission technology. It is implemented as a network protocol and was first developed in the mid 1980s. ( )

6. It is a process where multiple analog message signals or digital data streams are combined into one signal over a shared medium. ( )

7. If a service (or application) wishes to use a broadband network to transport a particular kind of traffic, it must first inform the network about what kind of traffic is to be transported, and the performance requirements of that traffic. ( )

8. It is a mechanism in high-performance telecommunications networks which directs and carries data from one network node to the next. ( )

Passage 4:

Part A

A. Modulation

B. Demodulation

C. Integrated circuit

D. Amplitude modulation (AM)

E. Frequency modulation (FM)

Part B

1. It is a miniaturized electronic circuit (consisting mainly of semiconductor devices, as well as passive components) that has been manufactured in the surface of a thin substrate of semiconductor material. ( )

2. It is a technique used in electronic communication, most commonly for transmitting information via a radio carrier wave. It works by varying the strength of the transmitted signal in relation to the information being sent. ( )

3. It conveys information over a carrier wave by varying its frequency. ( )

4. It is the process of conveying a message signal, for example a digital bit stream or an analog audio signal, inside another signal that can be physically transmitted. ( )

5. It is the act of extracting the original information-bearing signal from a modulated carrier wave. ( )

E. Expansion

Make a group of five. Discuss the following topic:

"What are the negative effects of television programs for kids and how to avoid those negative effects."

After discussing, present your opinion.

Lesson 2

Internet

GENERAL OBJECTIVE

After learning this lesson, the students are expected to understand 'scanning' skill.

SPECIFIC OBJECTIVES

After learning this lesson, the students are able to:

(1) use 'scanning' skill in reading English texts
(2) understand some vocabularies about internet
(3) talk about negative effects of internet for children and teenagers

A. Discuss the following questions

1. What do you understand about internet?
2. What benefits can people get from internet?

B. Reading Skill: Scanning

Scanning is a strategy you apply when you are looking for a specific piece of information from a passage or reading text. When you scan, do not read every word, only key words that will answer your question.

For example, read the following questions and then read the paragraph to find the answers.

1. What is a host?

2. What online service that offers access to some internet services?

The internet is a global network connecting millions of computers. More than 100 countries are linked into exchanges of data, news and opinions. Unlike online services, which are centrally controlled, the internet is decentralized by design. Each internet computer, called a host, is independent. Its operators can choose which internet services to use and which local services to make available to the global internet community. Remarkably, this anarchy by design works exceedingly well. There are a variety of ways to access the internet. Most online services, such as

America Online, offer access to some internet services. It is also possible to gain access through a commercial Internet Service Provider (ISP).

To answer the first question, you have to read the paragraph quickly to find the word 'host' as a key word, while from the second question you have to find the phrase 'offer access to some internet services'. By finding only key words, you will be able to answer the questions more quickly. This is what you do in scanning.

C. Reading

1. Read these questions and then scan passage 1 to find the correct answers.

1. What carries a vast array of information resources and services?
2. What are the examples of traditional communications media?
3. What are the forms of newspaper publishing?
4. When did the United States fund research projects of its military agencies to build robust, fault-tolerant and distributed computer networks?
5. What happened in 1990s?
7. What is the name of organization that directs two principal name spaces in the internet?

Passage 1
Internet

The internet is a global system of interconnected computer networks that use the standard *Internet Protocol Suite* (TCP/IP) to serve billions of users worldwide. It is a network of networks that consists of millions of private, public, academic, business, and government networks of local to global scope that are linked by a broad array of electronic and optical networking technologies. The internet carries a vast array of information resources and services, most notably the inter-linked *hypertext* documents of the *World Wide Web* (WWW) and the infrastructure to support *electronic mail.*

Most traditional communications media, such as telephone and television services, are reshaped or redefined using the technologies of the internet, giving rise to services such as *Voice over Internet Protocol* (VoIP) and IPTV. Newspaper publishing has been reshaped into web, blogging, and *web feeds*. The Internet has enabled or accelerated the creation of new forms of human interactions through instant messaging, internet forums, and social networking sites.

The origins of the internet reach back to the 1960s when the United States funded research projects of its military agencies to build robust, fault-tolerant and distributed computer networks. This research and a period of civilian funding of a new U.S. *backbone* by the National Science Foundation spawned worldwide participation in the development of new networking technologies and led to the commercialization of an international network in the mid 1990s, and resulted in the following popularization of countless applications in virtually every aspect of modern human life. As of 2009, an estimated quarter of Earth's population uses the services of the internet.

The internet has no centralized governance in either technological implementation or policies for access and use; each constituent network sets its own standards. Only the overreaching definitions of the two principal name spaces in the internet, the Internet Protocol address space and the *Domain Name System*, are directed by a maintainer organization, the Internet Corporation for Assigned Names and Numbers (ICANN).

adopted from http://en.wikipedia.org/wiki/Internet

2. Scan passage 2 below, and match part A and part B. Put the letter in part B to the line in part A. Work quickly.

Part A

Year:

1. _____ 1950
2. _____ 1957
3. _____ 1958
4. _____ 1962
5. _____ 1965
6. _____ 1968
7. _____ 1969
8. _____ 1970
9. _____ 1971
10. _____ 1974
11. _____ 1985
12. _____ 1988
13. _____ 1989
14. _____ 1993
15. _____ 1996

Part B

Event:

A After interested in information technology, Licklider moved from the Psycho-Acoustic Laboratory at Harvard University to MIT.

B. A British scientist, Tim Berners-Lee, invented World Wide Web.

C. The National Center for Supercomputing Applications at the University of Illinois released version 1.0 of Mosaic web browser.

D. Leonard Kleinrock, a professor of UCLA, provided the theoretical foundations for packet networks.

E. Davies built a packet switched network in the UK called the Mark I.

F. A paper on TCP protocols written by Cerf and Kahn was published.

G. Taylor approved a report called Resource Sharing Computer Networks which was prepared by Roberts.

H. National Science Foundation commissioned the construction of the NSFNET.

I. Fifteen sites were already connected to ARPANET.

J. Lawrence Roberts started a project to make a network, and he based the technology on the work of Paul Baran, who had written an exhaustive study for the United States Air Force.

K. The word *internet* had become commonplace.

L. It began the opening of the network to commercial interests.

M. The USA created ARPA to regain a technological lead.

N. ARPANET, which is the interconnection between Kleinrock's Network Measurement Center and Douglas Engelbart's NLS system, appeared.

O. Licklider became a Vice President at BBN.

Passage 2

History of Internet

The USSR's launch of Sputnik spurred the United States to create the Advanced Research Projects Agency (ARPA or DARPA) in February 1958 to regain a technological lead. ARPA created the Information Processing Technology Office (IPTO) to further the research of the Semi Automatic Ground Environment (SAGE) program, which had networked country-wide radar systems together for the first time. The IPTO's purpose was to find ways to address the US Military's

concern about survivability of their communications networks, and as a first step to interconnect their computers at the Pentagon, Cheyenne Mountain, and SAC headquarters. J. C. R. Licklider, a promoter of universal networking, was selected to head the IPTO. Licklider moved from the Psycho-Acoustic Laboratory at Harvard University to MIT in 1950 after becoming interested in information technology. At MIT, he served on a committee that established Lincoln Laboratory and worked on the SAGE project. In 1957 he became a Vice President at BBN, where he bought the first production PDP-1 computer and conducted the first public demonstration of time-sharing.

At the IPTO, Licklider's successor Ivan Sutherland in 1965 got Lawrence Roberts to start a project to make a network. Roberts based the technology on the work of Paul Baran, who had written an exhaustive study for the United States Air Force that recommended packet switching (opposed to circuit switching) to achieve better network robustness and disaster survivability. Roberts had worked at the MIT Lincoln Laboratory originally established to work on the design of the SAGE system. UCLA professor Leonard Kleinrock had provided the theoretical foundations for packet networks in 1962, and later, in the 1970s, for hierarchical routing, concepts which have been the underpinning of the development towards today's internet.

Sutherland's successor Robert Taylor convinced Roberts to build on his early packet switching successes and be the IPTO Chief Scientist. Once there, Roberts prepared a report called Resource Sharing Computer Networks which was approved by Taylor in June 1968 and laid the foundation for the launch of the working ARPANET the following year.

After much work, the first two nodes of what would become the ARPANET were interconnected between Kleinrock's Network Measurement Center at the UCLA's School of Engineering and Applied Science and Douglas Engelbart's NLS system at SRI International (SRI) in Menlo Park, California, on October 29, 1969. The third site on the ARPANET was the Culler-Fried Interactive Mathematics centre at the University of California at Santa Barbara, and the fourth was the University of Utah Graphics Department. In an early sign of future growth, there were already fifteen sites connected to the young ARPANET by the end of 1971.

The ARPANET was one of the "eve" networks of today's internet. In an independent development, Donald Davies at the UK National Physical Laboratory also discovered the concept of packet switching in the early 1960s, first giving a talk on the subject in 1965, after which the teams in the new field from two sides of the Atlantic ocean first became acquainted. It was actually Davies' coinage of the wording "packet" and "packet switching" that was adopted as the standard

terminology. Davies also built a packet switched network in the UK called the Mark I in 1970.

Following the demonstration that packet switching worked on the ARPANET, the British Post Office, Telenet, DATAPAC and TRANSPAC collaborated to create the first international packet-switched network service. In the UK, this was referred to as the International Packet Switched Service (IPSS), in 1978. The collection of X.25-based networks grew from Europe and the US to cover Canada, Hong Kong and Australia by 1981. The X.25 packet switching standard was developed in the CCITT (now called ITU-T) around 1976.

The early ARPANET ran on the Network Control Program (NCP), a standard designed and firstly implemented in December 1970 by a team called the Network Working Group (NWG) led by Steve Crocker. To respond to the network's rapid growth as more and more locations connected, Vinton Cerf and Robert Kahn developed the first description of the now widely used TCP protocols during 1973 and published a paper on the subject in May 1974. Use of the term "internet" to describe a single global TCP/IP network originated in December 1974 with the publication of RFC 675, the first full specification of TCP that was written by Vinton Cerf, Yogen Dalal and Carl Sunshine, then at Stanford University. During the next nine years, work proceeded to refine the protocols and to implement them on a wide range of operating systems. The first TCP/IP-based wide-area network was operational by January 1, 1983 when all hosts on the ARPANET were switched over from the older NCP protocols. In 1985, the United States' National Science Foundation (NSF) commissioned the construction of the NSFNET, a university 56 kilobit/second network backbone using computers called "fuzzballs" by their inventor, David L. Mills. The following year, NSF sponsored the conversion to a higher-speed 1.5 megabit/second network. A key decision to use the DARPA TCP/IP protocols was made by Dennis Jennings, then in charge of the supercomputer program at NSF.

The opening of the network to commercial interests began in 1988. The US Federal Networking Council approved the interconnection of the NSFNET to the commercial MCI Mail system in that year and the link was made in the summer of 1989. Other commercial electronic e-mail services were soon connected, including OnTyme, Telemail and Compuserve. In that same year, three commercial Internet Service Providers (ISPs) were created: UUNET, PSINet and CERFNET. Networks that offered gateways then merged with the internet, including Usenet and BITNET. Various other commercial and educational networks, such as Telenet, Tymnet, Compuserve and JANET were interconnected with the growing internet. Telenet (later called Sprintnet) was a large privately funded national computer network with free dial-up access in cities throughout the U.S. that had been in operation since the 1970s. This network was eventually interconnected with the

others in the 1980s as the TCP/IP protocol and became increasingly popular. The ability of TCP/IP to work over virtually any pre-existing communication networks allowed for a great ease of growth, although the rapid growth of the internet was due primarily to the availability of an array of standardized commercial routers from many companies, the availability of commercial Ethernet equipment for local-area networking, and the widespread implementation and rigorous standardization of TCP/IP on UNIX and virtually every other common operating system.

Although the basic applications and guidelines that make the internet possible had existed for almost two decades, the network did not gain a public attention until the 1990s. On 6 August 1991, CERN, a pan European organization for particle research, publicized the new World Wide Web project. The Web was invented by British scientist Tim Berners-Lee in 1989. An early popular web browser was ViolaWWW, patterned after HyperCard and built using the X Window System. It was eventually replaced in popularity by the Mosaic web browser. In 1993, the National Center for Supercomputing Applications at the University of Illinois released version 1.0 of Mosaic, and by late 1994 there was growing public interest in the previously academic, technical internet. By 1996 use of the word *internet* had become commonplace, and consequently, so had its use as a synecdoche in reference to the World Wide Web.

Meanwhile, over the course of the decade, the internet successfully accommodated the majority of previously existing public computer networks (although some networks, such as FidoNet, have remained separate). During the 1990s, it was estimated that the internet grew by 100 percent per year, with a brief period of explosive growth in 1996 and 1997. This growth is often attributed to the lack of central administration, which allows organic growth of the network, as well as the non-proprietary open nature of the internet protocols, which encourages vendor interoperability and prevents any one company from exerting too much control over the network. The estimated population of internet users was 1.67 billion as of June 30, 2009.

adapted from http://en.wikipedia.org/wiki/Internet

3. You are going to make a report on the uses of internet nowadays, and you find an article. Read each question and then scan the article (passage 3) to find the correct answers.

1. Mention some tools people use to connect to the internet.

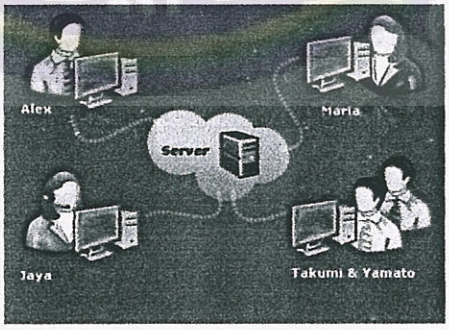
2. What benefit do some big companies get from the internet?

3. How can the internet revolutionize shopping?
4. How does the internet facilitate personalized marketing?
5. What are some examples of online communities for personalized marketing?
6. What can collaborative software do?
7. What are the examples of internet effect to social and political aspect?
8. What are the examples of free software to access the internet?
9. What does the internet allow its users to do?
10. What can a secure PVN do to an office worker away from his desk?

Passage 3

Modern Uses of Internet

The internet allows greater flexibility in working hours and location, especially with the spread of unmetered high-speed connections and *web applications*. Now the internet can be accessed almost anywhere by numerous means, especially through mobile internet devices. Mobile phones, datacards, handheld game consoles and *cellular routers* allow users to connect to the internet from anywhere when there is a wireless network supporting that device's technology. Within the limitations imposed by small screens and other limited facilities of such pocket-sized devices, services of the internet, including email and the web, may be available. Service providers may restrict the services offered and wireless data transmission charges may be significantly higher than other access methods.



The internet has also become a large market for companies. Some of the biggest companies today have grown by taking advantage of the efficient nature of low-cost advertising and commerce through the internet, also known as e-commerce. It is the fastest way to spread information to a vast number of people

simultaneously. The internet has also subsequently revolutionized shopping. For example, a person can order a CD online and receive it in the mail within a couple of days, or *download* it directly in some cases. The internet has also greatly facilitated personalized marketing which allows a company to market a product to a specific person or a specific group of people more so than any other advertising medium. Examples of personalized marketing include online communities such as MySpace, Friendster, Facebook, Twitter, Orkut and others which thousands of internet users join to advertise themselves and make friends online. Many of these users are young teens and adolescents ranging from 13 to 25 years old. In turn, when they advertise themselves they advertise interests and hobbies, which online marketing companies can use as information as to what those users will purchase online, and advertise their own companies' products to those users.

The low cost and nearly instantaneous sharing of ideas, knowledge, and skills has made collaborative work dramatically easier, with the help of collaborative software. Not only can a group cheaply communicate and share ideas, but the wide reach of the internet also allows such groups to easily form in the first place. An example of this is the free software movement, which has produced, among other programs, Linux, Mozilla Firefox, and OpenOffice.org. Internet "chat", whether in the form of *IRC* chat rooms or channels, or via instant messaging systems, allow colleagues to stay in touch in a very convenient way when working at their computers during the day. Messages can be exchanged even more quickly and conveniently than via e-mail. Extensions to these systems may allow files to be exchanged, "whiteboard" drawings to be shared, or voice and video contact to be possible between team members.

Version control systems allow collaborating teams to work on shared sets of documents without either accidentally overwriting each other's work or having members wait until they get "sent" documents to be able to make their contributions. Business and project teams can share calendars as well as documents and other information. Such collaboration occurs in a wide variety of areas including scientific research, software development, conference planning, political activism, and creative writing. Social and political collaboration is also becoming more widespread as both internet access and *computer literacy* grow. From the *flash mob* 'events' of the early 2000s to the use of social networking in the 2009 Iranian election protests, the internet allows people to work together more effectively and in many more ways than was possible without it.

The internet allows computer users to remotely access other computers and information stores easily, wherever they may be across the world. They may do this with or without the use of security, authentication and encryption technologies, depending on the requirements. This is encouraging new ways of working from home as well as collaboration and information sharing in many

industries. An accountant sitting at home can audit the books of a company based in another country, on a *server* situated in a third country that is remotely maintained by IT specialists in a fourth. These accounts could have been created by home-working bookkeepers, in other remote locations, based on information e-mailed to them from offices all over the world. Some of these things were impossible before the widespread use of the internet, but the cost of private *leased lines* would have made many of them infeasible in practice. An office worker away from his desk, perhaps on the other side of the world on a business trip or a holiday, can open a remote desktop session into his normal office PC using a secure *Virtual Private Network* (VPN) connection via the internet. This gives the worker complete access to all of his or her normal files and data, including e-mail and other applications, while away from the office. This concept is also referred to by some network security people as the Virtual Private Nightmare, because it extends the secure perimeter of a corporate network into its employees' homes.

adopted from http://en.wikipedia.org/wiki/Internet

D. Vocabulary

There are a lot of terms of the internet. Match the terms in the box with their definition.

Passage 1

internet protocol suite	hypertext	world wide web
electronic mail		

1. _____ is a method of exchanging digital messages. Its systems are based on a store-and-forward model in which e-mail server computer systems accept, forward, deliver and store messages on behalf of users.

2. _____ is text displayed on a computer or other electronic device with references (hyperlinks) to other text that the reader can immediately access, usually by a mouse click or keypress sequence.

3. _____ is the set of communications protocols used for the internet and other similar networks.

4. _____ is a system of interlinked hypertext documents contained on the internet.

voice over internet protocol (VoIP)	web feed
network backbone	domain name system (DNS)

5. _____ is a data format used for providing users with frequently updated content.

6. _____ is a general term for a family of transmission technologies for delivery of voice communications over IP networks such as the Internet or other packet-switched networks.

7. _____ is a part of computer network infrastructure that interconnects various pieces of network, providing a path for the exchange of information between different LANs or subnetworks.

8. _____ is a hierarchical naming system for computers, services, or any resource connected to the internet or a private network.

Passage 3

Internet Relay Chat (IRC)	download	revision control
web application	cellular routers	

1. _____ is an application that is accessed via a web browser over a network such as the internet or an intranet.

2. _____ are routers that provide shared internet access by incorporating a cellular data modem and providing traditional interfaces like Ethernet and WiFi.

3. _____ means to receive data to a local system from a remote system, or to initiate such a data transfer.

4. _____ is a form of real-time internet text messaging (chat) or synchronous conferencing. It is mainly designed for group communication in discussion forums, called *channels.*

5. _____,also known as version control, source control or software configuration management (SCM), is the management of changes to documents, programs, and other information stored as computer files.

computer literacy	server	flash mob	leased line
Virtual Private Network (VPN)			

6. _____ is a large group of people who assemble suddenly in a public place, perform an unusual and pointless act for a brief time, then quickly disperse.

7. _____ is defined as the knowledge and ability to use computers and technology efficiently.

8. _____ is any combination of hardware or software designed to provide services to clients.

9. _____ is a symmetric telecommunications line connecting two locations. It is sometimes known as a 'Private Circuit' or 'Data Line' in the UK or as CDN (Circuito Diretto Numerico) in Italy.

10. _____ is a computer network that is layered on top of an underlying computer network.

E. Expansion

What are the negative effects of internet for children and/or teenagers. Discuss in group and then present your group opinion.

Lesson 3

Satellite

GENERAL OBJECTIVE

After learning this lesson, the students are expected to understand 'guessing word meaning from context and recognizing word referent' skill.

SPECIFIC OBJECTIVES

After learning this lesson, the students are able to:

(1) guess word meaning from context of English texts
(2) recognize word referent of English texts
(3) write paragraphs about satellite

A. Discuss the following questions.

1. What do you know about satellite?

2. Why is satellite important in telecommunications?

B. Reading Skill

1. Guessing Word Meaning in Context

When reading, we can guess the meaning of an unknown word by using the context – the text surrounding the text. There are two ways we can do.

1. We can guess the meaning of a word from the other words in the sentence.

   Example:

   Try to guess the meaning of *orbit* in the following sentence taken from the first paragraph of passage 1.

   In the context of spaceflight, a satellite is an object which has been placed into **orbit**, the gravitationally curved path of one object around a point or another body, by human endeavor.

We can guess the meaning of *orbit* by looking at a phrase between commas after that word. Besides commas, sometimes the writer uses dash (-) to explain a word.

2. We can guess the meaning of an unknown word by reading several sentences.

   Example:

   Try to guess the meaning of *space debris* by reading following sentences taken from the second paragraph of passage 2.

   1. A few hundred satellites are currently operational, whereas thousands of unused satellites and satellite fragments orbit the Earth as space debris.
   2. Space debris is also known as orbital debris, space junk and space waste.
   3. It is the collection of objects in orbit around the earth that were created by humans but no longer serve any useful purpose.

   From the last sentence we can guess what *space debris* is.

2. Recognizing Words That Connect Ideas

To understand the words of a reading passage, we also need to pay attention to the connecting words. One of connecting words mostly used is pronouns. Writers use pronouns instead of repeating the similar word. Pronouns can be singulars or plurals.

Here is a list of some commonly used pronouns:

he, she, it, we, you, they, who
me, him, her, us, them
my, your, her, his, our, their, its
myself, yourself, herself, himself, itself
this, these, that, those, there

Example:

On July 29, 1955, the White House announced the project to launch a satellite by the spring of 1958. *This* became known as Project Vanguard. On July 31, the Soviets announced that *they* intended to launch a satellite by the fall of 1957.

What does *this* refer to?

What does *they* refer to?

Answer:

This refers to the project.

They refers to the Soviets.

The project is the referent for *this.*

The Soviets is the referent for *they*

C. Reading

1. Guess the meaning of each word from the context of passage 1. Don't use dictionary.

1. What does *space probes* mean? _____

   _____

2. What does *communications satellite* mean? _____

   _____

3. What does a *space station* mean? _____

   _____

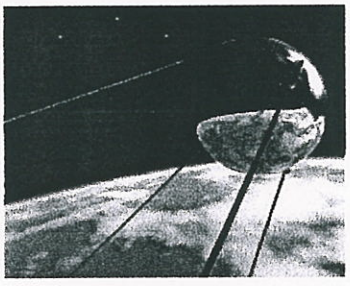
4. What does *low earth orbit* mean? _____

   _____

Passage 1

Satellite

In the context of spaceflight, a satellite is an object which has been placed into orbit, the gravitationally curved path of one object around a point or another body, by human endeavor. Such objects are sometimes called artificial satellites to distinguish them from natural satellites such as the Moon.



Sputnik 1

Sputnik 1, the first artificial satellite was launched by the Soviet Union in 1957. By 2010 thousands of satellites have been launched into orbit around the earth. These satellites originate from more than 50 countries and have used the satellite launching capabilities of ten nations. A few hundred satellites are currently operational, whereas thousands of unused satellites and satellite fragments orbit the earth as space debris. Space debris is also known as orbital debris, space junk, and space waste. It is the collection of objects in orbit around earth that were created by humans but no longer serve any useful purpose. A few *space probes* - a scientific space exploration mission - have been placed into orbit around other bodies and become artificial satellites to the Moon, Venus, Mars, Jupiter and Saturn.

Satellites are used for a large number of purposes. Common types of satellites include military and civilian earth observation satellites, *communications satellites*, navigation satellites, weather satellites, and research satellites. A communications satellite is sometimes abbreviated to COMSAT. It is an artificial satellite stationed in space for the purpose of telecommunications.

A Space station, an artificial structure designed for humans to live and work in outer space for a period of time, and human spacecraft in orbit are also satellites. Satellite orbits vary greatly, depending on the purpose of the satellite. They are classified in a number of classes. The well-known classes include *low earth orbit*, polar orbit, and geostationary orbit. The first class abbreviated to LEO is generally defined as an orbit within the locus extending from the Earth's surface up to an altitude of 2,000 km.

Satellites are usually semi-independent computer controlled systems. Satellite subsystems attend many tasks. Those tasks include power generation, thermal control, telemetry, attitude control, and orbit control.

adapted from http://en.wikipedia.org/wiki/Satellite

2. Guess the meaning of each word from the context of the sentence/sentences below. Don't use dictionary.

1. What does *track* mean? _____

   The United States Space Surveillance Network (SSN) has been *tracking* space objects since 1957 when the Soviets opened the space age with the launch of Sputnik I. Since then, the SSN has *tracked* more than 26,000 space objects orbiting Earth. The SSN currently *tracks* more than 8,000 man-made orbiting objects.

2. What does *rely on* mean? _____

Many more countries have the capability to design and build satellites, but they are unable to launch those satellites. Instead, the countries *rely on* foreign launch services.

3. What does *hack* mean? _____

In recent times satellites have been *hacked* by militant organizations to broadcast propaganda and to steal classified information from military communication networks.

4. What does *eliminate* mean? _____

As test, satellites in low earth orbit have been destroyed by ballistic missiles launched from earth. Russia, the United States, and China have demonstrated the ability to *eliminate* satellites. In 2007 the Chinese military shot down an aging weather satellite, followed by the US Navy shooting down a defunct spy satellite in February 2008.

5. What does *precipitation* mean? _____

Satellite communications are affected by moisture and various forms of *precipitation* such as rain or snow in the signal path between end users or ground stations.

6. What does *propagate* mean? _____

The radio signal width between two ground satellite dish receivers is not perfectly straight and uniform, as if it were a beam of light. As the signal *propagates* away from the transmitting dish, it widens towards the center point between the two dishes and then narrows again as it approaches the receiving dish.

7. What does *coverage* mean? _____

A satellite phone is a type of mobile phone that connects to orbiting satellites instead of terrestrial cell sites. Depending on the architecture of a particular system, *coverage* may include the entire earth, or only specific regions.

8. What does *distinguishable* mean? _____

More recent satellite phones are similar in size to a regular mobile phone while some prototype satellite phones have no *distinguishable* difference from an ordinary smartphone.

9. What does *reception* mean? _____

Internet service satellite phones have notoriously poor *reception* indoors, though it may be possible to get a consistent signal near a window or in the top floor of a building.

10. What does *resident* mean? _____

In Australia, *residents* of remote areas may apply for a government subsidy for a satellite phone, whereas people living in urban areas do not get a government subsidy.

11. What does *obstacle* mean? _____

One problem of geostationary satellite systems is that in many areas—even where a large amount of open sky is present—the line-of-sight between the phone and the satellite is broken by *obstacles* such as steep hills and forest. The user will need to find an area with line-of-sight before being able to use the phone.

12. What does *subscriber* mean? _____

Two such systems, both based in the United States started up in the late 1990s but soon went into bankruptcy after they failed to gain the number of *subscribers* required to fund the large satellite launch costs. They are now operated by new owners who bought the assets for a fraction of their original cost and are now both planning to launch replacement constellations supporting higher bandwidth.

13. What does *particular* mean? _____

Since satellite phones are purposely built for one *particular* network and cannot be switched to other networks, the price of handsets varies with the performance of the network.

14 What does *various* mean? _____

Satellite TV providers get programming from *various* international turnaround channels such as HBO, ESPN and CNN, STAR TV, SET, B4U and *various* local channels such as SaBe TV, Sahara TV, Doordarshan, etc.

15. What does *cannot afford* mean? _____

Satellite television has been far more successful in Africa than cable TV, primarily because the infrastructure for cable television does not exist and would be expensive to install since majority of Africans *cannot afford* paid cable television. Furthermore, maintaining a cable network is expensive due to the need to cover larger and more sparsely populated areas.

3. In each paragraph, the pronouns are underlined. Write the referent for each pronoun on the lines below.

Satellite Television

Satellite television is television delivered by the means of communications satellite and received by a satellite dish and set-top box. In many areas of the world it (1) provides a wide range of channels and services, often to areas that are not serviced by terrestrial or cable providers. The first satellite television signal was relayed from Europe to the Telstar satellite over North America in 1962. The first geosynchronous communication satellite was Syncom 2. It (2) was launched in 1963.

1. It _____ 2. It _____

The world's first commercial communication satellite was called Intelsat I, nicknamed as Early Bird. It (3) was launched into synchronous orbit on April 6, 1965. The first national network of satellite television, called Orbita, was created in Soviet Union in 1967, and it (4) was based on the principle of using the highly elliptical Molniya satellite for re-broadcasting and delivering of TV signal to ground downlink stations. The first domestic North American satellite to carry television was Canada's geostationary Anik 1. It (5) was launched in 1972. ATS-6, the world's first experimental educational and Direct Broadcast Satellite, was launched in 1974. The first Soviet geostationary satellite to carry Direct-To-Home television was launched in 1976. It (6) was named Ekran.

3. It _____ 4. It _____

5. It _____ 6. It _____

Today, most satellite TV customers in developed television markets get their (7) programming through a direct broadcast satellite (DBS) provider, such as DISH TV or DTH platform. The provider selects programs and broadcasts them (8) to subscribers as a set package. Basically, the provider's goal is to bring dozens or even hundreds of channels to its (9) customers' television in a form that approximates the competition from Cable TV. Unlike earlier programming, the provider's broadcast is completely digital, which means it (10) has high picture and stereo sound quality. Early satellite television was broadcast in C-band - radio in the 3.4-gigahertz (GHz) to 7 GHz frequency range. Digital broadcast satellite

transmits programming in the K_u frequency range (10 GHz to 14 GHz). There are five major components involved in a direct to home (DTH) satellite system: the programming source, the broadcast center, the satellite, the satellite dish and the receiver. (adapted from http://en.wikipedia.org/wiki/Satellite_television)

7. Their _____ 8. Them _____

9. Its _____ 10. It _____

Satellite Dish

A satellite dish is a type of parabolic antenna designed to receive microwave from communications satellites. They (1) transmit data transmissions or broadcasts, such as satellite television. The parabolic shape of a dish reflects the signal to the dish's focal point. Mounted on brackets at the dish's focal point is a device called a feedhorn. It (2) is essentially the front-end of a waveguide that gathers the signals at or near the focal point and 'conducts' them (3) to a low-noise block downconverter or LNB. The LNB converts the signals from electromagnetic or radio waves to electrical signals and shifts the signals from the downlinked C-band and/or K_u-band to the L-band range. Direct broadcast satellite dishes use an LNBF. It (4) integrates the feedhorn with the LNB.

1. They _____ 2. It _____

3. Them _____ 4. It _____

The theoretical gain of a dish increases as the frequency increases. The actual gain depends on many factors. They (5) include surface finish, accuracy of shape, and feedhorn matching. A typical value for a consumer type 60 cm satellite dish at 11.75 GHz is 37.50 dB. With lower frequencies, dish designers have a wider choice

of materials. For the large size of dish required for lower frequencies, they (6) use metal mesh. At higher frequencies, mesh type designs are rarer though some designs have used a solid dish with perforations. A common misconception is that the LNBF (low-noise block/feedhorn), the device at the front of the dish, receives the signal directly from the atmosphere. For instance, one BBC News countdown shows a "red data stream" being received by the LNBF directly instead of being beamed to the dish, which because its (7) parabolic shape will collect the signal into a smaller area and deliver it (8) to the LNBF.

5. They _____ 6. They _____

7. Its _____ 8. It _____

Modern dishes intended for home television use are generally 43 cm (18 in) to 80 cm (31 in) in diameter, and they (9) are fixed in one position, for Ku-band reception from one orbital position. Prior to the existence of direct broadcast satellite services, home users would generally have a motorised C-band dish. It (10) is up to 3 metres in diameter for reception of channels from different satellites. Overly small dishes can still cause problems, however, including rain fade and interference from adjacent satellites. (adopted from http://en.wikipedia.org/Wiki/ satellite_dish)

9. They _____ 10. It _____

Learning from Failure

It is almost a rite of passage that an Indian launch vehicle runs into trouble in its (1) first flight. The country's very first attempt to launch a satellite failed in August 1979 when the SLV-3 rocket went out of control and ended up in the Bay of Bengal. A year later, those problems were sorted out and the rocket put a 35-kg Rohini satellite into orbit. The Indian Space Research Organisation had to cope with two successive failures with the Augmented Satellite Launch Vehicle (ASLV) before its (2) third flight in 1992 went smoothly.

In 1993, a series of technical shortcomings coalesced and the first flight of the Polar Satellite Launch Vehicle (PSLV) ended in failure. Those issues were swiftly resolved and the PSLV has become known for its (3) ability to carry out a wide range of missions with rugged reliability. The first launch of the Geosynchronous Satellite Launch Vehicle (GSLV) nine years ago, using a Russian-made cryogenic upper stage, was, to some extent, the exception. Although the GSAT-1 satellite was put into orbit, a small under-performance of the cryogenic stage meant that it

was not the planned orbit. Attempts to move the satellite using its (4) own thrusters were not successful and the satellite was ultimately abandoned.

Despite such a history, the failure of Thursday's GSLV launch with the country's first indigenous cryogenic engine and stage came as a bolt from the blue. The engine and later the full stage have gone through extensive testing on the ground in the course of their development. After the unsuccessful flight, the ISRO chairman, K. Radhakrishnan, initially suggested that two small cryogenic steering engines, which swivel to maintain the rocket's orientation, might have malfunctioned. Later he (5) indicated that the main cryogenic engine itself might not have ignited. In such a complex system as the cryogenic stage, even a small defect that escapes attention is sufficient to doom the flight. But the space agency would be unwise to confine its (6) analysis to problems encountered with the indigenous cryogenic stage. This is an opportunity for a thorough examination of the entire GSLV rocket and its (7) past five flights. There have, for instance, been problems with the Vikas liquid-propellant engine in previous flights. The procedures for the manufacture, assembly, and pre-flight testing of all liquid propellant engines and stages need particular attention. A comprehensive review would best ensure the future reliability of the GSLV.

adopted from http://beta.thehindu.com/opinion/editorial/article399252.ece

1. Its _____
2. Its _____
3. Its _____
4. Its _____
5. he _____
6. Its _____
7. Its _____

D. Vocabulary

Fill in the blanks with the words provided in the box

A. used	B. fully	C. transmitted	D. determine
E. provide	F. process	G. operational	H. expand

Global Navigation Satellite Systems

Global Navigation Satellite Systems (GNSS) is the standard generic term for satellite navigation systems ("sat nav") that (1) _____ autonomous geo-spatial positioning with global coverage. GNSS allows small electronic receivers to (2) _____ their location (longitude, latitude, and altitude) to within a few metres using time signals (3) _____ along a line-of-sight by radio from satellites. Receivers calculate the precise time as well as position, which can be (4) _____ as a reference for scientific experiments.

As of 2010, the United States NAVSTAR Global Positioning System (GPS) is the only (5) _____ operational GNSS. The Russian GLONASS is a GNSS in the (6) _____ of being restored to full operation (21 of 24 satellites are operational). The European Union's Galileo positioning system is a GNSS in initial deployment phase, scheduled to be (7) _____ in 2014. The People's Republic of China has indicated it will (8) _____ its regional Beidou navigation system into the global Compass navigation system by 2010. The global coverage for each system is generally achieved by a constellation of 20–30 Medium Earth Orbit (MEO) satellites spread between several orbital planes.

http://en.wikipedia.org/wiki/Global_Navigation_Satellite_System

E. Expansion

Write 2-paragrah essay. First paragraph talks about what satellite is, and second paragraph talks about why satellite is important for our life.

Lesson 4

Computer

GENERAL OBJECTIVE

After learning this lesson, the students are expected to understand 'making inferences' skill.

SPECIFIC OBJECTIVES

After learning this lesson, the students are able to:

(1) make inferences of English texts
(2) talk and present about computer

A. Discuss the following questions.

1. What is computer?
2. What are the uses of computer in our life?
3. What can you predict to human's life nowadays if there is no computer?

B. Reading Skill: Making Inferences

Readers sometimes act just like a detective. They infer when reading. In making inferences, they look for clues found in the reading texts and guess what the writer means. Making inferences is important when the writer does not state his ideas directly.

Read passage 1 quickly.

Passage 1

Computer

A computer is a programmable machine. It can receive input, store data, manipulate data, and provide output in a useful format. Although mechanical examples of computers have existed through much of recorded human history, the first electronic computers were developed in the mid-20th century (1940–1945).

These were the size of a large room, and they consumed as much power as several hundred modern personal computers (PCs).

Modern computers that are based on integrated circuits (IC) are millions to billions of times more capable than the early machines, and they occupy a fraction of the space. Simple computers are small enough to fit into small pocket devices, and can be powered by a small battery. Personal computers in their various forms are icons of the Information Age and are what most people think as "computers". However, the embedded computers are found in many devices from MP3 players to fighter aircraft and from toys to industrial robots, and they are actually the most numerous.

The ability to store and execute lists of instructions called programs makes computers extremely versatile, distinguishing them from calculators. In fact any computer with a certain minimum capability is, in principle, capable of performing the same tasks that any other computer can perform. Therefore computers ranging from a netbook to a supercomputer are all able to perform the same computational tasks if they are given enough time and storage capacity.

adapted from http://en.wikipedia.org/wiki/Computer

After reading the passage, answer this question:

How do you compare early computer and modern computer?

The passage doesn't clearly mention the differences between early computer and modern computer, but the passage gives clues about the differences such as size and speed. So, to answer the question we can infer from the information in the passage.

C. Reading

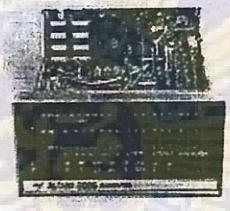
1. Read the article below (passage 2) and make inferences of the questions that follow.

Passage 2

Honoring the Father of the PC

Henry Edward Roberts's Altair 8800 started the era of home computing, and inspired a young man named Bill Gates to write software.

Bill Gates and Paul Allen are two prominent figures in the field of computer. Both of them paid homage last night to the passing of the man who spurred their careers. The Microsoft founders got their start in the computer business writing software for the Altair 8800, a forerunner or predecessor of home computing first created by Henry Edward Roberts.



Altair 8800

That program, Altair-Basic, became the foundation for Microsoft's rising after Gates and Allen moved to Albuquerque to work on their early version of Beginners All-purpose Symbolic Instruction Code (BASIC).

"Ed was willing to take a chance on us - two young guys interested in computers long before they were commonplace - and we have always been grateful to him," Gates and Allen said in their joint statement on Thursday.

Roberts died on April 1 of pneumonia at the age of 68.

The Altair 8800 cost $395 for early computer in 1975, or about $1557.56 in 2009 dollars. The switch-operated machine contained no display and used the Intel 8080 microprocessor.

Roberts created the device for his company Micro Instrumentation and Telemetry Systems (MITS), which he originally founded to sell electronics kits to model rocket hobbyists. He eventually sold the company in 1977.

Just about everyone owes a debt of gratitude to Roberts, given that his invention helped usher in the era of home computing and everything that has followed. The future that we at *PopSci* enjoy writing about has evolved in large part from Roberts's work.

Both Bill Gates and Paul Allen have also since gone on to become wildly successful entrepreneurs and philanthropists, with Gates in particular making recent action regarding the future of nuclear power, some far-out (unusual) geo-engineering schemes, and vaccines for the developing world.

adapted from http://www.popsci.com/technology/article/2010-04

1. What is the writer's opinion of Henry Edward Roberts? _____

   _____

2. How can you tell (no.1)? _____

   _____

3. What does possibly Bill Gates think of Henry Edward? _____

   _____

4. Why does the writer say that every body owes a debt of gratitude to Henry Roberts?

   _____

   _____

5. What is *PopSci*? _____

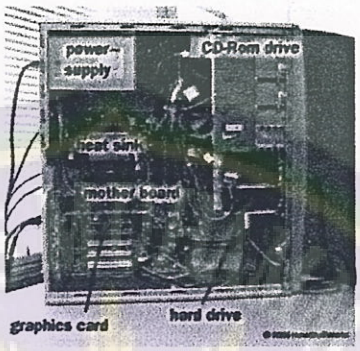
   _____

2. Read the article below (passage 3) and make inferences of the questions that follow.

Passage 3

How PCs Work

by Jeff Tyson



The image of computer hardware

When we mention the word "technology," most of us will think about computers. Virtually, every facet of our lives has some computerized components. The appliances in our homes have microprocessors built into them, as do our televisions. Even our cars have computers. But the computer that everyone thinks of first is typically the personal computer, or PC.

A PC is a general-purpose tool built around a microprocessor. It has lots of different parts - including memory, a hard disk, a modem, and more - that work together. "General purpose" means that we can do many different things with a PC. We can use it to type documents, send e-mail, browse the internet, and play games.

PCs trace their history back to the 1970s, when a man named Ed Roberts began to sell computer kits based on a microprocessor chip designed by Intel. Roberts called his computer the Altair 8800 and sold the unassembled kits for $395. Popular Electronics ran a story about the kid in its January 1975 issue, and to the surprise of just about everyone, the kits became an instant hit and the era of the personal computer began

A few years later, the dynamic duo of Steve Jobs and Steve Wozniak unleashed the Apple II computer on the world. From that point on, the personal computer really began to take off. Other manufacturers followed suit, and soon there were computers from Commodore, Atari and Texas Instruments. Not long after the debut of the Apple II, IBM got into the personal computer game.

Today, when we say PC, chances are we mean a machine running on the Microsoft Windows operating system with an x86-compatible microprocessor. While Apple Macintosh computers are technically personal computers, most people wouldn't call them PCs.

adapted from http://computer.howstuffworks.com/pc.htm

1. What kind of magazine will probably publish this article? _____

   _____

2. Who will read this article? _____

   _____

3. What is Popular Electronics in paragraph 3? _____

   _____

4. Why do you think the writer says that virtually our lives are computerized? _____

   _____

   _____

5. How is the development of personal computer? _____

   _____

   _____

3. **Read these two laptop reviews below (passage 4) and make inferences of the questions that follow. Discuss your inferences with your friends.**

Passage 4

Computer Review

Review 1

Toshiba Satellite L505-ES5018
This budget notebook looks good but is outperformed by other machines in its price range.
Lowest Price: $529.99

by Michael A. Prospero on April 20, 2010

Consumers on a budget have to be careful where they spend their cash when buying a new notebook. The Toshiba Satellite L505-ES5018 isn't going to dazzle you by any means, but for those whose needs are basic, this $587 mainstream system ($529 through Best Buy) gets the job done with a small amount of style. However, a last-generation processor and poor battery life means that your money can be better spent elsewhere, even if you want to stick with Toshiba.

Review 2

Samsung R580
This multimedia laptop has power and style, but its Blu-ray drive doesn't add much value.
Lowest Price: $829.99
by K.T. Bradford on April 21, 2010

Samsung has recently stepped up its design game with a line of laptops whose facades impress as much as their powerful guts. The 15.6-inch, $949 Samsung R580 (available at Best Buy for just $829) sports an eye-catching style and the same powerful Core i5 processor as the larger R780. This model brings more than just a trimmed down size; a Blu-ray drive lets users play the latest movies in high definition. However, the display doesn't support 1080p, and we don't imagine many buyers plugging this laptop into a big-screen TV. So if Blu-ray is just a bonus, is this multimedia machine really a good deal?

5. Is the reviewer 2 in favor of or against the product? _____

_____

6. How can you tell? _____

_____

7. If you have $830, would you buy this product? _____

8. What is you reason? _____

_____

9. Which product are you in favor of, Toshiba or Samsung? _____

10. Tell the reason? _____

_____

D. Vocabulary

Fill in the blanks with suitable words provided in the box.

Words taken from Passage 1 & 2

evolved	commonplace	forerunner	spur	execute

1. A computer is able to _____ a lot of instructions called programs. It makes the computer immensely skillful.
2. Lower taxes would _____ investment and help economic growth.
3. Altair 8800, which was created by Ed Roberts, was a _____ of home computer.
4. Computer has _____ dramatically since Altair 8800 was created.
5. Long before computers were _____, Bill Gates had worked for Ed Roberts.

Words taken from Passage 3 & 4

sport	appreciate	followed suit	stick with	unleashed

1. A few years after Altair 8800 appeared, Steve Jobs _____ the computer named Apple II to the world.
2. Apple was not alone in Personal Computer business. Other computer manufacturers such as Commodore, Atari, and Texas Instruments _____.
3. Toshiba's last-generation processor and poor battery life proves that your money can be better spent elsewhere, even if you want to _____ it.
4. Samsung R580 notebooks _____ an eye-catching style, and they have a powerful processor.
5. Users who rely on keyboard shortcuts will _____ that the keys on the edges are properly placed.

E. Expansion

Make a group of three. Bring along the brochure(s) of notebooks or laptops. Pretend that you are a sales person. Promote the product by giving presentation in front of the class.

Lesson 5

Optical Fiber

GENERAL OBJECTIVE

After learning this lesson, the students are expected to understand more about 'skimming' skill.

SPECIFIC OBJECTIVES

After learning this lesson, the students are able to:

(1) use 'skimming' skill in reading English texts
(2) present in group about optical fiber

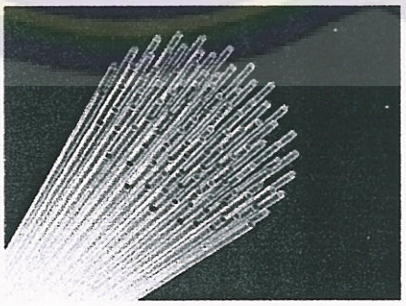
A. Discuss the following questions.

1. What do you know about optical fiber?
2. What do you about the uses of optical fiber for communication?

Read passage 1 very quickly to make you know more about optical fiber.

Passage 1

Optica l Fiber



An optical fiber is made up of the core, the cladding, and the buffer coating. The core carries the light pulses. The cladding reflects the light pulses back into the core, and the buffer coating protects the core and cladding from moisture,

damage, etc. Together, all of this creates a fiber optic which can carry up to 10 million messages at any time using light pulses.

Optical fibers are widely used in fiber-optic communications due to some advantages. They permit transmission over longer distances and at higher bandwidths (data rates) than other forms of communications. They are used instead of metal wires because signals travel along them will reduce loss. They are also immune to electromagnetic interference.

Optical fibers are also used for illumination, and they are wrapped in bundles so they can be used to carry images. This allows viewing in tight spaces. Specially designed fibers are used for a variety of other applications, including sensors and fiber lasers.

Light is kept in the core of the optical fiber by total internal reflection. This causes the fiber to act as a waveguide. Fibers which support many propagation paths or transverse modes are called multi-mode fibers (MMF), while those which can only support a single mode are called single-mode fibers (SMF). Multi-mode fibers generally have a larger core diameter, and are used for short-distance communication links and for applications where high power must be transmitted. Single-mode fibers are used for most communication links longer than 550 meters or 1,800 feet.

Joining lengths of optical fiber is more complex than joining electrical wire or cable. The ends of the fibers must be carefully cleaved, and then spliced together either mechanically or by fusing them together with an electric arc. Special connectors are used to make removable connections.

adapted from http://en.wikipedia.org/wiki/Optical_fiber

B. Reading Skill: Skimming

Read chapter one to review your understanding about this reading skill/strategy.

C. Reading

1. Read these questions and then skim passage 1. Work as quickly as possible for the skimming.

1. Does this passage give you information about optical fiber? _____
2. What is most of this passage about? _____

3. What is optical fiber? _____

_____

4. Why do people use optical fiber? _____

_____

5. Is there a weakness of optical fiber compared to electrical wire? _____

2. Read these questions and then skim passage 2. Work as quickly as possible for the skimming.

1. What is your opinion about the advantages of optical fiber communication? _____

_____

2. Optical fibers are small in size and weight. What is the main advantage of that factor?

_____

_____

3. What is the advantage of optical fibers compared to their metallic counterparts?

_____

_____

4. What does it mean by 'Signal Security' from the advantage of optical fibers?

_____

_____

5. Why can using optical fiber reduce maintenance time and cost? _____

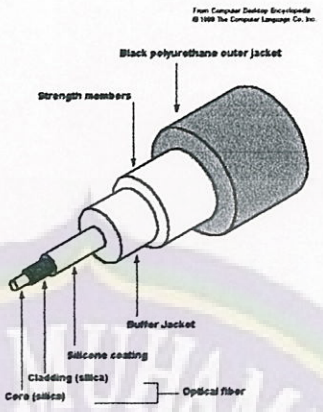
_____

Passage 2

Advantages of Optical Fiber Communication

Communication using an optical carrier wave guided along a glass fiber has a number of extremely attractive features, several of which were apparent when the

technique was originally conceived. Furthermore, the advances in technology to date have surpassed even the most optimistic prediction, creating additional advantages. Hence it is useful to consider the merits and special features offered by optical fiber communications over more conventional electrical communications.



Optical fiber

Small size and weight

Optical fibers have very small diameters which are often no greater than the diameter of a human hair. Hence, even when such fibers are covered with protective coatings, they are far smaller and much lighter than copper cables. This is a tremendous boon towards the alleviation of duct congestion in cities, as well as allowing for an expansion of signal transmission within mobiles such as aircraft, satellites and even ships.

Electrical isolation

Optical fibers which are fabricated from glass, or sometimes a plastic polymer, are electrical insulators and therefore, unlike their metallic counterparts, they do not exhibit earth loop and interface problems. Furthermore, this property makes optical fiber transmission - ideally suited for communication in electrically hazardous environment as the fibers - creates no arching or spark hazard at abrasions or short circuit.

Immunity to interference and crosstalk

Optical fibers form a dielectric waveguide and are therefore free from electromagnetic interference (EMI), radiofrequency interference (RFI), or switching transients giving electromagnetic pulses (EMP). Hence the operation of an optical fiber communication system is unaffected by transmission through an electrically noisy environment and the fiber cable requires no shielding from EMI.

The fiber cable is also not susceptible to lightning strikes if used overhead rather than underground. Moreover, it is fairly easy to ensure that there is no optical interference between fibers and hence, unlike communication using electrical conductors, crosstalk is negligible, even when many fibers are cabled together.

Signal security

The light from optical fibers does not radiate significantly and therefore they provide a high degree of signal security. Unlike the situation with copper cables, a transmitted optical signal cannot be obtained from a fiber in a noninvasive manner (i.e. without drawing optical power from the fiber). Therefore, in theory, any attempt to acquire a message signal transmitted optically may be detected. This feature is obviously attractive for military, banking and general data transmission (i.e. computer network) applications.

System reliability and ease of maintenance

These features primarily stem from the low loss property of optical fiber cables which reduces the requirement for intermediate repeaters or line amplifiers to boost the transmitted signal strength. Hence with fewer repeaters, system reliability is generally enhanced in comparison with conventional electrical conductor systems. Furthermore, the reliability of the optical components is no longer a problem with predicted lifetime of 20 to 30 years now quite common. Both these factors also tend to reduce maintenance time and costs.

Potential low cost

The glass which generally provides the optical fiber transmission medium is made from sand – not a scarce resource. So, in comparison with copper conductors, optical fibers offer the potential for low cost line communication. Although over recent years this potential has largely been realized in the costs of the optical fiber transmission medium which for bulk purchases is now becoming competitive with copper wires (i.e. twisted pairs), it has not yet been achieved in all the other component areas associated with optical fiber communications. For example, the costs of high performance semiconductor lasers and detector photodiodes are still relatively high, as well as some of those concerned with the connection technology (demountable connectors, couplers, etc).

adopted from *Optical Fiber Communication: Principles and Practice* by John M. Senior

3. Read these questions and then skim passage 3. Work as quickly as possible for the skimming.

1. What does the writer associate how optical fibers work with? _____

   _____

2. Why will an image appear distorted if we look through the water at an angle?

   _____

   _____

3. Why does the part of the light that hits the water first will slow down first if it hits the water at an angel? _____

   _____

4. What really happens with the term called *refraction*? _____

   _____

5. What will happen every time the light touches the wall of the fiber that we call "mirror effect"? _____

   _____

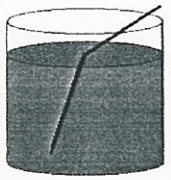
Passage 3

How Optical Fibers Work

Fiber optic is one of the newer buzzwords these days. Optical fiber has a number of advantages over the copper wire used to make connections electrically. For example, optical fiber, made of glass (or sometimes plastic), is immune to electromagnetic interference caused by thunderstorms. Also, because light has a much higher frequency than any radio signal people can generate, fiber has a wider bandwidth, and therefore it can carry more information at one time.

But just how does it work? We're talking about a thin, flexible "string" of glass. Looking sideways at it, we can see right through it. How can we keep light that's inside the fiber from getting out all along the length of the fiber?

Consider an ordinary glass of water. We know that if we look through the water at an angle, images will appear distorted. This happens because light actually *slows down* a little bit when it enters the water, and *speeds up* again when it moves back into the air again.



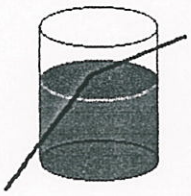
Since the light has a slight but measurable width, if it hits the water at an angle, the part of the light that hits the water first will slow down first. The result is that the direction the light is traveling changes, and the path of the light actually bends at the surface of the water.

No matter what angle the light is traveling as it approaches the water, it will take a steeper angle once it actually enters the water. You can see this at any time by looking at a picture or newspaper through a glass of water, and by looking at different angles. Even a straw in a glass of water *looks* bent, although it really isn't. This phenomenon is called *refraction*.

The same phenomenon happens with glass, although we don't usually notice it when looking through a window. Nevertheless, light striking the glass at an angle bends as it slows down within the glass, and then bends again as it speeds up when leaving the glass. You can see this phenomenon clearly if you slide a piece of flat glass over the print in a book or newspaper.

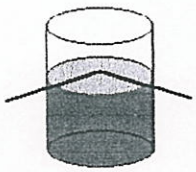
Any substance that light can travel through will exhibit this phenomenon to some extent. Glass happens to be a very practical choice for optical fiber because it is reasonably strong, flexible, and has good light transmission characteristics.

The question to be answered now is, "How can we use this phenomenon to keep the light inside the glass, especially if we want to bend the glass (with the light still inside) around corners?"



Now, consider looking into a glass of water from below the surface of the water. If you look up through the bottom of the glass, you will see a somewhat distorted view of the ceiling or whatever is above the glass. However, if you look in from the side of the glass and observe the underside of the top surface, you will begin to note an interesting and useful effect.

If you are looking up from a steep angle, the light you see entered the top surface of the water at a shallower angle, as shown on the left. However, as you look at the underside of the top surface from a shallower angle, as shown below, you will find a point at which light can't enter the top surface at a yet shallower angle. At this point, the top surface of the water looks like a perfect mirror, even though you know it isn't.



Now, the light you see is reflected from the surface, rather than being refracted through it. This effect persists for all angles shallower than the *critical angle* at which the phenomenon first appears. As you might expect, the same phenomenon is exhibited by glass or any other material through which light might pass.

Consider a single glass fiber, such as the one shown in an enlarged view below. The actual fiber is so thin that light entering one end will experience the "mirror effect" every time it touches the wall of the fiber. As a result, the light will travel from one end of the fiber to the other, bouncing back and forth between the walls of the fiber.

This is the basic concept of optical fibers, and it correctly describes the fundamental operation of all such fibers. Unfortunately, it is not possible to use fibers of this basic construction for any practical application. The reason for this has to do with the physical realities of the phenomenon of reflection within the fiber, and how the parameters involved will change under different conditions.

The basic fact governing the reflection of light within the fiber has to do with the speed of light inside the fiber, and the speed of light in the medium just outside the fiber. Every possible material through which light can pass has a characteristic called the *refractive index*, which is a measure of the speed of light through that material as compared to the speed of light in open space. We won't get into the mathematics in this demonstration; it is only necessary for you to understand this concept.

adopted from http://www.play-hookey.com/optics/fiber1.html

D. Vocabulary

1. Read the sentences below carefully and try to understand the *italicized* verbs from the context.

1. The ends of the fibers must be carefully *cleaved*, and then *spliced* together either mechanically or by *fusing* them together with an electric arc.

2. Communication using an optical carrier wave guided along a glass fiber has a number of extremely attractive features, several of which were apparent when the technique was originally *conceived.*

3. Furthermore, the advances in technology to date have *surpassed* even the most optimistic prediction.

4. Unlike their metallic counterparts, optical fibers do not *exhibit* earth loop and *interface* problems.

5. The fiber cable is also not susceptible to lightning strikes if used overhead rather than underground. Moreover, it is fairly easy to *ensure* that there is no optical interference between fibers.

6. Unlike the situation with copper cables, a transmitted optical signal cannot be *obtained* from a fiber.

7. These features primarily *stem* from the low loss property of optical fiber cables which reduces the requirement for intermediate repeaters.

8. With fewer repeaters, system reliability is generally *enhanced* in comparison with conventional electrical conductor systems.

9. Although over recent years this potential has largely been realized in the costs of the optical fiber transmission medium which for bulk purchases is now becoming competitive with copper wires, it has not yet been *achieved* in all the other component areas *associated* with optical fiber communications.

10. Because light has a much higher frequency than any radio signal we can *generate*, fiber has a wider bandwidth and can therefore carry more information at one time.

11. Now, the light you see is reflected from the surface, rather than being refracted through it. This effect *persists* for all angles shallower than the 'critical angle' at which the phenomenon first appears.

2. Find the synonyms of the words taken from the 11 sentences above. Write down the letter from part B to the line in part A.

Exercise 1:

Part A	**Part B**
1. to cleave _____	A. to blend
2. to splice _____	B. to imagine
3. to fuse _____	C. to combine
4. to conceive _____	D. to exceed
5. to surpass _____	E. to tie

Exercise 2:

Part A	**Part B**
1. to exhibit _____	A. to connect
2. to interface _____	B. to demonstrate
3. to ensure _____	C. to originate
4. to obtain _____	D. to secure
5. to stem _____	E. to gain

Exercise 3:

Part A	**Part B**
1. to enhance _____	A. to continue
2. to achieve _____	B. to produce
3. to associate _____	C. to intensify
4. to generate _____	D. to accomplish
5. to persist _____	E. to relate

E. Expansion

In group, find a text from telecommunication journals, textbooks, or internet concerning *optical fibers* such as history of optical fiber, application of optical fiber, or optical fiber cables. Present your group findings in front of the class.

Lesson 6

R a d a r

GENERAL OBJECTIVE

After learning this lesson, the students are expected to understand more about 'scanning' skill.

SPECIFIC OBJECTIVES

After learning this lesson, the students are able to:

(1) use 'scanning' skill in reading English texts
(2) write a paragraph about radar

A. Discuss the following questions.

1. What do you know about radar?
2. What do you know about the uses of radar in the field of telecommunications?
3. Do you know some modern uses of radar?

B. Reading Skill: Scanning

Read chapter two to review your understanding about this reading skill/strategy.

C. Reading

1. Read these questions and then scan passage 1 to find the correct answers.

1. What was radar originally called? _____

   _____

2. What happens when radio waves emitted by radar system's transmitter come into contact with an object? _____

   _____

3. What do the uses of radar include? _____

_____

4. Who is Christian Hülsmeyer? _____

5. What did Christian Hülsmeyer demonstrate? _____

_____

6. Who fully exploited radar as a defense against aircraft attack for the first time?

_____

7. What motivated the action of question number 6? _____

_____

Passage 1

Radar

Radar is an object detection system that uses electromagnetic waves to identify the range, altitude, direction, or speed of both moving and fixed objects such as aircraft, ships, motor vehicles, weather formations, and terrain. The term *RADAR* was coined in 1940 by the U.S. Navy as an acronym for *RAdio Detection And Ranging*. The term has since entered the English language as a standard word, *radar*, losing the capitalization. Radar was originally called RDF (Range and Direction Finding) in the United Kingdom, using the same acronym as Radio Direction Finding to preserve the secrecy of its ranging capability.

A radar system has a transmitter that emits radio waves. When they come into contact with an object, they are scattered in all directions. The signal is thus partly reflected back and it has a slight change of wavelength (and thus frequency) if the target is moving. The receiver is usually, but not always, in the same location as

the transmitter. Although the signal returned is usually very weak, the signal can be amplified through the use of electronic techniques in the receiver and in the antenna configuration. This enables radar to detect objects at ranges where other emissions, such as sound or visible light, would be too weak to detect. Radar uses include meteorological detection of precipitation, measuring ocean surface waves, air traffic control, police detection of speeding traffic, military applications, or to simply determine the speed of a baseball.

History of Radar

Several inventors, scientists, and engineers contributed to the development of radar. The first to use radio waves to detect "the presence of distant metallic objects" was Christian Hülsmeyer, who in 1904 demonstrated the feasibility of detecting the presence of a ship in dense fog, but not its distance. He received Reichspatent Nr. 165546 for his pre-radar device in April 1904, and later patent 169154 for a related amendment for ranging. He also received a patent in Britain for his *telemobiloscope* on September 23, 1904.

Before the Second World War, British, Germans, French, Soviets, and Americans led to the modern version of radar. In 1934 the French Émile Girardeau stated he was building a radar system and obtained a patent (French Patent n° 788795 in 1934) for a working dual radar system, a part of which was installed on the Normandie liner in 1935. The same year, American Dr. Robert M. Page tested the first monopulse radar and the Soviet military engineer P.K. Oschepkov, in collaboration with Leningrad Electrophysical Institute, produced an experimental apparatus RAPID which is capable of detecting an aircraft within 3 km of a receiver. Hungarian Zoltán Bay produced a working model by 1936 at the Tungsram laboratory.

However, it was the British who were the first to fully exploit it as a defense against aircraft attack. This was spurred on by fears that the Germans were developing death rays. Following a study of the possibility of propagating electromagnetic energy and the likely effect, the British scientists asked by the Air Ministry to investigate, concluded that a death ray was impractical but detection of aircraft appeared feasible. Robert Watson-Watt demonstrated to his superiors the capabilities of a working prototype and patented the device in 1935 (British Patent GB593017). It served as the basis for the Chain Home network of radars to defend Great Britain.

The war precipitated research to find better resolution, more portability and more features for radar. The post-war years have seen the use of radar in fields as diverse as air traffic control, weather monitoring, astrometry, and road speed control. adopted from http://en.wikipedia.org/wiki/Radar

2. Scan passage 1 again to match 'Scientists' and their 'Achievements'.

Scientists	**Achievements**
1. Christian Hülsmeyer _____	A. Produced a working model
2. Émile Girardeau _____	B. Creating telemobiloscope
3. Robert M. Page _____	C. Building a radar system
4. Zoltán Bay _____	D. Testing the first monopulse radar
5. Robert Watson-Watt _____	E. Demonstrating the capabilities of a working type.
6. P.K. Oschepkov _____	F. Producing an experimental apparatus RAPID

3. Read these questions and then scan passage 2 to find the correct answers.

1. What does police department use radar for? _____

   _____

2. Why do the military use radar? _____

   _____

3. What are the functions of radar for meteorologists? _____

   _____

4. What are three purposes of why people use radar? _____

   _____

5. What are two underlying principles of the way radar works? _____

   _____

6. How does echo occur? _____

   _____

7. What determines the length of time between the moment you shout and the moment you hear the echo? _____

_____

8. How does Doppler shift occur? _____

_____

9. What determines the exact speed of sound through the air? _____

_____

10. What can we know if we measure the pitch of the echo of a car? _____

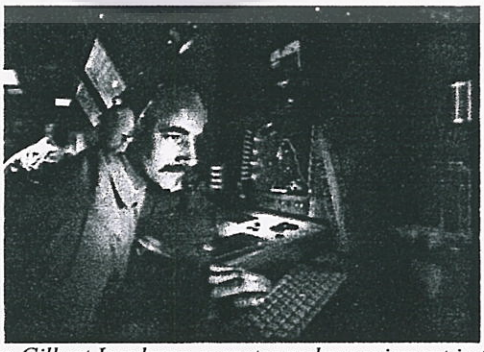
_____

Passage 2

How Radar Works: Part 1

by Marshall Brain

Although it is normally invisible, radar is something that is in use all around us. For example, air traffic control uses radar to track planes both on the ground and in the air, and to guide planes for smooth landings. Police department uses radar to detect the speed of passing motorists. NASA uses radar to map the earth and other planets, to track satellites and space debris, and to help with things like docking and maneuvering. The military uses it to detect the enemy and to guide weapons.



Operation Specialist 2nd Class Gilbert Lundgren operates radar equipment in the combat information center of the USS Carney.

Meteorologists use radar to track storms, hurricanes and tornadoes. You even see a form of radar at many grocery stores when the doors open automatically. Obviously, radar is an extremely useful technology.

When people use radar, they are usually trying to accomplish one of these three things:

- **Detect the presence of an object at a distance** - Usually it is a moving object like an airplane. However, radar can also be used to detect stationary objects buried underground. In some cases, radar can identify an object as well. For example, it can identify the type of aircraft it has detected.
- **Detect the speed of an object** - This is the reason why police department uses radar.
- **Map something** - The space shuttle and orbiting satellites use something called *Synthetic Aperture Radar* to create detailed topographic maps of the surface of planets and moons.

All three of these activities can be accomplished using two things you may be familiar with from everyday life: **echo** and **Doppler shift**. These two concepts are easy to understand in the realm of sound because your ears hear echo and Doppler shift every day. Radar makes use of the same techniques using radio waves.

In this article, we'll uncover radar's secrets. Let's look at the **sound** version first, since you are already familiar with this concept.

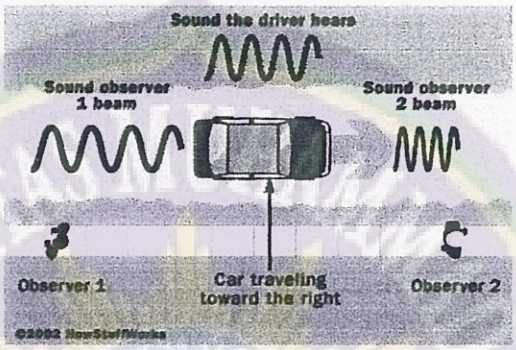
Echo and Doppler Shift

Echo is something you experience all the time. If you shout into a well or a canyon, the echo comes back a moment later. The echo occurs because some of the sound waves in your shout reflect off of a surface (either the water at the bottom of the well or the canyon wall on the far side) and travel back to your ears. The length of time between the moment you shout and the moment that you hear the echo is determined by the distance between you and the surface that creates the echo.

Doppler shift is also common. You probably experience it daily (often without realizing it). Doppler shift occurs when sound is generated by, or reflected off of, a moving object. Doppler shift in the extreme creates **sonic booms** (see below). Here's how to understand Doppler shift (you may also want to try this experiment in an empty parking lot). Let's say there is a car coming toward you at 60 miles per hour (mph) and its horn is blaring. You will hear the horn playing one "note" as the car approaches, but when the car passes you the sound of the horn will

suddenly shift to a lower note. It's the same horn making the same sound the whole time. The change you hear is caused by Doppler shift.

Here's what happens. The speed of sound through the air in the parking lot is fixed. For simplicity of calculation, let's say it is 600 mph (the exact speed is determined by the air's pressure, temperature and humidity). Imagine that the car is standing still, it is exactly 1 mile away from you and it toots its horn for exactly one minute. The sound waves from the horn will propagate from the car toward you at a rate of 600 mph. What you will hear is a six-second delay (while the sound travels 1 mile at 600 mph) followed by exactly one minute's worth of sound.



Doppler shift: The person behind the car hears a lower tone than the driver because the car is moving away. The person in front of the car hears a higher tone than the driver because the car is approaching.

Now let's say that the car is moving toward you at 60 mph. It starts from a mile away and toots its horn for exactly one minute. You will still hear the six-second delay. However, the sound will only play for 54 seconds. That's because the car will be right next to you after one minute, and the sound at the end of the minute gets to you instantaneously. The car (from the driver's perspective) is still blaring its horn for one minute. Because the car is moving, however, the minute's worth of sound gets packed into 54 seconds from your perspective. The same number of sound waves is packed into a smaller amount of time. Therefore, their frequency is increased, and the horn's tone sounds higher to you. As the car passes you and moves away, the process is reversed and the sound expands to fill more time. Therefore, the tone is lower.

You can combine echo and Doppler shift in the following way. Say you send out a loud sound toward a car moving toward you. Some of the sound waves will bounce off the car (an echo). Because the car is moving toward you, however, the sound waves will be compressed. Therefore, the sound of the echo will have a higher pitch than the original sound you send. If you measure the pitch of the echo, you can determine how fast the car is going.

adopted from http://science.howstuffworks.com/radar.htm

3. Read these questions and then scan passage 3 to find the correct answers.

1. What can we use the echo of a sound for? _____

_____

2. What can we use the Doppler shift for? _____

_____

3. What is sonar? _____

_____

4. What are the weaknesses of sound in the air? _____

_____

5. Why does radar use radio waves instead of sound? _____

_____

6. How fast radio waves travel? _____

_____

7. What can it measure if the radar set has a good high-speed clock? _____

_____

Passage 3

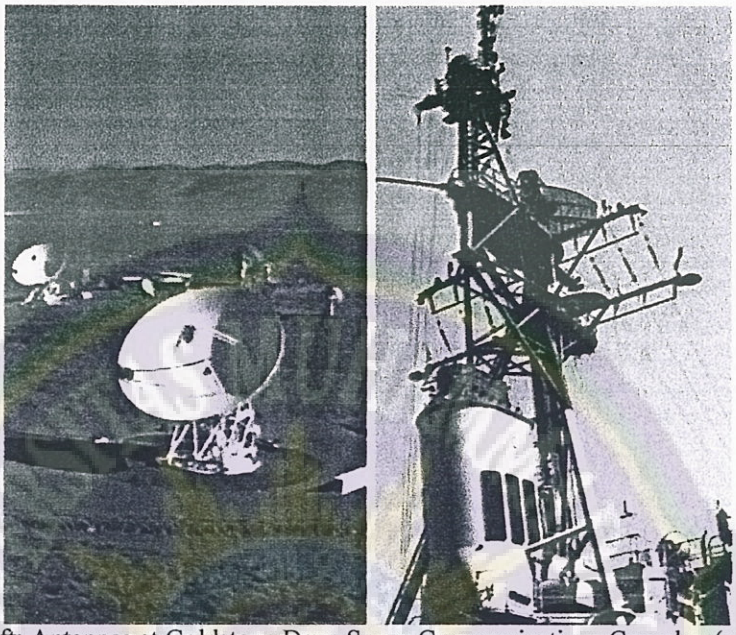
How Radar Works: Part 2

We have seen that the echo of a sound can be used to determine how far away something is, and we have also seen that we can use the Doppler shift of the echo to determine how fast something is going. It is therefore possible to create a "sound radar," and that is exactly what sonar is. Submarines and boats use sonar all the time. You could use the same principles with sound in the air, but sound in the air has a couple of problems:

- Sound doesn't travel very far - maybe a mile at the most.
- Almost everyone can hear sounds, so a "sound radar" would definitely disturb the neighbors (you can eliminate most of this problem by using ultrasound instead of audible sound).

- Because the echo of the sound would be very faint, it is likely that it would be hard to detect.

Radar therefore uses radio waves instead of sound. Radio waves travel far, are invisible to humans, and are easy to detect even when they are faint.



Left: Antennas at Goldstone Deep Space Communications Complex (part of NASA's Deep Space Network) help provide radio communications for NASA's interplanetary spacecraft.

Right: Surface search radar and air search radar are mounted on a guided missile destroyer.

Let's take a typical radar set designed to detect airplanes in flight. The radar set turns on its transmitter and shoots out a short, high-intensity burst of high-frequency radio waves. The burst might last a microsecond. The radar set then turns off its transmitter, turns on its receiver and listens for an echo. The radar set measures the time it takes for the echo to arrive, as well as the Doppler shift of the echo. Radio waves travel at the speed of light, roughly 1,000 feet per microsecond. So, if the radar set has a good high-speed clock, it can measure the distance of the airplane very accurately. Using special signal processing equipment, the radar set can also measure the Doppler shift very accurately and determine the speed of the airplane.

In ground-based radar, there's a lot more potential interference than in air-based radar. When the police radar shoots out a pulse, it echoes off of all sorts of objects - fences, bridges, mountains, buildings. The easiest way to remove all of these sorts of clutter is to filter it out by recognizing that it is not Doppler-shifted. The police

radar looks only for Doppler-shifted signals. And because the radar beam is tightly focused, it hits only one car. Police department is now using a laser technique to measure the speed of cars. This technique is called lidar. It uses light instead of radio waves.

adopted from http://science.howstuffworks.com/radar2.htm

D. Vocabulary

Fill in the blanks with the words provided in the box.

detect	solar	allows	requires	innovation	smuggling
maritime	economical	flawlessly	maintenance		

Indonesia Produces Maritime Radar

PT Radar and Communications System has created Indonesia's first domestically produced (1) _____ radar to protect the country's waters from security threats, terrorism, hijacking and (2) _____, the company's director said.

The INDRA's radius range is 40 nautical miles and can (3) _____ objects as small as 2.9 meters in length. It also has an extremely low power consumption of 1 watt and can be powered by a (4) _____ cell.

Indonesia is currently using the imported radar that uses 10,000 watts and (5) _____ bulky generators, RCS director Beno Kunto Pradekso said.

Another (6) _____ is the use of a Frequency Modulated Continuous Wave, which is a continuous low-emission radio wave that (7) _____ for a more accurate and continuous measurement than the current pulsating radar. The wave causes less disruption to other instruments and reduces the chances of vessels knowing they are being tracked.

The INDRA working unit is operating at a test in Cilegon, Banten Province. RCS presented the working unit in October to Navy research and development officials, who said it worked (8) _____.

Beno said the radar was significantly more (9) _____. "For years, Indonesia has imported radars at high prices and with high maintenance costs," he said. "Imported radars are not always compatible with local components, so we are forced to buy spare parts from the exporting countries." He said that the INDRA required very little (10) _____.

"The current radar has a spare part that needs to be replaced every now and then," he said. "The INDRA is much more robust; it can even stay unmanned for years."

adopted from: http://thejakartaglobe.com/national

E. Expansion

Write an essay about radar. The essay consists of 3 paragraphs with the following criteria:

1. First paragraph talks about what radar is.
2. Second paragraph talks about the uses of radar.
3. Third paragraph talks about your personal opinion if the world is without radar.

The passages of this lesson can give your ideas to write, but do not copy the sentences. Use your own sentences and wording.

Lesson 7

Antenna

GENERAL OBJECTIVE

After learning this lesson, the students are expected to understand more about 'guessing word meaning and recognizing word referent' skill.

SPECIFIC OBJECTIVES

After learning this lesson, the students are able to:

(1) use 'guessing word meaning' skill in reading English texts
(2) use 'recognize word referent' skill in reading English texts
(3) write a paragraph about antenna

A. Discuss the following questions.

1. What do you understand about antenna?
2. Why is antenna important in the field of telecommunications?
3. Who invented antenna?

B. Reading skill: guessing meaning from context

Read chapter three to review your understanding about this reading skill/strategy.

C. Reading

1. The following words are taken from passage 1. Guess their meaning from contexts and don't use dictionary in guessing their meaning.

1. Rigid _____
2. Common _____
3. Attributed _____
4. Uniformly _____

5. Necessitate _____

6. Remain _____

7. Electrical length _____

8. Inductance _____

9. Standing wave _____

10. Entire _____

Passage 1

Antenna

The words *antenna* (plural: *antennas*) and *aerial* are used interchangeably, but usually a rigid (not elastic) metallic structure is termed an antenna and a wire format is called an aerial. In the United Kingdom and other British English speaking areas the term aerial is more common or universal, even for rigid types. The noun *aerial* is occasionally written with a diaeresis mark—*aërial*—in recognition of the original spelling of the adjective *aërial* from which the noun is derived.

The origin of the word *antenna* relative to wireless apparatus is attributed –as a recognition- to Guglielmo Marconi. In 1895, while testing early radio apparatuses in the Swiss Alps at Salvan, Switzerland in the Mont Blanc region, Marconi experimented with early wireless equipment. A 2.5-meter-long pole, along which was carried a wire, was used as a radiating and receiving aerial element. In Italian a tent pole is known as *l'antenna centrale,* and the pole with a wire alongside it used as an aerial was simply called *l'antenna.* Until then wireless that radiates, transmits, and receives elements were known simply as aerials or terminals. Marconi's use of the word *antenna* (Italian for *pole*) would become a popular term for what today is uniformly or evenly known as the *antenna* by most people around the world.

A Hertzian antenna is a set of terminals that does not require or does not necessitate the presence of a ground for its operation (versus a Tesla antenna which is grounded). A loaded antenna is an active antenna having an elongated portion of appreciable *electrical length* (the effective length of an element, usually expressed in wavelengths). It also has additional *inductance* (the property in an electrical circuit where a change in the electric current through that circuit induces an electromotive force) or capacitance directly in series or shunt with the elongated portion so as to modify the *standing wave* (a wave that stay or remains in a constant position) pattern existing along the portion or to change the effective electrical length of the portion. An antenna grounding structure is a structure for establishing a reference potential level for operating the active antenna. It can be any structure closely associated with (or acting as) the ground which is connected to the terminal of the signal receiver or source opposing the active antenna terminal.

In colloquial usage, the word *antenna* may refer broadly to an entire, not partial, assembly including support structure, enclosure (if any), in addition to the purely functional components.

adapted from http://en.wikipedia.org/wiki/Antenna

2. Guess the meaning of each word from the context of the sentence/sentences below it. Don't use dictionary.

1. What does *oscillate* mean? _____

   Basically, the frequency is just a measure of how fast the wave is *oscillating*. And since all EM waves travel at the same speed, the faster it *oscillates* the shorter the wavelength. And a longer wavelength implies a slower frequency.

2. What does *discrete* mean? _____

   In general, waveforms are not made up of a *discrete* number of frequencies, but rather a continuous range of frequencies.

3. What does *exhibit* mean? _____

   A parabolic antenna is a high-gain reflector antenna used for radio, television and data communications, and also for radiolocation (radar), on the UHF and SHF parts of the electromagnetic spectrum. The relatively short wavelength of electromagnetic radiation at these frequencies allows reasonably sized

reflectors to *exhibit* and show the desired highly directional response for both receiving and transmitting.

4. What does *employed* mean? _____

Antennas are most commonly *employed* in air or outer space, but can also be operated under water or even through soil and rock at certain frequencies for short distances.

5. What does *accelerate* mean? _____

An electromagnetic wave refractor is a structure which is shaped or positioned to not only delay but also *accelerate* transmitted electromagnetic waves, passing through such structure, an amount which varies over the wave front.

6. What does *equally* mean? _____

Typically, antennas are designed to operate in a relatively narrow frequency range. The design criteria for receiving and transmitting antennas differ slightly, but generally an antenna can receive and transmit *equally* well.

7. What does *encompass* mean? _____

Generally, the dipole is considered to be omni-directional in the plane perpendicular to the axis of the antenna, but it has deep nulls in the directions of the axis. Variations of the dipole *encompass* the folded dipole, the half wave antenna, the ground plane antenna, the whip, and the J-pole.

8. What does *replaced* mean? _____

Improvements in the transistor came rapidly, and now they have all but completely *replaced* the vacuum tube.

9. What does *radiate* mean? _____

Although any circuit can *radiate* if driven with a signal of high enough frequency, most practical antennas are specially designed to beam or gleam efficiently at a particular frequency. An example of an inefficient antenna is the simple Hertzian dipole antenna, which *radiates* over wide range of frequencies and is useful for its small size.

10. What does *ground* mean? _____

Antennas are typically used in an environment where other objects are present that may have an effect on their performance. Height above *ground*,

in the air, has a very significant effect on the radiation pattern of some antenna types.

11. What does *created* mean? _____

When an electromagnetic wave arrives at the surface of an object, two waves are *created*: one enters the dielectric and the other is reflected. If the object is a conductor, the transmitted wave is negligible and the reflected wave has almost the same amplitude as the incident one.

12. What does *estimate* mean? _____

The smart antenna system *estimates* the direction of arrival of the signal. In estimating or computing, it uses techniques such as MUSIC (Multiple Signal Classification), estimation of signal parameters via rotational invariance techniques (ESPRIT) algorithms, Matrix Pencil methods or one of their derivatives.

13. What does *assist* mean? _____

In 2008, the United States NTIA began a major effort to *assist* consumers in the purchase of digital television converter boxes. Through this help or assistance, many people have been exposed to the concept of smart antennas for the first time.

14. What does *multiple* mean? _____

Smart antenna systems are also a defining characteristic of MIMO systems, such as the IEEE 802.11n standard. Conventionally, a smart antenna is a unit of a wireless communication system and performs spatial signal processing with *multiple* antennas. These many antennas can be used at either the transmitter or receiver. Recently, the technology has been extended to use the *multiple* antennas at both the transmitter and receiver; such a system is called a multiple-input multiple-output (MIMO) system.

15. What does *launched* mean? _____

The first pre-commercial 3G network was *launched* by NTT DoCoMo in Japan in May 2001 on a pre-release of W-CDMA technology. Then the first commercial start or commencement of 3G was also by NTT DoCoMo in Japan on 1 October 2001.

16. What does *implement* mean? _____

In Canada, Rogers Wireless was the first to *implement* or use 3G technology, with HSDPA services in eastern Canada in late 2006.

17. What does *retain* mean? _____

China announced in May 2008, that the telecoms sector was re-organized and three 3G networks would be allocated so that the largest mobile operator, China Mobile, would *retain* its GSM customer base. China Unicom would *retain* and hold its GSM customer base but relinquish its CDMA2000 customer base, and launch 3G on the globally leading WCDMA (UMTS) standard.

D. Vocabulary

Fill in the blanks with the words provided in the box

Passage 2

The History of Antenna

transformed	growth	demonstrated

In the 1890s, there were only a few antennas in the world. These rudimentary devices were primarily a part of experiments that (1) _____ the transmission of electromagnetic waves. By World War II, antennas had become so ubiquitous that their use had (2) _____transformed the lives of the average person via radio and television reception. The number of antennas in the United States was on the order of one per household, representing (3) _____ rivaling the auto industry during the same period.

use	significant	number	average

By the early 21st century, thanks in large part to mobile phones, the (4) _____ person now carries one or more antennas on them wherever they go (cell phones can have multiple antennas, if GPS is used, for instance). This (5) _____ rate of growth is not likely to slow, as wireless communication systems become a larger part of everyday life. In addition, the strong growth in RFID devices

suggests that the (6) _____ of antennas in use may increase to one antenna per object in the world (product, container, pet, banana, toy, CD, etc.). This number would dwarf the number of antennas in (7) _____ today. Hence, learning a little (or a large amount) about of antennas couldn't hurt, and will contribute to one's overall understanding of the modern world.

the image of TV antenna

captured	transmit	receives

What is the origin of antennas? Ben Franklin's kite experiment wasn't quite an antenna, as that (8) _____ lightning discharge, which is a direct current path where the energy is not transferred independently of the medium it travels. The human eye of course (9)_____ high frequency electromagnetic waves (light, to the layman). Technically the eye could be classified as an antenna; however since it can't (10) _____ waves, it is really a sensor, so I'll exclude that as well.

occur	wires	attached	electric	showed

The first experiments that involved the coupling of electricity and magnetism and (11) _____ a definitive relationship was that done by Faraday somewhere around the 1830s. He slid a magnetic around the coils of a wire (12) _____ to a galvanometer. In moving the magnet, he was in effect creating a time-varying magnetic field, which as a result (from Maxwell's Equations), must have had a time-varying (13) _____ field. The coil acted as a loop antenna and received the electromagnetic radiation, which was received (detected) by the galvanometer - the work of an antenna. Interestingly, the concept of electromagnetic waves had not even been thought up at this point.

Heinrich Hertz developed a wireless communication system in which he forced an electrical spark to (14) _____ in the gap of a dipole antenna. He used a loop antenna as a receiver, and observed a similar disturbance. This was 1886. By 1901,

Marconi was sending information across the Atlantic. For a transmit antenna, he used several vertical (15) _____ attached to the ground. Across the Atlantic, the receive antenna was a 200 meter wire held up by a kite.

research	focuses	discussed	predicted	used

In 1906, Columbia University had an Experimental Wireless Station where they (16) _____ a transmitting aerial cage. This was a cage made up of wires and suspended in the air, resembling a cage.

A rough outline of some major antennas and their discovery/fabrication dates are listed:

- Yagi-Uda Antenna, 1920s
- Horn antennas, 1939. Interesting, the early antenna literature (17)_____ waveguides as "hollow metal pipes".
- Antenna Arrays, 1940s
- Parabolic Reflectors, late 1940s
- Patch Antennas, 1970s
- PIFA, 1980s

Current (18) _____ on antenna involves metamaterials (materials that have engineered dielectric and magnetic constants that can be simultaneously negative, allowing for interesting properties like a negative index of refraction). Current research (19)_____ on making antennas smaller, particularly in communications for personal wireless communication devices (e.g. cell phones). A lot of work is being performed on numerical modeling of antennas, so that their properties can be (20) _____ before they are built and tested.

adopted from http://www.antenna-theory.com/intro/main.html

E. Expansion

Write one paragraph report about antenna. The report consists of minimum 15 sentences that cover what antenna is and what people use antenna for.

Lesson 8

Mobile Phone

GENERAL OBJECTIVE

After learning this lesson, the students are expected to understand more about 'making inferences' skill.

SPECIFIC OBJECTIVES

After learning this lesson, the students are able to:

(1) use 'making inferences' skill in reading English texts
(2) understand some vocabularies about mobile phone
(3) write an opinion
(4) present group opinion

A. Discuss the following questions.

1. What do you know about mobile phone?
2. What are some benefits of mobile phone?
3. Do you think it is expensive to use mobile phone? Why or why not?
4. What do you predict the development of mobile phone in the future?

B. Reading Skill: Making Inferences

Read chapter four to review your understanding about this reading skill/strategy.

C. Reading

1. Read passage 1 and infer the answers of the following questions.

1. How is mobile phone different from cordless phone? _____

_____

_____

2. After reading passage 1, how can you explain about Martin Cooper? _____

_____

_____

3. What do you infer about the statement 'mobile phones have effectively started to reach the bottom of the economic pyramid'? _____

_____

_____

4. What are services the mobile phone offer? _____

_____

_____

5. What do you understand about Motorola and Bell Labs? _____

_____

_____

Passage 1

Mobile Phone

A mobile phone or mobile (also called cellphone and handphone) is an electronic device used for mobile telecommunications (mobile telephone, *text messaging* or data transmission) over a *cellular network* of specialized base stations known as *cell sites*. Mobile phones differ from *cordless telephones*, which only offer telephone service within limited range, e.g. within a home or an office, through a fixed line and a base station owned by the subscriber and also from *satellite phones* and *radio telephones*. As opposed to a radio telephone, a cell phone offers full *duplex communication*, automates calling to and paging from a public land mobile network (PLMN), and handoff (handover) during a phone call when the user moves from one cell (base station coverage area) to another.

Most current cell phones connect to a cellular network consisting of switching points and base stations (cell sites) owned by a *mobile network operator*. In addition to the standard voice function, current mobile phones may support many additional services, and accessories, such as SMS for text messaging, email, packet

switching for access to the internet, gaming, *bluetooth*, infrared, camera with video recorder and MMS for sending and receiving photos and video, MP3 player, radio and GPS. The concept of a handheld phone was Martin Cooper's brainchild, and with the help of his Motorola team, the first handset was born in 1973 weighing two kilos.

The International Telecommunication Union estimated that mobile cellular subscriptions worldwide would reach approximately 4.6 billion by the end of 2009. Mobile phones have gained increased importance in the sector of information and communication technology for development in the 2000s and have effectively started to reach the bottom of the economic pyramid.

History

Radiophones have a long and varied history going back to Reginald Fessenden's invention and shore-to-ship demonstration of radio telephony, through the Second World War with military use of radio telephony links and civil services in the 1950s, while hand-held mobile radio devices have been available since 1973.

In 1960, the world's first partly automatic car phone system, Mobile System A (MTA), was launched in Sweden. MTA phones were consisted of vacuum tubes and relays, and had a weight of 40 kg. In 1962, a more modern version called Mobile System B (MTB) was launched, which was a push-button telephone, and which used *transistors* in order to enhance the telephone's calling capacity and improve its operational reliability. In 1971 the MTD version was launched, opening for several different brands of equipment and gaining commercial success.

Martin Cooper, a Motorola researcher and executive is considered to be the inventor of the first practical mobile phone for hand-held use in a non-vehicle setting, after a long race against Bell Labs for the first portable mobile phone. Using a modern, somewhat heavy portable handset, Cooper made the first call on a hand-held mobile phone on April 3, 1973 to his rival, Dr. Joel S. Engel of Bell Labs.

adapted from: http://en.wikipedia.org/wiki/Mobile_phone

2. Read mobile phone reviews and infer the answers to the questions that follow.

Mobile Phone Reviews

Sony Ericsson W995 Red

Design
Sliding Keypad
Dimensions: 97 x 49 x 15 mm
Weight: 113gram
Navigation Keys
Auto Rotate

Display
2.6 inches
240x320 Pixels resolution
TFT 256K Colours
Accelerometer sensor for auto rotate

Network
2G and 3G

Memory and Battery Backup
Internal 118MB
External 8GB Micro SD card M2
3G talk time 4hrs
2G talk time 9hrs
Music Play time 20hrs

Camera and Imaging
8.1 megapixel camera with Auto focus and LED flash face and Smile detection

Data access and connectivity
GPRS, EDGE, HSCSD
WLAN Wi-Fi
HSDPA 7.2Mbps
HSUPA 2Mbps
Bluetooth With A2DP
USB Port v2.0
DLNA
GSM Internet Dial Up Support
WAP 2.0XHTML
RSS Feeds
Access NetFront Web Browser

Navigation
GPS with aGPS
Google maps
Wayfinder Navigator

Music And Entertainment
Walkman player
Stereo FM radio with RDS
3.5 mm audio jack
Stereo Speakers with Clear Bass and Stereo
Movies and videos from PlayNow arena
TrackID, Album Art and SenseMe applications
3D motion gaming with Java

16X Digital Zoom
Image and video stabilisation
Photo fix and Photo flash
Picture and video blogging
Video recording with Video light
PictBridge

Organiser

Alarm clock and calender
Timer and Stopwatch
Phonebook, 1000 entries with 20 field
Notes
Tasks
Calculator

support
Audio and video Streaming
YouTube upload and download

Messaging and Communication

Video Calling
Sound Recorder and audio messaging
Instant Messaging
Email and MMS
SMS with Predictive text input

Nokia 5800 Xpress Music Red

Screen

3.2 Inch 16 Million Colour Touch Screen (640 x 320 Pixels)

Imaging

3.2 Megapixel Camera
Carl Zeiss Optics
Auto Focus
3 x Digital Zoom
Dual LED Flash
Dedicated Camera Key
Video Recording (30 fps)
4 x Video Zoom
Video Clip Length 90 Minutes
Video Player
Video Settings
Second Camera
TV Out
Video Calling

Messaging

SMS (Text Messaging)
Email
Email with Attachments
Instant Messaging
MMS (Multimedia Messaging)

Organiser

Phonebook
Calendar
Phonebook
Home Screen Contact Bar
Contacts
Notes
Clock
Calculator
Flight Mode
OS Symbian 9.4 Operating System
S60 Software
Push To Talk
Conference Call
Handsfree Speaker Phone
Call Log (Dialled, Missed & Received)
Speed Dialling
Assisted GPS Navigation
Nokia Maps Applications
Screen Accelerometer
Full & Mini QWERTY Keyboard
Handwriting Recognition
Stylus & Finger Screen

Predictive Text	Control
Sound	
Music Player	**Entertainment**
Media Bar Touch Screen (Music, Video Images, Web, Share Online & Video Centre)	Java Games Embedded Games Downloadable Games
Album Graphics Display	**Connectivity**
Music Selection (Album, Artist, Composer & Genre)	3G HSDPA Micro USB 3.5mm AV Connector
Playlist	Bluetooth®
8 Band Graphic Equaliser	EDGE
Bass Booster	WLAN Wi-Fi
Stereo Widening	**Network**
Volume Key	Quad Band (GSM 850, GSM 900
Loudness	GSM 1800 & GSM 1900)
Integrated Stereo Speakers	HSDPA 2100
MP3, AAC, Polyphonic & Video Ringtones	**Internet**
FM Radio with RDS	HTML & XHTML WAP Browser RSS Feeds
Memory & Talk Time	**Weight & Size**
81 Mbytes Memory plus 8 Gbytes	109 g
MicroSDT Card & Supports Up To 16 Gbytes	111 x 51.7 x 15.5 mm
8.8 Hours GSM Talk Time	
5 Hours WCDMA Talk Time	
406 Hours GSM Standby Time	
400 Hours WCDMA Standby Time	
35 Hours Music Playback Time	

1. What do you infer from Sony Ericsson W995 Red? _____

   _____

2. What do you understand about Nokia 5800 Xpress Music Red? _____

   _____

3. What does Sony Ericsson W995 Red have that Nokia 5800 Xpress Music Red doesn't? _____

   _____

4. What does Nokia 5800 Xpress Music Red have that Sony Ericsson W995 Red doesn't? _____

_____

5. In general, which product is better? _____

6. Why? _____

_____

7. Which product are you interested in? _____

8. Why? _____

_____

3. Read passage 2 about car crash and infer the answers to the questions that follow.

Passage 2

Cell phone use cited in crash that killed 11

By BRETT BARROUQUERE (AP)

LOUISVILLE, Ky. — An Alabama truck driver was on his cell phone sending and receiving calls leading up to a crash that killed him and 10 other people in Kentucky in March, Kentucky State Police said in a report on the wreck.

The 28-page report also says that 45-year-old Kenneth Laymon of Jasper, Ala., was driving in excess of the 70 mph speed limit and did not have his tractor-trailer under control when he crossed the median on March 26 and struck a van carrying Mennonites to a wedding in Iowa.

The report said Laymon tried braking 96 feet after entering the median, and a witness said Laymon may have been traveling 80 mph when the accident happened near Munfordville. The van showed no signs of trying to avoid Laymon's truck at that point, state police said.

The report cites cell phone use and distraction on Laymon's part as "human factors" related to the wreck. Trooper Charles Swiney, a spokesman for the state police post investigating the wreck, declined to say who Laymon was on the phone with or whether he was on the phone at the moment of the crash.

Peter Knudson, a spokesman for the National Transportation Safety Board, told The Associated Press the agency is aware Laymon may have been on a cell phone leading up to the wreck, and is working to verify the information.

"We have not yet determined if the driver was on the cell phone at the time the tractor-trailer departed the roadway nor have we made any determination if the use of the cell phone was a factor in the accident," Knudson said.

He said NTSB investigators are also looking at highway engineering, vehicle design and operation, and other issues before reaching a conclusion, which is expected to take 12-18 months. An investigation by the Federal Motor Carrier Administration is also pending.

Also killed in the crash were John Esh, 64, owner of a vinyl-building business in Marrowbone, his 62-year-old wife, Sadie, their daughters, Rose, 40, Anna, 33, and Rachel, 20; and their son and daughter-in-law, Leroy Esh, 41, and wife Naomi, 33, and their adopted infant son, Jalen.

Two other victims in the van were Rachel's fiance, Joel Gingerich, 22, and Ashlie Michelle Kramer, 22, an Esh family friend from Franklin.

Troopers eliminated weather as a cause of the wreck, saying the road was wet from rainfall the night before, but that didn't cause the accident. Toxicology tests are still pending, but troopers said alcohol does not appear to have been a factor.

The Courier-Journal first reported about the findings.

Scott Hester, the owner of Hester Inc., which employed Laymon as a driver, said he hadn't heard the details of the report but said the fact that information is in the report "doesn't mean it's true."

The Federal Motor Carrier Safety Administration, which oversees the trucking industry, is conducting a review of Hester Inc., which is based in Fayette, Ala., because of the company's safety rating and the wreck near Munfordville.

The agency gave Hester Inc. a driver safety evaluation area of 88.4 in February, based on inspections of the company's 30 drivers during the past 30 months. The agency uses a scale of 1 to 100, with 100 being the worst score. The company was not considered deficient in other areas, so the agency had not targeted it for a compliance review.

Federal records show the agency has conducted 194 driver inspections on Hester drivers in the 30 months before the wreck. Those inspections resulted in 21 drivers

being taken out of service for log book violations, exceeding the 11-hour driving limit or the 14-hour on duty limit.

adopted from http://www.google.com/hostednews/ap/article

1. What is the most possible cause of the accident from the article? _____

   _____

2. How can you tell? _____

   _____

3. Does the report blame the truck driver's using cell phone? _____

   _____

4. How can you tell? _____

   _____

5. Why do think it is dangerous driving while using cellular phone? _____

   _____

6. Besides a cellular phone, what causes the accident? _____

   _____

7. What lesson can we get from the newspaper article? _____

   _____

4. Read passage 3 and infer the answers to the questions that follow.

Passage 3

More deadly crashes after dark linked to teen cell use

An increase in fatal nighttime crashes involving teenage drivers is likely attributable to an increase in talking and texting while driving, according to a new report from the Texas Transportation Institute.

As the Associated Press reports, researchers found that, across the U.S., deadly nighttime crashes involving drivers between the ages of 16 to 19 increased by 10% between 1999 and 2008. During the same period, fatal nighttime collisions involving drivers ages 20 and older rose by 8% during the same time period. Yet while alcohol was largely to blame for the increase in crashes among older drivers, researchers say that driver distraction caused by texting or talking on cell phones was a major cause of the increase in deadly crashes among teens.

Bernie Fette, a senior researcher for the Texas Transportation Institute told the AP:

"We know driving at night is dangerous. We know using a cell phone behind the wheel compromises your ability to drive... Put those together and you've created a perfect storm."

Researchers analyzed data from the National Highway Traffic Safety Administration's Fatality Analysis Reporting System. They found that, while total collisions dropped by 11% between 1999 to 2008, the proportion occurring after dark increased:

In 2008, 4,322 fatal crashes involved drivers ages 16 to 19 years, with 2,148 of them — or just under 50 percent — at night, according to the study. In 1999, 6,368 fatal crashes involved drivers ages 16 to 19, with 2,875, or 45 percent, of them at night. That same year, 44,803 fatal crashes involved drivers ages 20 to 97, with 18,601 at night. In 1999, the total number of fatal car crashes for drivers that age was 48,991, with 18,899 at night.

adopted from http://wellness.blogs.time.com/2010/05/07

1. What is the writer's opinion on teens' cell phone use? _____

   _____

2. How can you tell? _____

   _____

3. What do you infer from the Associated Press reports? _____

   _____

4. What can you infer from Bernie Fette's opinion? _____

   _____

5. What do you suggest to people driving at night? Why? _____

   _____

D. Vocabulary

Match column A and column B. The terms are taken from passage 1.

A	B
1. Text Messaging ( )	A. refers to the exchange of brief written messages between mobile and portable devices over cellular networks.
2. Cellular Network ( )	B. is a type of mobile phone that connects to orbiting satellites instead of terrestrial cell sites.
3. Cell Site ( )	C. is a communications device that allows two or more people to talk using radio.
4. Cordless Telephone ( )	D. is a radio network made up of a number of cells, each served by at least one fixed-location transceiver known as a cell site or base station.
5. Satellite Telephone ( )	E. is a proprietary open wireless technology standard for exchanging data over short distances (using short length radio waves) from fixed and mobile devices.
6. Radiotelephone ( )	F. is a system composed of two connected parties or devices that can communicate with one another in both directions.
7. Duplex Communication System ( )	G. is a term used primarily in North America for a site where antennas and electronic communications equipment are placed on a radio mast or tower to create a cell in a cellular network.
8. Mobile Network Operator ( )	H. is a semiconductor device used to amplify and switch electronic signals.
9. Bluetooth ( )	I. is a telephone company that provides services for mobile phone subscribers.

10. Transistor ( )	J. is a telephone with a wireless handset that communicates via radio waves with a base station connected to a fixed telephone line.

E. Expansion

Do you agree that people driving a car while using a cellular phone should be given a penalty?

1. Write your opinion in one paragraph.
2. Make two group (one group is for the idea, and the other is against it). Present your opinion. The opposing group must give comments.

Lesson 9

GSM and CDMA

GENERAL OBJECTIVE

After learning this lesson, the students are expected to understand more about 'skimming and scanning' skill.

SPECIFIC OBJECTIVES

After learning this lesson, the students are able to:

(1) use 'skimming' skill in reading English texts
(2) use 'scanning' skill in reading English texts
(3) write an report
(4) present group report

A. Discuss the following questions.

1. What do you know about GSM technology?
2. What do you understand about CDMA technology?
3. Which technology is more popular nowadays? Why?
4. Which technology is better? Why?
5. What do you know about GPRS?
6. Why is GSM called Second Generation?

B. Reading Skill: Skimming and Scanning

Read chapter 1 and 2 to remind you about these reading skills.

C. Reading

1. Read these questions and then skim passage 1. Work as quickly as you can for the skimming.

1. What was the reason of creating GSM? _____

_____

2. What can you say about the subscribers of GSM by the end of 1993? _____

_____

3. What does it mean by a cellular network? _____

_____

4. What does the passage say about Macro cells in a GSM network? _____

_____

5. What is the difference between Macro cells and Micro cells? _____

_____

6. What does the passage say about Umbrella cells? _____

_____

7. What is GMSK modulation? _____

_____

Passage 1

History of GSM

In 1982, the European Conference of Postal and Telecommunications Administrations (CEPT) created the Groupe Spécial Mobile (GSM) to develop a standard for a mobile telephone system that could be used across Europe. In 1987, a memorandum of understanding was signed by 13 countries to develop a common cellular telephone system across Europe. Finally the system was created by SINTEF, and Torleiv Maseng was selected as a leader.

In 1989, GSM responsibility was transferred to the European Telecommunications Standards Institute (ETSI), and phase I of the GSM specifications was published in 1990. The first GSM network was launched in 1991 by Radiolinja in Finland with joint technical infrastructure maintenance from Ericsson. By the end of 1993, over a million subscribers were using GSM phone networks being operated by 70 carriers across 48 countries.

Technical Details: Cellular Radio Network

GSM is a cellular network, which means that mobile phones connect to it by searching for cells in the immediate vicinity. There are five different cell sizes in a GSM network—macro, micro, pico, femto, and umbrella cells. The coverage area of each cell varies according to the implementation environment. Macro cells can be regarded as cells where the base station antenna is installed on a mast or a building above average roof top level. Micro cells are cells whose antenna height is under average roof top level. They are typically used in urban areas.

Picocells are small cells whose coverage diameter is a few dozen meters, and they are mainly used indoors. Femtocells are cells designed for use in residential or small business environments and connect to the service provider's network via a broadband internet connection. Umbrella cells are used to cover shadowed regions of smaller cells and fill in gaps in coverage between those cells.

Cell horizontal radius varies depending on antenna height, antenna gain, and propagation conditions from a couple of hundred meters to several tens of kilometers. The longest distance the GSM specification supports in practical use is 35 kilometers (22 mi). There are also several implementations of the concept of an extended cell in which the cell radius could be double or even more, depending on the antenna system, the type of terrain, and the timing advance.

Indoor coverage is also supported by GSM and may be achieved by using an indoor picocell base station, or an indoor repeater with distributed indoor antennas fed through power splitters to deliver the radio signals from an antenna outdoors to the separate indoor distributed antenna system. These are typically deployed when a lot of call capacity is needed indoors, for example, in shopping centers or airports. However, this is not a prerequisite since indoor coverage is also provided by in-building penetration of the radio signals from any nearby cell.

The modulation used in GSM is Gaussian minimum-shift keying (GMSK), a kind of continuous-phase frequency shift keying. In GMSK, the signal to be modulated onto the carrier is firstly smoothed with a Gaussian low-pass filter prior to being fed to a frequency modulator, which greatly reduces the interference to neighboring channels (adjacent-channel interference).

adapted from http://en.wikipedia.org/wiki/GSM

2. Read these questions and then skim passage 2. Work as quickly as you can for the skimming.

1. What does the passage say about TDMA technology? _____

_____

2. What are some useful features of GSM? _____

_____

3. What does the passage say about iDEN? _____

_____

4. What does the writer think about the incredible growth of GSM? _____

_____

Passage 2

What does GSM mean in a cell phone?

Probably the most useful thing to know about the Global System for Mobile communications (GSM) is that it is an international standard. If you travel in Europe and many other parts of the world, GSM is the only type of cellular service available. Originally, the acronym GSM stood for Groupe Spécial Mobile, a group formed by the Conference of European Posts and Telegraphs (CEPT) in 1982 to research the merits of a European standard for mobile telecommunications. Commercial service using the GSM system did not actually start until 1991. Instead of using analog service, GSM was developed as a digital system using TDMA technology.

Using TDMA, a narrow band that is 30 kHz wide and 6.7 milliseconds long, is split time-wise into three time slots. Narrow band means channels in the traditional sense. Each conversation gets the radio for one-third of the time. This is possible because voice data that has been converted to digital information is compressed so that it takes up significantly less transmission space. Therefore, TDMA has three times the capacity of an analog system using the same number of channels.

TDMA is the access method used by GSM, as well as the Electronics Industry Alliance and the Telecommunications Industry Association for Interim Standard 54 (IS-54) and Interim Standard 136 (IS-136). GSM implements TDMA in a somewhat different and incompatible way from IS-136. Think of GSM and IS-136 as two different operating systems that work on the same processor, like Windows and Linux both working on an Intel Pentium III. GSM systems provide a number of useful features:

- Uses encryption to make phone calls more secure

- Data networking
- Group III facsimile services
- Short Message Service (SMS) for text messages and paging
- Call forwarding
- Caller ID
- Call waiting
- Multi-party conferencing

GSM operates in the 900 MHz band (890 MHz – 960 MHz) in Europe and Asia and in the 1900 MHz (sometimes referred to as 1.9 GHz) band in the United States. It is used in digital cellular and PCS-based systems. GSM is also the basis for Integrated Digital Enhanced Network (iDEN), a popular system introduced by Motorola and used by Nextel. The incredible growth of GSM is a big part of why the acronym is now commonly thought of as standing for the Global System for Mobile communications.

adopted from http://weccache.googleusercontent.com

3. Read the following questions and then scan the article (passage 3) to find the correct answers. Work quickly.

1. What happened in 1987? _____

   _____

2. What is the aim of GSM Association? _____

   _____

3. Which one is faster in data transfer, GSM or CDMA? _____

4. Which one is more susceptible to interference: EVDO or EDGE? _____

5. What make EVDO less superior than EDGE? _____

   _____

6. What is the similarity between EVDO and EDGE? _____

   _____

7. What does the removable SIM card allow the GSM users? _____

   _____

8. Which technology is more profitable for users in terms of roaming, GSM or CDMA?

_____

9. If you are a GSM user, what should you do to save international roaming? _____

_____

10. Mention the chief GSM and CDMA carriers in the USA? _____

_____

Passage 3

What's the Difference between GSM and CDMA?

In cellular service there are two main competing network technologies: Global System for Mobile Communications (GSM) and Code Division Multiple Access (CDMA). Cellular carriers including Sprint PCS, Cingular Wireless, Verizon, and T-Mobile use one or the other. Understanding the difference between GSM and CDMA will allow you to choose a carrier that uses the preferable network technology for your needs.

The GSM Association is an international organization founded in 1987, dedicated to providing, developing, and overseeing the worldwide wireless standard of GSM. CDMA, a proprietary standard designed by Qualcomm in the United States, has been the dominant network standard for North America and parts of Asia. However, GSM networks continue to make inroads in the United States, as CDMA networks make progress in other parts of the world. There are camps on both sides that firmly believe either GSM or CDMA architecture is superior to the other. To the non-invested consumer who simply wants bottom line information to make a choice, the following considerations may be helpful.

Coverage: The most important factor is getting service in the areas you will be using your phone. Upon viewing competitors' coverage maps you may discover that only GSM or CDMA carriers offer cellular service in your area. If so, there is no decision to be made, but most people will find that they do have a choice.

Data Transfer Speed: With the advent of cellular phones doing double and triple duty as streaming video devices, podcast receivers and email devices, speed is important to those who use the phone for more than making calls. CDMA has been traditionally faster than GSM, though both technologies continue to rapidly

leapfrog along this path. Both boast "3G" standards, or 3rd generation technologies.

EVDO, also known as CDMA2000, is CDMA's answer to the need for speed with a downstream rate of about 2 megabits per second, though some reports suggest real world speeds are closer to 300-700 kilobits per second (kbps). This is comparable to basic DSL. As of fall 2005, EVDO is in the process of being deployed. It is not available everywhere and requires a phone that is CDMA2000 ready.

GSM's answer is EDGE (Enhanced Data Rates for GSM Evolution), which boasts data rates of up to 384 kbps with real world speeds reported closer to 70-140 kbps. With added technologies still in the works that include UMTS (Universal Mobile Telephone Standard) and HSDPA (High Speed Downlink Packet Access), speeds reportedly increase to about 275—380 kbps. This technology is also known as W-CDMA, but is incompatible with CDMA networks. An EDGE-ready phone is required.

In the case of EVDO, theoretical high traffic can degrade speed and performance, while the EDGE network is more susceptible to interference. Both require being within close range of a cell to get the best speeds, while performance decreases with distance.

Subscriber Identity Module (SIM) cards: In the United States only, GSM phones use SIM cards. The removable SIM card allows phones to be instantly activated, interchanged, swapped out and upgraded, all without carrier intervention. The SIM itself is tied to the network, rather than the actual phone. Phones that are card-enabled can be used with any GSM carrier.

The CDMA equivalent, a R-UIM card, is only available in parts of Asia but remains on the horizon for the U.S. market. CDMA carriers in the U.S. require proprietary handsets that are linked to one carrier only and are not card-enabled. To upgrade a CDMA phone, the carrier must deactivate the old phone then activate the new one. The old phone becomes useless.

Roaming: For the most part, both networks have fairly concentrated coverage in major cities and along major highways. GSM carriers, however, have roaming contracts with other GSM carriers, allowing wider coverage of more rural areas, generally speaking, often without roaming charges to the customer. CDMA networks may not cover rural areas as well as GSM carriers, and though they may contract with GSM cells for roaming in more rural areas, the charge to the customer will generally be significantly higher.

International Roaming: If you need to make calls to other countries, a GSM carrier can offer international roaming, as GSM networks dominate the world market. If you travel to other countries you can even use your GSM cell phone abroad, providing it is a quad-band phone (850/900/1800/1900 MHz). By purchasing a SIM card with minutes and a local number in the country you are visiting, you can make calls against the card to save yourself international roaming charges from your carrier back home. CDMA phones that are not card-enabled do not have this capability. However, there are several countries that use CDMA networks. Check with your CDMA provider for your specific requirements.

According to CDG.org, CDMA networks support over 270 million subscribers worldwide, while GSM.org tallies up their score at over 1 billion. As CDMA phones become R-UIM enabled and roaming contracts between networks improve, integration of the standards might eventually make differences all but transparent to the consumer.

The chief GSM carriers in the United States are Cingular Wireless, recently merged with AT&T Wireless, and T-Mobile USA. Major CDMA carriers are Sprint PCS, Verizon and Virgin Mobile. There are also several smaller cellular companies on both networks.

adopted from: http://www.wisegeek.com

4. Read the following questions and then scan passage 4 to find the correct answers. Work quickly.

1. What does it mean by a form of multiplexing? _____

   _____

2. What does CDMA technology employ? _____

   _____

3. What information do you get about CDMA channel? _____

   _____

4. What do CDMA networks use? _____

   _____

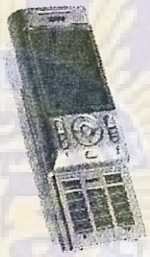
5. What information do you get about CDMA one? _____

_____

Passage 4

What is CDMA?

CDMA (Code-Division Multiple Access) refers to any of several protocols used in so-called second-generation (2G) and third-generation (3G) wireless communications. As the term implies, CDMA is a form of multiplexing, which allows numerous signals to occupy a single transmission channel, optimizing the use of available bandwidth. The technology is used in ultra-high-frequency (UHF) cellular telephone systems in the 800-MHz and 1.9-GHz bands.



a CDMA mobile phone

CDMA employs analog-to-digital conversion (ADC) in combination with spread spectrum technology. Audio input is firstly digitized into binary elements. The frequency of the transmitted signal is then made to vary according to a defined pattern (code), so it can be intercepted only by a receiver whose frequency response is programmed with the same code, so it follows exactly along with the transmitter frequency. There are trillions of possible frequency-sequencing codes which enhance privacy and make cloning difficult.

The CDMA channel is nominally 1.23 MHz wide. CDMA networks use a scheme called soft handoff, which minimizes signal breakup as a handset passes from one cell to another. The combination of digital and spread-spectrum modes supports several times as many signals per unit bandwidth as analog modes. CDMA is compatible with other cellular technologies. This allows for nationwide roaming.

The original CDMA standard, also known as CDMA One and still common in cellular telephones in the U.S., offers a transmission speed of only up to 14.4 Kbps

in its single channel form and up to 115 Kbps in an eight-channel form. CDMA2000 and wideband CDMA deliver data many times faster.

adopted from: http://searchtelecom.techtarget.com/sDefinition

5. Read the following questions and then scan the newspaper article (passage 5) to find the correct answers. Work quickly.

1. What is Coolpad Communications? _____

   _____

2. What will the company's investment go for? _____

   _____

3. What is the main reason why the company invests in India? _____

   _____

4. What company is the biggest player in Indian market? _____

5. Mention three Indian companies in telephone market? _____

   _____

6. Who is Sami Al-Lawati? _____

7. What is Coolpad S100? _____

8. What is the target of the company in regard with Coolpad sales? _____

   _____

Passage 5

China Mobile mulls handset factory in India by 2012

by Mansi Taneja

Chenzhen-based China Wireless Technologies is planning to set up a mobile handset factory in India by 2012 through its Indian subsidiary, Coolpad Communications. The company will invest Rs (Indian Rupee) 3,000,000,000 to Rs 4,000,000,000 in the plant and a research centre.

This comes at a time when the Indian government has virtually banned the sale of telecommunication equipment by Chinese companies like Huawei Technologies in the country due to security concerns. Huawei, as well as ZTE, has of late shown interest in setting up a manufacturing facility in India.

Coolpad will be the first Chinese company to manufacture mobile handsets in India. India is the fastest-growing market for mobile telephone in the world. All told, there are over 600 million users in the country. Over 100 million handsets were sold in the country in 2009, which was about the same as in 2008. Nokia is the biggest player in the market, followed by Samsung. A clutch of local brands like Karbonn, Lava and Micromax too have gained market share through aggressive pricing.

Both Nokia and Samsung have set up production facilities in the country. Coolpad could be the next. The company, which offers CDMA and dual mode handsets in India through Reliance Webstore, will also start its research & development centre by next year.

"We will open our R&D center in Delhi and Mumbai by next year. Currently, we use services from our center in China. Subsequently, we plan to set up a manufacturing facility in 2012. The total investment would be in the range of Rs 3,000,000,000 – 4,000,000,000 over a period of time," Coolpad Communication Managing Director Sami Al-Lawati told Business Standard.

The company also plans to increase its current employee strength of about 200 to 300 by the end of this year and 1,000 by end of 2012, he said. The Chinese company has forayed into the Indian market through a tie-up with Reliance Webstore, the retail arm of Reliance Communications. India was the first overseas market for Coolpad. The company will now foray into USA and Brazil.

The company is currently rolling out India's most affordable touchscreen CDMA mobile phone, the Coolpad S100, one of the bestsellers in China at a price below Rs 4,500. It plans to introduce 15 new models this year. The price tags are aggressive

– about half of rivals. "Coolpad will follow a two-pronged strategy to drive its CDMA volumes. While the operator-bundled offerings will help gain volumes for its low-end phones, an independent drive for distribution-led sales will help increase smartphone volumes," Al-Lawati said. Coolpad is targeting sales of one million handsets within a year of its operations.

adopted from: http://www.business-standard.com/india/news

D. Vocabulary

Fill in the blanks in each paragraph with the words provided in the box

equipment	limited	incompatible	rapid

Paragraph 1

During the early 1980s, analog cellular telephone systems were experiencing (1) _____ growth in Europe, particularly in Scandinavia and the United Kingdom, but also in France and Germany. Each country developed its own system, which was (2) _____ with everyone else's in equipment and operation. This was an undesirable situation, because not only was the mobile (3) _____ limited to operation within national boundaries, which in a unified Europe were increasingly unimportant, but there was also a very (4) _____ market for each type of equipment, so economies of scale and the subsequent savings could not be realized.

network	operational	subscribers	specifications

Paragraph 2

In 1989, GSM responsibility was transferred to the European Telecommunication Standards Institute (ETSI), and phase I of the GSM (5) _____ were published in 1990. Commercial service was started in mid-1991, and by 1993 there were 36 GSM (6) _____ in 22 countries. Although standardized in Europe, GSM is not only a European standard. Over 200 GSM networks (including DCS1800 and PCS1900) are (7) _____ in 110 countries around the world. In the beginning of 1994, there were 1.3 million (8) _____ worldwide, which had grown to more than 55 million by October 1997. With North America making a delayed entry into the GSM field with a derivative of GSM called PCS1900, GSM systems

exist on every continent, and the acronym GSM now aptly stands for Global System for Mobile communications.

advancements	analog	providing	innovation

Paragraph 3

The developers of GSM chose an unproven (at the time) digital system, as opposed to the then-standard (9) _____ cellular systems like AMPS in the United States and TACS in the United Kingdom. They had faith that (10) _____ in compression algorithms and digital signal processors would allow the fulfilment of the original criteria and the continual improvement of the system in terms of quality and cost. The over 8000 pages of GSM recommendations try to allow flexibility and competitive (11) _____ among suppliers, but provide enough standardization to guarantee proper interworking between the components of the system. This is done by (12) _____ functional and interface descriptions for each of the functional entities defined in the system.

adopted from http://www.privateline.com/mt_gsmhistory

E. Expansion

1. Write a report about the differences between GSM and CDMA technology and give your personal opinion which technology is better for the use in Indonesia.
2. Make a group of four, discuss your opinion from number 1, and present your group opinion.

Lesson 10

Modem

GENERAL OBJECTIVE

After learning this lesson, the students are expected to understand more about 'guessing meaning from context, recognizing word referent, and making inferences' skill.

SPECIFIC OBJECTIVES

After learning this lesson, the students are able to:

(1) use 'guessing meaning from context' skill in reading English texts
(2) use 'recognizing word referent' skill in reading English texts
(3) use 'making inferences' skill in reading English texts
(4) write an essay

A. Discuss the following questions.

1. What is modem?
2. What is the function of modem?
3. Is modem only used for computer?
4. Why is modem important in the field of telecommunications?

B. Reading Skill: Pronoun Referent and Guessing Word Meaning in Context

Read chapter 3 to remind you about these reading skills/strategies.

C. Reading

1. Write the referent for each pronoun taken from passage 1.

1. It (paragraph 1 line 2) _____
2. They (paragraph 2 line 2) _____
3. They (paragraph 3 line 1) _____

4. They (paragraph 3 line 2) _____

5. Its (paragraph 3 line 3) _____

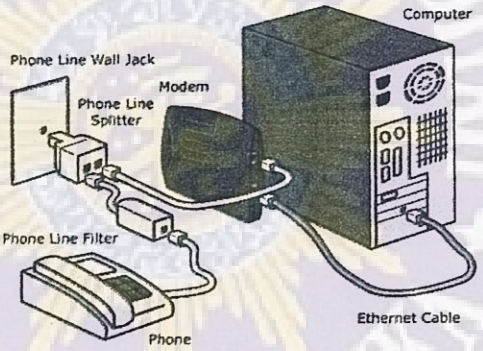
6. They (paragraph 5 line 4) _____

7. It (paragraph 6 line 2) _____

Passage 1

Modem

A **modem** (**mo**dulator-**dem**odulator) is a device that modulates an analog carrier signal to encode digital information. *It* also demodulates such a carrier signal to decode the transmitted information. The goal is to produce a signal that can be transmitted easily and decoded to reproduce the original digital data. Modems can be used over any means of transmitting analog signals, from driven diodes to radio.



The most familiar example is a voiceband modem that turns the digital data of a personal computer into analog audio signals. Then *they* are transmitted over a telephone line, and once received on the other side, a modem converts the analog data back into digital.

Modems are generally classified by the amount of data *they* can send in a given time, normally measured in bits per second (bit/s, or bps). *They* can also be classified by Baud, the number of times the modem changes *its* signal state per second. For example, the ITU V.21 standard used audio frequency-shift keying to carry 300 bit/s using 300 baud, whereas the original ITU V.22 standard allowed 1,200 bit/s with 600 baud using phase-shift keying.

Faster modems are used by internet users every day, notably cable modems and ADSL modems. In telecommunications, wide-band radio modems transmit repeating frames of data at very high data rates over microwave radio links.

Narrow-band radio modem is used for low data rate up to 19.2k mainly for private radio networks. Some microwave modems transmit more than a hundred million bits per second. Optical modems transmit data over optical fibers. Most intercontinental data links now use optical modems transmitting over undersea optical fibers. Optical modems routinely have data rates in excess of a billion ($1x10^9$) bits per second. One kilobit per second (kbit/s, kb/s, or kbps) as used in this article means 1,000 bits per second and not 1,024 bits per second. For example, a 56k modem can transfer data at up to 56,000 bit/s (7 kB/s) over the phone line.

In the summer of 1960, the name *Data-Phone* was introduced to replace the earlier term *digital subset*. The *202 Data-Phone* was a half-duplex asynchronous service that was marketed extensively in late 1960. In 1962, the *201A* and *201B Data-Phones* were introduced. *They* were synchronous modems using two-bit-per-baud phase-shift keying (PSK). The 201A operated half-duplex at 2,000 bit/s over normal phone lines, while the 201B provided full duplex 2,400 bit/s service on four-wire leased lines, the send and receive channels running on their own set of two wires each.

The famous *Bell 103A dataset* standard was also introduced by Bell Labs in 1962. *It* provided full-duplex service at 300 baud over normal phone lines. Frequency-shift keying was used with the call originator transmitting at 1,070 or 1,270 Hz and the answering modem transmitting at 2,025 or 2,225 Hz. The readily available 103A2 gave an important boost to the use of remote low-speed terminals such as the KSR33, the ASR33, and the IBM 2741. AT&T reduced modem costs by introducing the originate-only 113D and the answer-only 113B/C modems.

adopted from: http://en.wikipedia.org/wiki/Modem

2. In each paragraph below, the pronouns are underlined and italicized. Write the referent for each pronoun on the lines provided.

Passage 2

Faster Modems

In order to create faster modems, modem designers had to use techniques far more sophisticated than frequency-shift keying. First <u>*they*</u> moved to phase-shift keying (PSK), and then quadrature amplitude modulation (QAM). <u>*These*</u> techniques allow an incredible amount of information to be crammed into the 3,000 hertz of bandwidth available on a normal voice-grade phone line. 56K modems, which actually connect at something like 48 Kbps on anything but absolutely perfect lines, are about the limit of these techniques.

1. They _____ 2. These _____

The next step in the evolution of the modem was asymmetric digital subscriber line (ADSL) modems. The word *asymmetric* is used because these modems send data faster in one direction than *they* do in another. An ADSL modem takes advantage of the fact that any normal home, apartment or office has a dedicated copper wire running between *it* and phone company's nearest mux or central office. *This* dedicated copper wire can carry far more data than the 3,000-hertz signal needed for your phone's voice channel. If both the phone company's central office and your house are equipped with an ADSL modem on your line, then the section of copper wire between your house and the phone company can act as a purely digital high-speed transmission channel. The capacity is something like 1 million bits per second (Mbps) between the home and the phone company (*upstream*) and 8 Mbps between the phone company and the home (*downstream*) under ideal conditions. The same line can transmit both a phone conversation *and* the digital data.

3. They _____ 4. It _____

5. This _____

The approach an ADSL modem takes is very simple in principle. The phone line's bandwidth between 24,000 hertz and 1,100,000 hertz is divided into 4,000-hertz bands, and a virtual modem is assigned to each band. Each of these 249 virtual modems tests *its* band and does the best *it* can with the slice of bandwidth *it* is allocated. The aggregate of the 249 virtual modems is the total speed of the pipe.
adopted from: http://computer.howstuffworks.com

6. Its _____ 7. It _____

8. It _____

3. Guess the meaning of each word from the context of the sentence/sentences below it.

1. What does *instead* mean? _____

   Today, no one uses dumb terminals or terminal emulators to connect to an individual computer. Instead, we use our modems to connect to an Internet service provider (ISP), and the ISP connects us into the Internet.

2. What does *replace* mean? _____

In the summer of 1960, the name *Data-Phone* was introduced to replace the earlier term *digital subset*. The *202 Data-Phone* was a half-duplex asynchronous service that was marketed extensively in late 1960.

3. What does *traditionally* mean? _____

A *Winmodem* or *Softmodem* is a stripped-down modem that replaces tasks traditionally handled in hardware with software. In this case the modem is a simple digital signal processor designed to create sounds, or voltage variations, on the telephone line.

4. What does *equivalent* mean? _____

One downside is that the software generating the modem tones is not simple, and the performance of the computer as a whole often suffers when it is being used. For online gaming this can be a real concern. Another problem is lack of portability such that non-Windows operating systems (such as Linux) may not have an equivalent driver to operate the modem.

5. What does *incorporate* mean? _____

A standard modem of today contains two functional parts: an analog section for generating the signals and operating the phone, and a digital section for setup and control. This functionality is actually incorporated into a single chip, but the division remains in theory.

6. What does *misleading* mean? _____

The commands themselves are typically from the Hayes command set, although that term is somewhat misleading or untrue. The original Hayes commands were useful for 300 bit/s operation only, and then extended for their 1,200 bit/s modems. Faster speeds required new commands, leading to a proliferation of command sets in the early 1990s.

7. What does *astonishing* mean? _____

In 1980, Gottfried Ungerboeck from IBM Zurich Research Laboratory applied powerful channel coding techniques to search for new ways to increase the speed of modems. His results were amazing and astonishing but only conveyed to a few colleagues. Finally in 1982, he agreed to publish what is now a landmark paper in the theory of information coding.

8. What does *initiate* mean? _____

By using a majority of the bandwidth for data and reserving part for voice transmission, DSVD modems allow users to pick up a telephone handset interfaced with the modem, and initiate a call to the other peer.

9. What does *envision* mean? _____

Advocates of DSVD envisioned and predicted whiteboard sharing and other practical applications for the standard. However, with advent of cheaper 56kbps analog modems intended for internet connectivity, peer-to-peer data transmission over the PSTN became quickly irrelevant.

10. What does *allow* mean? _____

Wireless modems come in a variety of types, bandwidths, and speeds. Wireless modems are often referred to as transparent or smart. They transmit information that is modulated onto a carrier frequency to allow many simultaneous wireless communication links to work simultaneously on different frequencies.

11. What does *scattered* mean? _____

Transparent modems operate in a manner similar to their phone line modem cousins. Typically, they were half duplex, meaning that they could not send and receive data at the same time. Typically transparent modems are polled in a round robin manner to collect small amounts of data from scattered locations that do not have easy access to wired infrastructure. Transparent modems are most commonly used by utility companies for data collection.

12. What does *contend* mean? _____

The faster data rates of the newest cellular modem technologies (UMTS, HSPA, EVDO, WiMax) are also considered to be *broadband cellular modems* and contend with other broadband modems to win the competition.

13. What does *advanced* mean? _____

Broadband modems should still be classed as modems, since they use complex waveforms to carry digital data. They are more advanced devices than traditional dial-up modems as they are capable of modulating /demodulating hundreds of channels simultaneously.

8. What does *initiate* mean? _____

By using a majority of the bandwidth for data and reserving part for voice transmission, DSVD modems allow users to pick up a telephone handset interfaced with the modem, and initiate a call to the other peer.

9. What does *envision* mean? _____

Advocates of DSVD envisioned and predicted whiteboard sharing and other practical applications for the standard. However, with advent of cheaper 56kbps analog modems intended for internet connectivity, peer-to-peer data transmission over the PSTN became quickly irrelevant.

10. What does *allow* mean? _____

Wireless modems come in a variety of types, bandwidths, and speeds. Wireless modems are often referred to as transparent or smart. They transmit information that is modulated onto a carrier frequency to allow many simultaneous wireless communication links to work simultaneously on different frequencies.

11. What does *scattered* mean? _____

Transparent modems operate in a manner similar to their phone line modem cousins. Typically, they were half duplex, meaning that they could not send and receive data at the same time. Typically transparent modems are polled in a round robin manner to collect small amounts of data from scattered locations that do not have easy access to wired infrastructure. Transparent modems are most commonly used by utility companies for data collection.

12. What does *contend* mean? _____

The faster data rates of the newest cellular modem technologies (UMTS, HSPA, EVDO, WiMax) are also considered to be *broadband cellular modems* and contend with other broadband modems to win the competition.

13. What does *advanced* mean? _____

Broadband modems should still be classed as modems, since they use complex waveforms to carry digital data. They are more advanced devices than traditional dial-up modems as they are capable of modulating /demodulating hundreds of channels simultaneously.

14. What does *employ* mean? _____

Mobile phones, smartphones, and PDAs can be employed as data modems to form a wireless access point connecting a personal computer to the internet (or some proprietary network). In this use the mobile phone is providing a gateway between the cellular service provider's data network technology and Point-to-Point Protocol (PPP) spoken by PCs.

15. What does *achieve* mean? _____

Wireless FireWire, USB and Serial modems are also used in the Wi-Fi and WiMAX standards, operating at microwave frequencies, to give a laptop, PDA or desktop computer an access point to a network. The modems may be as large as a regular cable modem to as small as a WiFi dongle/USB-stick. If combined with VoIP technology, these computing devices can achieve telephone-like capability to make and receive telephone calls.

D. Vocabulary

1. Fill in the blanks in the passage below with the suitable words provided in the box.

frequencies	multiple	digital	network	distance

Radio Modems

Direct broadcast satellite, WiFi, and mobile phones all use modems to communicate, as do most other wireless services today. Modern telecommunications and data networks also make extensive use of radio modems where long (1) _____ data links are required. Such systems are an important part of the PSTN, and are also in common use for high-speed computer (2) _____ links to outlying areas where fiber is not economical.

Even where a cable is installed, it is often possible to get better performance or make other parts of the system simpler by using radio (3) _____ and modulation techniques through a cable. Coaxial cable has a very large bandwidth, however signal attenuation becomes a major problem at high data rates if a (4) _____ signal is used. By using a modem, a much larger amount of digital data can be transmitted through a single piece of wire. Digital cable television and cable internet services use radio frequency modems to provide the increasing

bandwidth needs of modern households. Using a modem also allows for frequency-division (5) _____ access to be used, making full-duplex digital communication with many users possible using a single wire.

resends	throughout	similar	scattered	modulated

Wireless modems come in a variety of types, bandwidths, and speeds. Wireless modems are often referred to as transparent or smart. They transmit information that is (6) _____ onto a carrier frequency to allow many simultaneous wireless communication links to work simultaneously on different frequencies.

Transparent modems operate in a manner (7) _____ to their phone line modem cousins. Typically, they were half duplex, meaning that they could not send and receive data at the same time. Typically transparent modems are polled in a round robin manner to collect small amounts of data from (8) _____ locations that do not have easy access to wired infrastructure. Transparent modems are most commonly used by utility companies for data collection.

Smart modems come with a media access controller inside which prevents random data from colliding and (9) _____ data that is not correctly received. Smart modems typically require more bandwidth than transparent modems, and typically achieve higher data rates. The IEEE 802.11 standard defines a short range modulation scheme that is used on a large scale (10) _____ the world.

adopted from: http://en.wikipedia.org/wiki/Modem

2. Fill in the blanks in the passage below with the suitable words provided in the box.

embedded	instead	connect	routers	slides

Mobile Modems and Routers

Modems, which use mobile phone lines (GPRS, UMTS, HSPA, EVDO, WiMax, etc.), are known as cellular modems. Cellular modems can be (1) _____

inside a laptop or appliance, or they can be external to it. External cellular modems are datacards and cellular routers. The datacard is a PC card or ExpressCard which (2) _____ into a PCMCIA/PC card/ExpressCard slot on a computer. The best known brand of cellular modem datacards is the AirCard made by Sierra Wireless. Nowadays, there are USB cellular modems as well that use a USB port on the laptop (3) _____ of a PC card or ExpressCard slot. A cellular router may or may not have an external datacard (*AirCard*) that slides into it. Most cellular (4) _____ do allow such datacards or USB modems. Cellular Routers may not be modems per se, but they contain modems or allow modems to be slid into them. The difference between a cellular router and a cellular modem is that a cellular router normally allows multiple people to (5) _____ to it (since it can route, or support multipoint to multipoint connections), while the modem is made for one connection.

come	broadband	pushing	charge	flat

Most of the GSM cellular modems (6) _____ with an integrated SIM cardholder (i.e., Huawei E220, Sierra 881, etc.) The CDMA (EVDO) versions do not use SIM cards, but use Electronic Serial Number (ESN) instead.

Huawei CDMA2000 Evolution-Data Optimized USB wireless modem

The cost of using a cellular modem varies from country to country. Some carriers implement (7) _____ rate plans for unlimited data transfers. Some have caps (or maximum limits) on the amount of data that can be transferred per month. Other countries have plans that (8) _____ a fixed rate per data transferred—per megabyte or even kilobyte of data downloaded; this tends to add up quickly in today's content-filled world, which is why many people are (9) _____ for flat data rates.

The faster data rates of the newest cellular modem technologies (UMTS, HSPA, EVDO, WiMax) are also considered to be *broadband cellular modems* and compete with other (10) _____ modems below.

adopted from: http://en.wikipedia.org/wiki/Modem

E. EXPANSION

Write an essay about modem. Your essay must consist of minimum 3 paragraphs.

- Paragraph 1 talks about what modem is.
- Paragraph 2 talks about the functions of modem.
- Paragraph 3 talks about your prediction of modem in the future.

Appendix 4

Examples of Questionnaire

DAFTAR PERTANYAAN UNTUK SISWA
(Needs Analysis Questionnaire for Students)

Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia.

A. Seberapa seringkah Anda mengalami kesulitan dalam menggunakan Bahasa Inggris?

	Sangat Sering	Sering	Kadang Kadang	Jarang	Tidak Pernah
Membaca	1	2	(3)	4	5
Menulis	1	2	(3)	4	5
Berbicara	1	2	(3)	4	5
Mendengar	1	2	(3)	4	5

B. Seberapa pentingkah Bahasa Inggris untuk keberhasilan studi Anda?

	Sangat Penting	Penting	Cukup Penting	Tidak Penting	Sangat Tidak Penting
Membaca	(1)	2	3	4	5
Menulis	(1)	2	3	4	5
Berbicara	(1)	2	3	4	5
Mendengar	(1)	2	3	4	5

C. Menurut Anda, seberapa pentingkah Bahasa Inggris bagi Anda ketika nanti bekerja?

	Sangat Penting	Penting	Cukup Penting	Tidak Penting	Sangat Tidak Penting
Membaca	1	2	3	4	5
Menulis	1	2	3	4	5
Berbicara	1	2	3	4	5
Mendengar	1	2	3	4	5

Kemampuan Membaca (Reading Skills)

D. Seberapa sulitkah bacaan berikut ini menurut Anda?

	Sangat Sulit	Sulit	Cukup Sulit	Mudah
1. Jurnal Ilmiah	1	2	3	4
2. Artikel Koran	1	2	3	4
3. Artikel Internet	1	2	3	4
4. Buku Teks Kuliah	1	2	3	4
5. Fiksi (Novel, Cerpen)	1	2	3	4
6. Lain-lain (sebutkan bila ada)	1	2	3	4

_____

_____

_____

E. Dari bahan bacaan berikut ini, yang manakah yang ingin Anda pelajari di kelas?

	Ya	Tidak
1. Jurnal Ilmiah	1	2
2. Artikel Koran	1	2
3. Artikel Internet	1	2
4. Buku Teks Kuliah	1	2
5. Fiksi (Novel, Cerpen)	1	2
6. Lain-lain (sebutkan bila ada)	1	2

_____

_____

F. Seberapa seringkah Anda melakukan hal-hal berikut ini untuk mengerti suatu bacaan?

	Sangat Sering	Sering	Jarang	Tidak Pernah
1. Memahami gagasan utama dari bacaan (main point of text)	1	2	3	4
2. Membaca dengan cepat untuk mengerti gagasan sebuah teks (skimming)	1	2	3	4
3. Melihat teks secara keseluruhan untuk mencari informasi spesifik (scanning)	1	2	3	4
4. Menebak kata yang tidak dimengerti di dalam teks	1	2	3	4
5. Memahami struktur teks (text organization)	1	2	3	4

6. Memahami istilah khusus dalam teks (specialist vocabulary)	(1)	2	3	4
7. Membaca untuk memberikan respon (respond critically)	1	(2)	3	4
8. Meringkas suatu bacaan	1	2	3	(4)

Terimakasih Atas Kesediaan Anda Mengisi Questionnaire Ini

DAFTAR PERTANYAAN UNTUK SISWA
(Needs Analysis Questionnaire for Students)

Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia.

A. Seberapa seringkah Anda mengalami kesulitan dalam menggunakan Bahasa Inggris?

	Sangat Sering	Sering	Kadang Kadang	Jarang	Tidak Pernah
Membaca	1	(2)	3	4	5
Menulis	1	2	(3)	4	5
Berbicara	1	2	(3)	4	5
Mendengar	1	(2)	3	4	5

B. Seberapa pentingkah Bahasa Inggris untuk keberhasilan studi Anda?

	Sangat Penting	Penting	Cukup Penting	Tidak Penting	Sangat Tidak Penting
Membaca	(1)	2	3	4	5
Menulis	(1)	2	3	4	5
Berbicara	(1)	2	3	4	5
Mendengar	(1)	2	3	4	5

C. Menurut Anda, seberapa pentingkah Bahasa Inggris bagi Anda ketika nanti bekerja?

	Sangat Penting	Penting	Cukup Penting	Tidak Penting	Sangat Tidak Penting
Membaca	1	(2)	3	4	5
Menulis	(1)	2	3	4	5
Berbicara	(1)	2	3	4	5
Mendengar	(1)	2	3	4	5

Kemampuan Membaca (Reading Skills)

D. Seberapa sulitkah bacaan berikut ini menurut Anda?

	Sangat Sulit	Sulit	Cukup Sulit	Mudah
1. Jurnal Ilmiah	1	2	(3)	4
2. Artikel Koran	1	2	3	(4)
3. Artikel Internet	1	2	3	(4)
4. Buku Teks Kuliah	1	2	(3)	4
5. Fiksi (Novel, Cerpen)	1	2	3	(4)
6. Lain-lain (sebutkan bila ada) _____ _____ _____	1	2	3	4

E. Dari bahan bacaan berikut ini, yang manakah yang ingin Anda pelajari di kelas?

	Ya	Tidak
1. Jurnal Ilmiah	1	2
2. Artikel Koran	1	2
3. Artikel Internet	1	2
4. Buku Teks Kuliah	1	2
5. Fiksi (Novel, Cerpen)	1	2
6. Lain-lain (sebutkan bila ada)	1	2

_____

_____

F. Seberapa seringkah Anda melakukan hal-hal berikut ini untuk mengerti suatu bacaan?

	Sangat Sering	Sering	Jarang	Tidak Pernah
1. Memahami gagasan utama dari bacaan (main point of text)	1	2	3	4
2. Membaca dengan cepat untuk mengerti gagasan sebuah teks (skimming)	1	2	3	4
3. Melihat teks secara keseluruhan untuk mencari informasi spesifik (scanning)	1	2	3	4
4. Menebak kata yang tidak dimengerti di dalam teks	1	2	3	4
5. Memahami struktur teks (text organization)	1	2	3	4

6.	Memahami istilah khusus dalam teks (specialist vocabulary)	1	(2)	3	4
7.	Membaca untuk memberikan respon (respond critically)	1	(2)	3	4
8.	Meringkas suatu bacaan	(1)	2	3	4

Terimakasih Atas Kesediaan Anda Mengisi Questionnaire Ini

DAFTAR PERTANYAAN UNTUK SISWA
(Needs Analysis Questionnaire for Students)

Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia.

A. Seberapa seringkah Anda mengalami kesulitan dalam menggunakan Bahasa Inggris?

	Sangat Sering	Sering	Kadang Kadang	Jarang	Tidak Pernah
Membaca	1	2	3	(4)	5
Menulis	1	2	3	(4)	5
Berbicara	1	2	(3)	4	5
Mendengar	1	(2)	3	4	5

B. Seberapa pentingkah Bahasa Inggris untuk keberhasilan studi Anda?

	Sangat Penting	Penting	Cukup Penting	Tidak Penting	Sangat Tidak Penting
Membaca	(1)	2	3	4	5
Menulis	(1)	2	3	4	5
Berbicara	(1)	2	3	4	5
Mendengar	(1)	2	3	4	5

C. Menurut Anda, seberapa pentingkah Bahasa Inggris bagi Anda ketika nanti bekerja?

	Sangat Penting	Penting	Cukup Penting	Tidak Penting	Sangat Tidak Penting
Membaca	1	2	3	4	5
Menulis	1	2	3	4	5
Berbicara	1	2	3	4	5
Mendengar	1	2	3	4	5

Kemampuan Membaca (Reading Skills)

D. Seberapa sulitkah bacaan berikut ini menurut Anda?

	Sangat Sulit	Sulit	Cukup Sulit	Mudah
1. Jurnal Ilmiah	1	2	3	4
2. Artikel Koran	1	2	3	4
3. Artikel Internet	1	2	3	4
4. Buku Teks Kuliah	1	2	3	4
5. Fiksi (Novel, Cerpen)	1	2	3	4
6. Lain-lain (sebutkan bila ada)	1	2	3	4

_____

_____

_____

E. Dari bahan bacaan berikut ini, yang manakah yang ingin Anda pelajari di kelas?

	Ya	Tidak
1. Jurnal Ilmiah	1	2
2. Artikel Koran	1	2
3. Artikel Internet	1	2
4. Buku Teks Kuliah	1	2
5. Fiksi (Novel, Cerpen)	1	2
6. Lain-lain (sebutkan bila ada)	1	2

_____

_____

F. Seberapa seringkah Anda melakukan hal-hal berikut ini untuk mengerti suatu bacaan?

	Sangat Sering	Sering	Jarang	Tidak Pernah
1. Memahami gagasan utama dari bacaan (main point of text)	1	2	3	4
2. Membaca dengan cepat untuk mengerti gagasan sebuah teks (skimming)	1	2	3	4
3. Melihat teks secara keseluruhan untuk mencari informasi spesifik (scanning)	1	2	3	4
4. Menebak kata yang tidak dimengerti di dalam teks	1	2	3	4
5. Memahami struktur teks (text organization)	1	2	3	4

6. Memahami istilah khusus dalam teks (specialist vocabulary)	1	2	3	4
7. Membaca untuk memberikan respon (respond critically)	1	2	3	4
8. Meringkas suatu bacaan	1	2	3	4

Terimakasih Atas Kesediaan Anda Mengisi Questionnaire Ini

DAFTAR PERTANYAAN UNTUK ALUMNI
(Needs Analysis Questionnaire for Alumni)

Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia (A dan B), dan menuliskan pendapat Anda pada ruang yang telah disediakan (C dan D).

A. Seberapa seringkah Anda mengalami kesulitan dalam menggunakan Bahasa Inggris?

	Sangat Sering	Sering	Kadang Kadang	Jarang	Tidak Pernah
Membaca	1	2	(3)	4	5
Menulis	1	2	(3)	4	5
Berbicara	1	2	3	(4)	5
Mendengar	1	2	(3)	4	5

B. Menurut Anda, seberapa pentingkah Bahasa Inggris untuk kesuksesan karir Anda?

	Sangat Penting	Penting	Cukup Penting	Tidak Penting	Sangat Tidak Penting
Membaca	1	(2)	3	4	5
Menulis	1	(2)	3	4	5
Berbicara	1	2	(3)	4	5
Mendengar	1	2	(3)	4	5

C. Kemampuan Membaca (Reading Skills)

Kesulitan-kesulitan apa yang Anda temui ketika membaca suatu teks Bahasa Inggris.

1. Mengerti artinya
2. Penulisannya susah
3. -
4. -
5. -

D. Kemampuan Berbicara (Speaking Skills)

Kesulitan-kesulitan apa yang Anda temui ketika berbicara dalam Bahasa Inggris.

1. Susah membaca / Mengucapkan kata yg benar
2. -
3. -
4. -
5. -

E. Kemampuan Menulis (Writing Skills)

Kesulitan-kesulitan apa yang Anda temui ketika menulis dalam Bahasa Inggris.

1. Tidak mengerti Grammar
2. -
3. -
4. -
5. -

Terimakasih atas partisipasi Anda

DAFTAR PERTANYAAN UNTUK ALUMNI
(Needs Analysis Questionnaire for Alumni)

Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia (A dan B), dan menuliskan pendapat Anda pada ruang yang telah disediakan (C dan D).

A. Seberapa seringkah Anda mengalami kesulitan dalam menggunakan Bahasa Inggris?

	Sangat Sering	Sering	Kadang Kadang	Jarang	Tidak Pernah
Membaca	1	2	3	4	5
Menulis	1	2	3	4	5
Berbicara	1	2	3	4	5
Mendengar	1	2	3	4	5

B. Menurut Anda, seberapa pentingkah Bahasa Inggris untuk kesuksesan karir Anda?

	Sangat Penting	Penting	Cukup Penting	Tidak Penting	Sangat Tidak Penting
Membaca	1	2	3	4	5
Menulis	1	2	3	4	5
Berbicara	1	2	3	4	5
Mendengar	1	2	3	4	5

C. Kemampuan Membaca (Reading Skills)

Kesulitan-kesulitan apa yang Anda temui ketika membaca suatu teks Bahasa Inggris.

1. Tidak Mengetahui Maksud dan Tujuannya
2. -
3. -
4. -
5. -

D. Kemampuan Berbicara (Speaking Skills)

Kesulitan-kesulitan apa yang Anda temui ketika berbicara dalam Bahasa Inggris.

1. Tidak Mengetahui Pronounciation/cara pengucapannya
2. -
3. -
4. -
5. -

E. Kemampuan Menulis (Writing Skills)

Kesulitan-kesulitan apa yang Anda temui ketika menulis dalam Bahasa Inggris.

1. Vocabulary nya
2. -
3. -
4. -
5. -

Terimakasih atas partisipasi Anda

DAFTAR PERTANYAAN UNTUK ALUMNI
(Needs Analysis Questionnaire for Alumni)

Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia (A dan B), dan menuliskan pendapat Anda pada ruang yang telah disediakan (C dan D).

A. Seberapa seringkah Anda mengalami kesulitan dalam menggunakan Bahasa Inggris?

	Sangat Sering	Sering	Kadang Kadang	Jarang	Tidak Pernah
Membaca	1	2	(3)	4	5
Menulis	1	2	(3)	4	5
Berbicara	1	(2)	3	4	5
Mendengar	1	(2)	3	4	5

B. Menurut Anda, seberapa pentingkah Bahasa Inggris untuk kesuksesan karir Anda?

	Sangat Penting	Penting	Cukup Penting	Tidak Penting	Sangat Tidak Penting
Membaca	(1)	2	3	4	5
Menulis	(1)	2	3	4	5
Berbicara	(1)	2	3	4	5
Mendengar	(1)	2	3	4	5

C. Kemampuan Membaca (Reading Skills)

Kesulitan-kesulitan apa yang Anda temui ketika membaca suatu teks Bahasa Inggris.

1. Susah membaca
2. Sulit mengartikan
3. -
4. -
5. -

D. Kemampuan Berbicara (Speaking Skills)

Kesulitan-kesulitan apa yang Anda temui ketika berbicara dalam Bahasa Inggris.

1. Sulit memulai kata-kata
2. -
3. -
4. -
5. -

E. Kemampuan Menulis (Writing Skills)

Kesulitan-kesulitan apa yang Anda temui ketika menulis dalam Bahasa Inggris.

1. Mengetahui ejaan kata
2. -
3. -
4. -
5. -

Terimakasih atas partisipasi Anda

DAFTAR PERTANYAAN UNTUK ALUMNI
(Needs Analysis Questionnaire for Alumni)

Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia (A dan B), dan menuliskan pendapat Anda pada ruang yang telah disediakan (C dan D).

A. Seberapa seringkah Anda mengalami kesulitan dalam menggunakan Bahasa Inggris?

	Sangat Sering	Sering	Kadang Kadang	Jarang	Tidak Pernah
Membaca	1	2	3	(4)	5
Menulis	1	2	(3)	4	5
Berbicara	1	(2)	3	4	5
Mendengar	1	2	3	(4)	5

B. Menurut Anda, seberapa pentingkah Bahasa Inggris untuk kesuksesan karir Anda?

	Sangat Penting	Penting	Cukup Penting	Tidak Penting	Sangat Tidak Penting
Membaca	1	(2)	3	4	5
Menulis	1	(2)	3	4	5
Berbicara	(1)	2	3	4	5
Mendengar	(1)	2	3	4	5

C. Kemampuan Membaca (Reading Skills)

Kesulitan-kesulitan apa yang Anda temui ketika membaca suatu teks Bahasa Inggris.

1. kurang vocabulary
2. kurang penguasaan grammar
3. -
4. -
5. -

D. Kemampuan Berbicara (Speaking Skills)

Kesulitan-kesulitan apa yang Anda temui ketika berbicara dalam Bahasa Inggris.

1. sulit dalam pengucapan b. inggris
2. kurang vocabulary
3. -
4. -
5. -

E. Kemampuan Menulis (Writing Skills)

Kesulitan-kesulitan apa yang Anda temui ketika menulis dalam Bahasa Inggris.

1. kurang mengetahui penulisan yang benar
2. kurang penguasaan grammar
3. -
4. -
5. -

Terimakasih atas partisipasi Anda

DAFTAR PERTANYAAN UNTUK AKADEMI TEKNIK TELEKOMUNIKASI (Needs Analysis Questionnaire for Stakeholder – Academy of Telecommunications Engineering)

Jawablah pertanyaan-pertanyaan di bawah ini dengan jelas dan ringkas.

1. Apa tujuan diberikannya mata kuliah Bahasa Inggris, khususnya Kemampuan Membaca (Reading Skills) kepada mahasiswa?

A. Agar mahasiswa dapat membaca buku Textbook sebagai buku penunjang perkuliahan

B. Agar mahasiswa terbiasa membaca text dalam bahasa Inggris sehingga secara tidak langsung mahasiswa dapat dengan fasih mengucapkan kalimat dalam b Inggris

C. Agar mahasiswa aktif ber-bahasa Inggris.

D. _____

_____

_____

_____

2. Seberapa pentingkah bacaan berikut ini untuk diberikan kepada mahasiswa di kelas?

	Sangat Penting	Penting	Cukup Penting	Tidak Penting
1. Jurnal Ilmiah	(1)	2	3	4
2. Artikel Koran	(1)	2	3	4
3. Artikel Internet	(1)	2	3	4
4. Buku Teks Kuliah	(1)	2	3	4
5. Fiksi (Novel, Cerpen)	1	2	3	(4)
6. Lain-lain (sebutkan bila ada) _____ _____ _____	1	2	3	4

Terimkasih Atas Kesediaan Anda Mengisi Questionnaire

DAFTAR PERTANYAAN UNTUK PERUSAHAAN
(Needs Analysis Questionnaire for Company)

1. Jenis pekerjaan apa yang diisi oleh lulusan Akademi Telekomunikasi TELKOM (Akatel) di perusahaan Anda?

   Teknisi, Customer Service, Marketing Support

2. Apakah kemampuan berbahasa Inggris dibutuhkan oleh mereka?

   Ya

3. Terdapat empat (4) kemampuan berbahasa: *membaca, berbicara, menulis,* dan *mendengarkan.* Menurut Anda kemampuan manakah yang paling dibutuhkan bagi lulusan Akatel di perusahaan Anda?

   untuk Teknisi = Reading ; Dua yang lain Speaking

4. Untuk kemampuan *membaca*, apa yang Anda harapkan dari lulusan Akatel?

   Mengerti manual mesin

5. Untuk kemampuan *menulis,* apa yang Anda harapkan dari lulusan Akatel?

   Membuat laporan

6. Untuk kemampuan *berbicara*, apa yang Anda harapkan dari lulusan Akatel?

   Berkomunikasi dengan pelanggan

Terimakasih atas partisipasi Anda

DAFTAR PERTANYAAN UNTUK PERUSAHAAN
(Needs Analysis Questionnaire for Company)

1. Jenis pekerjaan apa yang diisi oleh lulusan Akademi Telekomunikasi TELKOM (Akatel) di perusahaan Anda?

   Teknisi

2. Apakah kemampuan berbahasa Inggris dibutuhkan oleh mereka?

   Ya

3. Terdapat empat (4) kemampuan berbahasa: *membaca, berbicara, menulis,* dan *mendengarkan.* Menurut Anda kemampuan manakah yang paling dibutuhkan bagi lulusan Akatel di perusahaan Anda?

   Membaca dan menulis .

4. Untuk kemampuan *membaca*, apa yang Anda harapkan dari lulusan Akatel?

   Membaca buku manual peralatan teknik .

5. Untuk kemampuan *menulis,* apa yang Anda harapkan dari lulusan Akatel?

   Membuat laporan .

6. Untuk kemampuan *berbicara*, apa yang Anda harapkan dari lulusan Akatel?

   —

Terimakasih atas partisipasi Anda

DAFTAR PERTANYAAN UNTUK PERUSAHAAN
(Needs Analysis Questionnaire for Company)

1. Jenis pekerjaan apa yang diisi oleh lulusan Akademi Telekomunikasi TELKOM (Akatel) di perusahaan Anda?

   Teknisi

2. Apakah kemampuan berbahasa Inggris dibutuhkan oleh mereka?

   Ya

3. Terdapat empat (4) kemampuan berbahasa: *membaca, berbicara, menulis,* dan *mendengarkan.* Menurut Anda kemampuan manakah yang paling dibutuhkan bagi lulusan Akatel di perusahaan Anda?

   Membaca dan berbicara

4. Untuk kemampuan *membaca*, apa yang Anda harapkan dari lulusan Akatel?

   Membaca buku manual peralatan teknik.

5. Untuk kemampuan *menulis,* apa yang Anda harapkan dari lulusan Akatel?

   —

6. Untuk kemampuan *berbicara*, apa yang Anda harapkan dari lulusan Akatel?

   Berkomunikasi dengan supervisor (expatriate)

Terimakasih atas partisipasi Anda

ANGKET UNTUK MATERI PENGAJARAN
(Questionnaire for Teaching Materials – Lesson 1)

A. Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia.

		Ya	Tidak
1.	Apakah materi *Lesson 1* sesuai dengan bidang studi Anda?	(1)	2
2.	Apakah materi *Lesson 1* mudah dimengerti?	(1)	2
3.	Apakah materi *Lesson 1* menarik bagi Anda?	(1)	2
4.	Secara keseluruhan, apakah Anda puas dengan materi *Lesson 1*	(1)	2

B. Tulislah pendapat Anda hal-hal yang perlu diperbaiki/ditambah dari materi *Lesson 1* (jika ada).

1. –

2. –

3. –

ANGKET UNTUK MATERI PENGAJARAN
(Questionnaire for Teaching Materials – Lesson 1)

A. Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia.

		Ya	Tidak
1.	Apakah materi *Lesson 1* sesuai dengan bidang studi Anda?	(1)	2
2.	Apakah materi *Lesson 1* mudah dimengerti?	(1)	2
3.	Apakah materi *Lesson 1* menarik bagi Anda?	1	(2)
4.	Secara keseluruhan, apakah Anda puas dengan materi *Lesson 1*	(1)	2

B. Tulislah pendapat Anda hal-hal yang perlu diperbaiki/ditambah dari materi *Lesson 1* (jika ada).

1. ~ _____

_____

2. ~ _____

_____

3. ~ _____

_____

ANGKET UNTUK MATERI PENGAJARAN
(Questionnaire for Teaching Materials – Lesson 1)

A. Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia.

		Ya	Tidak
1.	Apakah materi *Lesson 1* sesuai dengan bidang studi Anda?	(1)	2
2.	Apakah materi *Lesson 1* mudah dimengerti?	1	(2)
3.	Apakah materi *Lesson 1* menarik bagi Anda?	(1)	2
4.	Secara keseluruhan, apakah Anda puas dengan materi *Lesson 1*	(1)	2

B. Tulislah pendapat Anda hal-hal yang perlu diperbaiki/ditambah dari materi *Lesson 1* (jika ada).

1. – _____

_____

2. – _____

_____

3. – _____

_____

ANGKET UNTUK MATERI PENGAJARAN
(Questionnaire for Teaching Materials – Lesson 2)

A. Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia.

		Ya	Tidak
1.	Apakah materi *Lesson 2* sesuai dengan bidang studi Anda?	(1)	2
2.	Apakah materi *Lesson 2* mudah dimengerti?	(1)	2
3.	Apakah materi *Lesson 2* menarik bagi Anda?	(1)	2
4.	Secara keseluruhan, apakah Anda puas dengan materi *Lesson 2*	(1)	2

B. Tulislah pendapat Anda hal-hal yang perlu diperbaiki/ditambah dari materi *Lesson 2* (jika ada).

1. –

2. –

3. –

ANGKET UNTUK MATERI PENGAJARAN
(Questionnaire for Teaching Materials – Lesson 2)

A. Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia.

		Ya	Tidak
1.	Apakah materi *Lesson 2* sesuai dengan bidang studi Anda?	(1)	2
2.	Apakah materi *Lesson 2* mudah dimengerti?	1	(2)
3.	Apakah materi *Lesson 2* menarik bagi Anda?	(1)	2
4.	Secara keseluruhan, apakah Anda puas dengan materi *Lesson 2*	(1)	2

B. Tulislah pendapat Anda hal-hal yang perlu diperbaiki/ditambah dari materi *Lesson 2* (jika ada).

1. - Penggunaan vocabulary disini saya rasa masih cukup tinggi
2. -
3. -

ANGKET UNTUK MATERI PENGAJARAN
(Questionnaire for Teaching Materials – Lesson 2)

A. Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia.

		Ya	Tidak
1.	Apakah materi *Lesson 2* sesuai dengan bidang studi Anda?	(1)	2
2.	Apakah materi *Lesson 2* mudah dimengerti?	(1)	2
3.	Apakah materi *Lesson 2* menarik bagi Anda?	(1)	2
4.	Secara keseluruhan, apakah Anda puas dengan materi *Lesson 2*	(1)	2

B. Tulislah pendapat Anda hal-hal yang perlu diperbaiki/ditambah dari materi *Lesson 2* (jika ada).

1. ~ _____

_____

2. ~ _____

_____

3. ~ _____

_____

ANGKET UNTUK MATERI PENGAJARAN
(Questionnaire for Teaching Materials -- Lesson 3)

A. Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia.

		Ya	Tidak
1.	Apakah materi *Lesson 3* sesuai dengan bidang studi Anda?	1	2
2.	Apakah materi *Lesson 3* mudah dimengerti?	1	2
3.	Apakah materi *Lesson 3* menarik bagi Anda?	1	2
4.	Secara keseluruhan, apakah Anda puas dengan materi *Lesson 3*?	1	2

B. Tulislah pendapat Anda hal-hal yang perlu diperbaiki/ditambah dari materi *Lesson 3* (jika ada).

1. _____

_____

2. _____

_____

3. _____

_____

ANGKET UNTUK MATERI PENGAJARAN
(Questionnaire for Teaching Materials – Lesson 3)

A. Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia.

		Ya	Tidak
1.	Apakah materi *Lesson 3* sesuai dengan bidang studi Anda?	(1)	2
2.	Apakah materi *Lesson 3* mudah dimengerti?	(1)	2
3.	Apakah materi *Lesson 3* menarik bagi Anda?	1	(2)
4.	Secara keseluruhan, apakah Anda puas dengan materi *Lesson 3*?	(1)	2

B. Tulislah pendapat Anda hal-hal yang perlu diperbaiki/ditambah dari materi *Lesson 3* (jika ada).

1. – _____
_____
2. – _____
_____
3. – _____
_____

ANGKET UNTUK MATERI PENGAJARAN
(Questionnaire for Teaching Materials – Lesson 3)

A. Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia.

		Ya	Tidak
1.	Apakah materi *Lesson 3* sesuai dengan bidang studi Anda?	1	2
2.	Apakah materi *Lesson 3* mudah dimengerti?	1	2
3.	Apakah materi *Lesson 3* menarik bagi Anda?	1	2
4.	Secara keseluruhan, apakah Anda puas dengan materi *Lesson 3*?	1	2

B. Tulislah pendapat Anda hal-hal yang perlu diperbaiki/ditambah dari materi *Lesson 3* (jika ada).

1. –

2. –

3. –

ANGKET UNTUK MATERI PENGAJARAN
(Questionnaire for Teaching Materials – Lesson 4)

A. Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia.

		Ya	Tidak
1.	Apakah materi *Lesson 4* sesuai dengan bidang studi Anda?	(1)	2
2.	Apakah materi *Lesson 4* mudah dimengerti?	(1)	2
3.	Apakah materi *Lesson 4* menarik bagi Anda?	1	(2)
4.	Secara keseluruhan, apakah Anda puas dengan materi *Lesson 4*?	(1)	2

B. Tulislah pendapat Anda hal-hal yang perlu diperbaiki/ditambah dari materi *Lesson 4* (jika ada).

1. ~ _____

_____

2. ~ _____

_____

3. ~ _____

_____

ANGKET UNTUK MATERI PENGAJARAN
(Questionnaire for Teaching Materials – Lesson 4)

A. Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia.

		Ya	Tidak
1.	Apakah materi *Lesson 4* sesuai dengan bidang studi Anda?	(1)	2
2.	Apakah materi *Lesson 4* mudah dimengerti?	(1)	2
3.	Apakah materi *Lesson 4* menarik bagi Anda?	(1)	2
4.	Secara keseluruhan, apakah Anda puas dengan materi *Lesson 4*?	(1)	2

B. Tulislah pendapat Anda hal-hal yang perlu diperbaiki/ditambah dari materi *Lesson 4* (jika ada).

1. Ada Puzzlenya. . . .

2. _____

3. _____

ANGKET UNTUK MATERI PENGAJARAN
(Questionnaire for Teaching Materials – Lesson 4)

A. Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia.

		Ya	Tidak
1.	Apakah materi *Lesson 4* sesuai dengan bidang studi Anda?	(1)	2
2.	Apakah materi *Lesson 4* mudah dimengerti?	1	(2)
3.	Apakah materi *Lesson 4* menarik bagi Anda?	(1)	2
4.	Secara keseluruhan, apakah Anda puas dengan materi *Lesson 4*?	(1)	2

B. Tulislah pendapat Anda hal-hal yang perlu diperbaiki/ditambah dari materi *Lesson 4* (jika ada).

1. – _____

_____

2. – _____

_____

3. – _____

_____

ANGKET UNTUK MATERI PENGAJARAN
(Questionnaire for Teaching Materials – Lesson 5)

A. Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia.

		Ya	Tidak
1.	Apakah materi *Lesson 5* sesuai dengan bidang studi Anda?	(1)	2
2.	Apakah materi *Lesson 5* mudah dimengerti?	(1)	2
3.	Apakah materi *Lesson 5* menarik bagi Anda?	(1)	2
4.	Secara keseluruhan, apakah Anda puas dengan materi *Lesson 5*?	(1)	2

B. Tulislah pendapat Anda hal-hal yang perlu diperbaiki/ditambah dari materi *Lesson 5* (jika ada).

1. – _____
_____
2. – _____
_____
3. – _____
_____

ANGKET UNTUK MATERI PENGAJARAN
(Questionnaire for Teaching Materials – Lesson 5)

A. Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia.

		Ya	Tidak
1.	Apakah materi *Lesson 5* sesuai dengan bidang studi Anda?	(1)	2
2.	Apakah materi *Lesson 5* mudah dimengerti?	1	(2)
3.	Apakah materi *Lesson 5* menarik bagi Anda?	(1)	2
4.	Secara keseluruhan, apakah Anda puas dengan materi *Lesson 5*?	(1)	2

B. Tulislah pendapat Anda hal-hal yang perlu diperbaiki/ditambah dari materi *Lesson 5* (jika ada).

1. - _____
_____
2. - _____
_____
3. - _____
_____

ANGKET UNTUK MATERI PENGAJARAN
(Questionnaire for Teaching Materials – Lesson 5)

A. Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia.

		Ya	Tidak
1.	Apakah materi *Lesson 5* sesuai dengan bidang studi Anda?	(1)	2
2.	Apakah materi *Lesson 5* mudah dimengerti?	(1)	2
3.	Apakah materi *Lesson 5* menarik bagi Anda?	1	(2)
4.	Secara keseluruhan, apakah Anda puas dengan materi *Lesson 5*?	(1)	2

B. Tulislah pendapat Anda hal-hal yang perlu diperbaiki/ditambah dari materi *Lesson 5* (jika ada).

1. – _____

_____

2. – _____

_____

3. – _____

_____

ANGKET UNTUK MATERI PENGAJARAN
(Questionnaire for Teaching Materials – Lesson 6)

A. Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia.

		Ya	Tidak
1.	Apakah materi *Lesson 6* sesuai dengan bidang studi Anda?	(1)	2
2.	Apakah materi *Lesson 6* mudah dimengerti?	1	(2)
3.	Apakah materi *Lesson 6* menarik bagi Anda?	1	(2)
4.	Secara keseluruhan, apakah Anda puas dengan materi *Lesson 6*?	1	(2)

B. Tulislah pendapat Anda hal-hal yang perlu diperbaiki/ditambah dari materi *Lesson 6* (jika ada).

1. _____
_____
2. _____
_____
3. _____
_____

ANGKET UNTUK MATERI PENGAJARAN
(Questionnaire for Teaching Materials – Lesson 6)

A. Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia.

		Ya	Tidak
1.	Apakah materi *Lesson 6* sesuai dengan bidang studi Anda?	(1)	2
2.	Apakah materi *Lesson 6* mudah dimengerti?	(1)	2
3.	Apakah materi *Lesson 6* menarik bagi Anda?	(1)	2
4.	Secara keseluruhan, apakah Anda puas dengan materi *Lesson 6*?	1	(2)

B. Tulislah pendapat Anda hal-hal yang perlu diperbaiki/ditambah dari materi *Lesson 6* (jika ada).

1. _____
   _____
2. _____
   _____
3. _____
   _____

ANGKET UNTUK MATERI PENGAJARAN
(Questionnaire for Teaching Materials – Lesson 6)

A. Jawablah pertanyaan-pertanyaan di bawah ini dengan melingkari salah satu angka yang tersedia.

		Ya	Tidak
1.	Apakah materi *Lesson 6* sesuai dengan bidang studi Anda?	(1)	2
2.	Apakah materi *Lesson 6* mudah dimengerti?	(1)	2
3.	Apakah materi *Lesson 6* menarik bagi Anda?	(1)	2
4.	Secara keseluruhan, apakah Anda puas dengan materi *Lesson 6*?	(1)	2

B. Tulislah pendapat Anda hal-hal yang perlu diperbaiki/ditambah dari materi *Lesson 6* (jika ada).

1. Memuaskan, ada fotonya.

2. _____

3. _____