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ภาคผนวก

ผนวก ก

รายละเอียดตารางสอนและแผนการสอน

วิธีการสอนแบบเดิม

ตารางที่สี่ รายละเอียดตารางสอน

การสอนประจำปีการศึกษา ๒๕๒๖ ภาคฤดูร้อน (๒๘ ก.พ. - ๒๕ มี.ค. ๒๖)

วัน \ เวลา	๐๘๐๐	๐๙๐๐	๑๐๐๐	๑๑๐๐	๑๒๐๐	๑๓๐๐	๑๔๐๐	๑๕๐๐
จันทร์			กลุ่มทดลอง ๓๒					
อังคาร						กลุ่มควบคุม ๓๒		
พุธ								
พฤหัสบดี						กลุ่มทดลอง ๓๒		
ศุกร์			กลุ่มควบคุม ๓๒					

รวมสอนสัปดาห์ละ : กลุ่มละ ๒ ชั่วโมง

งานพิเศษ : ———

Lesson Plan Unit I

Subject : Reading Comprehension

Class : 5th year air cadets

No. of Students : 32

Average Age : 23

Time : 50 minutes

Objective : The intergration of the 4 skills but with the predomination of reading.

Behavioral Objectives : Students must be able to

1. answer the Comprehension questions.
2. rewrite, rephrase or combine sentences into past and present participle phrases.
3. change non-verbal to verbal information and vice versa.
4. recognize and correctly use learned vacabularies : device, back and forth, line up, and extension in answering questions.

Content : 'Door Lock' based on ALC. Student Text Vol. 2500 by Defense Language Institute, U.S.A.

Language : Structures, lexis and vocabularies will be suggested within context and the communicative acts.

Assumption : Students already know some technical words like cam, lever, peak,valley, bolt, groove and ridge.

Aids : Real objects, diagram, gesture, blackboard and chalk.

Activities :

Teacher's Activities :

1. Asking questions.
2. Showing aids.
3. Writing on the black-board.

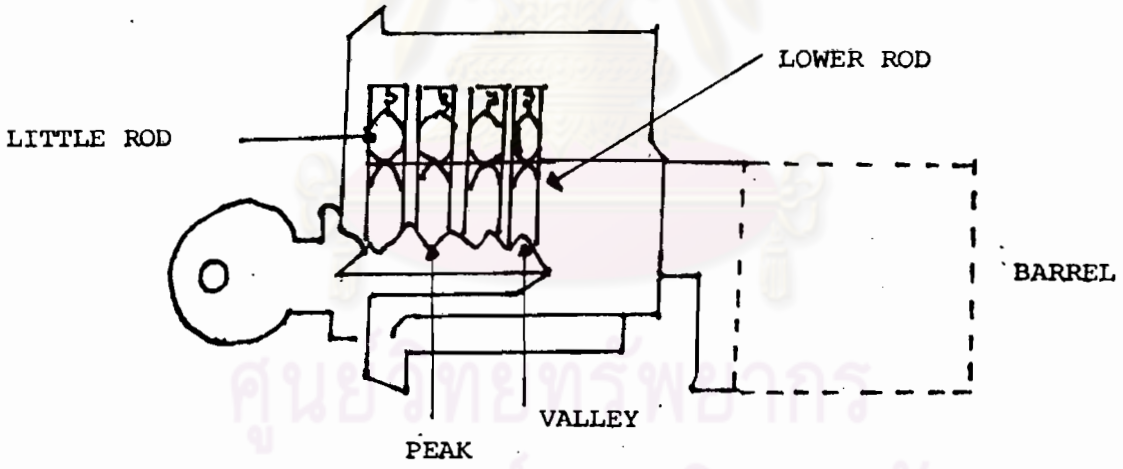
Students' Activities :

1. Answering questions (oral and writing).
2. Doing exercises (oral and written).

Reading Passage.

Door Lock

The door lock we are going to talk about is a key-operated locking device. In other words, it is locking instrument operated with a key. The diagram below shows what happens when you put the right key in the key-hole of the lock. The peaks and valleys of the key match the little rods. When the key is all the way in, the tops of the lower rods line up with the top of the barrel. Thus, the barrel is free to be turned. You want to be able to turn the barrel so that you can move the bolt back and forth.



Think of the barrel as a lever with two extensions. One is attached and the other is a separate part. The key then becomes the separate extension, and the cam becomes the attached extension. The cam fits into the slot in the bolt. When you turn the barrel in one direction, the cam pushes the bolt into the hole of the door frame and when you turn it the

other way, the cam pulls the bolt out of the hole. You can open the door then. So, as you see the key is used to align the lower rods and to turn the barrel, which in turn, moves the bolt back and forth, or in other words, in and out of the opening in the door frame.

What happens when we use the wrong key ? The key may slide into the key-hole, since the grooves and ridges along the sides of the two keys are sometimes the same. However, as the key goes in the top of the lower rods will not line up. If one of the rods e tends boyond the edge of the barrel, you can't turn the barrel.

Teacher	Students
Attention Pointer and Examples :	
device	
T.shows a pen to students.	
- Class, what is this ?	- It's a pen.
- What is it used for ?	- It's used for writing.
- Yes, a pen is used for writing. It's a device. (T.writes 'device' on the blackboard)	
Repeat after me pleas 'device.'	- device.
- A microphone is a device for increasing weak sound.	- A microphone is a device for increasing weak sound.
- A tape recorder is a device for recording sound.	- A tape recorder is a device for recording sound.

Teacher	Students
- A door lock is a locking device.	- A door lock is a locking device.
Generalization	
- Is an ax a device ?	- Yes, it is.
- What is it used for ?	- It is used for cutting big things.
- So it is a ...	- device for cutting.
- If you want to plant a tree what device do you have to use for digging soil ?	- We use a shovel.
- So, can you tell me what a device is ?	- Yes, it is an instrument or tool for doing something. (Here if students can't say in English, they can say in Thai)
Practice	
T. points at each item in the room and asks questions.	
- What is this ?	- It's a key.
- What is a key ?	- It's a device for locking and unlocking the door.
- What is that ?	- It's a pen-knife.
- What is a pen-knife ?	- It's a device for sharpening pencils.
- What is an earphone ?	- It's a device for listening to the sound from the tape.

Teacher	Students
What is a calculator ?	- It's a device for calculating the amount of numbers.
Attention Pointer and Examples : back and forth T.shows a string which is attached to a small box at one end to the students.	
- Look, class, when I swing this string the box is swaying back and forth. What is the box doing ?	- It's swaying back and forth.
- Class, look out of the window, see that tree ? When the wind blows what is that tree doing ?	- Yes, ma'am. - It's swinging back and forth.
(T.writes 'back and forth' on the blackboard.)	
- Repeat after me, please. 'back and forth'	- back and forth.
- He moves the key back and forth.	- He moves the key back and forth.
- The tree keeps swaying back and forth in the wind.	- The tree keeps swaying back and forth in the wind.
- The swing moves very slowly back and forth.	- The swing moves very slowly back and forth.

Teacher	Students
Generalization	
- Class, when I say 'back and forth', what do I mean by this expression ?	- To move to one direction and then come back to the opposite direction. (S. may use 'go' for 'move' and 'back, front' for 'direction'. - Even, they can tell the meaning in Thai).
- What am I doing when I turn the key to one direction and then come back to the opposite direction ?	- You're moving (turning) the key back and forth.
Practice	
- Class, please finish my unfinished sentences.	
- When the wind blows, the trees ...	- sway back and forth.
- In order to unlock the door, I have to ...	- turn the key back and forth.
- When I swing the string, the attached box ...	- swings back and forth.
- The children throw the swing ...	- back and forth.
- Please answer one more question, what do you do everyday when you have to walk to the academic building in the morning and go back to your hangar in the afternoon ? (Hangar and Academic building are	- We go back and forth between the academic building and the hangar everyday.

Teacher	Students
opposite)	
Attention Pointer and Examples :	
line up	
T.asks students to look at the diagram in their sheets.	
- Class, this is the picture of a key in a lock; you see the rods, the peaks and the valleys of the key. They match one another. In this manner, we say they are lined up.	
(T.writes on the blackboard 'line up')	
Repeat after me please 'line up'	- line up.
- The top of the lower rods line up with the top of the barrel.	- The top of the lower rods line up with the barrel.
(T.puts some pieces of chalk in line)	
- I'm lining up these pieces of chalk.	- I'm lining up these pieces of chalk.
- We line up to take oath every morning.	- We line up to take oath every morning.
- He lines the pictures up even with the wall.	- He lines the pictures up even with the wall.

Teacher	Students
Generalization	
Can you tell me class, what does 'line up' mean ?	- To put things in a line. - To make something in a line. (Some may answer it in Thai)
- What did I do a minute ago ?	- You lined up those pieces of chalk.
- If I ask you to line up what are you going to do ?	- We will have to go in front of the class and be in line.
Good.	
Practice	
Class - what do you do every morning before classes start ?	- We line up to take an oath.
- What did the commander order you to do yesterday ?	- He ordered us to line up our beds for an inspections.
- The barrel will be free to be turned if its top ...	- lines up with the lower rods.
- When I put these pieces of chalk into a line, what am I doing ?	- you are lining them up.
Attention Pointer and Examples :	
extension, extend	
T.stretches her arm to her side.	
- Class, I extend my arm. What am I doing ?	- You're extending your arm.
Extends your arms, please, like I do.	SS.extend their arms.

Teacher	Students
Thank you, put you arm down.	
(T.write on the blackboard 'extend → extension')	
Now, repeat after me 'extend, extension'	extend, extension.
- The fishing pole extends out over the water.	- The fishing pole extends out over the water.
- The coat-hanger extends out of the wall.	- The coat-hanger extends out of the wall.
- He extended his staying.	- He extended his staying.
(T.draws a picture of a lever on the blackboard)	
- Class, this is a lever which is a device for lifting things. How many bars do the lever have ?	Two bars.
- The two bars extend to both sides, repeat.	- The two bars extend to both sides.
- The two bars are extensions of the lever.	- The two bars are extensions of the lever.
- A lever has two extensions.	- A lever has two extensions.
Generalization	
Class, can you guess what extend means ?	Yes, ma'am ยื่น, ยืด

Teacher	Students
What part of speech do you think it is ?	-It's a verb.
- Yes, and how about extension ? What does it mean ? You can say it in Thai.	-It's a noun. ส่วนที่ยื่น
- Look at this sentence : The telephone number of English Department is 5236151 extension 3188. What does extension here mean ?	ต่อ, เบอร์ต่อ
- Very good.	
Practice	
— What does a lever have ?	- It has extensions.
-When I want to call you at your barracks, what number I should call?	- The number is 5236151 extension 3871
- Prakarn is absent to-day, he is still at home. What did he ask for ?	- He asked for the extension of his staying
- Everybody please extend your right arm.	Students extend their right arms.
- O.K. put them down.	SS. put down their arms.

Teacher	Students
Attention Pointer and Examples :	
past participle (phrase)	
T.tears a sheet of paper in her hands.	
Class, what did I do ?	- You tore a piece of paper.
O.K. this is the paper and it is torn. In other words, this is the torn paper.	
(T.writes on the blackboard 'a torn paper')	
Repeat after me please, 'a torn paper.'	- a torn paper.
- This is a glass.	- This is a glass.
The glass is broken.	The glass is broken.
This is a broken glass.	This is a broken glass.
- That is a man.	- That is a man.
He is called 'Tiger'.	He is called 'Tiger.'
A man called 'Tiger.'	A man called 'Tiger'.
- We are talking about the process.	- We are talking about the process.
The process is developed by man.	The process is developed by man.
We are talking about the process developed by man. (T. writes this sentence on the blackboard).	We are talking about the process developed by man.

Teacher	Students
Generalization	
Class, for each word, like glass	
how many sentences do I have ?	-Three sentences.
-Where does the third sentence come from ?	-From the first and second sentences.
-What do I do with the first and the second ?	-You combine them together.
-Do you still see there are 2 sentences in the third one ?	-No, ma'am
-What do you see in 'This is the broken glass'	- past participle.
Good, by combining this way we call it a rephrasing or rewrite them into one sentence.	
-What part of speech is the word 'broken'	-It's an adjective
Yes, because it modifies a noun.	
-What do you see in the sentence 'We are talking about the process developed by man ?	- Also a past participle.
- Only past participle ?	- No, ma'am. With a phrase 'by man'
- What part of speech is it ?	- It's an adjective too.
Yes an adjective followed by a phrase; so we should call it an adjective phrase	

Teacher	Students
But this adjective is formed from past participle, so what can we call it ? ...	- A part participle phrase.
-Very good. One more question, look carefully at the sentence on the blackboard. From which sentence do you think the past participle phrase come from ? - The second sentence is in passive form.	- From the second sentence.
-So can you generalize where a past participle or a past participle phrase come from ? ...	- The sentence which is in passive form.
- That's right. Last question, what do we use past participle for ?	-For modifying the noun in the first sentence.
-Very excellent. <u>Practice</u>. -Class, when I say sentences, please rephrase them as the combined sentence with past participle phrase O.K. ?	-Yes, ma'am.
- This is a piece of chalk and it is broken.	-This is a piece of broken chalk.

Teacher	Students
- I've found my book. The book was lost.	I've found my lost book.
- I saw a man. His left leg is broken.	I saw a broken left leg man.
- A lock is a device and it is operated with a key.	A lock is a key-operated device.
- Very good. The last sentence is special. Here you have put the word 'key' infront of operated.	
- Can you leave it out ?	- No, ma'am.
- Why ?	- Because then we will not know what to be used to operate this device.
- That's right.	
Attention Pointer and Examples:	
Present Participle (Phrase).	
- Class, look at this tape recorder. What do we use it for ?	- For recording sound.
- Yes, it is a tape recorder and we use it for recording sound. In other words, it is a recording tape.	
T. writes the sentences on the blackboard.	
- Repeat after me please, a recording tape.	- A recording tape.

Teacher	Students
- This is a tape recorder. We use it for recording sound. It is a recording tape.	- This is a tape recorder. We use it for recording sound. It is a recording tape.
- We saw a bird. A bird is singing. We saw a singing bird.	- We saw a bird. A bird is singing. We saw a singing bird.
- A microphone is a device. We use it for increasing weak sound. A microphone is an increasing weak sound device.	- A microphone is a device. We use it for increasing weak sound. A microphone is an increasing weak sound device.
- A door lock is a device. We use it for locking. It is a locking device.	- A door lock is a device. We use it for locking. It is a locking device.
<u>Generalization</u>	
- Class - do you think this is the same as past participle phrase ? I mean the way we rephrase it.	Yes, ma'am.
- What is present participle ?	An - ing form of verb.
- What part of speech is it here in the examples we read ?	- an adjective.
- Can you tell me the difference between present and past participle	- Yes, the past participle phrase is rephrased from the sentence in

Teacher	Students
phrase ? What kind of sentence it is rephrased ?	passive form.
- How about the present participle ?	- It is rephrased from the sentence in active form.
Yes, you have to remember that the present participle phrase must be rephrased from the active form only.	
Review of some connectors, when, if, however, so that.	
- Class, let's have some review on what you have already known; 'when' is a connector. What does it show ?	- It shows time.
- Yes, it indicates time. Now look at the following sentence. T. writes on the blackboard. 'When water is at zero degree, it freezes'.	
- Repeat please.	- When water is at zero degree it freezes.
- From this sentence, 'when' indicates time which is ...	- condition.
- Yes, it shows conditional cause-effect.	

Teacher	Students
- How about 'if' ? What does it show ?	- Condition too.
- Can we replace 'when' with 'if ?	- Yes ma'am.
- How is this sentence ? What will it become ?	- It will be like this 'If water is at zero degree, it freezes'.
T. Writes a sentence on the blackboard. 'He is rich, however, he is unhappy.'	
- What does 'however' show ?	- It shows contrast.
T. writes another sentence. 'He saves his money so that he can buy a car.'	
- What does 'so that' here show ? So you still know very well about these connectors.	-It shows purpose.
Reading	
- Now please read the passage silently. Now, let's have some talk about the passage.	S S. read silently.
- Do you see the picture on your sheet ?	- Yes, ma'am.

Teacher	Students
- What is it ?	A key.
- Yes, a key and a door lock. You have read the passage, now I'll check whether you understand it correctly.	
- What is a door lock ?	- It is a device operated with a key.
- What happens when you put the right key in the key-hole ?	- The peeks and the valleys of the key line up with the lower tops of the rods.
- And what happens if these things line up ?	- The barrel is free to be turned.
- What can a key do ?	- It can align the lower rods and to turn the barrel.
- When you use the wrong key, why can't you turn the barrel ?	- Because the peaks and the valleys do not line up with the rods.
- Good, I see you understand it clearly. But tell me what does this passage tell you ?	- The way the key works.
- Yes, that's the passage that gives you the description of the process of the key's work. It gives you information. Now, please do the following exercises.	

Exercises

I. Reading Comprehension.

Write T. in front of the correct statement and F. in front of the false one.

1. The kind of locking device we have talked about is nut and bolt.
2. The barrel is free to be turned when the lower rods line up with the top of the barrel.
3. You can't move the bolt back and forth if you are not able to turn the barrel.
4. The barrel has two extensions which are attached.
5. The two extensions are the keys and the rods.
6. The key is used to align the lower rods and to turn the barrel.
7. Sometimes the key can slide into the key-hole even that key is wrong.
8. If one of the rods extends beyond the edge of the barrel, you can't unlock the door.

II. Rephrasing.

Rephrase the following sentences as examples.

Ex. 1. A pencil is an instrument. It is used for writing.

Rephrased Sentence = A pencil is a an instrument used for writing.

2. A lock is a device. We use it for protection.

Rephrased Sentence = A lock is a device using for protection.

1. A laboratory is a room or a building. It is used for research.
2. A microphone is an instrument. It is designed for increasing weak sound.
3. A microscope is an instrument. We use it to make small objects

look larger.

4. An ax is a hand tool. It is used for chopping wood.

5. A lever is a device. We use it for moving and lifting things.

III. Use of Language

Decide whether each sentence is a definition, description of the result of an action, conditional cause-effect and statement giving information.

[1]Ridges is the narrow, raised strip. [2]The barrel in a lock has a key-hole in it. [3]And this key-hole has ridges and grooves in it. [4]The ridges and grooves match those on the side of a key. [5]If the ridges and grooves don't match those of the key-hole, then you can't put the key in the lock.

1.

2.

3.

4.

5.

Connectors

Fill in the blank with the following connectors:

if, however, when, so that, in other words.

1. ..... the ridges and grooves don't line up with the barrel, then you can't turn the barrel.
2. Sometimes the wrong key may slide into the key-hole, ... you can't turn the barrel.
3. When the top of the lower rods matches the top of the barrel, the barrel is free to be turned, ..., you can unlock the door.

4. The top of the lower rods has to line up with the barrel ..... the barrel is free to be turned.

5. ..... you put in the wrong key, the barrel won't be turned.

Note :

1. Sometimes, Thai can be used when students can't follow the explanation.
2. Exercises, sometimes, will be assigned as a home work.

Lesson Plan Unit II

Subject : Reading Comprehension.

Class : 5^{th} year Air Cadets.

No. of Students : 32

Average Age : 23

Time : 50 minutes.

Objective : The intergration of the 4 skills with the predomination of reading.

Behavioral Objectives : Students must be able to

1. answer the comprehension question.
2. rewrite, rephrase or combine sentences into past or present participle phrases.
3. change non-verbal to verbal information and vice versa.
4. recognize and correctly use learned vocabularies : convert, achieve, essential, take up and reverse in answering questions.

Content : 'Photosynthesis' based on ALC. Student Text Vol. 2500 by Defense Language Institute, U.S.A.

Language : Structures, lexis and vocabularies will be suggested within context and the communicative acts.

Assumption : Students already know some technical words like process, energy, element, combustion and chemical.

Aids : Real objects, gesture, blackboard and chalk.

Activities :

Teacher's Activities :

1. Asking questions
2. Showing aids
3. Writing on the board
4. Guiding students answering questions

Students' Activities :

1. Answering questions (oral and writing)
2. Doing exercises (oral and written)

Reading Passage.

Photosynthesis

We like to read and talk about the remarkable process developed by man for producing things. Yet, when we talk about the process by which plants convert light energy into chemical energy, we are discussing the most marvelous chemical process in the world. Scientists use the word photosynthesis, which simply means putting things together with light, to refer to this remarkable ability of plants to put things together. What is so important about this process ? How is photosynthesis achieved ?

Let's take up the question of the importance of the process first. Plants produce almost all of the oxygen in our atmosphere; and as you know, oxygen is an element essential to life processes and to combustion. Green plants combine the energy from light with the water and carbon dioxide, the gas that passes out of our lungs as we breathe, to make food. All of our food comes from this wonderful, energy-converting process of plants.

The question of how photosynthesis is achieved has not been answered. Scientists have been trying to understand this process for years. It seems that this is like asking how life itself begins, or how a black cow eats green grass and gives white milk. However, we do know a lot about the process.

Light contributes to the break down of particles of water so that carbon dioxide and water combines to form sugar. In this process, oxygen is given off. We also know that carbon dioxide and water are reduced with a kind of chemical energy to form sugar.

This brings us to a most interesting part of our story : the amazing ability of green plants to put things together with light and then reverse the process. Green leaves can use the energy from light to make sugar and oxygen out of carbondioxide and water. Then they can reverse the process, breaking down the sugar with oxygen so that carbon dioxide and water are released.

Green leaves produce an abandance of sugar and oxygen. These are essential ingredients for sustaining the life of animals and human beings. So far, man has neither copied nor fully understood this wonderful manufacturing process. Anyway, we get our energy by eating food produced by plants and by using oxygen, also procuced by plants. Then, we return carbon dioxide and water to the atmosphere. In this process, the carbon dioxide and oxygen balance is maintained.

Teacher	Students
Attention Pointer and Examples : convert.	
T. shows students a piece of chalk.	
- Class, what color is this chalk ?	White, ma'am.
- I'll convert its color.	
T. put the chalk into the ink bottle on the desk.	

Teacher	Students
- Class, what color does it become now ?	Blue ma'am.
- Yes, I convert the color of this chalk. T. writes on the blackboard the word 'convert'.	
- Repeat after me please, convert.	Convert.
- The traffic light is converted from green to yellow.	- The traffic light is converted from green to yellow.
- plants convert the energy of light into chemical energy.	- Plants convert the energy of light into chemical energy.
- A generator converts mechanical energy to electrical energy.	- A generator converts mechanical energy to electrical energy.
- He was a Buddhist then he converted into Christian.	- He was a Buddhist then he converted into Christian.
Generalization	
- Class, if you convert something, what do you do ?	- I change or turn, that thing into other thing.
- Yes, if the traffic light is changed from green light to yellow one what does that mean ?	- the traffic light is converted into yellow.
- He was a Buddist, he became a Christian. What did he do ?	- He converted his religion.

Teacher	Students
O.K. you understand it correctly. Let's have some practice.	
Practice.	
Answer my questions, please.	
- He was a Christian then he became a Buddist. What did he do ?	- He converted his religion.
- The witch changed the boy to a rabbit.	- She converted the boy into a rabbit.
What did the witch do to the boy ?	
- He changed a garage to a game room.	
What did he do to the garage ?	- He converted it into a game room.
- What do plants do with energy of light ?	- They convert it into chemical energy.
Attention Pointer and Examples :	
Achieve	
-Class, did you finish the assignment I gave you last time ?	Yes, ma'am.
- Did you put them on my desk ?	Yes, ma'am.
- That means you achieved your assigment.	
T.writes on the blackboard the word 'achieve'.	

Teacher	Students
- Here, class, repeat after me, 'achieve'	- achieve.
- He works very hard in school,so he achieves high marks.	- He works very hard in school, so he achieves high marks.
- She won a scholarship to go abroad; she has achieved her goal.	- She won a scholarship to go abroad; she has achieved her goal.
- She won a scholarship, so she achieved what she wanted.	- She won a scholarship, so she achieved what she wanted.
- The astronauts could land on the moon. They achieved man's hope.	- The astronauts could land on the moon. They achieved man's hope.
Generalization	
- Class, can you guess what 'chieve' means ?	- It means to get, to succeed.
- Or to accomplish. If you succeed in getting straight A. What can you say in another way ?	- We achieve straight A.
Practice	
Please answer my questions.	
- Did you achieve anything last week?	- Yes, we achieved our assignment.
- What did the astronauts achieve ?	- They could land on the moon.
- If you get what that is your goal. What can you say in another way ?	- We achieve our goals.
- In studying, if you study hard and	- We will achieve a good grade.

Teacher	Students
are diligent, what will you achieve then ?	
Attention Pointer and Examples :	
essential	
T. looks for her glasses on the desk.	
- Class, has anyone seen my glasses ? I remember I put it here.	One student comes out and helps looking for it. 'Here ma'am, under these sheets'
- Oh, thank you I can't teach if I have no glasses. It's very essential for me. Otherwise, I can't read.	
T. puts on her glasses and writes 'essential' on the blackboard.	
- Please repeat after me class, 'essential'	- essential
- Oxygen is essential for our lives.	- Oxygen is essential for our lives.
- Food is essential for our bodies.	- Food is essential for our bodies.
- It's essential for you to remember the entire procedure of locking.	- It's essential for you to remember the entire procedure of locking.
- He gave us only the essential information we need.	- He gave us only the essential information we need.

Teacher	Students
- The essential facts are written on the board.	- The essential facts are written on the board.
Generalization	
- Pichai, what is essential for you now ?	- Money, ma'am.
- Money ? not learning ? O.K. Class, the glasses is very essential for me. If I don't have it, I can't see. From this sentences and the sentences you repeat after me, can you guess what is the meaning of 'essential'?	- Important, necessary.
Yes and what part of speech is it ?	- It's an adjective.
Think of the word 'important'; it is equivalent.	
Practice	
T. asks students at random what are essential to them.	S. answer differently.
- Class, what is essential for Pichai ?	- Money is important for him.
- What is essential for my reading ?	— your glasses.
- What element is essential to life process ?	- Oxygen is.

Teacher	Students
- Can you live without food for a long time ?	- No ma'am.
- Why ?	- Because it is essential to our bodies.
I can see you understand this word clearly now.	
Attention Pointer and Examples :	
take up	
Let's have some talk about you, class.	SS. answer in chorus
- What are you going to do after graduating from here at the end of this year?	- 'We're going to fly'
- you mean you're going to be student pilots ?	- Yes, ma'am.
- You will learn how to fly, right ?	- Right, ma'am.
Oh, you'll take up flying !	
T. writes the words 'take up' on the blackboard.	
- Repeat after me please, 'take up'	take up.
- Air cadets would like to take up flying after graduating from the Academy.	- Air cadets would like to take up flying after graduating from the Academy.
- We do not take up French in this semester.	- We do not take up French in this semester.

Teacher	Students
- All of us here take up English.	- All of us here take up English.
Generalization	
- What will you do after graduating from here, Suwit' ?	- I'll take up flying, ma'am.
- How about you Sompote ?	- I'll take up flying too.
- Here class, when I say 'take up' what do I mean by this verb ?	- It means to study about or to become interested in.
- Yes, just like Suwit and Sompote, they'll study about flying after graduating. In other words, we can say that they are going to ...	... take up flying.
Practice	
- Today, we're learning English, in other words, we ...	- are taking up English.
- Pichai is learning to fly. What is Pichai doing ?	- He's taking up flying.
- I don't like mathematic, so I don't	- take up mathematic.
- Why don't you take up French, Thiti?	- Because I don't like it.
- Thiti doesn't like French, so he...	- doesn't take up French.
- Repeat class, Today, we're going to take up what photosynthesis is.	- Today, we're going to take up what photosynthesis is.

Teacher	Students
Attention Pointer and Examples :	
reverse	
T. asks one student to plug in her tape recorder.	S. does as she tells.
Then she turns on the tape but no sound is heard.	
'Why, it doesn't work, please try turning the plug up side down'.	S. does as she tells.
'Still there's no sound, there must be something wrong with either the plug or the tape. Anyway, this reminds me of a word you should know.'	
T.writes the word 'reverse' on the blackboard.	
- Class even I asked your friend to reverse the plug, the sound wasn't heard. So repeat after me 'reverse'	'reverse'
- Please reverse the plug.	- Please reverse the plug.
- He tried reversing the plug but the tape still would not operate.	- He tried reversing the plug but the tape still would not operate.
- He followed the process and then reversed it after finishing.	- He followed the process ana then reversed it after finishing.

Teacher	Students
- Plants reverse the process of which making food to release carbon dioxide.	- Plants reverse the process of which making food to release carbon dioxide.
Generalization	
From the examples, can you guess what 'reverse' means ? Good, it means to turn backward or to go back to the opposite direction.	- ทวน, ย้อน, กลับ
- When I ask your friend to reverse the plug, what do I ask him to do ?	- to put in the plug again but with the opposite direction.
Practice	
- Class, what did I ask your friend to do at the second time ?	- You asked him to reverse the plug.
- Then what did he try to do ?	- He tried reversing it.
- Can you reverse anything here in this room ?	- Yes, the earphones. We can reverse them from left to right.
- In order to release carbon dioxide what must green plants do ?	- They reverse the process of making food.
Review present and past participle (Phrase) Class, let's have a review on what we learnt last time.	

Teacher	Students
- Who can remember what grammar points we talked about last time ?	- Present and Past Participle Phrase.
- Now when I say the sentences please rephrase them as we have learnt.	
- We will talk about the process. This process is developed by man.	- We will talk about the process developed by man.
- We get our energy by eating food. The food is produced by plants.	- We get our energy by eating food produced by plants.
- We breathe in oxygen. the oxygen is also produced by plants.	- We breathe in oxygen also produced by plants.
- Be careful with this one . All of our food comes from this process. The process converts energy of plants.	- All of our food comes from this energy converting process of plants.
- We don't understand the process. It manufacturesoxygen.	- We don't understand the oxygen-manufacturing process.
- I can see you still remember well these grammar points.	
Review connectors : however, also, then, so that.	
Practice	
- Combine these two sentences for me please by using connector.	

Teacher	Students
– Kanok is very rich. He is always unhappy.	- Kanok is very rich, however, he is always unhappy.
- Thiti studies hard. He does not achieve good grades.	- Thiti studies hard, however, he does not achieve good grades.
Good. What connector can replace 'however'	- 'But'
Now for the next pair.	
- He is rich. And he is handsom.	- He is rich and also handsom.
- The plants produce oxygen. The plants produce carbon dioxide.	- The plants produce oxygen and carbondioxide.
- Can we use 'also' ?	- Yes, the plants produce oxygen and also carbondioxide.
Now combine with 'then'	
- You had your lunch. Next you came here.	- You had your lunch then you came here.
- You have your classes. Next you go back to your hangar.	- You have your classes then you go back to your hangar.
Now combine with 'so that'	
- You study hard. You can get good grades.	- You study hard so that you can get good grades.
- The teacher makes students practise. The students can understand well.	- The teacher makes students practise so that they can understand well.

Teacher	Students
Reading	
Good. Now will you please read the paragraph silently.	SS. read silently.
- Class, I'll ask you something about what you read so I'll know whether you understand it.	
- What is a photosynthesis ?	- It's a process used by plants in converting energy.
- What does photosynthesis mean ?	- It means putting things together with light.
- Does man know how photosynthesis is achieved ?	- No, man doesn't know.
- What do plants release when making food ?	- They release oxygen.
- When do plants release carbon dioxide ?	- When they reverse process.
O.K. I see you can understand the main idea of the passage. Anyway please do these exercises for me.	

Exercises

I. Reading comprehension.

Answer the following questions on a separate sheet.

1. How do scientists refer to the process used by plants to put things together with light?
2. Plants convert light into what kind of energy ?
3. What is the source of almost all the oxygen in our atmosphere ?
4. What gas do we expel (release) from our lungs when we breathe ?
5. What element is essential to combustion ?
6. What do plants combine to make food ?

II. Rephrasing.

Rephrase the following sentences as example.

Ex. We like to read about the remarkable process. The process is developed by man.

We like to read about the remarkable process developed by man.

1. A shovel is a tool. It is used for lifting and moving loose material.
2. A furnace is an enclosed chamber. It is made for producing heat.
3. Oxygen is a colorless, orderless, tasteless gas. It is considered essential to life process.
4. Clay is a plastic, fine-grained earth. It is produced by the deposit of fine rock particles in water.
5. A barn is a farm building. It is designed for shelting livestock.

III. Connectors.

Fill in the blank with the following words : however, anyway, so that, then , also, so far.

1. Plants require energy from light to produce food, they ..... require carbon dioxide.
2. Plants require energy from light, carbon dioxide, and water ..... they can make food.
3. We don't know anything about the process, ... we do know that plants release oxygen.
4. Plants make food and release oxygen,..... by reversing the process, they produce carbon dioxide.

Notes:

1. Sometimes, Thai must be used if the students can't follow the teacher's explanation.
2. Exercise may be assigned as home work.

Lesson Plan Unit III

Subject : Reading Comprehension.

Class : 5th year Air Cadets.

No. of Students : 32

Average Age : 23

Time : 50 minutes.

Objective : The intergration of the 4 skills with the predomination of reading.

Behavioral Objectives : Students must be able to:

1. answer the comprehension questions.
2. rewrite, rephrase
3. change non-verbal to verbal information and vice versa.
4. recognize and correctly use learned vocabularies : collide, creature, bounce ..... off, with ease and some connectors as well in answering questions.

Content : 'Bionics' based on ALC.Student Text Vol. 2500 by Defense Language Institute U.S.A.

Language : Structures, lexis, and vocabularies will be suggested within context and the communicative acts.

Assumption : Student already know some technical words like mechanism, navigation, frequency, transmit, application.

Aids : Real objects, gesture, blackboard and chalk, pictures.

Activities :

Teacher's Activities :

1. Asking questions
2. Showing aids
3. Writing on the board
4. Guiding students in answering questions

Students' Activities :

1. Answering questions (oral and writing)
2. Doing exercises. (oral and written)

Reading Passage.

'Bionics'

Bionics is the study of living creatures. It is study in researching principles that are applicable to engineering. Bionics is so new that even the name of this science is not well-known. This new science developed from realizing that a complete understanding of the special purpose mechanism by which some of our creatures such as bats, frogs, owls, porpoises, etc. do mysterious things could lead to important application to engineering. Bats and porpoises,for example, have better sound navigation ranging (sonar) mechanics than our man-made devices. Bats bounce high-frequency noises off objects in flight and avoid colliding with them in a split second. Porpoises are also extremely skillful sound navigators. Like bats, propoises have a highly developed echo-locating system. Porpoises find their way around in water by bouncing high-frequency noises off objects. In comparison with the bat's and the porpoise's echolocating systems, our best echo-locating systems, our best echolocating devices are crudes. Why haven't we been able to copy nature's echo-locating mechanisms ?

We know, for instance, that the porpoises emits high-frequency noises, but we do not know where they come from since it has no vocal cords. In addition, the porpoises has no visible external ears or ear openings. Porpoises can see with their eyes only as well as man. Thus, their vision is limited in muddy water. On the other hand, they are capable of navigating with ease by their special-purpose mechanism. Their transmitting and receiving system is so efficient that they can avoid colliding with

objects and find food with unerring accuracy in darkened waters. Experimenters have conducted tests to evaluate their sound system. In one test, porpoises swim around a large number of iron pipes at high speed without running into a single pipe. In other tests, they avoid hitting a piece of clear glass, a section of wire and went straight through an opening.

Teacher	Students
Attention Pointer and Example : creature T.sticks a large picture of porpoise and bat on the blackboard.	
- Class, can you tell me what picture this is ?	- It is a picture of a fish and a bat.
- What are fish and bat ?	- They are aminals.
- Yes, they are living animals. They are creatures. T.writes the word 'creature' on the blackboard.	
- Repeat after me please, 'creature'.	- Creature.
Bats are creatures.	- Bats are creatures.
Fish is a creature.	- Fish is a creature.

Teacher	Students
Man is a creature All kinds of living animals are creatures.	- Man is a creature. - All kinds of living animals are creatures.
Generalization	
— What is a creature ?	—It is a living animal.
— Are we creatures ?	- Yes, we are creatures.
— What is a dog ?	- It is a four-legged creature.
Practice	
— What is this ? (T. points at the picture).	- It is a picture of creatures.
— How many creatures are there in this picture ?	- There are 2 creatures.
- How many creatures are there in this class ?	- There are 32.
- How about me ? Am I not a creature?	- Yes, you're, sorry. There are 33 creatures in this class.
Attention Pointer and example collide T. shows class a picture of a car accident :	
- How about this picture, class ? What is it ?	It is the picture of a car accident.
- How many cars are there in this picture ?	- Two cars.

Teacher	Students
- What happened with these two cars?	- They hit each other.
- The two cars collided with each other violently.	- The two cars collided with each other violently.
T. writes on the blackboard the word 'collide'	
- Class, please repeat after me, collide.	- Collide.
- The driver didn't see the other car, so he collided with it.	- The driver didn't see the other car, so he collided with it.
- The bats can fly in the dark without colliding with anything.	- The bats can fly in the dark without colliding with anything.
- The light went out and he didn't see anything in the dark; so he collided with a table.	- The light went out and he didn't see anything in the dark, so he collided with the table.
Generalization	
- Class, can you guess what 'collide' means ?	- It means to hit or to run into something.
- What did you see in the picture ?	- Two cars collided with each other.
- Have you ever collided with anything?	- Yes, ma'am.
Practice	
- Class, what will happen, if you drive carelessly ?	- We may collide with other cars.
- How well do the bats fly in the dark?	- They fly very well without colliding with anything.

Teacher	Students
- What is a synonym of collide ? T. asks one student to come to the front of the class and ask his friends at random the questions of 'Can you drive a car ?' 'Have you ever collided with other ?'	- Run into A. student asks his friends at random with those two questions. His friends answer the questions.
Attention Pointer and Examples : bounce ... off	
- Class, do you play tennis ?	- Yes, we do ma'am.
- Do you play badminton too ?	- Yes, we do too ma'am.
- Can you tell me the difference between hitting the tennis ball and hitting the shuttle ?	- In tennis, you can let the ball hit the ground first then you hit it. But for badminton, you have to hit the shuttle before it falls to the ground.
Good, that means in tennis you let the ball bounce off the ground first. How about basket ball, how do you carry the ball ?	- We have to hit the ball to the ground all the way down to the opposite goal.
- That means you bounce the ball off the ground all the way to the opposite goal, right ?	- Right.
T. writes the words 'bounce... off' on the blackboard.	

Teacher	Students
- Class, please repeat after me, 'bounce ... off'	'Bounce ... off'
- The ball bounces off the ground.	- The ball bounces off the ground.
- You must let the tennis ball bounce off the ground first before you hit it.	- You must let the tennis ball bounce off the ground first before you hit it.
- He carried the ball by bouncing it all the way.	- He carried the ball by bouncing it all the way.
- The ball bounced off the wall and hit right on his face.	- The ball bounced off the wall and hit right on his face.
- Radar detects object by bouncing radio waves off that objects.	- Radar detects object by bouncing radio waves off that objects.
Generalization	
- Can you guess. calss, what does 'bounce ... off' mean ? Yes it means reflect.	- กระเด้ง, สท้อน, กระดอน
- What does 'the ball bounces off the wall' mean ?	- It reflects back from the wall.
Practice	
- In playing tennis, how do you hit the ball ?	- By letting it bounce off the ground first, then hit it.
- What is the synonym of 'reflect'?	- Bounce ... off
- What is able to bounce off the	- Balls, rubber

Teacher	Students
surface of objects ?	
- Besides balls and rubber, do you think light and sound can bounce ? Very good.	Yes, they can like echo.
Attention Pointer and examples :	
with ease	
- Class, have you finished your home work I gave you last time ?	- Yes ma'am. We put it on your desk.
- Good, did you find it difficult ?	- No, ma'am, it is not difficult.
- Did you do it easily ?	- Yes, we did.
- In other words, you did it with ease.	
T.writes on the balckboard the words 'with ease'.	
- Class, please repeat after me, 'with ease'	- 'with ease'.
- I did my home work with ease.	- I did my home work with ease.
- He studied hard, so he did his exam paper with ease.	- He studies hard, so he did his exam paper with ease.
- He has many works to do but he does them with ease.	- He has many works to do but he does them with ease.
- The bats find their ways in the dark with ease.	- The bats finds their ways in the dark with ease.

Teacher	Students
Generalization	
— Class, do you know what 'with ease' means ?	- It means 'easily'.
— Good. you did your home work with ease. What does it mean by this sentence ?	- I did my home work easily.
Practice	
-How did you do your home work ?	- We did it with ease.
- If the questions are not difficult, how can you answer them ?	- We can answer them with ease.
- How can the bats find their ways in the dark ?	- They can find them with ease.
- If you close your eyes, can you find your way with ease ?	- No, we can't.
- When you become nervous, can you work with ease ?	- No, we can't.
- How can you work, if you feel relaxing ?	- we can work with ease.
Review on some connectors Class, in unit III you will see many connectors. So let's have some brief review on them.	

Teacher	Students
- Can you tell me the meaning of 'such as'	- The same as example.
- Yes and when you use the words 'in comparison with' or the word 'like' what do you want to indicate?	- Comparison.
- How about the word 'also' and 'in addition', what do they indicate?	- They indicate addition or what is more than what is said.
- Can you give me an example of the phrase 'on the other hand', Apiraks ?	- I am quite good at English. On the other hand, my mathematic is poor.
- Is that correct class ?	- Yes, it's correct.
- Sutham, give me the example of 'such as'	- Chantaburi is famous for itsfruit such as durian, rambutan and mangoesteen.
- Is that correct class?	- Correct
- How about 'therefore', what does it indicate ?	- Reason.
- Saravudhi give me the sentence of this word.	- I was sick yesterday, therefore I didn't come to school.
- Is that correct too, class ?	- Yes it is.
Now, read the passage, please	-SS.read silently.
Reading	
Let's have some questions and answer about the passage, so I can check	

Teacher	Students
your comprehension.	
- Class, what is bionics ?	- It is the study of living creatures.
- How is bionics developed ?	- It is developed from realizing the special purpose mechanism by which some creatures do mysterious things.
- What are that some creatures ?	- bats, frogs, owls and porpoises.
- What is the use of this bionics ?	- It can be applied to engineering.
- How can bats fly in the dark without colliding any objects.	- By bouncing high-frequency noises off that objects in flight.
- In other words, what does a bat use in flying ?	- an echo-locating system.
- How about porpoises, is it the same as bats ?	- Yes, it is.
- What is the difference between these two animals ?	- Bats are in the air, and porpoises are in water.
Very good. I can see that you can understand the passage quite clearly.	

Exercises

I. Reading Comprehension

1. What is bionics ?

2. What is this new science developed from ?

3. How do bats and porpoises avoid colliding with objects ?

4. How does an eacho help to locate an object ?

5. How well can porpoises see with their eyes ?

II. Fill in the blanks with the missing words.

As you know, the eye is the ..... organ used by living creatures for seeing. The ear is the sense mechanism ..... for hearing. For thousand of years we accepted one basic idea. Living beings can see with their eyes and hear with their ears and that was that. Yet, the bat's strange ability to guide ..... in flight, fine food, and avoid ..... with objects in complete darkness led investigators to raise the question : Can it be that bats and some other animals '.....' with their ears rather than with their eyes?

III. Tell which sentence is a definition, a description of explanation, of stating information, and of reason.

Echoes are sound waves that bounce back after striking the surface of objects. In other words, echoes are reflected sound waves. Bats produce sound waves in the air, and porpoises send out sound waves in the water. It is these echoes that bats and porpoises use to avoid running into objects and to find food. Therefore, you understand why these animals are referred to as echo-navigators and echo-locators.

Lesson Plan Unit IV

Subject : Reading Comprehension.

Class : 5th year Air Cadets.

No. of Students : 32

Average Age : 23

Time : 50 minutes.

Objective : The intergration of the 4 skills with the predomination of reading.

Behavioral Objectives : Students must be able to

1. answer the comprehension questions.
2. rewrite, rephrase or refill the given sentences.
3. change non-verbal to verbal information and vice versa.
4. recognize and correctly use learned vocabularies : recall, obstacle,detect,determine and some connectors as well in answering questions.

Content : 'Radar' based on ALC.Student Text Vol.2500 by Defense Language Institute, U.S.A.

Language : Structures, lexis and vocabularies will be suggested within context and the communicative acts.

Assumption : Student already know some technical words like radio wave, sound wave, indicator, blips and altitude.

Aids : Pictures, real objects, gesture and blackboard and chalk.

Activities :

Teacher's Activities :

1. Asking questions
2. Showing aids
3. Writing on the board
4. Guiding students in answering questions

Students' Activities :

1. Answering questions (oral and writing)
2. Doing exercises (oral and written)

RADAR

The word radar comes from the words radio detection and ranging. This means discovering objects and measuring their distance (ranging). This is done by means of radio waves. Radar devices are complicated. But the way radar works is simple. You will recall that bats and porpoises detect and locate objects by sending out sound waves. You will also remember that objects reflects sound waves. Animals navigate by listening to these sound waves or echoes. Sailors, many years ago, used echoes to navigate near land in foggy weather. A sailor standing in the bow of a boat would shout. If an echo came back to him he knew that an obstacle was nearby.

In much the same way, echoes make it possible for radar to detect distant objects. It can tell how far away these objects are. Objects such as ship, airplanes, and buildings reflect radar waves just as they do sound waves. Radar sends out short burst of radio waves. Then it listens between the bursts for echoes. The distance to an object is determined by the time it takes from the radio wave to travel to the object and return. The radar set has a device called an indicator. This is a screen similar to a television screen. The indicator shows the echoes as dots of light. These are called blips. You simply read the screen to tell the direction and the distance to the objects that caused the blips.

Radar is used to guide ships and airplanes through fog and clouds. It can spot land marks such as cliffs and lighthouses.

This can tell the ship's captain where he is. There is another kind

of radar that tells the pilots his altitude above earth. A ship's radar can detect obstacle in fog, rain, or snow, The men working in the control towers watch the radar screen. They can see the path of approaching planes and guide them in for perfect landings even in fog.

Teacher	Students
Attention Pointer and examples :	
recall	
T.shows the picture of a bat and a porpoise to students.	
Class, what is this picture ?	- It's a picture of porpoise and bat.
Did you see this picture before ?	- Yes, you showed us last time.
Can you remember what bat can do ?	- It can fly in the dark without colliding any objects.
Good, in other words, you can recall this picture and the ability of a bat.	
T.writes on the blackboard, 'recall'	
Class, repeat after me please, recall	- Recall.
- We recall the picture of a porpoise and a bat.	- We recall the picture of a porpoise and a bat.
- We also recall the ability of these two creatures.	- We also recall the ability of these two creatures.

Teacher	Students
- He could recall the hard time when he was young. - He recalls the stories he was told.	- He could recall the hard time when he was young. - He recalls the stories he was told.
Generalization	
Class, from the examples, can you tell me what 'racall' means ? Yes, it means to remember or to bring back memory of.	- It means 'remember'.
Practices	
T.points at the picture of porpoise.	
Class, last time we talked about this fish. Can you recall its name ?	- Yes, it is a porpoise.
- Can you recall what we talked about last time ?	- Yes, we can recall that we talked about 'bionics'
- Can you also recall what bionics means ?	- Yes, it means a study of living creatures with special purpose mechanism.
- Can you recall what a door lock is?	- Yes, it is a locking device.
- Can you recall what is it operated with ?	- Yes, it is operated with a key.
Very good. I'm sure now you understand the word recall and you can recall all what we talked about too.	

Teacher	Students
Attention Pointer and Examples : obstacle T.points to the student who sits in the middle of the row near the back.	Siripong stands up and tries to come out quickly. But he has to pass three or four of his friends in the row, this makes him move .
— Siripong, will you please comes to the front of the class quickly. I'll give you ten seconds. T.looks at the watch and says. — Siripong can't make it in ten seconds. —Why are you so slow ? - They are in your way. You can't come out earily or smoothly. That means they are obstacle to you. T. writes the word 'obstacle' on the blackboard. Class, please repeat after me, obstacle.	Siripong - I can't go out quickly because my friends sit on my way. Obstacle,
- Siripong couldn't come out because his friends were obstacles. - The cars can't pass through that road because there is a fallen tree on it, and the tree becomes an obstacle.	- Siripong couldn't come out because his friends were obstacles. - The cars can't pass through that road because there is a fallen tree on it, and the tree becauses an obstacle.

Teacher	Students
- All difficulties are obstacles to success. - Echoes are soundwaves that reflect from an obstacle.	- All difficulties are obstacles to success. - Echoes are soundwaves that reflect from an obstacle.
Generalization	
Class, what is the meaning of 'obstacle' ?	- อุปสรรค, สิ่งกีดขวาง
Yes, that's right.	
When you have an obstacle in your way, can you go directly or smoothly ?	- No we can't. We have to go indirectly.
- Can you guess, what part of speech is this word ?	- It's a noun.
That's right.	
Practice	
In working, do you always do it smoothly ?	- No, sometimes it is difficult.
- If difficulty arises, what can you say about it ?	We have an obstacle.
- Bats and porpoises bounce high-frequency noises off objects.	- We call them obstacles.
- What is the synnonym of obstacle ?	- Hindrance.
- What is an echo ?	- It is a soundwave that reflects from an obstacle.

Teacher	Students
- Why didn't Siripong come out quickly ?	- Because his friends are obstacles in his way.
Attention Pointer and Examples : detect T. asks a student to plug in a tape for her. But it doesn't work.	
- Class, does anyone know how to operate this tape ?	Another student comes out. He works at the tape for a while, then the sound comes out.
- Very interesting, what's wrong with it ?	The student - The plug is a little bit loosing.
- Class, your friend is very clever. He could seek and find the problem in the tape. He could detect it. T.writes the word 'detect' on the blackboard.	
- Class, please repeat after me, 'detect'	- 'Detect'.
- Your friend could detect the problem in the tape recorder.	- Your friend could detect the problem in the tape recorder.
- He heard a sound so he tried to detect where the sound was coming.	- He heard a sound so he tried to detect where the sound was coming.
- The engine wouldn't start and he wouldn't detect any problem in	- The engine wouldn't start and he couldn't detect any problem in the

Teacher	Students
the engine either. - The plan failed, and they detected the error at once.	engine either. - The plan failed, and they detected the error at once.
Generalization	
- Class, from those examples please tell me what the meaning of detect is. - Yes it means seek and find. Your friend seeked and could find the problem in my tape recorder.	- ตรวจพบ
Practice	
Class, how can a bat detect that there is an object in his way ? - John is a careful worker. Do you expect to detect any error in his work ? - When your plan fails, what is the best way you should do ? - How can you detect an enemy's plane ?	- by bouncing a high-frequency noise off that object. - No, we don't - We should review it and try to detect where the fault is and revise it. - With radar.
Attention Pointer and Examples : determine	

Teacher	Students
- Supote, if someone buys you a ticket to go abroad, where do you want to go, Europe or America ?	- America ma'am.
- How about you Prakong ?	- America too.
- And you Mana ?	- Europe ma'am.
- And you Chamras ?	- I'am not sure ma'am. I want to go both America and Europe.
- So, you can't determine where to go. T. write the word 'determine' on the blackboard.	
- Repeat after me please, class, determine .	'determine'
- Chamras can't determine where to go.	- Chamras can't determine where to go.
- Supote determines to go to America.	- Supote determines to go to America.
- Mana determines to go to Europe.	- Mana determines to go to Europe.
- The plan failed and they tried to determine the cause of this failure.	- The plan failed and they tried to determine the cause of this failure.
- Have you determined where to go for this coming holiday ?	- Have you determined where to go for this coming holiday ?
Generalization	
Class, what does determine mean ?	Decide กำหนด

Teacher	Students
- Yes, it means both, 'decide' and 'fix'. When Mana determines to go to Europe, what does determine mean here ?	- Decide. It means Mana decides to go to Europe.
- Yes, and when I say 'their plan failed, they tried to determine the cause of this failure'. What does determine mean here ?	- Fix. They tried to fix the cause of the problem.
-That's right.	
Practice	
- Upon graduation from here by the end of this year, what will you do next ?	- We determine to become pilot students at flying school.
- How is the class leader appointed ?	- He is determined by his conduct and his good grades.
- Class, how can you determine a bat and a porpoise strange creatures ?	- We determine them strange creatures from their strange ability in finding their ways.
- Have you determined what to do during this weekend ?	- Yes, we have determined to have a party.
Review Let's have a quick review on connectors, shall we? The first one is 'but'. What does but indicate ?	- A contrast.
Siriporn, give me a sentence with	- He is very rich, but he is always

Teacher	Students
this connector.	unhappy.
- Class, is that correct ?	- Yes, it is correct.
- How about 'if', what does this connector show ?	- Condition.
- Krisada, give me an example please. Correct. Now, the word 'then'. What does it tell you ?	- If it rains, I won't go. - Sequence of time.
- You had your lunch, then you came to class.	
- From this sentence what happened first.	- You had your lunch.
Reading	
Will you please read the whole passage now ?	SS. read silently.
- Let me check your comprehension, will you ?	
- Class, where does the word 'radar' come from ?	- It comes from the first letter of the words 'radio detection and ranging.
- What do we use radar for ?	- We use it for discovering objects and measuring thier distances.
- How can radar work ?	- It works by means of radio waves.
- What do we call dots of light on the radar screen ?	- We call them blips.

Teacher	Students
How many things can most radar tell us ?	- 2 things.
What are they ?	- They are direction and distance.
What else can some kinds of radar tell us ?	- An altitude.
O.K. you can understand it very well. And this is an exercise for you. Do it please.	

EXERCISES

I. Reading comprehension

1. What does the word radar come from?
2. What kind of waves does radar use?
3. How is the distance to an object determined?
4. What do the blips on the radar screen look like?
5. What is radar used for?

II. Indicate which sentence is a description of explanation, contrast, comparison, condition and addition of which stating information.

Light waves and radio waves are quite similar. The light waves from a flashlight travel in a beam. They travel in the direction in which you point the flashlight. And, when the light strikes an object, it bounces back. In much the same way, radio waves travel in a beam. They travel in the direction in which they are pointed. They are reflected back when they strike an object. We can see light waves, as we do with a flash light. But we cannot see radio waves. In addition, radio waves can pass through substances that cause light waves to spread out.

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9.
10.

Lesson Plan Unit V

Subject : Reading Comprehension.

Class : 5th year air cadets.

No. of Students : 32

Average age : 23

Time : 50 minutes

Objective : The intergration of the 4 skills but with the predomination of reading.

Behavioral Objectives : Students must be able to

1. answer the comprehension questions.
2. rewrite, rephrase or combine sentences with some connectors.
3. change non-verbal to verbal information and vice versa.
4. recognize and correctly learned vocabularies : evaporate, condense, absorb, keep in mind in answering questions and doing exercise.

Content : 'Window Air Conditioners', based on ALC Book, Volume 2500, by Defense Language Institute, U.S.A.

Language : Structures, lexis and vocabularies will be suggested within context clues and the communicative acts.

Assumption : Students already know some technical words like refrigerant, condenser, coil, compressor.

Aids : real object, gestures, blackboard and chalk.

Activities :

Teacher Activities :

1. Asking questions
2. Showing aids.
3. Writing on the board.

Students' Activities :

1. Answering questions (oral and writing)
2. Doing exercises (oral and written)

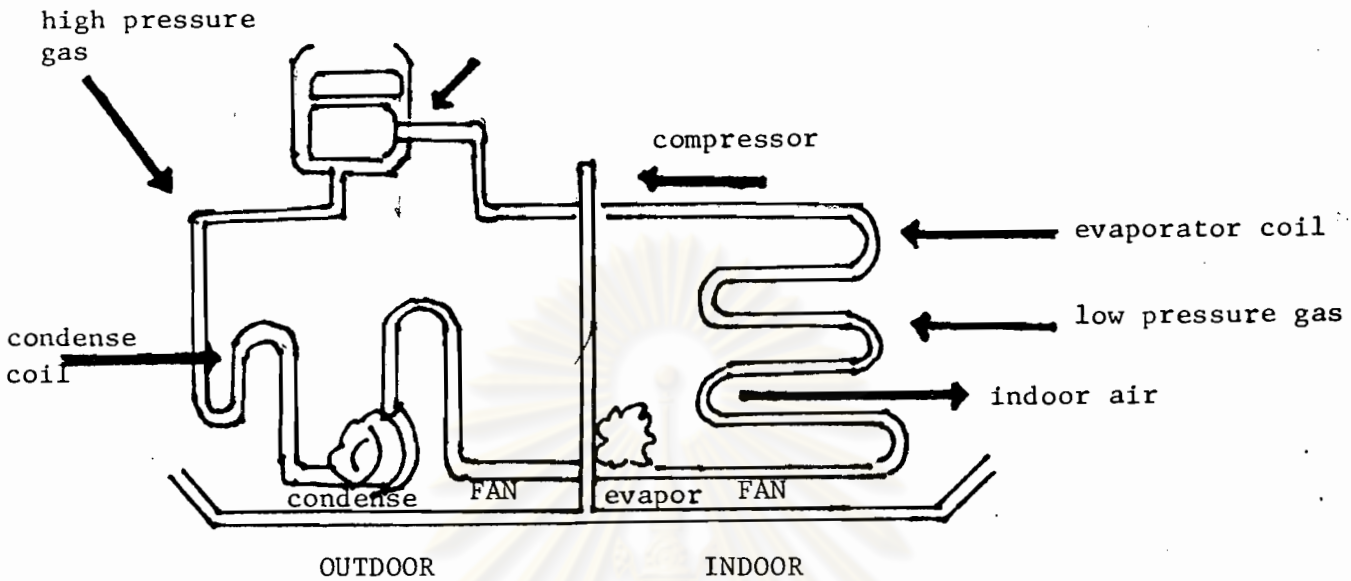
Reading Passage.

Window Air Conditioners.

We are going to talk about how air conditioner works. Before we begin, let's be sure you know a few things. You need to know what happens when a liquid evaporates and when it condenses. This is important because air conditioner uses a liquid known as a refrigerant, or coolant. This liquid alternately changes from a liquid to a gas. Keep in mind that when a liquid evaporates like a refrigerant does, it changes to a gas. Then, when this gas condenses, it changes back to a liquid. This is one of the basic principles we are going to talk about in this unit. When a liquid refrigerant changes back to a liquid it releases heat. A second principle to remember is that heat moves, or flows, only from warmer substances to cooler substances. In other words. heat goes from a warmer place to a cool place; it doesn't flow from a colder to a warmer substance.

A simple explanation will help you understand what happens when a liquid evaporates, or changes to a gas. You will notice that you usually feel cool when you get out of cold water a swim. Your skin is actually cold because the film of water left on it begins to evaporate. The heat that changes the thin film of water to water vapor comes from your skin and you feel cold. This is similar to cooling the warm air in a room by evaporating a liquid coolant.

As shown in the above diagram, the liquid refrigerant moves into the evaporator coil. The evaporator coil is a cooling coil. The liquid quickly turns into a gas and absorbs heat from the room air. The room air is drawn into the air conditioner unit and is blown over the coils by the evaporator



fan. The cooled air is then blown back into the room. This air is now cold and you feel cool. Next, the compressor draws the refrigerant gas from the cooling coil into the condenser coil The condenser coil is exposed to the outdoor air. Then the condenser fan blows the outdoor air over the coil. This cools the gas enough to make it turn into a liquid and release heat. The outdoor air takes heat from the gas in the coil because the gas is hotter than the outdoor air.

Teacher	Students
Attention Pointer and Examples. : evaporate.	
- Class, what season are we in right now ?	- We're in the beginning of summer.
- Is it sunny or rainy everyday ?	- It is sunny.
- What happens to the water in the canal and in the pond in front of our school ?	- The amount of the water becomes less.
- Do you know, why the water becomes less ?	- The sun dries it.
- Yes, or in other words we can say that the sun evaporates it.	
T.write the word' evaporate on the blackboard.	
- Class, repeat after me please, 'evaporate.'	'evaporate.'
- The sunlight evaporates water in summer.	The sunlight evaporates water in summer.
- When I'm out from the water, the water is evaporating from my skin.	- When I'm out from the water, the water is evaporating from my skin.
- The water evaporated off the wet clothes.	- The water evaporated off the wet clothes.
- The water evaporated off the coils in the air conditioner.	- The water evaporated off the coils in the air conditioner.

Teacher	Students
Generalization	
Class, do you know what 'evaporate' means ?	- It means to turn into vapor.
Good. And can you guess, what part of speech it is ?	- It's a verb.
That's right.	
Practice	
- Class, what happens to water during dry season ?	- It evaporates.
- Why is your skin dry without rubbing it, after you are out from the water for a while ?	- Because it evaporates from our skins.
- What happens if a liquid is heated	- It evaporates.
- If you put your wet clothes in the sun, what will happen to them ?	- They will be dry, because the sun evaporates water off them.
Very good.	
Attention Pointer and Examples :	
condense	
Class, look at the sky, it's very cloudy. Do you think it's going to rain this afternoon ?	- It might be ma'am.
- Can you tell me what causes rain ?	- The vapor in the air.
- But how can vapor become rain ?	- It turns into liquid when it is cold.

Teacher	Students
- Or you can say it condenses when it is cold. T.writes the word 'condense' on the blackboard. - Class, repeat after me, please, condense.	Condense.
- The vapor condenses when it is cold.	- The vapor condenses when it is cold.
- The exercises are very long, so he condenses them into 3 parts.	- The exercises are very long, so he condenses them into 3 parts.
- The book is very large, so he is condensing his book into 16 chapters.	- The book is very large, so he is condensing his book into 16 chapters.
- When the vapor condenses, it changes back to a liquid.	- When the vapor condenses, it changes back to a liquid.
Generalization	
- Class, can you guess what condense means ?	- ทด, ย่อ
- Yes, and you can use 'contract' or 'compress' as its synonyms. For example the vapor compresses when it's cold. The book is too large, so he contracts it.	

Teacher	Students
Practice	
- When the vapor is cold, what happens to it ?	It condenses and turns to a liquid.
If you write a book and it is too long, how can you do so that the readers won't be bored with it ?	- We can condense it into chapters.
- What does rain come from ?	- It comes from clouds.
- How can clouds turn into rains ?	- They condense and turn into rains.
- What can water be condensed to ?	- To ice.
Attention Pointer and Examples : absorb.	
T.imitates an advertisement on T.V. by showing students a piece of chalk.	
- Class, what colour is this chalk?	- It is white.
- Look, I will change its colour.	
T.puts that piece of chalk into the bottle of blue ink.	
- What colour is it now ?	- It is blue now. (Some students might imitate the sound of ooh-hoo, like in T.V.)
- Do you know why it becomes blue ?	Yes, the ink goes into the chalk.
- That means this chalk absorbs ink and the colour changes to the	

Teacher	Students
colour of the ink. T. writes the word 'absorb' in the blackboard.	
- Repeat after me, please, 'absorb!	'Absorb!
- This chalk absorbs ink and turns its colour into blue.	- This chalk absorbs ink and turns its colour into blue.
-Water gets heat from the sun and absorbs it; then turns to vapor.	- Water gets heat from the sun and absorbs it, then turns to vapor.
- Ice absorbs heat and turns into a liquid.	- Ice absorbs heat and turns into a liquid.
- When the metal was burnt it absorbed the heat from the fire.	- When the metal was burnt it absorbed the heat from the fire.
- To dry water on the floor, he put some paper on it, and the paper absorbed all of the water on the floor.	- To dry water on the floor, he put some paper on it and the paper absorbed all of the water on the floor.
Generalization	
Class, from the sentences you have repeated, can you tell me the meaning of 'absorb' ?	- Yes ma'am. It means .... ซึม ดูดซึม ซับ
- Yes, it means 'take in' or 'assimilate'	
- What part of speech is it ? Right.	- It's a verb.

Teacher	Students
Practice	
Class, if you burn the metal, what will happen ?	- It will absorb heat from the fire.
- If you put dry colth on a very wet floor, what does dry cloth do ?	- It absorbs water on the floor.
- Why does ice become a liquid ?	- Because it absorbs heat and the heat melts the ice.
- Why does a liquid becomes a vapor?	- Because it absorbs heat.
- When a liquid becomes a gas, what does it do ?	- It absorbs heat.
Very good.	
Attention Pointer and Examples :	
keep in mind	
Class, have you finished the exercises I gave you last time ?	Yes, ma'am.
- Does anybody forget to put it on my desk ?	- No, ma'am.
Good, you have to remember that after each class you have to do exercises and put them on my desk. In other words you have to keep it in your mind that after each class you have to do some exercises and put them on my desk.	

Teacher	Students
Practice	
- How many vocabularies do you have to keep in mind now ?	- There are four of them.
- As students, what do you have to do when the teacher tells you something ?	- We have to keep it in mind.
- What did I ask you to do before leaving this room ?	- To keep in mind that we have to turn off the light and the air conditioners.
- What did I tell you to remember or to keep in mind about the heat ?	- That heat goes from a warmer place to a cool place.
- What do you have to keep in mind about the liquid ?	- That when it changes to a gas, it absorbs heat.
- What else do you have to keep in mind about the liquid ?	- That when it evaporates, it changes to a gas.
Review on connectors : because, if, so.	
- Class, when you want to give reason why something happens or why you do something what connector should you use ?	- Because
- Can you give me an example, Prakarn ?	- Yes ma'am. - I was absent yesterday, because I was sick.

Teacher	Students
- Is that right, class ?	- It is right.
- If you want to show conditional cause-effect relation, what connector should you use ?	- 'If'
- Give me an example, Apirak.	- If it rains, I won't go.
- Class, is that correct ?	- Yes ma'am.
Now, for the cause-effect sentence, what connector should you use ?	- So' or 'therefore'
- Sumate, give your friends an example.	- I was sick, so I didn't come to school yesterday.
- Is that correct class ?	- Yes, ma'am.
Reading	
Class, please read the passage silently.	S. read silently.
- Class, please answer some questions.	
What liquid does an air conditioner use ?	- A refrigerant or a coolant.
- What does a liquid turn into when it evaporates ?	- It turns into a gas.
- And what does a gas turn into when it condenses ?	- It turns into a liquid again.
- Does heat go from a cool place to a warm place ?	- No, it goes from warm place to a cool place.
- How many basic principles are there	- There are two of them.

Teacher	Students
in dealing with air conditions ?	
Right. What is the first principle?	When a liquid evaporates it changes to gas, and when this gas condenses it changes back to a liquid.
- What is the second principle ?	- Heat moves from a warm place to a cool place.
- Why do you feel cool after a swim?	- Because the film of water left on it begins to evaporate.
- When a liquid evaporates, what does it do ?	- It absorbs heat.
- O.K. if you understand the basic principles, then you can understand how air conditioner works.	

Exercises

1. When a liquid evaporates in an air conditioner, what does it do ?

2. What does a gas change to when it condenses ?

3. What would happen if you placed a warm bottle of milk into a container of cold water ?

4. Suppose a fan is blowing on you, will you feel colder when your skin is dry or wet ?

5. What is another name for the evaporator coil ?

Rephrase the following sentences by using connectors 'because' 'of' 'so' and deletion of word or words.

1. You loose heat from your skin. You feel cool.

2. You feel cool. Evaporations take the heat from your skin.

3. The air is dry. The air conditioner takes the moisture.

4. You suddenly cool the hot gas. It will turn into a liquid.

5. We heard an echo. It was coming from the cliff.

6. You didn't listen carefully. You didn't understand.

7. Glue is a sticky substance. It is used for sticking things together.

8. He didn't like his work. He resigned and took a job with a different company.

Lesson PIan Unit VI

Subject : Reading Comprehension.

Class : 5th year air cadets.

No. of Students : 32

Average Age : 23

Time : 50 minutes

Objective : The intergration of the 4 skills but with the predomination of reading.

Behavioral Objectives : Students must be able to

1. answer the comprehension questions.
2. rewrite, rephrase or combine sentences into past and present participle phrases.
3. change non-verbal to verbal informtion and vice versa.
4. recognize and correctly use learned vocabularies : descend, a variety of, observe, provide and carry out, in answering questions.

Content : 'Types of Aircraft' based on The Language of the Air Force in English by Francis A.Cartier.

Language : Structures, lexis and vocabularies will be suggested within context and the communicative acts.

Assumption : Students already know some technical words like tactical, strategic, mission, radius, aircraft, fuselage, reconnaissance, interceptor, target and missile.

Aids : picture, blackboard and chalk, gestures.

Activities :

Teacher's Activities:

1. Asking questions.
2. Showing aids.
3. Writing on the board.

Students' Activities :

1. Answering questions (oral and writing)
2. Doing exercises (oral and written)

Types of Aircraft

No single type of aircraft can perform all the task that Air Force plane must do. A fighter is designed to fly very fast at high altitudes. It is also able to turn quickly, and climb and descend at high speeds; that is, it is very maneuverable.

Some types of aircraft, especially those used for tactical missions, must be able to fly at both high and low airspeeds. This requirement causes difficult problems for the aircraft designer. For high speeds, it is best to have short wings. However, planes with short wings do not fly well at low airspeeds. Recently, therefore, planes such as F-111 have been built with wings that can swing back toward the tail while the plane is in flight. This brings the tips of the wings closer to the fuselage and, in effect, shortens wings. Thus, the F-111 can have long wings for slow flight and shorter wings for higher airspeeds.

No one, however, has invented a plane that can change all its characteristics so it can be used for all purposes. An air force must, therefore have a wide variety of aircraft :

Reconnaissance Aircraft. The first military use of aircraft was reconnaissance. Before the invention of the flying machine, a commander had to try to get to the top of a hill to observe enemy troops in the distance. Even a very small plane that could not fly very high or very fast provided a greatly inproved view of the enemy's position and movements. It provided him with a 'hill' that he could move anywhere he wanted it.

Modern reconnaissance aircraft fly at extremely high altitudes and at extremely high speeds. The SR-71 A, for example, is a strategic reconnaissance plane that flies higher 60,000 feet (18,300 metres) at an airspeed three times faster than sound. Its airspeed is more than 2,250 knots. Of course, the pilot can see very little at such a speed and altitudes, but reconnaissance planes carry extremely fine cameras and other equipment that can gather and record the information for him.

Not all reconnaissance planes fly so high or so fast. Sometime it is necessary to fly slowly and at low altitudes. A small, slow reconnaissance plane is used for such a mission.

Bombers. Some fighters are also used to carry and drop bombs, but few fighters have sufficient radius for strategic missions. The United States Air Force's primary longrange bomber is the B-52 'Strato Fortress'. This is one of the few military aircraft that still has a crew member called a gunner. The gunner fires the weapons that defend the bomber from enemy interceptors.

Originally, bombers carried out their strategic missions by dropping bombs on their targets. Now, however, they sometimes also carry missiles that are fired from the bomber while it is still far away from the target. These missiles then fly at very high speeds to hit a factory or other targets while the bomber avoids the defense around the target.

Teacher	Students
Attention Pointer and Examples :	
descend.	
T. shows a large picture of two airplanes to the students.	
- Class, what is the picture ?	- It is the picture of two airplanes.
- Yes, what are the planes 'doing'?	- They're flying.
- What is the difference between their flying ?	- One flies with its nose down, the other is in ordinary position.
- Can you guess what the plane with the nose down is going to do ?	- It's going to land.
- Yes, it's going to land. Now it is descending.	
T. writes the word 'descend' on the blackboard.	
Repeat after me class, descend'.	'Descend'
- One plane is descending.	- One plane is descending.
- The birds are descending down on the pond.	- The birds are descending down on the pond.
- His house is on the hill. There is a road down from the hill. He always comes to town by the road descending from the hill.	- His house is on the hill. There is a road down from the hill. He always comes to town by the road descending from the hill.
- The pilot sees the enemy's troops. He descends his plane on them.	- The pilot sees the enemy's troops. He descends his plane on them.

Teacher	Students
Generalization	
- Class, do you know what 'descend' means ?	- โฉบลง, ลงต่ำ, ลง
- Yes, it means to come down, to slope down.	
- When the road descends from a hill. What does it mean ?	- It slopes down a hill.
- When the plane is descending. What is it doing ?	- It's coming down to the earth.
- The plane is descending has two meanings. First it is coming down. The second meaning is quite a terminology. Listen to this sentence again. 'The pilot sees the enemy's troops and descends his plane on them'.	
- Can you guess, what the pilot is doing with the enemy ?	- He'a attacking them.
Very good. What is the second meaning of 'descend' if used with the plane ?	- To attack.
Practice	
- If you live on a hill, how can you come to town ?	- I descend from the hill.

Teacher	Students
- The plane is flying, if the pilot is going to land, what is he going to do first ?	- He's going to descend first.
- If you are a pilot, and your mission is to attack the power plant of the enemy. In other words, what is your mission ?	- My mission is to descend on the power plant of the enemy.
- What does a bird do when it catches its food ?	- It has to descend first and then picks up its food.
- How can you descend from the third floor ?	- By descending down the stairs.
Attention Pointer and Examples : a variety of T. shows the picture of many kinds of fruit to students.	
- Class, what is this picture ?	- It's a picture of fruit.
- What fruit can you see in this picture ?	- Durian, pineapple, oranges, watermelon, rambutan, ลิ้นจี่
They are lyshees. Class how many kinds of fruit do you see ?	- I see six kinds of them.
- Are they the same ?	- No, they're different.
- What can you say about these kinds of fruit then ?	- There are many different kinds of them.

Teacher	Students
- Yes, or you can say, there is a variety of them.	
T. writes the words 'a variety of' on the balckloard.	
- Class, repeat after me please. 'a variety of.'	'A variety of'
- There is a variety of fruit in this picture.	- There is a variety of fruit in this picture.
- The Air Force is made up of a variety of aircrafts.	- The Air Force is made up of a variety of aircrafts.
- In aircraft maintenance, we need a variety of devices.	- In aircraft maintenance, we need a variety of devices.
Generalization	
Class, what does 'a variety of' mean ?	- It means 'many different kinds'
That's right.	
Practice	
- What is this picture ?	- It is a picture of a variety of fruit.
- How many types of aircraft are there in our Air Force ?	- There are a variety of them.
- If you want to build a garage what kinds of tools would you like to use, Siri ?	- I have to use a variety of them.

Teacher	Student
- There is a variety of fruit in Thailand, can you name some of them Sakda ? That's right, there are many kinds of them.	- Yes, durian, mango, mangoesteen, rambutan, orange, water-melon, papaya.
<u>Attention Pointer and Examples</u> : observe	
Class, when you were on field training, did you have an officer go with you ?	- Yes, ma'am.
Why did he go with you ?	- To watch what we did.
That means he went to observe while you were training. T. writes 'observe' on the black-board.	
Class, please repeat after me. 'observe'	Observe.
- The officer observed while we were training.	- The officer observed while we were training.
- The teacher observes at the back of the class while students are working.	- The teacher observes at the back of the class while students are working.
- We use a plane to observe the enemy's troops and thier position.	- We use a plane to observe the enemy's troops and their position.

Teacher	Students
- Reconnaissance plane is used for observing.	- Reconnaissance plane is used for observing.
Generalization	
Class, can you guess what 'observe' means ?	- To watch.
Yes, to watch or to notice.	
What part of speech is it ?	- It's a verb.
Practice	
- Class, what is a reconnaissance plane used for ?	- It is used for observing.
- While you were training what did the officer do ?	- He observed us.
- When you are doing exercise, what am I doing ?	- You're observing us.
- In those days when we did not have a plane, the commander went up on the hill. Can you guess why he went up there ?	- He wanted to observe the enemy's position.
Attention Pointer and Examples : provide	
Class, how often do you have your uniform made ?	- We were given four uniforms when we were in the first year.

Teacher	Students
- Who gave them to you ?	- The academy did.
- Did you have to pay for them ?	- No, the academy did.
In other words, the Academy provided them for you.	
T. writes 'provide' on the blackboard.	
- Class, repeat after me please, 'provide'.	- Provide.
- The Academy provides everything for students.	- The Academy provides everything for students.
- The parents provide neccessity for their children.	- The parents provide neccessity for their children.
- The army provided supplies for soldiers.	- The army provided supplies for soldiers.
- Supplies are provided by the army.	- Supplies are provided by the army.
- Reconnaissance plane provides a great view of the enemy's position and movements.	- Reconnaissance plane provides a great view of the enemy's position and movements.
Generalization	
Can you guess, class, what is the meaning of 'provide' ?	- To give
Yes, to give or to supply.	
When the academy supplies you with uniforms, what does it mean ?	- The academy provides uniforms for you.

Teacher	Students
Practice	
- Class, who provides you food and clothes ?	- My parents do.
- Where did you get your uniforms ?	- The academy provided them for us.
- What is a reconnaissance plane used for ?	- It is used for providing enemy's position and movements.
- Do you have to pay for anything in this academy ?	- No, the academy provides everything for us.
- Where do the soldiers get their supplies ?	- The army provides them every necessary thing.
Attention Pointer and Examples :	
carry out.	
- Class, who promised to help me carry these books to class ?	- The class leader did, ma'am.
- Sompote, did you keep your promise ?	- I'm sorry ma'am. I've forgoten.
- So, you've forgot. Class, did your class leader complete his duty ?	- No ma'am. He's a bad boy !
- That means he did not carry out his promise.	
T. writes the word 'carry out' on the blackboard.	
- Class, repeat after me please 'carry out'	Carry out.

Teacher	Students
- The class leader didn't carry out his promise. - The teacher gives students an assignment. The students carry it out. - The commander ordered the officers to bomb the enemy. The officers can successfully carry out the mission ordered by the commander. That is they have bombed the enemy.	- The class leader didn't carry out his promise. - The teacher gives students an assignment. The students carry it out. - The commander ordered the officers to bomb the enemy. The officers can successfully carry out the mission ordered by the commander. That is they have bombed the enemy.
<u>Generalization</u> - Class, from the examples, can you tell me the meaning of the words 'carry out' ?	- Yes, ma'am. It means to complete.
- Yes, it means to complete or to accomplish.	
<u>Practice</u> - If the mission of a pilot was to bomb an enemy's power plant. He accomplished it. What can I say in another way ?	- He could carry out his mission.

Teacher	Students
- What is the duty of the lower-rank officer ?	- He must carry out the order told by his commander.
- If you plan to do something and it turns out successful. What can I say about your plan ?	- The plan is carried out successfully.
- Sompote, did you carry out your promise ?	- No ma'am. I'm sorry.
— A gentleman should carry out his promise.	
Reading	
— You know some difficult words now. Then read the passage please.	SS. read the passage silently.
- Class, please answer my questions. According to the passage, how many types of aircraft are mentioned?	- Two types.
- What are they ?	- The reconnaissance and the bomber.
- Can you guess, how we name the type of the aircraft ?	- From its mission.
- Why do we call a bomber ?	- Because its mission is to drop bombs.
- What is the mission of the reconnaissance ?	- For observing enemy's position and movements.
- Can the bomber do something else ?	- Yes, it can carry missiles.

Teacher	Students
- What is the SR-71 A ?	- It is a strategic reconnaissance plane.
- What is its airspeed ?	- 2,250 knots.
- What is a B-52 ?	- It's a bomber.
- I see you understand very well.	

EXERCISES

A. Fill in the spaces in these sentences with the correct terms.

1. A plane that carries cargo is a .....
2. The plane that must be albe to climb faster than all other is the .....
3. Jet aircraft can fly faster than .....
4. Large bombers are used for ..... bombing missions.
5. An F-5 carrying bombs is probably flying on a ..... mission.
6. Students who are learning to be pilots fly in .....
7. A bomber can extend its range by refueling from a .....
8. A French fighter, the "Mirage 5", has an ..... of 1520 knots.
9. All modern fighters can fly faster than sound and are .....
10. A plane sent to take pictures or make measurement of the weather is on a ..... mission.

B. For each word or phrase in the left column, find the word or phrase on the right that goes with it. Write the number in the blank space.

..... attacks bombers	1. tanker
..... refueling	2. fighter
..... drops explosives	3. bombers
..... takes off straight up	4. propeller
..... pulls the aircraft	5. jet

.....	pushes the aircraft	6.	trainer
.....	cooperation	7.	transport
.....	cargo	8.	reconnaissance
.....	pictures	9.	helicopter
.....	learning	10.	tactical
.....	local battle	11.	strategic
.....	distance	12.	range
.....	500 knots	13.	airspeed
.....	long-range bombing	14.	liaison

Lesson Plan Unit VII

Subject : Reading Comprehension.

Class : 5th year air cadets.

No. of Students : 32

Average Age : 23

Time : 50 minutes

Objective : The intergration of the 4 skills with the predomination of reading.

Behavioral Objectives : Students must be able to

1. answer the comprehension questions.
2. rewrite, rephrase or combine sentences.
3. change non-verbal to verbal information and vice versa.
4. recognize and correctly use learned vocabularies : be responsible for, operation, fasten, extra.

Content : 'Types of Aircraft (Cont.)'based on : The Language of the Air Force in English by Francis A Cartier.

Language : Structures, lexis and vocabularies will be suggested within context and the communicative acts.

Assumption : Students already know some technical words like ammunition, replacement, transport jet engine, airspeed, knot, ceiling, pilot, copilot. loadmaster, flight deck, paratroops.

Aids : pictures, gestures, blackboard and chalk.

Activities :

Teacher's Activities :

1. Asking questions
2. Showing aids
3. Writing on the board
4. Guiding students in answering questions

Students' Activities :

1. Answering questions (oral and writing)
2. Doing exercises (oral and written)

Reading Passage.

Types of Aircraft (Cont.)

Transports If you want to move large amounts of supplies or equipment or a lot of men, you need a transport. When a country is at war, it must provide its fighting men with food, ammunition, replacements for weapons and equipment that are lost or damaged, medical supplies, and many other things. To do this, you need several kinds of transports.

Some are designed to carry large cargoes for long distances. An example of this type transport is the 'C-5 galaxy'. The C-5 has four jet engines that give it an airspeed of about 450 knots. It can carry more than 100,000 pounds (over 50,000 kilograms) of cargo,6,500 miles (10,500 kilometres) without air refueling. Its ceiling (the highest altitude at which it can fly) is about 34,000 feet (10,360 metres), which allows it to fly above most of the weather.

The C-5 has an aircrew of five men : the pilot, the copilot, the navigator, the flight engineer, whose position is on the flight desk, is responsible for the operation of the engines, the fuel system, and many other mechanical and electrical systems on the aircraft. The loadmaster is responsible for the way the cargo is loaded, fastened in place, and unloaded. He is also responsible for the passengers if there are any.

The C-5 is an unsually large transport. It is very valuable for carrying heavy loads over oceans or continents, but it is too big for some missions. If the load to be carried is not too large, it can be carried in the C-141, which also has intercontinental range. To carry

smaller cargoes and land in smaller places, a transport like the C-130 'Hercules' is more useful.

The C-130, a propeller plane that is used by several different air forces, including those of the United Kingdom, Canada, and Brazil, has an aircrew of four : pilot, copilot, navigator, and system manager. The job of the system manager is similar to that of a flight engineer. Sometimes the C-130 also has a load or jump-master to supervise paratroops. Paratroops are soldiers who jump from the plane with parachutes.

Many transports, such as the C-5 and the C-141, provide sleeping quaters for an extra crew on long flights. One crew sleeps while the other crew flies the plane. A transport may also have a gallery, where meals can be prepared for the aircrew and the passengers.

A very special type of transport is the KC-135 'Stratotanker' which carries a large amount of jet fuel and acts as a service station in the sky. It has a crew member whose specialty is connecting the tanker with the fuel tank of another plane.

Teacher	Students
Attention Pointer and Examples :	
be responsible for	
-Class, when are you going for a navigation training ?	-On 4 April ma'am.
-Which country are you going to visit?	- Philipines and Singapore.
-By what type of aircraft are you going ?	- C-130
- And who will take care of you during your journey ?	- The Superintendent.
- That means the Superintendent will be responsible for this trip.	
T.writes 'be responsible for' on the blackboard.	
- Class, please repeat after me, 'be responsible for'	Be responsible for.
- The superintendent will be responsible for the navigation training trip.	- The superintendent will be responsible for the navigation training trip.
- She is a typist. She is responsible for all the typing works in the office.	- She is a typist. She is responsible for all the typing works in the office.
- The pilot is resposible for bombing the targets.	- The pilot is responsible for bombing the targets.
- He is an engineer. He is respon-	- He is an engineer. He is responsible

Teacher	Students
sible for the working of engines. - I am a teacher. I am responsible for teaching.	for the working of engines. - I am a teacher. I am responsible for teaching.
Generalization	
- Class, what do I mean by the expression 'be responsible for' ? - Yes, it means 'to take care or to have responsibility.	รับผิดชอบ, ดูแล
Practice	
- Class, I'm a teacher. What am I responsible for ?	- You are responsible for teaching.
- Suppose you are a pilot, and you are assigned a mission. How will you do ? Why ?	- I'll do my best because I'm responsible for the mission.
- Who is responsible for your expenses ?	- My father is.
- Who will be responsible for your trip to Phillipines ?	- The superintendent will.
- Who is responsible for fixing cars?	- The mechanic is.
- As students, what must you be responsible for ?	- We must be responsible for learning.
Attention Pointer and Examples :	
operation (operate)	

Teacher	Students
T. puts a small tape recorder on her desk.	
- Class, this tape was out of order last time. But it was fixed and works well now. Does anyone know how to make it work ?	- A student comes out and puts a casette in. He turns it on. The sound comes out.
- Very good, Sopon can make it work, class. In other words, he can operate it.	
T. writes 'operate' on the blackboard.	
- Class, please repeat after me, operate.	Operate.
- Sopon can operate the tape-recorder.	- Sopon can operate the tape-recorder.
- The teacher doesn't know how to operate the tape-recorder.	- The teacher doesn't know how to operate the tape-recorder.
- You start the car but the engine doesn't start. It doesn't operate.	- You start the car but the engine doesn't start. It doesn't operate.
- He has a video tape but he doesn't know how to operate it; so he can't see the movie.	- He has a video tape but he doesn't know how to operate it; so he can't see the movie.
- The engineer knows how to operate the engine.	- The engineer knows how to operate the engine.

Teacher	Students
- A pilot must know how to operate the plane to fly.	- A pilot must know how to operate the plane to fly.
Generalization	
- Class, can you guess the meaning of operate ?	- Yes, ma'am, to make it work.
That's right, to make something work.	
- Is it a verb or a noun ?	- It's a verb'.
- Is it transitive or intransitive ?	- It's a transitive verb.
- But how about this sentence ?	
Listen, the engine doesn't operate.	
Is it a transtive verb ?	- No, ma'am.
- So ? Is it a transitive or an intransitive ?	- It can be both transitive and intransitive.
- Listen again to this sentence. 'The engineer is responsible for the operation of the engine'	
- Can you guess, what is the noun form of this verb ?	- Operation.
Very good. What does 'operation' mean ?	- Working.
That's right.	
Practice	
- Siripol, do you know how to	Yes, ma'am. Just push down the

Teacher	Students
operate this tape ?	'play' button.
- Class, what must a pilot know ?	- He must know how to operate a plane to fly.
- Deja, do you drive ?	No, ma'am. I don't know how to operate a car.
- What is an engineer ?	- He is a person who takes care of the operation of the engines.
- If the engine of the car doesn't operate, where should I take it to?	- A garage, to see a mechanic.
Attention Pointer and Examples :	
fasten	
T. puts the tape-recorder into a box.	
She gives a piece of string to a student.	
- Saisak, please tie the box with this string for me please. Tie it tightly.	Saisak ties the box with a string.
- Class, what did I ask Saisak to do?	- 'To tie the box with the string'
- In other words, I asked Saisak to fasten the box with a string for me'	
T. writes the word 'fasten' on the blackboard.	

Teacher	Student's
- Repeat after me please, class, fasten.	Fasten.
- I asked Saisak to fasten the box for me.	- I asked Saisak to fasten the box for me.
- Saisak fastened the box with a string.	- Saisak fastened the box with a string.
- When you drive fast you have to fasten yourselves with seatbelts.	- When you drive fast, you have to fasten yourselves with seatbelts.
- He is so forgetful that he for-got to fasten his belt to school.	- He is so forgetful that he for-got to fasten his belt to school.
Generalization	
- Class, what is the meaning of 'fasten' ?	- It means to tie.
- Yes, when you fasten something you tie it.	
- What part of speech is it ?	- It's a verb.
Practice	
- Class, let's have some practice on this word.	
Class, what did I ask Saisak to do?	- You asked him to fasten the box for you.
- What did he use for fastening ?	- He used a string for fastening.

Teacher	Students
-If your trousers is a little bit big for you. What do you have to do in order to keep it stick to your waist ?	- I have to fasten it with a belt.
- What is a rope used for ?	- It is used mostly for fastening.
- What should you do if you drive fast ?	- I should fasten myself with a seatbelt.
- If you put too many things on a cart, and in order not to let them fall off, what should you do ?	- You should fasten them with a rope.
Attention Pointer and Examples : extra	
- Prateep, where were you last Thursday ?	- I was sick and I asked for leave.
- So, you are behind your friends now. Do you want me to add one more hour for you after class ?	- No ma'am. Thank you.
- Class, Prateep didn't want me to add one more hour of class for him. In other words, Prateep didn't want an extra hour of class with me. T. writes 'extra' on the blackboard.	

Teacher	Students
Class, please repeat after me, extra.	Extra.
- Prateep didn't want an extra class.	- Prateep didn't want an extra class.
- The teacher wants to give an extra hour to Prateep.	- The teacher wants to give are extra hour to Prateep.
- He is good a student; he always works extra hours.	- He is a good student; he always works extra hours.
- Siri's salary is very little, she has to earn extra money by working at night.	- Siri's salary is very little, she has to earn extra money by working at night.
- My friend has two pens; and he uses only one of them. So he has an extra to lend me.	- My friend has two pens; and he uses only one of them. So he has an extra to lend me.
- Our house has 3 bedrooms and we use only 2 of them. So come to our house any time, we have an extra room for you.	- Our house has 3 bedrooms and we use only 2 of them. So come to our house any time, we have an extra room for you.
Generalization	
-Class, can you guess, what extra means ?	เพิ่ม, พิเศษ, มีมากกว่าที่ใช้
-Yes, if you have an extra thing, that means you have more than you want. Or if you have less than you want, you want some extra or addition.	

Teacher	Students
Practice	
- Sompob do you want an extra hour of class ?	No, ma'am. Thank you.
- I left my pen at home. Who can lend me one ?	- The class leader can. He always have extra pens.
- When the examination is near, what do you have to do ?	- We have to study extra hours every night.
- If you want to buy a tape-recorder, you have only 2,500 baht but the tape costs you 3,000 baht, what do you want ?	- I want extra money of 500 baht.
- If your English is not good, what will you do ?	- I have to pay extra attention to it.
- Do we have an extra seat in this class ?	- Yes ma'am, we have a lot.
Reading	
- Class, please read the whole passage silently.	SS. read silently.
- Class, let's have some questions and answers on what you have read.	
- What kind of aircraft is mentioned in this passage ?	- Transports.
- What is tranport used for ?	- It is used for moving men and large amount of supplies like weapon,

Teacher	Students
	equipment and so on.
- How many types of transports are talked about in the passage ?	- There are 4 types of them.
- What are they ?	- C-5, C-141, C-130 and KC-135
- Which one is the largest and can fly long range ?	- The C-5 'Galaxy'
- How many aircrew has the C-5 ?	- There are five aircrew.
- Who is responsible for the jet engines ?	- The flight engineer.
- Who is responsible for loading and unloading ?	- The load master.
- What is the capacity of the C-141.	- It can fly intercontinental range.
- Does Thailand have C-5 and C-141 ?	- No ma'am, we have only C-130
-What type of transport acts as a service station in the sky ?	- The KC-135
That's very good, I'm sure you understand all the information given. Now do some exercises please.	

Exercises

I. Reading Comprehension.

Write your answer to the following questions.

1. What is the missions of the transports ?

2. What are C-5 and C-141 ?

3. What is the job the flight engine.

4. What is the job of the loadmaster.

5. If C-13 is running out of fuel, whom she can ask for refuelling ?

II. Aircraft designators such as T-41 A are spoken as 'T.forty-one A' no as 'T. four one A' C-130 is spoken as 'C one thirty' not 'C one hundred and thirty'. How are the following numbers spoken in the air Force ?

C-141	F-111	T-37 B
C-133	SR-71 A	T-38
KC-135	B-52	F-14

III. When an aircraft designator is between 101 and 109, it is not spoken as 'One hundred and one' but as 'One oh one' or 'one oh nine'.

How do you say the following ? F-105 F-102 F-106

Lesson Plan Unit VIII

Subject : Reading Comprehension.

Class : 5th year air cadets.

No. of students : 32

Average Age : 23

Time : 50 minutes

Objective : The intergration of the 4 skills with the predomination of reading.

Behavioral Objectives : Students must be able to

1. answer the comprehension questions.
2. change non-verbal to verbal information and vice versa.
3. recognize and correctly use learned vocabularies : direction, wears and cracks, vital, and confuse.

Content : 'Ground Service' based on : The Language of the Air Force in English. by Francis A cartier.

Language : Structures, lexis and vocabularies will be suggestes within context and the communication acts.

Assumption : Students already know some technical words like maintenance, flightline, airframe, ailerons, rudder, avionic, electronic warfare.

Aids : real objects, gestures, chalk and blackboard.

Activities :

Teacher's Activities :

1. Asking questions
2. Showing aids
3. Writing on the board

Students' Activities

1. Answering questions (oral and writing)
2. Doing exercises (oral and written)

Ground Service

In the earlier days of aviation, a single mechanic could learn to do all the maintenance required on a plane. Aircraft were simpler then; so a man who understood engines and was a good electrician, carpenter, and metal worker could do all the necessary jobs.

Modern jet aircraft are much more complicated. Even if one man could learn all the specialties, he could not possibly find the time to do all the jobs. Therefore, a great many specialists are required to keep the aircraft flying safely. The lives of the aircrew depend on the specialists' work, and so does the defense of the nation.

You will find these men on the flight line, in the hangars, and in the repair shops, working under the direction and advice of the crew chief. They have many titles.

The jet engine mechanic must know how to remove a jet engine from an aircraft and take it apart. He checks its parts for wears and cracks, and if he finds them, he must remove the damaged or faulty parts and replace them. Then he must be able to put the engine back together again and replace it in the plane, with all the proper connections of wire, fuel and oil tubes, and so on.

Another specialist, the airframe mechanic, is responsible for the maintenance of the fuslage, the wings, the tail, and the landing gear, all of which from the airframe. When necessary, he or she repairs the ailerons, rudder, and elevators too.

There are several kinds of avionic specialists. The avionics instrument

systems specialist is responsible for the accuracy of the instruments on the pilot's instrument panel and those instruments used by the navigators. All of these instruments must work perfectly, since it is vital that the aircrew know their altitude, airspeed, direction, and the condition of air in which they fly.

The avionics communications specialists is another member of the ground crew. His job involves the maintenance of the plane's radios. If the problem is serious, he usually takes the entire radio out and replaces it with a new one. He then takes the bad radio to his maintenance shop and repairs it there.

Other avionics specialists maintain special navigation equipment, and repair computers. The electronic warfare system specialist has a particularly interesting job. To understand it, you must remember what radar is. Radar equipment uses radio waves to see' aircraft that are many miles away or are hidden in clouds. Modern bombers and fighters have avionics equipment that can 'feel' the enemy's radar waves, and in addition, send out other waves to confuse or blind, the enemy's radar. This is called electronic warfare, and the specialist who is responsible for the maintenance of this kind of equipment is the electronic warfare systems specialist.

Teacher	Students
Attention Pointer and Examples :	
(direct) direction.	
- Class, I saw all of you doing something on the parade ground yesterday evening. Can you tell me what were you doing there ?	Yes, we had military training.
- I saw an officer standing there too. What was he doing ?	- He was inspecting us, and told us how to do and also corrected us when we were doing something wrong.
- That means he was directing you in doing military training.	
T. writes 'direct' on the blackboard.	
Class, please repeat after me, 'direct'	'direct'
- While training, the officer was directing and inspecting us.	- While training, the officer was directing and inspecting.
- Before doing exercises, the teacher always tells us how to do them.	Before doing exercises, the teacher always tells us how to do them.
The teacher always directs us in doing exercises.	- The teacher always directs us in doing exercises.
- When you go to a strange place, you should have someone to tell or show you the way.	When you go to a strange place, you should have someone to tell or show you the way.

Teacher	Students
Generalization	
-Class, can you guess what 'direct' means ?	-Yes, แนะนำ, นำ
-Yes, to guide or to give an advice.	
-What part of speech is this word ?	-It's a verb.
-That's right. Do you know the noun form of this verb ? Very good.	- It is 'direction', isn't it ?
Practice	
- Class, who directs you while you are training ?	- The officer does.
- Before doing some exercises, the teacher always tell you how to do them. What does the teacher do ?	- He directs us how to do exercises.
- Last time, we learnt about radar. Can you tell me what radar is used for ?	- Radar is used for directing ships and airplane through fog or clouds.
- In doing written exercises, the teacher always writes how to do them before each question. What will you call the written words that the teacher writes ?	- We call it a direction.
- Yes, you can see it in your written exercises.	

Teacher	Students
Attention Pointer and Examples : wears and cracks.	
T. shows a broken earphone to S.	
Class, can you see this ? What's wrong with this earphone ?	- It's broken.
- Yes, it's broken. Is it new or old ?	It's an old one.
- Do you think we can fix it ?	Yes, it's like a plastic; so you just put a glue on it. It will stick again.
- So this earphone is quite old and the part of microphone is broken. In other words, this earphone has wears and cracks.	
T. writes 'wears and craks' on the blackboard.	
- Class, repeat after me please, 'wears and cracks'	Wears and cracks.
- One of the old earphones has wears and cracks on it.	- One of the old earphones has wears and cracks on it.
- His car is very old and there is a hole in the back seat.	- His car is very old and there is a hole in the back seat.
- His car has wears and cracks.	- His car has wears and cracks.
- The mechanic examined the car.	- The mechanic examined the car.

Teacher	Students
- He found the engine was out of order and the trunk was damaged. - The mechanic found wears and cracks in the car.	- He found the engine was out of order and the trunk was damaged. - The mechanic found wears and cracks in the car.
Gbneralization	
- Class, what is the meaning of wears and cracks ?	เก่า ชำรุด
- Yes, it means worn out. When something is old, out of order what can you call it in other words. ?	- wears and cracks.
Practice	
- Your tape-recorder doesn't work, the red light doesn't show, it must be out of order. In other words, what is wrong with your tape ?	It has wears and cracks.
- If you use a car for many years and you never take good care of it. What will happen to your car?	- It might have wears and cracks.
- If your car has wears and cracks, what should you do ?	- I'll have a mechanic fix it.
- What's wrong with your car ?	

Teacher	Students
The smoke comes out so black.	- I think the engine must have wears and cracks.
Attention Pointer and Examples : vital T. takes off her eye glasses. Class, do you think I can see without this glasses ?	No, ma'am, you can't.
- You're right, I can't read, I can't see you clearly, I can't write on the blackboard properly, if I don't have this glasses. I can say in other words that this glasses are vital to me. T. writes 'vital' on the balck-board.	
- Class repeat after me please, 'vital'	Vital.
- The glasses are vital to the teacher; she can't live happily without it.	- The glass are vital to the teacher; she can't live happily without it.
- Light, carbonioxide, and water is vital to plants; If they lack them they may die.	- Light, carbondioxide, and water is vital to plants; if they lack them they may die.
- A plane can fly if it has fuel.	- A plane can fly if it has fuel.

Teacher	Students
So fuel is vital in flying a plane. - Food, medicine, clothes, and house are vital to man.	So fuel is vital in flying a plane. - Food, medicine, clothes and house are vital to man.
Generalization	
- Class, can you guess what 'vital' means ? Very good, it means very inportant or essential.	- Important or essential.
- Can you guess what part of speech is it ?	It is an adjective.
Practice	
Class, I can't see you clearly, I can't read because I can't see the word.	
What is vital for me in seeing clearly ?	- The glasses.
- When you are thirsty, what is vital for you?	- Water.
- Why do we eat ?	- Because food is vital to our bodies. It makes energy.
- You are a pilot and you are approaching the airport. What is vital to you for guiding you a safe landing ?	- Radar is very vital

Teacher	Students
Attention Pointer and Examples :	
confuse.	
- Class, do you often go downtown on your week-end ?	- Not very often, ma'am. We don't like crowds.
- Have you ever gone around the Victory monoument ?	- Yes, ma'am.
- How do you find it ?	- A very crowded place.
- How about you, Chamras ? Do you think it is crowded too ?	- Yes, ma'am. A lot of people, a lot of cars, it makes me..m..en...
- You mean you don't know what to do, where to go and you feel mixed up. right ?	- Yes, ma'am.
- You can say. You're confused. The teacher writes 'confuse' on the blackboard.	
- Class, please repeat after me, 'confuse'	Confuse.
- Crowded places always confuse me.	- Crowded places always confuse me.
- His words are difficult to understand I can't figure out what he says. That is his words confuse me.	- His words are difficult to understand I can't figure out what he says. That is his words confuse me.
- My sister told me one thing, and my brother told me another thing	- My sister told me one thing, and my brother told me another thing

Teacher	Students
of the same story. I don't know who I should believe. They confused me.	of the same story. I don't know who I should believe. They confused me.
Generalization	
Class, can you guess what this word means ?	- สับสน วุ่นวาย จับต้นชนปลายไม่ติด
Yes, or you can say 'mixed up, or becomes disorder ? The crowded place make you feel mixed up.	
What can you say in another way ?	- The crowded place confuses me.
Practices	
- If the teacher doesn't explain something clearly. You feel mixed up with her explanation.	
What can you say in other words ?	- The teacher's explanation confuses us.
- Many friends tell you of the same story but with different information. You don't know who should you believe. You've got mixed up.	- The story they told confuses me.
What can you say about the situation ?	
- When you go to big cities, crowd and traffic always make you feel	

Teacher	Students
mixed up .	- Crowds and traffic in big cities always confuse me.
- What can you say in another way ?	
Reading	
Now, let's read the passage silently.	SS. read. silently.
I'll ask you some questions based on the information from the passage.	
- Class, in maintaining aircraft, how many kinds of specialists are needed ?	- Three kinds.
- What are they ?	- The jet engine mechanic, the airframe mechanic and the avionic specialists.
Good. What is the jet engine mechanic responsible for ?	- He is responsible for taking care of the engine.
- What is the airframe mechanic responsible for ?	- He is responsible for taking care of the body of the plane.
- What is called electronic warfare ?	- The avionics equipment that can feel the enemy's radar and send out other waves to confuse or blind the enemy's radar.
- What is the avionic specialist responsible for ?	- He is responsible for maintaining special navigation equipment and repairing computors.

Teacher	Students
Good, so you know now what the ground crew is. Let's do some exercise, will you?	

EXERCISE

Reading Comprehension.

A. Answer these questions.

1. Who is responsible for the aircraft when it is not flying?
2. Who repairs damage to the fuselage?
3. Who fills the fuel tanks of an aircraft? What else does he do?
4. Which member of the ground crew do you think has the most complicated job?
5. What is an electronic warfare?

B. Fill in the blanks in these sentences with the correct terms.

1. Electronic equipment carried on an aircraft is called ..... equipment.
2. The man who is responsible for an aircraft on the ground is .....
3. When a jet engine is not operating properly, the man who fixes it is the .....
4. If there is a dent in the wing of a plane, it will repaired by .....
5. The specialist who is responsible for maintenance of the system that automatically controls the flight of the aircraft is .....

C. For each phrase in the left-hand column, find the word or phrase on the right that goes with it. Write the number in the blank space.

_____ inspects engine of a fighter	1. avionics
_____ radio and radar	2. maintenance
_____ leader of the ground crew	3. jet engine mechanic
_____ several maintenance specialists	4. crew chief
_____ inspection and repair	5. airframe mechanic
_____ a 'garage' for aircraft	6. ground crew
_____ repairs the fuselage	7. hangar

ผนวก ข

แผนการสอนโดยวิธีวิเคราะห์ข้อความ

Lesson Plan Unit I

Subject : Reading Comprehension

Calss : 5th year Air Cadets

No. of Students : 32

Average Age : 23

Time : 50 minutes

Objectives : Students must be able to recognize

1. the basic communicative functions of a written text : definition and description of an object and procedure.
2. the organization of information in a text with its feature of cohesion and coherence.

Behavioral Objectives : Students must be able to

1. identify cross references (anaphoric, cataphoric by drawing arrows).
2. answer the comprehension questions.
3. label diagram.
4. rephrase.
5. decide the kinds of communicative acts.
6. change non-verbal information and vice versa.

General Purpose : The intergration of the 4 skills but with the predomination of reading.

Content : 'Door Lock' based on ALC. student Text Boo.2500 by Defense Language Institute, U.S.A.

Language : Lexis, structures and discourse markers will be suggested within context and the communicative acts.

Assumption : Students already know the technical words and basic structures : passive voice, present simple tense.

Aids : diagrams, real objects.

Activities :

Teacher's Activities :

1. Guiding the students to look for word equivalence, reference connection, and the rhetorical acts.
2. Asking questions.
3. Showing Aids.
4. Writing on the board.

Student's Activities :

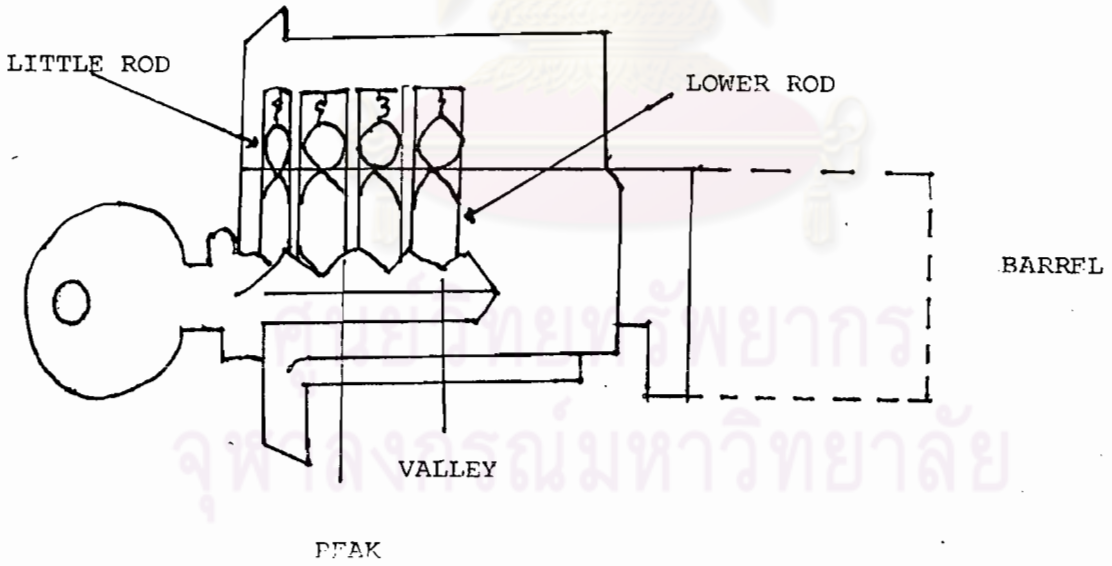
1. Guessing intelligently the functional meaning from the context clues. (Oral and written).
2. Answering questions (oral or writing).

Follow-up Activities : Oral and written exercise.

Reading Passage.

Door Lock

The door lock we are going to talk about is a key-operated locking device. In other words, it is a locking instrument operated with a key. The diagram below shows what happens when you put the right key in the key-hole of the lock. The peaks and vallys of the key match the little rods. When the key is all the way in, the tops of the lower rods line up with the top of the barrel. Thus the barrel is free to be turned. You want to be able to turn the barrel so that you can move the bolt back and forth.



Think of the barrel as a lever with two extensions. One is attached and the other is a separate part. The key then becomes the separate extension, and the cam becomes the attached extension. The cam fits into a

slot in the bolt. When you turn the barrel in one direction, the cam pushes the bolt into the hole of the door frame. And when you turn it the other way, the cam pulls the bolt out of the hole. You can open the door then.

So, as you see the key is used to align the lower rods and to turn the barrel, which in turn, moves the bolt back and forth, or in other words, in and out of the opening in the door frame.

What happens when we use the wrong key ? The key may slide into the key-hole, since the grooves and ridges along the sides of the two keys are sometimes the same. However, as the key goes in the tops of the lower rods will not line up. If one of the rods extends beyond the edge of the barrel, you can't turn the barrel.

Teacher	Students
- T. asks one student to open the door to the small room at the back of the class. But the student can't open it.	- It's locked. Ma'am.
- O.K. take these two keys and try each of them, one at a time, to unlock the door, please.	- S. takes the keys and tries the two keys with the lock. Finally, he unlocks the door, then he gives the keys back to the teacher and goes back to his seat.
- Thanks. Well, class, as you see, can you open the door if you don't have this key ?	- No ma'am, we can't.
- Class, to day we're going to talk about 'door locks'. Will you please read silently the first paragraph on your sheet ?	Students read silently.
- Look at the first sentence 'What is a door lock ?'	' It's a key operated device.
- Good. This sentence gives us a definition of what a key is. When you give a definition of what a thing is, you use this pattern : (The teacher writes on the black-	

Teacher	Students
board) NP + is + class word (Thing to define) A door lock is a key-operated device. Please write down this pattern and the example.	Students coppy what the teacher writes on the blackboard.
- Now can you give me an example of this pattern by answering my question, Prakarn ?	- Yes ma'am.
- What is a pen ?	- Prakarn - A pen is a writing device.
- That's fine. Then look at the word 'it' in the second sentence. What does 'it' refer to ?	- 'It' refers to 'door lock'.
- Yes, the word 'it' here refers to door lock. Please draw an arrow from 'it' to 'door lock'.	- Students draw an arrow from the word 'it' to 'door lock'.
- Look again at the second sentence and underline the words 'in other words'. When you say 'in other words', it means that you can say it in another way with the same meaning. It's used for explanations. This	- Students underline the word.

Teacher	Students
means the first and the second sentences have	- The same meaning.
- Good, look at both sentences again. They have the same meaning but are they written the same ?	- No, they aren't.
- What's the difference ?	- The word 'device' is replaced by the word 'instrument'.
- That's right, both words have quite the same meaning. They're interchangeable. Are there any other differences ?	- Yes, the second sentence uses 'operated with a key' instead of 'key-operated'.
- That's very good. You can rephrase 'key-operated' to 'operated with a key' by using prepositions. Draw an arrow from 'operated with a key' to the 'key-operated' please. That means they have the same meaning. Remember you can rephrase a phrase into a compound word. How do you know it is a compound word ?	- From a dash between these two words.
- Yes we use a dash to show they are one word.	
- Look at the two sentences again. Do you think we can rephrase 'locking device' ?	- Yes, we can.

Teacher	Students
- We can rephrase 'locking device' into 'device for locking'. Now copy this down on your sheet.	
T. write on the blackloard : device for locking → locking device.	SS. copy from the blackboard.
- How about 'locking instrument', how can we rephrase them ?	- Instrument for locking.
- Yes, write them down as locking device.	-SS. write. instrument for locking → locking instrument.
- Are they a compound word ?	- No, they aren't.
- How do you know ?	- They don't have a dash between them.
- O.K. I ask you the question again. Answer by rephrasing from your sheet. 'What's a door lock'	- A door lock is a device for locking operated with a key.
- Good, now please read from the third sentence through the whole paragraph.	SS. read silently.
- These sentences explain or describe what will happen if you put the right key in the key-hole. Are they trying to give you a definition ?	- No, they aren't.
- What are they trying to do ?	- They're trying to explain.

Teacher	Students
- You can say they're giving an explanation or a description. When you explain or decribe how things go or work, we can call it a description. Underline the word 'when' in sentences 3 and 5 and 'thus' in sentence 6.	S. underline 'when' and 'thus'
- The word 'when' shows condition, and 'thus' shows the relation of cause and effect. What is the condition in sentence 3 ?	- When you put the right key.
- How about sentence number 5 ?	- When the key is in and the top of the lower rods line up with the top of the barrel.
- Yes, if you want to lock or unlock the door you must have 2 conditions. First, it must be the right key. Secondly, it must line up with the top of the barrel. What happens then if you have these two conditions ?	- The barrel is free to be turned.
- Yes, the effect is that the barrel is free to be turned. Which word shows the effect or result ?	- 'Thus'

Teacher	Students
- O.K., now underline the words 'so that' in sentence 7.	SS. underline the word 'so that'
- The word 'so that shows the purpose of the preceeding clause. Look at sentence 7. What is the purpose of this sentence ?	- You can move the bolt back and forth.
- Now read the second paragraph.	SS. read silently.
- Let's underline the word 'one' and 'the other' in sentence 9.	SS. underline the words.
- What do these two words refer to ?	- To two extensions.
- So draw arrows from 'one' and 'the other' to the word 'extensions'	SS. draw arrows.
- From sentence 9 we know that one of these two extensions is	- attached
- And the other one is	- a separate part.
- From sentence 10, can you tell me what an attached extension is ?	- It is the cam.
- How about the separate extension ?	- The key.
- Class, is this paragraph a definition or a description ?	- It's a description.
- This is also a description of how the key works. Here, also you'll see the word 'when' again. What does 'when' indicate ?	- 'Condition'.

Teacher	Students
- What is the condition here ?	- You turn the barrel in one direction.
- What is the effect ?	- The cam pushes the bolt into the hole of the door frame.
- Do they have the word 'thus' here to show effect ?	- No, they don't.
- Here we don't have the word 'thus' but we have comma (,) instead. You can use this punctuation mark to indicate explanation. What is another condition in sentence 13 ?	- When you turn it the other way.
- What's the effect ?	- The cam pulls the bolt out of the hole.
- What does 'it' in sentence 13 refer to ?	- The cam.
- Look at sentence 14, underline the word 'then'.	SS. underline the word. 'then'.
- 'Then' indecates what will happen later. What will happen then when the cam pulls the bolt out of the hole ?	- You can open the door then.
- In sentence 15, how many things can the key do ?	- They can do 2 things.
- How do you know ?	- From the word 'and'.

Teacher	Students
- Yes, 'and' tells you of more added things.	
- What are the two things the key can do ?	- To aligne the lower rods and to turn the barrel.
- And when the key turns the barrel what will happen next ?	- The barrel moves the bolt back and forth.
- What can you say in another way for 'back and forth'.	- In and out.
- Good. Now will you please read the last paragraph ?	SS. read silently:
- Class, Look at sentence 18 and 19, underline the word 'however' and 'if', please.	SS. underline the words.
- 'However' introduces information which is unexpected from what comes first. In sentence 18, 'as the key goes in' comes first, the unexpected information is	- The tops of the lower rods will not line up.
- 'If' also indicates a condition. What is the condition in sentence 19 ?	- One of the rods extend beyond the edge of the barrel.
- Then what is the effect ?	- You can't turn the barrel.
- What is the main idea of this parapgraph ?	- When you use the wrong key, you can't unlock the door.

Teacher	Students
- Now class, read quickly and silently the whole paragraph.	S. read silently.
<u>Generalization</u> Answer my questions please. Which sentence shows the definition ?	- Sentence 1.
- What do the first 2 paragraphs deal with ?	- The description of how the right key operates in the key-hole.
- What does the last paragraph deal with ?	- The description of when using the wrong key.
- If you want to give a definition, what kind of sentence pattern you can use ?	thing to define / N.P. } + is + classword.
- Can you give me an example ?	- A door lock is a locking device.
- Good. When you want to refer back to what is said before, what will you use ?	- Pronoun and article and punctuation and the phrase 'in other words'.
- Like this ? T. stick a chart on the board.	- Yes, ma'am.

References
- pronoun
- article 'the'
- ,.....,
- ,
- in other words

Teacher	Students
- How about the connectors ? What do 'when' and 'if' tell you ?	- Conditional cause - effect.
- And thus ?	- It shows result.
- Yes, summative result. What does 'so that' indicate ?	- It indicates purpose.
- How about 'however' ?	- Unexpected information which contrasts to what have said.
And the last one 'then,' What does it indicate ?	- It indicates time sequence.
Very good. Please copy them down So you can remember them.	

Connectors tell you someting.

when, if, ⟶ conditional cause - effect

thus ⟶ summative result

so that ⟶ purpose

however ⟶ unexpected information

then ⟶ time sequence

Exercises

I. Reading Comprehension.

Write T. in front of the correct statement and F. in front of the false one.

1. The kind of locking device we have talked about is nut and bolt.
2. The barrel is free to be turned when the lower rods line up with the top of the barrel.
3. You can't move the bolt back and forth if you are not able to turn the barrel.
4. The barrel has two extensions which are attached.
5. The two extensions are the keys and the rods.
6. The key is used to align the lower rods and to turn the barrel.
7. Sometimes the key can slide into the key-hole even that key is wrong.
8. If one of the rods extends beyond the edge of the barrel, you can't unlock the door.

II. Rephrasing.

Rephrase the following sentences as examples.

Ex. 1. A pencil is an instrument. It is used for writing.

Rephrased Sentence = A pencil is a an instrument used for writing.

2. A lock is a device. We use it for protection.

Rephrased Sentence = A lock is a device using for protection.

1. A laboratory is a room or a building. It is used for research.
2. A microphone is an instrument. It is designed for increasing weak sound.
3. A microscope is an instrument. We use it to make small objects

look larger.

4. An ax is a hand tool. It is used for chopping wood.

5. A lever is a device. We use it for moving and lifting things.

III. Use of Language

Decide whether each sentence is a definition, description of the result of an action, conditional cause-effect and statement giving information.

[1]Ridges is the narrow, raised strip. [2]The barrel in a lock has a key-hole in it. [3]And this key-hole has ridges and grooves in it. [4]The ridges and grooves match those on the side of a key. [5]If the ridges and grooves don't match those of the key-hole, then you can't put the key in the lock.

1.

2.

3.

4.

5.

Connectors

Fill in the blank with the following connectors:

if, however, when, so that, in other words.

1. ..... the ridges and grooves don't line up with the barrel, then you can't turn the barrel.

2. Sometimes the wrong key may slide into the key-hole, ... you can't turn the barrel.

3. When the top of the lower rods matches the top of the barrel, the barrel is free to be turned, ..., you can unlock the door.

4. The top of the lower rods has to line up with the barrel ..... the barrel is free to be turned.

5. ..... you put in the wrong key, the barrel won't be turned.

Note :

1. Sometimes, Thai can be used when students can't follow the explanation.
2. Exercises, sometimes, will be assigned as a home work.

Lesson Plan Unit II

Objectives : Students must be able to recognize:

1. the basic communicative functions of written text: definition, classification and description of stating information.
2. the organization of information in a text with its features of cohesion and coherence.

Behavoral Objectives : Students must be able to:

1. identify cross references (anaphoric, cataphoric by drawing arrows).
2. Answer the comprehension question.
3. lable diagram.
4. rephrase.
5. decide the kinds of communicative acts.
6. change non-verbal to verbal information and vice versa.

General Purpose : The intergration of the 4 skills but with the predomination of reading.

Content : 'Photosynthesis' based on ALC Student Text Vol. 2500 by Defense Language Institute, U.S.A.

Language : Lexis, structures and discourse markers will be suggested within context and the communicative acts.

Assumption : 1. Students already know the content of the passage from biology they studied in secondary school.

2. They already know technical words such as: combustion, process, oxygen and carbon dioxide.

Activities :

Teacher's Activities : 1. Guiding the students to look for word equivalence, references, connection, and the rhetoric acts.

2. Asking questions.

3. Showing aids.

4. Writing on the blackboard.

Students' Activites : 1. Guessing intelligently the functional meaning from the context clues (written and oral).

2. Answering questions. (oral or writing)

Follow up activities : Oral and written exercise.

Note 1. Some semi-technical words like energy, element, sustain and ingredients are not explained. The teacher lets them assume the meaning from the context.

2. The teacher may use Thai in some parts whenever she finds it hard for the students to follow.

3. Sometime exercises may be assigned as homework.

Reading Passage '

Photosynthesis

We like to read and talk about the remarkable process developed by man for producing things. Yet, when we talk about the process by which plant convert light energy into chemical energy, we are discussing the most marvelous chemical process in the world. Scientist use the word photosynthesis, which simply means putting things together with light, to refer to this remarkable ability of plants to put things together. What is so important about this process? How is photosynthesis achieved?

Let's take up the question of the importance of the process first. Plants produce almost all of the oxygen in our atmosphere; and as you know, oxygen is an element essential of life processes and to combustion. Green plants combine the energy from light with the water and carbon dioxide, the gas that passes out of our lungs as we breathe, to make food. All of our food comes from this wonderful, energy-converting process of plants.

The question of how photosynthesis is achieved has not been answered. Scientists have been trying to understand this process for years. It seems that this is like asking how life itself begins, or how a black cow eats green grass and gives white milk. However, we do know a lot about the process.

Light contributes to the break down of particle of water so that carbon dioxide and water combine to form sugar. In this process, oxygen is given off. We also know that carbon dioxide and water are

reduced with a kind of chemical energy to form sugar.

This bring us to a most interesting part of our story: the amazing ability of green plants to put things together with light and then reverse the process. Green leaves can use the energy from light to make sugar and oxygen out of carbon dioxide and water. Then they can reverse the process, breaking down the sugar with oxygen so that carbon dioxide and water are release.

Green leaves produce an abandance of sugar and oxygen. These are essential ingredients for sustaining the life of animals and human beings. So far, man has neither copied nor fully understood this wonderful manufacturing process. Anyway, we get our energy by eating food produced by plants and by using oxygen, also produced by plants. These, we return carbon dioxide and water to the atmosphere. In this process, the carbon dioxide and oxygen balance is maintained.

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Teacher	Students
- How do you know?	- From the word 'by'.
- O.K. that's one thing. Actually this phrase comes from...(Teacher writes on the blackboard.) 'the remarkable processes which are produced by man' Then we delete 'which are'. So, you'll see that in many written discourses, they commonly use this pattern. O.K. copy this down. This is another way of rephrasing sentence to phrase.	Students copy, 'the remarkable processes produced by man.'
- Now underline the word 'which' in sentence 2 and 3.	Students underline the words.
- Look at 'which' in sentence 2. What does it refer to?	- The process.
- Right, this sentence is composed of 2 sentences; 'we talk about a process', and 'the plants convert light energy into chemical energy by this process? 'Convert' means change or turn, What do the plants do by this process?	- They change the light energy into chemical energy by this process.

Teacher	Students
- O.K. Now look at sentence 3, what does 'which' refer to?	- To the word 'Photosynthesis'
- Yes, draw an arrow from 'which' to Photosynthesis.	Students draw an arrow.
- Please notice that the clause 'which simply means putting things together with light' is between commas (,.....,). It means that this clause explains the word that comes before it. So what means putting things together with light?	- Photosynthesis.
- What does photosynthesis mean?	- It means putting things together with light.
- What word do scientists use to refer to the ability of plants to put things together? (Teahcer write the following on the blackboard).	- Photosynthesis.
The ability to put things together by light is refered to as Photosynthesis.	

Teacher	Students
NP + {is refered to as / is called / is known as} + thing to define.	
- Class, last time we had one pattern or type of how to define things. Today, you'll see the second type. Please copy them down. Then, Teacher asks students to read the second paragraph.	Students copy the pattern and example on the blackboard on their sheets.
- Class, this paragraph tells us the importance of this process. The words 'take up' here in sentence 5 means 'to discuss'. So, what are the first thing we'll do in this paragraph?	- To discuss the importance of this process.
- What process?	- Photosynthesis.
- What element is essential to our life process and combustion?	- Oxygen.
- Yes, Oxygen is necessary or essential to us. Where does most oxygen come from?	- From the plants.
- Good, the plants produce most of it.	

Teacher	Students
Now, how do plants make food?	- They combine energy from light with water and carbon dioxide.
- Can you guess, by what process?	- Photosynthesis.
- Very good. Look at sentence 7, here again you see the clause between commas (,.....,) 'the gas that passes out of our lungs as we breath. What does this clause explain?	- Carbon diozide
- So where does carbon dioxide come from?	- It comes from our lungs.
- Good. Can you tell me how many things are needed for plants to make food?	- Three things.
- What are they?	- Light energy, water and carbon dioxide.
- Can you guess what do plants produce while making food?	- Oxygen.
- Yes, now can you tell me why photo-synthesis is important?	- It produces oxygen which is important element for us to breathe.
- That's right. Now look at sentence 9, the word 'achieve' here means to	

Teacher	Students
get or gain. Do scientists know how photosynthesis is gained?	- No, they don't.
- Look at sentence 12, underline the word 'however'.	Students underline the word.
- Last time we met this marker, it shows the unexpected information or contrast. What is the unexpected information?	- We do know a lot about the process.
- So you see the contrast. We don't know how photosynthesis is gained but	- We do know a lot about it.
- Class, read the third paragraph please	Students read silently.
- Look at the word 'contribute.' It means give or provides. What does light give?	- The break-down of particles of water.
- Underline the word 'so that'. This marker shows purpose or cause-effect relation. What is the purpose of light contributing to the break down of particles of water?	- Carbon dioxide and water can combine to form sugar.
- Yes, light contributes the break down	

Teacher	Students
of particles of water so that carbon dioxide can combine to water to make sugar	
- During this process what is given off?	- Oxygen.
- Yes, oxygen is produced or released. Underline the word 'also'. It shows addition, something more than what has said before.	Students underline the word.
- We know that first, during this process oxygen is released. Secondly, we know that	- Carbon dioxide and water are reduced with a kind of chemical energy to form sugar.
- Yes, can you guess when something is reduced, it becomes more or less?	- It becomes less.
- Good, 'reduce' means to become less in quantity and you can use the word decrease as a synonym. So from this paraghaph you know that first during the process oxygen	- is released.
- and secondly	- water and carbon dioxide are reduced to form sugar.
- Teacher asks students to read next paragraph.	Students read silently.

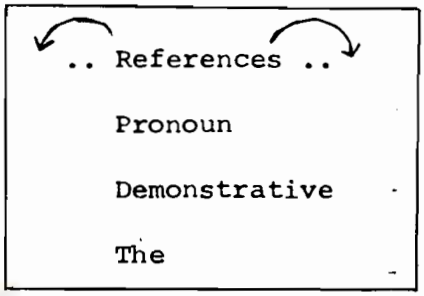
Teacher	Students
- Class, underline the word 'this' please.	Students underline the word.
- 'This' refers back to the information we have just read. What is that information?	- Oxygen is released and sugar is formed.
- How can sugar be formed?	- By light contributing the break-down of water then combine with carbon dioxide.
- Look at colon (:), it is used for explaining or classification of the information before it. Here the most interesting part of the story is classified into 2 things. What are they?	- They are the ability of green plants to put things together with light and then reverse
- Yes, the first thing is to put things together wiht light and the second thing is to reverse the process. What happens when green plants use the energy from light?	- the process. - They make sugar and oxygen out of carbon and water.
- Class, underline the word 'then'. This marker shows the sequence of time or the thing that comes after. After they have made sugar and oxygen	

Teacher	Students
what comes next?	- They reverse process.
- Yes, they turn the process backward. Reverse means to turn backward. How do they turn the process backward?	- By breaking down the sugar with oxygen.
- That's right. Here again you see the marker 'so that', what does it indicate?	- Purpose or effect.
- What will happen if the light break down the sugar with oxygen?	- Carbon dioxide and water are released.
- Very good. Now tell me class, how many things photosynthesis can do?	- It can do two things.
- What are they?	- First, they make sugar and release oxygen. Secondly, after that they release carbon dioxide and water.
- That's fine. Now, please read the last paragraph.	Students read silently.
- What can green leaves produce?	- Sugar and oxygen.
- Look at the word 'these', what does it refer to?	- Sugar and oxygen.

Teacher	Students
- Yes, it refers back to sugar and oxygen. Please draw an arrow to sugar and oxygen.	Students draw an arrow.
- Underline the word ' so far ' in sentence 21. This marker shows logical summative or it sums up the story. In summary, does man understand this process?	- No, he doesn't.
- Can he copy this process?	- No, he can't.
- What can he do?	- He eats food produced by plants and uses oxygen.
- And after that what does he do?	- He returns carbon dioxide and water to the atmosphere.
- Yes, and with this we can keep carbon dioxide and oxygen balance.	
- Look at sentence 21 'anyway' is another marker which indicates contrast or unexpected information follow what we've said before. We say that man can't neither copy nor understand the process. The unexpected information which follow is	- we get our energy by eating food produced by plant and by using oxygen.

Teacher	Students
- Besides food, what else can plants produce?	- Oxygen.
- How do you know?	- From the word 'also'.
- Good, 'also' is a marker indicating addition.	
Generalization	
- Now look at the whole paragraph together. The first paragraph is an introduction and it gives a definition of 'photosysthesis'. What is photosynthesis?	- It's an ability to put things together with light.
- How about the second paragraph, what does it deal with?	- It deals with the importance of the process.
- Good and the third paragraph, what does it deal with?	- The process - how the process works.
- We call it a description of how process works. Paragraph 4 tells you the two most important things the process can do. What are they?	- The process can make sugar and oxygen and then make carbon dioxide and water from sugar and oxygen.
- Good, the last paragraph is the	

Teacher	Students
conclusion. Is it a definition or a description?	- A description.
- Yes, it's a description stating information. Now let's go back to something we have talked about. First we have second type of definition. 'Suvit Please come out to the blackboard and write down the pattern of definition for me, will you?	Suvit comes to the blackboard. Suvit writes. NP + {is called / is known as / is refered as} thing to define.
- Prakarn can you give an example?	- A locking device is called a door lock.
- Good, everybody copy down this pattern.	
- Now for the references, can you find any references in this passage?	- Yes, ma'am. They are it, which, that, this, these and the.
- What part of speech are they?	- Pronoun, demonstrative and article.
- How about the way to explain word or words, can you find anyway?	- Yes, commas, colons and or.

Teacher	Students
Teacher sticks chart on the blackboard.	
- Good. Now the connectors, please tell me the functions they show. The first ones, 'however', 'anyway' shows	- Unexpected information.
so that?	- Purpose.
And then shows	- Time sequence
so far	- logical summative.
The last one, also	- addition.
Now copy these down please.	

Teacher sticks a chart on the blackboard.

however	⟶	unexpected information
anyway	⟶	unexpected information
so that	⟶	purpose
then	⟶	time sequence
so far	⟶	logical summative
also	⟶	addition

EXERCISES

I Reading comprehension.

Written question answer exercise.

1. How do scientists refer to the process used by plants to put things together with light?
2. Plants convert light into what kind of energy?
3. What is the source of almost all the oxygen in our atmosphere?
4. What gas do we expel (release) from our lungs when we breathe?
5. What element is essential to combustion?
6. What do plants combine to make food?

II Rephrasing

Rephrase the following sentences as example.

: We like to read about the remarkable process. The process is developed by man.

= We like to read about the process which is developed by man.

1. A shovel is a tool. It is used for lifting and moving loose material.
2. A furnace is an enclosed chamber. It is made for producing heat.
3. Oxygen is a colorless, odourless, tasteless gas. It is considered essential to life process.
4. Clay is a plastic, fine-grained earth. It is produced by the deposit of fine rock particles in water.
5. A barn is a farm building. It is designed for shelting liverstock.

Connectors.

Fill in the blank with the following words.

however, anyway, so that , then, also, so far.

1. Plants require energy from light to produce food, they ..... require carbon dioxide.
2. Plants require energy from light, carbon dioxide, and water ..... they can make food.
3. We don't know anything about the process, ... we do know that plants release oxygen.
4. Plants make food and release oxygen, ..., by reversing the process, they produce carbon dioxide.

Lesson Plan Unit III

Objectives : Students must be able to recognize :

1. the basic communicative functions of a written text: classification, definition and description stating information.
2. the organization of information in a text with its features of cohesion and coherence.

Behavioral Objectives : Students must be able to

1. identify cross references (anaphoric, cataphoric by drawing arrows).
2. answer the referential questions.
3. lable diagrams.
4 rephrase.
5. decides the kinds of communicative acts.
6. change non-verbal to verbal information and vice versa.

General Purpose : The intergration of the 4 skills but with the predomination of reading.

Content : 'Bionics' based on ALC, Volume 2500, by Defense Language Course, U.S.A.

Language : Lexis, structures and discourse markers will be suggested within context and the communicative acts.

Assumption : Students already know some technical words, consequently the teacher will not explain them (e.g. engineering, mechanism, navigation ranging, sonar, high-frequency).

Activities :

Teacher's activities :

1. Guiding the students to look for word equivalence, reference, connection and the rhetorical acts.
2. Asking questions.
3. Showing aids.
4. Writing on the board.

Students' activities :

1. Guessing intelligently the functional meaning from the context clues (oral and written).
2. Answering questions, writing on the sheets or oral.

Note :

1. Some semi-technical words like 'application, echo-locating system, conduct' are not explained to students. The teacher lets them assume the meaning from the context.

2. The teacher may use Thai in some parts whenever she finds it hard for the students to follow.
3. The exercises from the sheets may be assigned as homework.

Reading Passage

Bionics

Bionics is the study of living creatures. It is study in researching principles that are applicable to engineering. Bionics is so new that even the name of this science is not well-known. This new science developed from realizing that a complete understanding of the special purpose mechanism by which some of our creatures such as bats, frogs, owls, porpoises, etc. do mysterious things could lead to important application to engineering. Bats and porpoises, for example, have better sound navigation ranging (sonar) mechanic than our man-made devices. Bats bounce high-frequency noises off objects in flight and avoid colliding with them in a split second. Porpoises are also extremely skillful sound navigators. Like bats, porpoises have a highly developed echo-locating system. Porpoises find their way around in water by bouncing high-frequency noises off objects. In comparison with the bat's and porpoise 's echolocating systems, our best echolocating

devices are crudes. Why haven't we been able to copy nature's echo-locating mechanisms ?

We know, for instance, that porpoise emits high-frequency noises, but we do not know where they came from since it has no vocal cords. In addition, the porpoise has no visible external ears or ear openings. Porpoises can see with their eyes only about as well as man. Thus, their vision is limited in muddy water. On the other hand, they are capable of navigating with ease by their special-purpose mechanism. Their transmitting and receiving system is so efficient that they can avoid colliding with objects and find food with unerring accuracy in darkened waters. Experimenters have conducted tests to evaluate their sound system. In one test, porpoises swim around a large number of iron pipes at high speed without running into a single pipe. In other tests, they avoid hitting a piece of clear glass, a section of wire went straight through an opening.

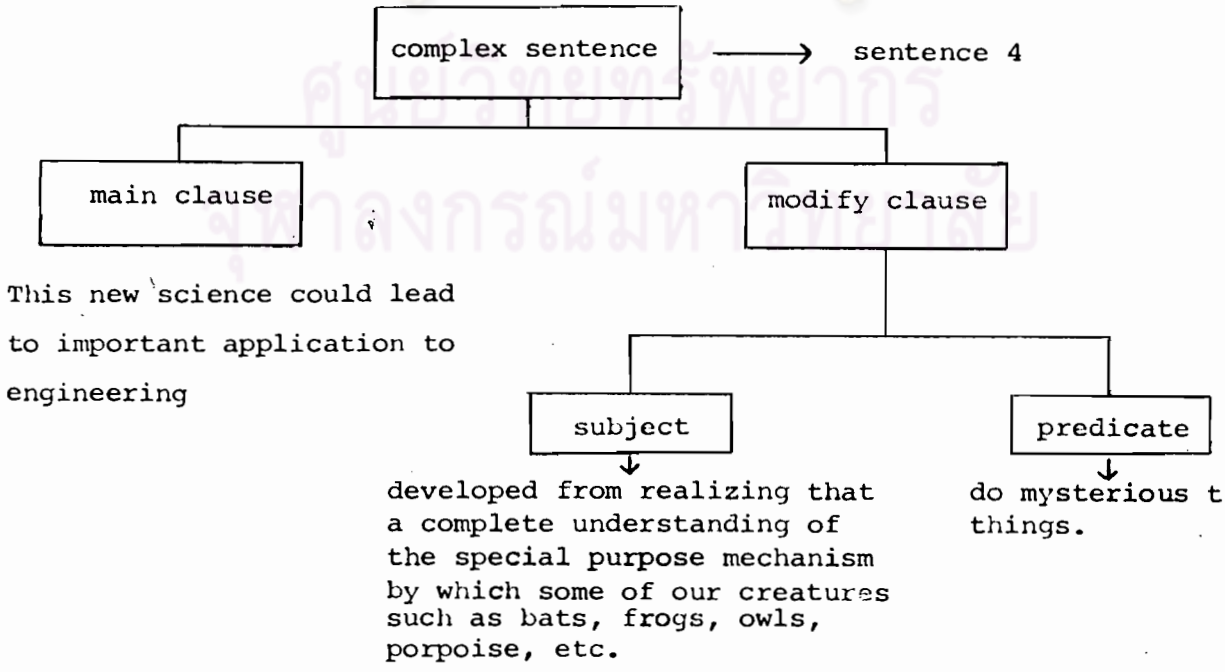
Teacher	Students
Attention Pointer and Presentation Teacher sticks picture of porpoise on the blackboard. - Class, do you know the name of this fish? - You don't know. Well, this is a porpoise. Teacher sticks another picture of a bat on the blackboard. - How about this one? - O.K., these two creatures or animals have a very special ability. But before we talk about them you have to answer my questions first. Do you know what a sense organ is? - Only ears?	Students sit silently. - It is a bat. - Ears. - No, there are eyes, nose and [illegible].

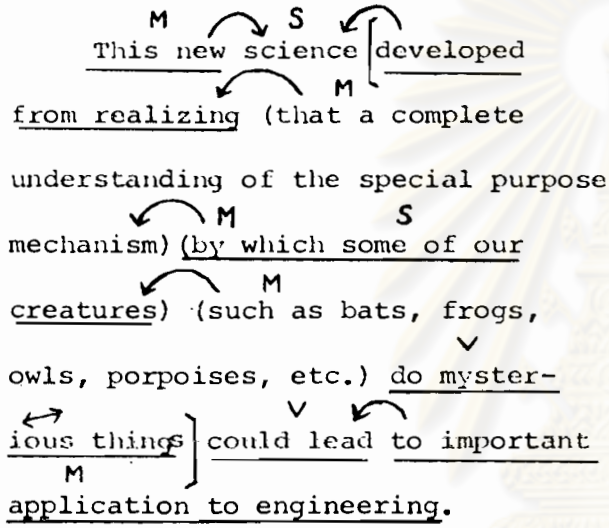
Teacher	Students
- Good, they are our sense organs. But today we'll talk about only ears and eyes. Can you see if you wear black cloth over your eyes?	- No, ma'am, we can't.
- If you cover your ears, do you think you'll hear me?	- No, we won't.
- You can't hear without your ears and you can't see without your eyes. But these two animals are exceptions. They can see and hear even without ears and eyes. So today, we're going to talk about 'Bionics'. which is referred to these special sense organs.	
Teacher asks students to read the first paragraph silently.	Students read silently.

Teacher	Students
- Look at the first sentence. What kind is this sentence, a definition or a description?	- A definition.
- Yes, it is a definition. I hope you can remember the pattern by now. What is bionics?	- It's the study about living creatures.
- Look at sentence 2, what does 'it' refer to?	- Bionics.
- Then draw an arrow from 'it' to 'bionics'. This pronoun refers back to bionics.	Students draw an arrow.
- Class, from sentence 2, you know that the study of creatures or animals is a study in.....	- Researching principles that are applicable to engineering.
- That's right, but what kind of principles are they?	- The principles that can be applied to engineering.
- Yes. Here you see the word applicable which	- Sense organ.

Teacher	Students
derives from the word 'apply' of which you already know the meaning. O.K. can you guess what should these principles deal with here? We have talked about it at the beginning.	
- Yes, highly specialized sense organs.	
- Look at sentence 3, is this bionics very famous?	- No, it isn't.
- No, because it's very new. In sentence 4, what does 'this new science' refer to?	- It refers to bionics.
- Please draw an arrow from 'this new science' to 'bionics'.	Students draw an arrow.
- And underline the word 'which' in sentence 4. What does 'which' refer to?	- To special purpose mechanism.

Teacher	Students
- Then draw an arrow from 'which' to 'special purpose mechanism'?	Students draw an arrow.
- Look at sentence 4 again, can you tell me what the subject and the verb of this sentence is?	Students sit silently.
- You don't know, I'll break this sentence for you and please copy them down when I finish writing and you understand it.	
Teacher writes on the black-board the diagram of the sentence.	Students copy down the diagram.



Teacher	Students
- Now, let's have a close look on them. Teacher writes the sentence on the blackboard.  This new science developed from realizing (that a complete understanding of the special purpose mechanism) (by which some of our creatures) (such as bats, frogs, owls, porpoises, etc.) do mysterious things could lead to important application to engineering. - This type of subject is called a heavy noun phrase. You'll see the subject is modified by phrase which is also modified by clause. And the subject of the latest clause is also a heavy noun phrase.	

Teacher	Students
- Class, what kind of sentence is sentence 4? What is the main clause?	- Complex sentence. - This new science could lead to application to engineering.
- This new science is bionics, so in other words, what can you say?	- Bionics could lead to application to engineering.
- Good, another question; from diagram, you know how bionics is developed?	- From realizing that a complete understanding of the special purpose mechanism.
- What mechanism?	- The mechanism which is used by bats, frogs, owls and porpoises.
- Now, look at the word 'such as', this marker shows the classification of the creatures that do mysterious things. It explains the word 'some of our creatures'. What are the 'some'?	- They are bats, frogs, owls and porpoises.

Teacher	Students
- Look at sentence 5, here again you see the words 'for examples'. This marker shows the same meaning as 'such as', the explanation and the classification. What animals have better sound navigation ranging, or in other word, sonar mechanism than our man made devices?	- They are bats and porpoises.
- So bats and porpoise have a better sense organs than devices made by man.	
Teacher writes down on the blackboard. devices which are made by man⟶man-made devices.	
- Copy this down, please. This is another way of rephrasing a clause into a phrase.	Students copy the pattern.
O.K. what can bats do in flight?	- Bounce high-frequency noises off objects.

Teacher	Students
- Do you think they have any reason in doing it?	- Yes, so they'll know there is object over there.
- Why?	- So they avoid colliding with them.
- Yes, they avoid hitting or running into them. What is 'them' here refer to?	- Objects.
- That's right, draw an arrow from 'them' to 'objects'	Students draw an arrow.
- Why do bats bounce off high frequency?	- To avoid running into objects.
- Good, look at sentence 7, underline the word 'also' please.	Students underline the word.
This marker shows.....	- Addition.
- Yes, we met this word last time. It means there is something more. Besides bats, what more has the same ability?	- Porpoises.

Teacher	Students
- 'Like' in sentence 8 shows similarity. What is like bats or what is similar to bats?	- Porpoises.
- How are they like?	- They have the same highly developed echo-locating system.
- How can porpoise swim in the dark water?	- By bouncing high-frequency noises off objects like bats.
- In sentence 10, underline 'in comparison with'. This marker also show comparison. If we compare our best echo-locating device with the bats' and porpoises' echo-locating system, which one is better?	- The bats' and porpoises'.
- Right, our systems are still crude. That means they are not developed to that point yet.	
- In summary, what is bionics?	- A study of principle of high quality sense organs.
- Good, now read the second paragraph, please.	Students read silently.

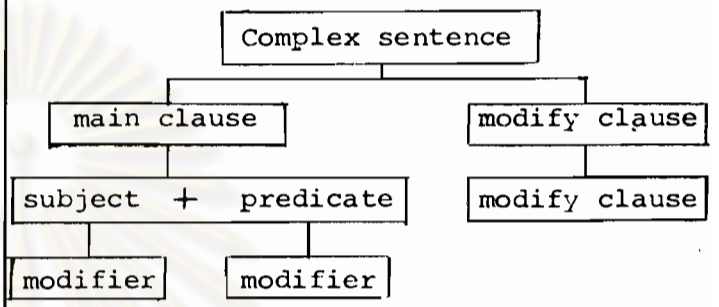
Teacher	Students
- Look at the word 'for instance'. It is the same as 'such as' and 'for example'. What does it show?	- It shows explanation.
- That's right. Now we have 'for instance' between commas (,.....,) that means it explains the word or words that come before it. So what do we know from this clause?	- That porpoises emit high frequency noises.
- What does 'they' in this sentence refer to?	- Noises.
- Yes, please draw an arrow from 'they' to noises.	Students draw an arrow.
- Do we know where these noises come from?	- No, we don't.
- They might come from vocal cords.	- No, it has no vocal cords.
- What does 'it' refer to?	- A porpoise.
- Then draw an arrow from 'it' to 'porpoise' please.	Students draw an arrow.

Teacher	Students
- And underline the word 'since'. Can you guess what this marker indicate?	- Reason
- Yes, it shows reason. Why don't we know where noises come from?	- Because the porpoise has no vocal cords.
- The words 'in addition' in sentence 13 shows that there is something more. What is more besides having no vocal cords.	- The porpoise has no visible external ears or ear openings.
- How well a porpoise can see?	- As well as man.
- In sentence 15, 'thus' indicates logical summary, or cause-effect relation. What is the effect of porpoise seeing as well as man?	- Their vision is limited in muddy water.
- Do you think you can see well in muddy water?	- No, we can't.

Teacher	Students
- Neither can the porpoise. Muddy water is water which is full of mud.	
- In sentence 16, 'on the other hand' is a marker indicating contrast. What is that contrast?	- In spite of their limited vision, the porpoise are capable of navigating with ease by their special purpose mechanism.
- Good. What does 'they' here refer to?	- Porpoises.
- In sentence 17, what does 'their' refer to?	- Porpoises'.
- And how about 'they' in sentence 19?	- Porpoises too.
- Well, what have experimenters done?	- They have conducted tests to evaluate porpoises' sound system.
- What is the result of the test?	- The porpoises swim at high speed without hitting or running into any objects.

Teacher	Students
Generalization	
- Very good. Now you understand what bionics is. What does it deal with?	- Sense organ.
- Let's look at the whole paragraph together. Which paragraph shows the main idea?	- The first paragraph.
- Yes, the first paragraph tells us something about bionics. What does the second paragraph deal with?	- Porpoises' special purpose mechanism.
- Yes, it's only an example to support main idea what bionics is. Class, let's go back to sentence analysis again. What is a complex sentence?	- It is a sentence which is composed of two clauses.
- What are they?	- Main clause and modify clause.

Teacher	Students
- Apiraks, come and draw a diagram we've just studied on the blackboard, please.	Apiraks comes at the blackboard and draws a diagram.
- Class, is that right?	- Yes, ma'am.
- What do we use for explaining the words that come before or after,....	- Verb to be, such as, for instance, for example.
- Good. Then copy them down.	
Teacher sticks a chart on the blackboard.	Students copy from the chart.



unknown word	marker of explanation/ definition
	is such as for instance for example

Teacher	Students
- We still have some connectors to remember. What does 'in comparison with' show?	- It shows comparison.
- How about 'on the other hand'?	- Contrast.
- And what does 'thus' show?	- Logical summary.

Teacher sticks another chart on the blackboard.

- Connectors

in comparison with	→ comparison
in addition	→ addition
on the other hand	→ contrast
thus	→ logical summary
for example, such as, for instance	→ illustrative

Follow-up activity

Teacher gives out the exercise sheets to students to work with.

EXERCISE

I. Reading Comprehension

1. What is bionics?
2. What is this new science developed from?
3. How do bats and porpoises avoid colliding with objects?
4. How does an echo help to locate an object?
5. How well can porpoises see with their eyes?

II. Fill in the blanks with the missing words.

As you know, the eye is the .....organ used by living creatures for seeing. The ear is the sense mechanism.....for hearing. For thousands of years we accepted one basic idea.

Living beings see with their eyes and hear with their ears- and that was that. Yet, the bat's strange ability to guide..... in flight, find food, and avoid.....with objects in complete darkness led investigators to raise the question: Can it be that bats and some other animals'....' with their ears rather than with their eyes.

III. Tell which sentence is a definition, a description of explanation, of stating information, and of reason.

Echoes are sound waves that bounce back after striking the surface of objects. In other words, echoes are reflected sound waves. Bats produce sound waves in the air, and porpoises send out sound waves in the water. It is these echoes that bats and porpoises use to avoid running into objects and to find food.

Therefore you understand why these animals are referred to as echo-navigators and echo-locators.

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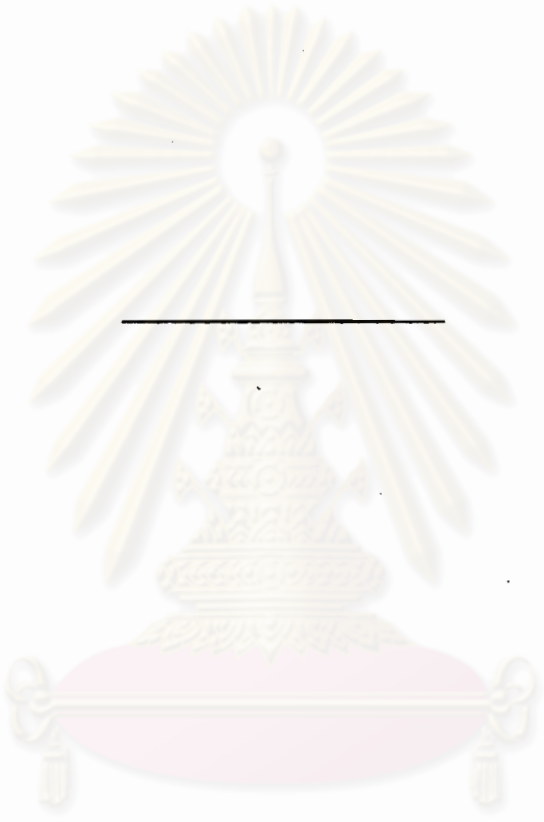


Lesson Plan Unit IV

Objectives : Students must be able to recognize :

1. the basic communicative functions of written texts: classification, definition, and description stating information or cause-effect relation.
2. the organization of information in a text with its features of cohesion and coherence.

Behavioral Objectives : Students must be able to

1. identify cross references (anaphoric, cataphoric by drawing arrows).
2. answer the referential questions.
3. lable diagrams.
4. rephrase.
5. decide the kinds of communicative acts.
6. change non-verbal to verbal information and vice versa.

General Purpose : The intergration of the 4 skills but with the predomination of reading.

Content : 'Radar' based on ALC book, Volume 2500, by Defense Language Institute, U.S.A.

Language : Lexis, structures and discourse markers will be suggested within context and the communica-

tive acts.

Assumption : Students already know some technical words, consequently the teacher will not explain them. (e.g. radar, radio waves, sound waves, blips, attitude)

Activities :

Teacher's Activities :
1. Guiding the students to look for word equivalence or opposit, reference, connection and the rhetoric acts.
2. Asking questions.
3. Showing aids.
4. Writing on the blackboard.

Students' Activities :
1. Guessing intelligently the functional meaning from the context clues (oral and written)

Note
1. Some semi-technical word like 'detect', 'locate', 'recall' 'screen' 'control towers' are not explained to students.
2. The teacher may use Thai in some parts whenever she finds it hard for the students to follow.
3. The exercises from the sheet may be assigned as homework.

RADAR

The word radar comes from the words radio detection and ranging. This means discovering objects and measuring their distance (ranging). This is done by means of radio waves. Radar devices are complicated. But the way radar works is simple. You will recall that bats and porpoises detect and locate objects by sending out sound waves. You will also remember that object reflects sound waves. Animals navigate by listening to these sound waves or echoes. Sailors, many years ago, used echoes to navigate near land in foggy weather. A sailor standing in the bow of a boat would shout. If an echo came back to him, he knew that an obstacle was nearby.

In much the same way, echoes make it possible for radar to detect distant objects. It can tell how far away these objects are. Objects such as ship, airplanes, and buildings reflect radar waves just as they do sound waves. Radar sends out short bursts of radio waves. Then it listens between the bursts for echoes. The distance to an objects is determined by the time it takes for the radio wave to travel to the object and return. The radar set has a device called an indicator. This is a screen similar to the television screen. The indicator shows to echo as dots of light. These are called a blips. You simply read the screen to tell the direction and the distance to the object that caused the blips.

Radar is used to guide ships and airplanes through fog and clouds. It can spot landmarks such as cliffs and lighthouse.

This can tell the ship's captain where he is. There is another kind of radar that tells the pilot his altitude above the earth. A ship's radar can detect obstacle in fog, rain or snow. The men working in the control towers watch the radar screen. They can see the path of approaching planes and guide them in for perfect landing even in fog.

Teacher	Students
Attention Pointer and Presentation	
T. shows the newspaper to Students.	
- Class, have your read the news about our F5-E (fighter plane) intercepting the vietnamese plane?	- Yes, ma'am, but that was quite long ago.
- Yes, but there is still something interesting about it that I want to talk with you. How did the pilot know the plane was coming?	- He knew from the radar.
- How?	- It appeared on the radar screen, then the man at the control tower informed the standby pilots.
- O.K. Do you know how radar works? How can it detect the plane?	- Students are silent.
- You'll find the answer in the sheet. Today we'll talk about radar and how it works. O.K.?	O.K.

Teacher	Students
T. asks students to read the first paragraph.	
- Class, the first thing we know from this passage is that radar comes from...	- radio detection and ranging.
- Look at 'radio detection and ranging' Can you guess how we form the word radar?	- from the first letter of each word.
- Yes, the word is formed by putting the first initial of each word together, except the first word, we take...	- the first two letters.
- Good, ra-d-a-r.	
- Look at sentence 2, what is 'this' refer to?	- Radar.
- So, draw an arrow from 'this' to radar.	Students draw an arrow.
- What does radar mean, then?	- Discovering objects and measuring their distance.
- What does 'their' refer to?	- Objects.
- Then what should you do with this word?	- Draw an arrow from 'their' to 'objects'.
- So, radar means discovering and measuring...	- the distance of the objects.

Teacher	Students
- Good, look at sentence 3, What is 'this' refer to?	- Discovering objects and measuring their distance.
- Right, so what does this sentence mean?	- Discovering objects and measuring their distance is done by radio waves.
- From sentence 4 and 5, what is the opposit word of 'simple'? Can you guess?	- Complicated.
- What is more complicated, radar devices or radar works?	- Radar devices.
- Look at sentence 8, here, the word 'or' is a marker which explains the word that comes before. So the meaning of sound waves in this sentence is ...	- Echoes.
- In sentence 9, the words ' many years ago' are put between commas. (,....,) Commas shows the explanation. Here you can rewrite the sentence to ...	- Many years ago, the sailors ...
- Yes, in sentence 11, please underline 'if' and ' he'.	Students underline the words.

Teacher	Students
- 'If' is a marker that indicates condition. What is the condition here?	- An echo came back to him.
- Then what is the effect of this condition?	- He knew that an obstacle was nearby.
- What does 'he' in this sentence refer to?	- The sailor.
O.K. draw an arrow from 'he' to 'sailor'	Students draw an arrow.
- From sentence 6 to 10, can you predict what information the passage give us?	- Radar works the way as bats and porpoises do.
- How do they work?	- By sending sound waves or echoes to detect and locate objects.
- Very good. So how does radar work?	- By sending sound waves to detect and lacate objects.
- Class, please read the second paragraph.	Students read silently.
- Look at sentence 12, underline 'in much the same way,' this marker in dicates comparison. What is compared here?	Students underline the words. - Radar
- What does pronoun 'it', in sentence 13 refer to? Draw an arrow from 'it' to 'radar', then.	- Radar Students draw an arrow.

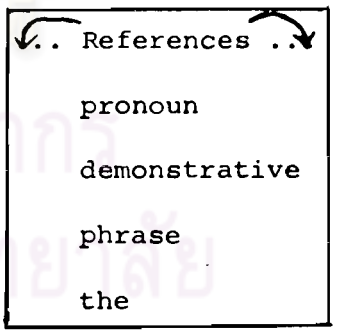
Teacher	Students
- What can radar do?	- It tells how far the objects are.
- How?	- By echoes.
- Good, look at 14, here again you see 'such as'. What does this marker indicate?	- Explanation and classification.
- Yes, it explains or classifies the word that comes before it; so you know what the objects are. What are they?	- Ships, airplanes and buildings.
- Underline 'as' please, this marker shows similarity. And what does 'they' here refer to?	- Ships, airplanes and buildings.
- What is the similarity indicated in this sentence?	- Ships, airplanes, and buildings reflect the radar waves the same way these objects reflect the sound waves.
- What kind of waves does the radar send out?	- Short burst of radio waves.
- In sentence 16, the marker 'then' shows the sequence of events. What does 'it' in this sentence refer to?	- Radar

Teacher	Students
- When the radar sends short burst of radio waves out what happens then?	- The radar listens for echoes between the burst.
- It is a description stating information. 'It' in sentence 23 refers to ...	- Radar.
- Here again the word 'such as', what does this marker indicates?	- Explains the word 'landmarks'
- Yes, they explain to us that landmarks are ...	- Cliffs, and lighthouse.
- Class, read the last paragraph please.	Students read silently.
- Can you guess what 'this' in sentence 24 refers to?	- Radar
- In sentence 25, underline the word 'another'. This word shows you there is something more. What is more?	Students underline the word. - There is one more kind of radar that can tell you the altitude of the plane.
- Very good, another kind of radar can tell you how high you are above the earth now. From this sentence you know how many kinds of radar there are?	- Two
- What are they?	- The first one tells only direction and distance and

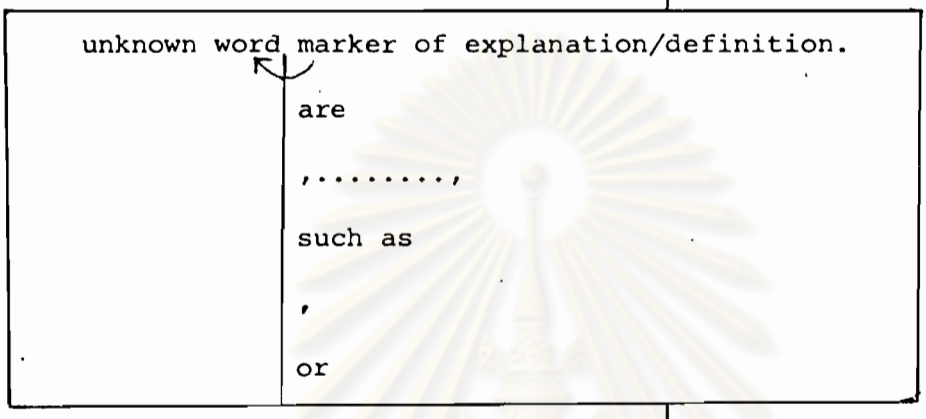
Teacher	Students
	the other also tells altitude besides direction and distance.
- Good, now tell me who works with radar?	- The men in the control towers.
- O.K. look at the last sentence. 'They' here refers to ...	- the men in the control towers.
- How can we know the distance of the objects?	- By determining from the time it takes for the waves to go to the objects and comes back.
- In sentence 19, 'this' refer to ...	- Indicator.
- And 'similar to' shows...	- Similarity.
- What information do you get from this sentence?	- That the screen of the radar is similar to the screen of T.V. set.
- How can the radar tell about the objects?	- By showing the echoes as dots of light.
- 'These' in sentence 21 refers to ...	- Dots of light.
- Draw an arrow from 'these' to dots of lights	Students draw an arrow.
- 'These are called blips' What kind of communicative function is it? A classification?	- No, it's a definition.

Teacher	Students
- Good, I hope you can remember the pattern when you define something by now. Anyway write down the pattern again (Teacher writes the pattern on the black-board) NP + is called + thing to define These / Dots of light } are called blips.	- Students copy the pattern.
- What can the blips tell you?	- The direction and the distance to the objects.
- That's right. Let's look at the next paragraph.	
- This short paragraph tell you the use of radar.	
- Right, and how about 'them'?	- The approaching planes.
- What are these men doing?	- Guiding the planes in for safe landing.
- Very good. So you see, next year you're going to be pilot students. By then, you'll know how important is radar. And this is the reason why our fighter	

Teacher	Students
plane knew beforehand when the Vietnamese plane entered our border. Radar told them so they would fly up to intercept them.	
Generalization	
Now let's have a quick look at the whole paragraph together.	
- What does the first paragraph deal with?	- What radar is.
- Yes, and what kind of communicative function is it?	- Definition and description.
- O.K. how about the second paragraph? What does it deal with?	- How radar works.
- Yes, the communicative function in this paragraph is a definition, isn't it?	- No, a description.
- Good, besides how radar working, what else does this paragraph tell you?	- How radar tells direction and distance.
- Fine, and the last paragraph, it is a description of what?	- A classification.
- Yes, from this paragraph you know that there are ...	- two kinds of radar.
- What are they?	- One that tells direction and

Teacher	Students
	distance and the other that also tells the altitude.
- Is the latter one used with ships?	- No only with the airplanes because airplanes go high in the sky.
- Yes, altitude has to deal with height. Now, let's have some review as usual.	
- Give me the example of definition please.	- Dots of light are called blips.
- The pattern is ...	NP+are called+things to define.
Teacher asks one student to come out at the blackboard.	
'Please write me the reference you've read in the passage the same pattern I used to write.	Student writes. 
- Is that correct class? Now for the explanation of word, or words what do they use to explain?	- Yes, correct. - Verb to be, such as, or and commas.

Teacher	Students
- Yes, like this. Teacher sticks a chart on the blackboard.	



— In this passage, we have many discourse markers. I hope you remember some by now. What does 'but' indicate?	- Contrast.
— And also?	- Addition.
— When do you use 'if' ?	- When I want to show conditional cause-effect.
— How about the 'same way' 'and' 'as'.	- They show comparison.
— Here comes again 'then'.	- Sequence of event.
— The last one 'similars to' shows ...	- Similarity.
— So you remember them now, anyway, copy down from the chart again. Teacher sticks a chart on the blackboard.	

Teacher	Students

but	→	contrast
also	→	additon
if	→	conditional cause-effect
in the same way	→	comparison
just as	→	comparison
then	→	sequence of time
similar to	→	similarity.

EXERCISES

I. Reading comprehension

1. What does the word radar come from?
2. What kind of waves does radar use?
3. How is the distance to an object determined?
4. What do the blips on the radar screen look like?
5. What is radar used for?

II. Indicate which sentence is a description of explanation, contrast, comparison, condition and addition of which stating information.

Light waves and radio waves are quite similar. The light waves from a flashlight travel in a beam. They travel in the direction in which you point the flashlight. And, when the light strikes an object, it bounces back. In much the same way, radio waves travel in a beam. They travel in the direction in which they are pointed. They are reflected back when they strike an object. We can see light waves, as we do with a flash light. But we cannot see radio waves. In addition, radio waves can pass through substances that cause light waves to spread out.

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Lesson Plan Unit V

Objective : Students must be able to recognize:

1. the basic communicative functions of written text: definition, description stating information of procedure and explanation.
2. the organization of information in a text with its features of cohesion and coherence.

Behavioral objectives : Students must be able to

1. identify cross references (anaphoric, cataphoric by drawing arrows).
2. answer the referential questions.
3. lable diagram
4. rephrase
5. change non-verbal to verbal information and vice versa.
6. decide the kinds of communicative acts.

General Purpose : the intergration of the 4 skills but with the predomination of reading.

Content : 'Window Air Conditioners', based on ALC book, Volume 2500 by Defense Language Institute, U.S.A.

Language : Lexis, structures and discourse markers will be suggested within context and the communicative acts.

Assumption : Students already know some technical words, consequently the teacher will not explain them: (e.g. evaporate, condense, coolant, coil, air-conditioner).

Activities :

Teacher's activities :

1. Guiding the students to look for word equivalence, reference, connection and the rhetorics acts.
2. Asking questions
3. Showing aids
4. Writing on the blackboard

Students' activities :

1. Guessing intelligently the functional meaning from the context clues. (oral and written)
2. Answering questions (writing on the sheets or oral).

Note :

1. Some semi-teachnical word like: liquid, absorb, release, substance, film, are not explained to

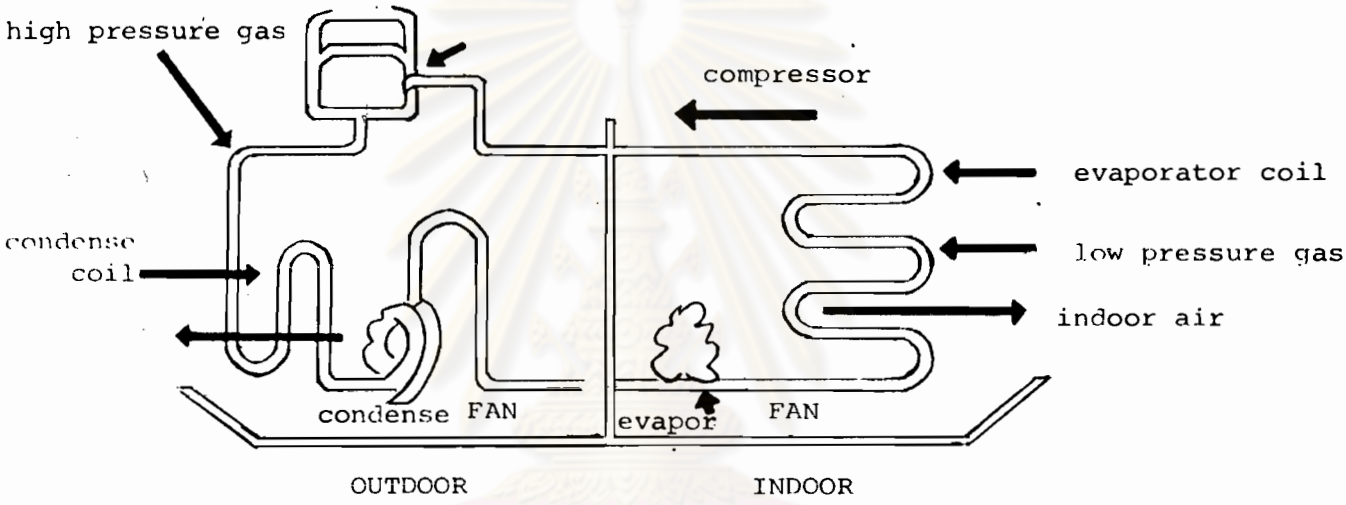
students. The teacher lets them assume the meaning from the content.

2. The teacher may use Thai in some parts whenever she finds it hard for the students to follow.
3. The exercises from the sheet may be assigned as homework.

Window Air Conditioners

We are going to talk about how airconditioner works. Before we begin, let's be sure you know a few things. You need to know what happens when a liquid evaporates and when it condenses. This is important because airconditioner uses a liquid known as a refrigerant, or coolant. This liquid alternately changes from a liquid to a gas. Keep in mind that when a liquid evaporates, like a refrigerant does, it changes to a gas. Then, when this gas condenses, it changes back to a liquid. This is one of the basic principles we are going to talk about in this unit. When a liquid refrigerant changes to a gas, it absorbs heat. When this gaseous refrigerant changes back to a liquid it releases heat. A second principle to remember is that heat moves, or flows, only from warmer substances to cooler substances. In other words, heat goes from a warm place to a cool place. It doesn't flow from a colder to a warmer substance.

A simple explanation will help you understand what happens when a liquid evaporates, or changes to a gas. You will notice that you usually feel cool when you get out of cold water. After a swim, your skin is actually cold because the film of water left on it begins to evaporate. The heat that changes the thin film of water to water vapor comes from your skin and you feel cold. This is similar to cooling the warm air in a room by evaporating a liquid coolant.



As shown in the above diagram, the liquid refrigerant moves into the evaporates coil. The evaporator coil is a cooling coil. The liquid quickly turns into a gas and absorbs heat from the room air. The room air is drawn into the airconditioner unit and is blown over the coils by the evaporator fan. The cooled air is then blown back into the room. This air is now cold and you feel cold. Next, the compressor draws the refrigerant gas from the cooling coil into the condenser coil. The condenser coil is exposed to the outdoor air. Then the condenser fan blows the outdoor air over the coil. This cools the gas enough to make it turn into a liquid and releases heat. The outdoor air takes heat from

the gas in the coil because the gas is hotter than the outdoor air.

Teacher	Students
Attention Pointer and Presentation The class is in the language laboratory.	
- What a weather! Last week it was cool but today, how warm it is!	- Can we turn on the air-conditioners,ma'am ?
- Go ahead, please turn both of them on.	2 students turn on the air-conditioners.
- Thank you, and thanks the man who invented the air-conditioner too. By the way, do you know how air-conditioner works?	- We're going to learn it next semester, ma'am.
- Then why don't we talk about some principles of it today? So you'll know something about it by then, O.K.?	- O.K., ma'am.
Teacher asks students to read the first paragraph.	Students read silently.

Teacher	Students
- Class, look at sentence 4, can you guess what does 'this' refer to ?	Students hesitate to answer.
- You're not sure. 'This' here refers back to 'need to know what happens when a liquid evaporates and when it condenses ? I'll ask you again, 'What is important ?'	- Knowing what happens when a liquid evaporates and when it condenses.
- Good, now go back to your answer 'when it condenses.' What does 'it' refer back to ?	- A liquid
- Again look at sentence 4, the connector 'because' shows reason. The reason why you have to know is... Yes, you have to know about the liquid because aircon-ditioner uses liquid known as a refrigerant.	- airconditioner uses a liquid known as a refrigerant.

Teacher	Students
Teacher writes on the black-board : ' Airconditioner uses a liquid known as a refrigerant' - Remember this ? What kind of rhetoric function is it ? A classification ?	- No, ma'am, it's a definition.
- So you can remember this pattern. Notice the clause how I rephrase it. Then the words 'which is' are deleted; and you have what you see in your sheet. Is it clear ?	- Yes, ma'am.
- Look at sentence 4 again, the word 'or' is a marker of explanation of the word that comes before it. From this word you know that a refrigerant is.....	- A coolant.

Teacher	Students
- Yes, the refrigerant and the coolant are the same. Now, go to sentence 6, 'like' here indicates similarity. What is that similarity ?	- A refrigerant does.
- 'does' here refers back to evaporates. Notice that the clause 'like a refrigerant does' is between commas (,.....,). What does this commas signal or show ?	- Explanation.
- Of what ?	- The word or words that come before it.
- Yes, then you can guess what this sentence means?	- When a liquid evaporates like a refrigerant evaporates.
- O.K. What will happen then ?	- It changes to gas.
- What does 'it' refer to ?	- A liquid.
- Good, that means 'a liquid' changes to gas.	

Teacher	Students
- 'When' is also a marker. It shows condition. What is the condition here ?	- A liquid evaporates.
- Then what will happen ?	- A liquid changes to gas.
- Please go on to next sentence, you see 'then' and 'when' again. 'Then' shows.....	- Sequence of event.
and 'when' shows.....	- Condition.
- The next thing to happen is that when this gas condenses, it changes back to a liquid. What is the condition here ?	- This gas condenses.
- But what does 'this gas' refer to ?	- The gas which is changed from a liquid.
- Very good. What is the effect of this condition ?	- It changes back to a liquid.
- What does 'it' refer to ?	- This gas.
- You can easily remember it this way.	

Teacher	Students
(Teacher writes on the black-board) a liquid ⟶ gas ⟶ a liquid. - What word should I put on the first arrow ?	- evaporates
- How about on the second arrow ?	- condenses.
- Good, so it will come out like this a liquid evaporates⟶ gas condenses⟶ a liquid.	
- Clear now ?	- Yes, ma'am.
- Then copy it.	Students copy from the black-board.
- Class, in sentence 8, What does 'this' refer to...	- what we've just coppied.
- That's right. This is the basic principle of aircon-ditioner. Now in sentence 9 and 10, here again you see 'when' which indicates condition. How many con-	- 2 conditions.

Teacher	Students
ditions are there in this sentence?	
- What is the first condition?	- A liquid refrigerant changes to gas.
- What is the effect ?	- It absorbs heat.
- Good. First thing is that when a liquid refrigerant changes to gas, this gas absorbs heat.	
- How about the second condition ?	- This gaseous refrigerant changes back to a liquid.
- What happens then ?	- It releases heat.
- What does 'it' refer to ?	- A liquid.
(Teacher goes to the blackboard)	
- From the diagram here, where should I put 'absorbs heat ? Under the first or second arrow ?	- The first arrow.
- Well, how about under the second arrow ?	- Release heat.
- Good, so it will be like this	

Teacher	Students
a liquid $\xrightarrow[\text{absorbs heat}]{\text{evaporates}}$ gas $\xrightarrow[\text{releases heat}]{\text{condenses}}$ a liquid	
- Put the two words down on your diagram too.	Students write down the words.
- Now look at sentence 11, a second principle to remember. How many principles do you have to remember ?	- 2 principles.
- What is the second one from this sentence ?	- Heat moves, or flows only from warmer substances to cooler substances.
- Right, look at the word 'or' here 'or' indicates	- Explanation
- Yes, it explains the word 'moves' which is before it. So 'moves' here has the same meaning as	- Flows
- Can heat moves from cooler substances to warmer substances ?	- No, it can't.
- Class, look at sentence 12, 'in other words' is a marker which also indicates explanation. Sentence 12 modifies sentence 11.	- Heat goes from a warm place to a cool place.

Teacher	Students
What can you say in another way with the same meaning?	
- That's right. Read the second paragraph please.	Students read silently.
- Class, 'because' in sentence 15 indicates	- Reason.
- The reason why you feel cool after a swim is that ...	- The film of water left on it begins to evaporates.
- Yes, and what does 'it' refer to?	- Your skin.
- Right. Now look at this. (Teacher writes on the blackboard) 'The film of the water left on it begins to evaporate.'	
- This clause is composed of 2 clauses. They are: The film of the water left on it begins to evaporate.	
- Then we delete 'which is' as usual. So the clause becomes just like we see. Please copy this.	Students copy the clause.

Teacher	Students
- Where does the heat that changes the thin film of water to vapor come from?	- The skin.
- What does 'this' in sentence 18 refer to?	- The changing of the thin film of water on your skin to vapor.
- That's right, and 'similar to' shows	- Similarity.
- What does this sentence mean?	- The changing of the thin film of water on your skin to vapor is like a cooling the warm air in your room by evaporating a liquid coolant.
- What does this paragraph tell you?	- The explanation of what happening when a liquid changes to gas.
- How does it explains?	- By giving an example or a comparison to why you feel cool after a swim.
- Very good. What is a rhetoric function in this paragraph?	- A description of explanation.
- That's right. Now read the last paragraph please.	Students read silently.

Teacher	Students
- In sentence 19, how can you rephrase this clause? I mean what is the original clause?	- As it is shown in the diagram.
- Yes, then we delete ...	- It is.
- O.K. write this down as shown in the above diagram.	Students write in their sheets.
- Sentence 20, what is the rhetoric function is it?	- A definition.
- Yes, I hope you remember the pattern by now. Teacher writes on the blackboard.	

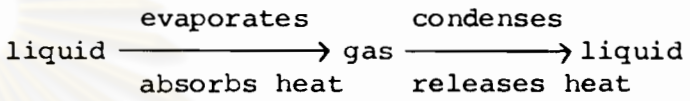
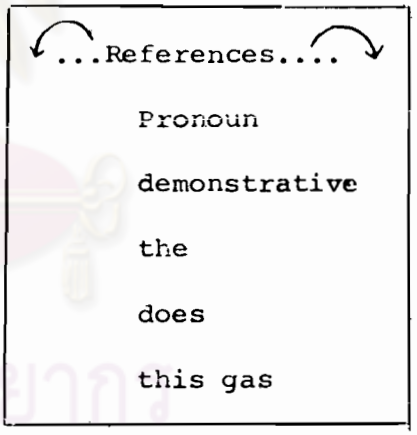
NP + is called + thing to define.

The evaporate coil is called a cooling coil.

- Copy it please	Students copy the pattern.
- Sentence 23, 'The cooled air' is rephrased from	- The air which is cooled.
- Right, the cooled air. This is another pattern of rephrasing. What should you do?	- Copy them down.
- What does 'then' here show?	- Sequence of event.

Teacher	Students
- When the room air is drawn and blown over the coils by evaporator fans, what happens next?	- It is blown back into the room.
- The marker 'next' indicates...	- Sequence of event too.
- After the cooled air is blown back into the room, what comes after?	- The compressor draws the refrigerant gas from the cooling coil into the condenser coil.
- In sentence 29, you see 'then' again. So what comes after the refrigerant gas is drawn?	- The condenser fan blows the outdoor air over the coil.
- Good, how about 'this' in sentence 28, what does it refer to?	- The blowing of the outdoor air over the coil.
- How about 'it'?	- The gas.
- Why does the outdoor air take heat from the gas in the coil?	- Because the gas is hotter than the outdoor air.
- Yes, according to the second principle, the hotter air will flow to	- The cooler.
- And that's the reason which is shown by the word	- 'because'

Teacher	Students
Generalization	
Now you know how the airconditioner works. What rhetoric function is in the last paragraph?	- Description of how airconditioner works.
- Or we can say description of explanation. For the main idea of the whole paragraph, I'll ask you some questions. What does the airconditioner use?	- A liquid known as refrigerant or coolant.
- How many basic principles are there in dealing with airconditioner.	- Two principles.
- What is the first one ?	- When a liquid evaporates it changes to gas, and when this gas condenses it changes back to a liquid.
- Right. What is the second principle ?	- Heat moves from a warm place to a cool place.
- Why do you feel cool after a swim ?	- Because the film of water left on it begins to evaporate.

Teacher	Students
- When a liquid evaporates, what does it do ?	- It absorbs heat.
- Very good. Can anyone of you come out here and draw a diagram of these two principles for me, please ?	A student comes out and draws a diagram on the blackboard. 
- Is that correct, class ?	- Yes, ma'am.
- Class, give me the sentence in the passage that is a definition.	- The evaporate coil is called a cooling coil.
Teacher asks one student to come out and write on the blackboard the reference.	
- Now, we come to the connectors. When you use the word 'because' that means you want to give.....	- reason.
- What do 'when' and 'if' show ?	- Conditional cause-effect.

Teacher	Students
Then, and next ? - And the last one 'similar to'.... Very good, now it's time for exercises.	- Sequence of time. - similarity or comparison.

EXERCISES

I. Reading Comprehension

1. When a liquid evaporates in an airconditioner, what does it do?
2. What does a gas change to when it condenses ?
3. What would happen if you placed a warm bottle of milk into a container of cold water ?
4. Suppose a fan is blowing on you, will you feel colder when your skin is dry or wet ?
5. What is another name for the evaporator coil ?

II. Rephrase by using connector 'because', 'if', 'so' and deletion of word or words.

1. You lose heat from your skin. You feel cool.
2. You feel cool. Evaporation takes the heat from your skin.
3. The air is dry. The airconditioner takes the moisture.

4. You suddenly cool the hot gas. It will turn into a liquid.
5. We heard an echo. It was coming from the cliff.
6. You didn't listen carefully. You didn't understand.
7. Glue is a sticky substance. It is used for sticking things together.
8. He didn't like his work. He resigned and took a job with a different company.

Lesson Plan Unit VI

Objectives : Students must be able to recognize:

1. the basic communicative functions of a written text: classification and description stating information.

Behavioral Objectives : Students must be able to

1. identify cross references (anaphoric, cataphoric by drawing arrows or underlining).
2. answer comprehension questions.
3. lable diagrams.
4. rephrase.
5. decides the kinds of communicative acts.

General Purpose : The intergration of the 4 skills but with the predomination of reading.

Content : 'Types of Aircraft' based on 'The Language of the Air Force in English' by Francis A. Cartur.

Language : Lexis, structures and discourse markers will be suggested within context and the communicative acts.

Assumption :

1. Students have already known the content from their Thai subject teachers.
2. Consequently, the teacher will not explain

the purely technical words (e.g. tactical, strategic, mission, altitude, fuselage, airspeed etc.)

Aids : Pictures, gestures, board and chalk

Activities :

Teacher's Activities :
1. Guiding the students to look for word equivalence, reference, connection and the rhetorical acts.
2. Asking questions.
3. Showing aids.
4. Writing on the board.

Students' Activities :
1. Guessing intelligently the functional meaning from the context clues (oral and written).
2. Answering questions, writing on the sheets.

Follow-up Activities : Oral and written exercises.

Notes :

1. The teacher may use Thai in some parts whenever she finds it hard for the students to follow.
2. Exercises may be assigned as homework.
3. Some semi-technical words like radius, defense, descend characteristics, won't be explained. The teacher lets them assume the meaning from the context.

Reading Passage

Types of Aircraft

No single type of aircraft can perform all the tasks that Air Force planes must do. A fighter is designed to fly very fast at high altitudes. It is also able to turn quickly, and climb and descend at high speeds; that is, it is very maneuverable.

Some types of aircraft, especially those used for tactical missions, must be able to fly at both high and low airspeeds. This requirement causes difficult problems for the aircraft designer. For high speeds, it is best to have short wings. However, planes with short wings do not fly well at low airspeeds. Recently, therefore, planes such as the F-111 have been built with wings that can swing back toward the tail while the plane is in flight. This brings the tips of the wings closer to the fuselage and, in effect, shortens the wings. Thus, the F-111 can have long wings for slow flight and shorter wings for higher airspeeds.

No one, however, has invented a plane that can change all its characteristics so it can be used for all purposes. An air force must, therefore, have a wide variety of aircraft.

Reconnaissance Aircraft. The first military use of aircraft was reconnaissance. Before the invention of the flying machine, a commander had to try to get to the top of a hill to observe enemy troops in the distance. Even a very small plane that could not fly very high or very fast provided a greatly improved view of the enemy's position and movements. It provided him with a 'hill' that he could move anywhere he wanted it.

Modern reconnaissance aircraft fly at extremely high altitude and at extremely high speeds. The SR-71A, for example, is a strategic reconnaissance plane that flies higher than 60,000 feet (18,300 meters) at an airspeed three times faster than sound. Its airspeed is more than 2,250 knots! of course, the pilot can see very little at such a speed and altitude, but reconnaissance planes carry extremely fine cameras and other equipment that can gather and record the information for him.

Not all reconnaissance planes fly so high or so fast. Sometimes it is necessary to fly slowly and at low altitudes. A small, slow reconnaissance plane is used for such a mission.

Bombers. Some fighters are also used to carry and drop bombs, but few fighters have sufficient radius for strategic missions. The United States Air Force's primary long-range bomber is the B-52 'Stratofortress'. This is one of the few military aircraft that still has a crew member called a gunner. The gunner fires the weapons that defend the bomber from enemy interceptors.

Originally, bombers carried out their strategic missions by dropping bombs on their targets. Now, however, they sometimes also carry missiles that are fired from the bomber while it is still far away from the target. These missiles then fly at very high speeds to hit a factory or other target while the bomber avoids the defenses around the target.

Teacher	Students
Attention Pointer + Prescutation Teacher sticks a large picture of different types of aircraft on the blackboard.	
- Class, since your're going to be students pilots next year, can you tell me the types of these aircrafts?	- Sure, ma'am.
Teacher points to one aircraft.	
- What type is this one?	- A fighter, F-5E, our newest one in the Air Force.
- O.K., how about this? Teacher points to another one.	- It's T-28 for traning , a very old fashioned in our Air Force too.
- Now tell me what would you like to fly most?	- A fighter. - A helicopter. - etc.
- That's very interesting. Let's see how many types of aircraft you can fly. Look at your sheet please. Read the first paragraph, will you?	S. read selently
- Class, sentence 1, what information	- Not only a type of aircraft

Teacher	Students
does it give you?	can perform all the tasks that airforce planes must do.
- Right, see the word 'that', what does it refer back to?	- All the tasks.
- Yes, all the tasks the air force plane must do. In sentence 3 what does 'it' here refer to?	- A fighter.
- What does marker 'also' indicate?	- It indicates addition.
- Yes, it indicates something more. Can you tell me what a fighter is designed for? Besides this what is more?	- It is for flying very fast and at high altitude. - It is also able to turn quickly and climb and descend at high speed.
- So fighter is designed to ...	- fly fast, at high speed, turn quickly, climb and descend at high speed.
- O.K. that is maneuverable. From what you read can you guess what the word 'maneuverable' means?	- It means 'highly efficient'
- Yes, you know it from the context.	

Teacher	Students
Now, look at 'that is' which is between commas, what does it indicate?	- It indicates explanation.
- Yes, it modifies the words that come before it. What does it modify?	- It modifies fighter.
- Yes, it modifies the fighter that it is maneuverable or highly efficient.	
Please read the second paragraph.	Students read silently.
- Class, from the first sentence - are all aircrafts able to fly at both high and low airspeed?	- No, ma'am.
- How do you know?	- From the word 'some'.
- Yes, the word 'some' indicates that not all the aircrafts are able to fly at both high and low airspeed. Now look at the clause - 'especially those used for tactical missions'. The clause is between commas, so what does it indicate?	- It indicates explanation.
- Yes, it explains the phrase 'some types of aircraft'. What are some types of aircraft?	- Those used for tactical mission.

Teacher	Students
- What does 'those' refer to?	- It refers to some types of aircraft.
- So what does the first sentence mean?	- It means some types of aircraft which are used for tactical missions must be able to fly at both high and low airspeeds.
- Good. Look at sentence 6, what does the words 'this requirement' refer to?	- The ability to fly at both high and low airspeed.
- Yes, the ability to fly at high and low airspeed causes difficult problem to designers.	
- Look at sentence 6 and 7, what does the marker 'however' indicate?	- Contrast.
- What does it contrast to?	- Sentence 6.
- Yes, it is best to have short wings for high speeds but the contrast is ...	- planes with short wings do not fly well at low airspeed.
- Then what is the effect of this contrast?	- Planes such as F-111 have been built with wings that can swing back toward the tail while the plane in

Teacher	Students
	flight.
- How do you know this sentence is the effect?	- from the marker 'therefore'.
- Very good, 'therefore' indicates effect or result. In sentence 9, what does 'this' refer to?	- The wings that can swing back.
- What happens when the wings swing back?	- The wings are shortened.
- Can you guess what 'in effect' means?	- The effect is .
- Here again, you see the word 'thus' in sentence 10. What does this word show you?	- It shows logical summary.
- What is that logical summary?	- The F-111 can have long wings for slow flight and shorter wings for higher airspeeds.
- Class, what rhetoric function does second paragraph give you?	- The description of contrast and effect of long wings and short wings.
- Good, now read the next paragraph please.	Students read silently.
- In sentence 11, we have marker 'however' indicate the contrast to the second	

Teacher	Students
paragraph. What have you read in second paragraph?	- That they design F-111 for both slow flight and higher airspeed.
- But can this plane be used for all purposes?	- No, ma'am.
- In sentence 12, 'therefore' signals reason. What is the reason that air force must have a wide variety of aircraft?	- The reason is that ther is no plane that can be used for all purposes.
- Look at (:) after the word aircraft. This punctuation signals classification. It modifies 'variety of aircraft' by classifying them into different types. What is the classification of the variety of aircraft?	- They are reconnaissance and bombers.
- Look at sentence 17, 'it' here refers to ...	- a small plane
and 'him' refers to ...	- a commander.
From the third paragraph can you infer from the passage what reconnaissance is used for?	- It is used to observe enemy's troops' position and movements.
- What is compared to a hill?	- A small plane.

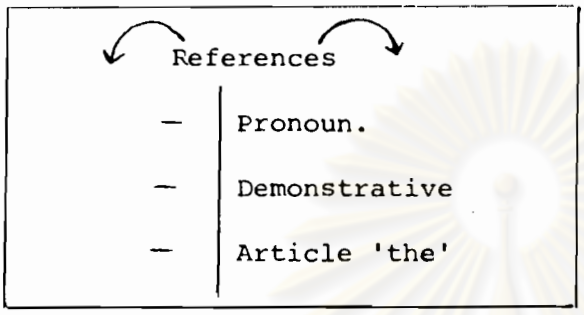
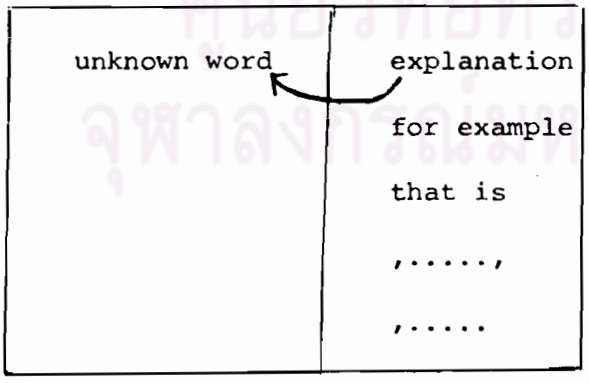
Teacher	Students
- Now read the forth paragraph please.	Students read silently.
- Class, look at sentence 18 the word ' for example ' here shows ...	- explanation.
- Yes, it modifies the sentence that comes before it. What does it modify?	- Modern reconnaissance aircraft.
- So what kind of a plane is SR-71 A?	- It is a modern reconnaissance aircraft.
- What characteristics do reconnaissance planes have to have?	- They can fly at extremely high altitude and at extremely high speed.
- That's right, and how about 'its' in sentence 19 refers to ...	- the airspeed of SR-71 A.
- Do you think the pilot can see anything at such speed and altitude?	- No, he can't.
- What does 'but' in this sentence indicate?	- Contrast.
- Yes, contrast or it is followed by the unexpected information. What is that unexpected information.	- The reconnaissance planes carry fine camera and other equipment that can gather and record information for him.

Teacher	Students
- No, the pilot can't see anything but the camera and equipment gather information for him. What does 'him' here refer back to?	- A pilot.
- Do all reconnaissance planes fly so high and so fast?	- No, not all of them.
- O.K. now read the next paragraph please.	Students read silently.
- What is the second type of aircraft? In sentence 24 notice the word 'some' and 'few'. Can all fighters be used to drop bombs?	Bombers. - No, only some or few of them.
- In sentence 26, 'this' refers back to..	- B-52 'Stratofortress'.
- Yes, and do all the military aircraft has crew member called gunner?	- No, there are only few of them.
- Yes, and B-52 is one among the few. How can you rephrase 'crew member called gunner'?	- Crew member who is called gunner then we delete 'who is '.
- That's right. What does 'originally' in sentence 28 indicate?	- The first or beginning.
- And in sentence 29 'however' shows ...	- an unexpected information which contrasts the one that comes before.

Teacher	Students
- What is that comes before?	- Dropping bombs on targets.
- What is the unexpected information?	- Also carry missiles.
- So you know that at the beginning bombers' mission is only to	- drop bombs.
But nowadays, what else can they do?	- Carry missiles.
- So how many things can modern bombers do?	- They can do 2 things.
- What are these 2 things?	- Dropping bombs and carrying missiles.
- Again in sentence 29, 'it' refers to...	- bomber
'These missiles' refers to ...	- the missiles that are carried by the bomber.
- Good, now you know two types of aircraft now. But can you guess what we name the type of the aircraft from?	- From its missions.
- That's right. A bomber is for ...	- dropping bomb.
And a reconnaissance is for ...	- observing enemy's position and movements.
- Very good. Now let's have some review on what we have learnt.	

Teacher	Students
Generalization.	
Suchinda, can you come out and write down the pattern of classification on the blackboard.	- Suchinda comes out and writes.
	There are + number + type of + thing to classify.
- Can you give us an example of this pattern?	- There are two types of aircraft.
- Is that right class?	- Yes, ma'am.
- Now for the connectors or discourse markers that we've seen in this passage.	
Sunit, what markers that indicate contrast?	- 'But' and 'however'.
- Good, Surachai, what does 'also' indicate?	- It indicates addition.
- Right, which connector shows you the effect or the result, Pichit?	- Therefore.
- And the last one, 'thus', what does this connectors indicate, Pichai?	- Summary.
- Yes, it shows you logical summative. Teacher sticks a chart on the black-board.	

Teacher	Students
- Class, will you please copy them down?	Students copy from the chart.
Connectors tell you something. but ⟶ contrast however ⟶ contrast therefore ⟶ effect, result thus ⟶ logical summative.	
- Class, if you want to refer back to what you've said what words can you use?	- Students answer in chorus. this that those it he, they, them the
- Precisely, we can use, article and what else ?	- Pronoun.
- Only pronoun? How about it and this?	- Demonstrative.
- Good, just like this.	

Teacher	Students
Teacher sticks a chart on the black-board  	
- How about the way to explain some words — What can you use for explaining?	- For example
— What else?	— That is
— How about punctuation?	— Commas
- Very good. I'm sure you know all what you should know. Anyway, please copy this down. Teacher sticks a chart on the board  	Students copy from the board.
Then class, please read the whole passage again.	

EXERCISES

A. Fill in the spaces in these sentences with the correct terms.

1. A plane that carries cargo is a .....
2. The plane that must be albe to climb faster than all other is the .....
3. Jet aircraft can fly faster than .....
4. Large bombers are used for ..... bombing missions.
5. An F-5 carrying bombs is probably flying on a ..... mission.
6. Students who are learning to be pilots fly in .....
7. A bomber can extend its range by refueling from a .....
8. A French fighter, the "Mirage 5", has an ..... of 1520 knots.
9. All modern fighters can fly faster than sound and are .....
10. A plane sent to take pictures or make measurement of the weather is on a ..... mission.

B. For each word or phrase in the left column, find the word or phrase on the right that goes with it. Write the number in the blank space.

..... attacks bombers	1. tanker
..... refueling	2. fighter
..... drops explosives	3. bombers
..... takes off straight up	4. propeller
..... pulls the aircraft	5. jet

.....	pushes the aircraft	6.	trainer
.....	cooperation	7.	transport
.....	cargo	8.	reconnaissance
.....	pictures	9.	helicopter
.....	learning	10.	tactical
.....	local battle	11.	strategic
.....	distance	12.	range
.....	500 knots	13.	airspeed
.....	long-range bombing	14.	liaison

Lesson Plan Unit VII

Subject : Reading Comprehension.

Class : 5^{th} year air cadets.

No. of Students : 32

Average Age : 23

Time : 50 minutes.

Objectives : Students must be able to recognize :

1. the basic communicative functions of a written text : classification and definition.
2. the organization of information in a technical text with its features of cohesion and coherence.

Behavioral Objectives : Students must be able to

1. identify cross references (anaphoric, cataphoric by drawing arrows).
2. answer the referential comprehension questions.
3. label diagram.
4. rephrase.
5. decide the kinds of communicative acts.
6. change non-verbal to verbal information and vice versa.

General Purpose : The intergration of the 4 skills but with the predomenation of reading.

Content : 'Types of Aircraft' based on The Language of The Air Force in English by Francis A.Catier.

Language : Lexis, structures and discourse markers will be suggested within content and the communicative acts.

Assumption : 1. Students have already known the content from their Thai subject teachers.

2. Consequently, the teacher will not explain the purely technical words.
(e.g. repleacement, ammunition, airspeed loadmaster, flight engineer etc.)

Aids : Pictures, models, gestures, board and chalk.

Activities :

Teacher's Activities :

1. Guiding the students to look for word equivalence, reference, connection and the rhetorical acts.
2. Asking questions.
3. Showing aids.
4. Writing on the board.

Students' Activities :

1. Guessing intelligently the functional meaning from the context clues (Oral and written).
2. Answering questions, writing on the sheets.

Follow-up Activities : Oral and written exercises.

Notes :

1. The teacher may use Thai in some parts whenever she finds it hard for the students to follow.
2. Exercises may be assigned as home work.
3. Some semi-technical words like supervise, provide, gallery won't be explained. The teacher lets them assume the meaning from the context.

Reading Passage

Types of Aircraft (Cont.)

Transport. If you want to move large amounts of supplies or equipment or a lot of men, you need a transport. When a country is at war, it must provide its flighting men with food, ammunition, replacements for weapons and equipment that are lost or damaged, medical supplies, and many other things. To do this, you need serveral kinds of transport.

Some are designed to carry large cargoes for long distances, an example of this type of transport is the 'C-5' 'Galaxy'. The C-5 has four engines that give it an airspeed of about 450 knots. It can carry more than 100,000 pounds (over 50,000 kilograms) of cargo 6,500 miles (10,500 kilometres) without air refueling. Its ceiling (the highest altitude at which it can fly) is about 34,000 feet (10,360 metres) which allows it to fly above most of the weather.

The C-5 has an aircrew of five men : the pilot, the copilot, the navigator, the flight engineer and the loadmaster. The flight engineer, whose position is on the flight deck, is responsible for the operation of the engines, the fuel system, and many other mechanical and electrical systems on the aircraft. The load master is responsible for the way the cargo is loaded, fastened in place, and unloaded. He is also responsible for the passengers if there are any.

The C-5 is an unusually large transport. It is very valuable for carrying heavy loads over oceans or continents, but it is too big for some missions. If the load to be carried is not too large, it can be carried in the C-141 which also has intercontinental range. To carry

smaller cargoes and land in smaller places, a transport like C-130 'Hercules' is more useful.

The C-130, a propeller plane that is used by several different air forces, including those of the United Kingdom, Canada and Brazil, has an aircrew of four : pilot, copilot, navigator, and system manages. The job of the system manager is similar to that of a flight engineer. Sometimes the C-130 also has a load or jumpmaster to supervise paratroops. Paratroops are soldiers who jump from the plane with parachutes.

Many transport, such as the C-5 and the C-141, provide sleeping quaters for an extra crew on long flight. One crew sleeps white the other crew flies the plane. A transport may also have a gallery, where meals can be prepared for the aircrew and the passengers.

A very special type of Transport is the KC-135 'Stratotanker' which carries a large amount of jet fuel and acts as a service station in the sky. It has a crew member whose specialty is connecting the tanker with the fuel tank of another plane.

Teacher	Students
Attention Pointer and Presentation	
- Class, last time we talked about types of aircraft. How many kinds of them did we already talk about.	- There are two types.
- What are they ?	- They are reconnaissance and bomber.
- Good, can you tell me again when you say there are 2 types of aircraft what kind of rhetoric function you indicate ?	- Classification.
Now, we'll talk more about the classification of aircraft. Please read the first paragraph silently.	$S. read silently.
- Class, what does 'if' in the first sentence indicate ?	- Condition.
- What is the condition here ?	- 'If you want to move large amount of supplies or equipment, or a lot of men.
- What is the effect of this condition ?	- You need a transportation.
- Underline 'or' please. This word is used here to indicate choices.	
In sentence 3, what do the word 'it' and 'its' refer to ?	- They refer to a country.

Teacher	Students
- In sentence 3, what does the word 'this' refer to ?	.... It must provide ....
- Good. From the first paragraph, the main idea is .... And this paragraph is also an introduction.	- You need several kinds of transports in moving men and equipment.
- Class, read the next paragraph please.	SS. read silently.
- Look at sentence 4, underline 'some' please.	SS. underline the word.
- This word indicates small number not all of them. So are all transport designed to carry large cargoes for long distances ?	No, ma'am.
- What is the expression 'an example of' in this sentence showing ?	- To some aircraft that are designed to carry large cargoes for long distances.
- It modifies 'type'. But what does 'which' refer to ?	- Its ceiling
- And how about 'it' after the verb 'allows' ?	- It refers to C-5.
- What information do you get from this paragraph ?	- That C-5 is a large transport that can carry large cargoes for long distances.
- What else does the passage tell you ?	- The capacity of C-5 in flying.

Teacher	Students
Now read the third paragraph.	SS. read silently.
- Look at colons (:) in sentence 8. This punctuation indicates explanation. Can you guess what this word explain ?	- It explains that the five aircrew are a pilot, copilot , a navigator, a flight engineer and a loadmaster.
- In sentence 9, again you see a clause in between two commas (,..,) what does it show ?	- It shows that this claus explain the word that comes before it.
- What word is it ?	- The flight engineer.
- And what does 'whose' relate to ?	- The flight engineer.
- In sentence 11, what does 'he' here refer to ?	- The loadmaster.
- And what do the word 'and' and 'also' indicate ?	- Addition, something more.
- So how many things is the load master responsible for ?	- 4 things.
- Class, what does this paragraph tell you ?	- The classification of the aircrew of C-5
Very good. Read the next paragraph please.	SS. read silently.
- Can you tell me what does 'it' in sentence 13 refer to ?	- To C-5.
- Underline 'but' please.	SS. underline the word.
What does this connector indicate ?	- Contrast.

Teacher	Students
- What is that contrast ?	- C-5 can carry large load for long distance but it can't be used in some missions.
- And 'if' in sentence 14 shows ...	- condition.
- What is that condition ?	- If the load to be carried is not too large.
- What's the effect ?	- It can be carried in C-141.
- What does 'it' here refer to ?	- The load.
- That's right. Now tell me what does 'also' in this sentence tell you ?	- addition.
- That means	- Besides C-5, C-141 has also inter-continental range.
- Up until now, you know there are two types of transport that can fly over oceans, what are they ?	- C-5 and C-141.
You are very good at reading now. Please read the two last paragraph please.	S S. read silently.
- In sentence 16, the word 'those' here refers to	.... air force.
- So from this sentence we know that. - - - -	... besides different air forces of different countries, The air forces of United Kingdom. of

Teacher	Students
	Canada and of Brazil also use this C-130.
- Very good. Now, you see that this sentence is very long. Can you guess what is the subject of this sentence ?	- The C-130.
- And verb ?	- has an aircrew.
So you see, the clause between 'C-130' and 'has' is also between two commas (,...,).	
This means that this clause ...	- explains the word C-130.
- Right. Again you see colons (:) after the word 'four'. What does it indicate ?	- Classification.
- Of what ?	- crew member
Yes, it classifies the crew members.	
- In sentence 17. underline the word 'that'.	S S. underline the word.
- What does 'that' refer to ?	- The job.
- Also underline the words 'similar to' what does it indicate ?	- Similarity.
- From this sentence you know that..	- The job of the system manager is the same as the job of the flight

Teacher	Students
	engineer.
- In sentence 19, what kind of rhetoric acts is this sentence ? Yes, this sentence give you a definition of paratroops.	- a definition
- What information do you get from this paragraph ?	- The information about C-130.
- Underline the word 'such as' in sentence 20.	S S. underline the word.
- What does this marker indicate ?	- Explanation by giving example.
- Yes, here it modifies 'many transport' by giving the examples of...	- C-5 and C-141
- The word 'extra' here shows addition.	
- So how many crew a C-5 and a C-141 may have ?	- 6 crew.
In sentence 24 which is the last sentence of the passage, underline the words 'it' and'whose'	- S. underline the words.
- 'It' refers to ...	- KC-135.
- And whose relates to ... Very good. Now let's look at the whole passage again.	- a crew member.

Teacher	Students
- What kind of information does this passage give you ?	- A classification of transports.
- What is the main idea of this passage.	- There are several kinds of transports for several kinds of missions.
- Good. How many types of transport are there, according to this passage ?	- 4 types
- What are they ?	- C-5, C-141, C-130 and KC-135
- Besides chassification, what does this passage also tell you ? Very good. Any way write these patterns down so you can remember them better.	- The description giving information of the capacity of each type.
Generalization	
- Class, you have studied many passages and have seen a few types of sentences indicating rhetoric functions. Can you tell me some ?	- Yes, ma'am.
- What is a classification type ? Sujinda, come out and write it on the blackboard.	Sujinda comes at the blackboard and writes.

Teacher	Students
	There are + {different / several / many} + kinds of + thing to classify.
- Is that right, class ?	- Yes, ma'am.
- Veera, can you give me an example of it ?	Veera 'there are serveral kinds of aircraft'.
- Is that correct, class ?	- Yes, it is.
- Then, copy it down in your books.	SS. copy the pattern.
- Class, is there any definition type in this passage ?	- Yes, there is.
- Mana, come and write the pattern for your friends, will you ?	Mana comes out and writes.
	(NP) Thing to define {is / are} + class word.
- Class, is that correct ?	- Yes, ma'am.
- Can you give me an example ?	- Paratroops are soldiers who jump from the plane.
Good, now let's have a quick review on connectors.	
- What do 'if' and 'when' show you ?	- Conditional cause - effect.
What does 'similar to' tell you ?	- A similarity.
- What do 'also' and 'and' indicate?	- An addition or something more than what has said.

Teacher	Students
- Very good. Anyway, copy this down so you won't forget it. T. sticks charts on the black-board.	$S. copy from the chart.
when - conditional cause - effect. if - conditional cause - effect. and - addition also - addition similart to - similarity	
- How about references, what kind of speech can you use as references?	- Pronoun, demonstrative like that or those which are used as pronoun.
- Good, then copy them again. T. sticks another charts on the board.	$ S. copy from the chart.
References pronoun that those	
- You can do exercise now.	

Exercises

Reading Comprehension.

I. Write your answer to the following questions.

1. What is the missions of the transports.
2. What are C-5 and C-141.
3. What is the job of the flight engineer ?
4. What is the job of the loadmaster.
5. If C-130 is running out of fuel, whom she can ask for refuelling ?

II. Aircraft designators such as T-41 A are spoken as 'T forty-one A' not as 'T four one A' C-130 is spoken as 'C one thirty', not 'C one hundred and thirty'. How are the following numbers spoken in the Air Force ?

C-141	F-111	T-37 B
C-133	SR-71 A	T-38
KC-135	B-52	F-14

III. When an aircraft designator is between 101 and 109, it is not spoken as 'One hendred and one', but as 'One oh one' or 'One oh nine'. How do you say the following ?

F-105	F-102	F-106

Lesson Plan Unit VIII

Subject : Reading Comprehension

Class : 5th year air cadets

No. of students : 32

Average Age : 23

Time : 50 minutes

Objectives : Students must be able to recognize :

1. the basic communicative functions of a written text : definition and classification.
2. the organization of information in a text with its features of cohesion and coherence.

Behavioral objectives : Students must be able to

1. identify cross references (anaphoric, cataphoric by drawing arrows).
2. answer the referential questions
3. label diagram
4. rephrase
5. decide the kinds of communicative acts.
6. change non-verbal to verbal information and vice versa.

General Purpose : The intergration of the 4 skills but with the predomination of reading.

Content : 'Ground Service' based on 'The Language of the Air Force by Francis A. Cartier

Language : Lexis, structures and discourse markers will be suggested within context and the communicative acts.

Assumption : Student already know the technical word, consequently the teacher won't teach them since it is not the duty of the language teacher.

Aids : pictures, gestures, blackboard.

Activities :

Teacher's Activities :

1. Guiding the students to look for word equivalence, references, connection and the rhetoric acts.
2. Asking questions.
3. Showing aids.
4. Writing on the board.

Student's Activities :

1. Guessing intelligently the functional meaning from the context clues. (Oral and written)
2. Answering questions (Oral or writing)

Follow up Activities : Oral and written exercises.

Reading Passage.

'Ground Service'

In the earlier days of aviation, a single mechanic could learn to do all the maintenance required on a plane. Aircraft were simpler then, so a man who understand engines and was a good electrician, carpenter, and metalworker could do all the necessary jobs.

Modern jet aircraft are much more complicated. Even if one man could learn all the specialties, he could not possibly find the time to do all the jobs. Therefore, a great many specialists are required to keep the aircraft flying safely. The lives of the aircrew depend on the specialists' work, and so does the defense of the nation.

You will find these men on the flight line, in the hangars, and in the repair shops, working under the direction and advice of the crew chief. They have many titles.

The jet engine mechanic must know how to remove a jet engine from an aircraft and take it apart. He checks its parts for wears and cracks, and if he finds them, he must remove the damaged or faulty parts and replace them. Then he must be able to put the engine back together again and replace it in the plane, with all the proper connections of wire, fuel and oil tubes and so on.

Another specialist, the airframe mechanic, is responsible for the maintenance of the fuselage, the wing, the tail, and the landing gear, all of which from the airframe. When necessary, he or she repairs the ailerons, rudder, and elevators too.

There are several kinds of avionic specialists. The avionics instrument systems specialist is responsible for the accuracy of the pilot's instrument systems panel and those instruments used by the navigators. All of these instrument must work perfectly, since it is vital that the aircrew know their altitude, airspeed, direction, and the condition of the air in which they fly.

The avionics specialist maintain special navigation equipment, and repair computors. The electronic warfare system specialist has a particularly interesting job. To understand it, you must remember what radar is. Radar equipment uses radio waves to 'see' aircraft that are many miles away or are hidden in clouds. Modern bombers and fighters have avionics equipment that can 'feel' the enemy's radar waves and, in addition, send out other waves to confuse, or blind, the enemy's radar. This is called electronic warfare, and the specialist who is responsible for the maintenance of this kind of equipment is the electronic warfare systems specialists.

Teacher	Students
Attention Pointer and Presentation. Teacher shows a picture of old-fashioned aircraft to the students.	
- Class, look at the picture, can you tell me something about it?	- It's a picture of an airplane.
- A modern one?	- No, the old one.
- Is it a jet?	- No ma'am, we didn't have jet at that time.
- From what you see in the picture, do you think it is very easy to operate or maintain it?	- Yes, it is very simple.
- Which do you think is simpler, a modern jet or an old-fashioned one?	- The old-fashioned one.
- According to your opinion, which type needs more ground crew to service it?	- The modern one.
Well, we'll see from the passage. Today, we'll talk about the ground service of the plane. Will you please look at your sheets and the first two paragraphs silently? /read	Students read silently

Teacher	Students
- Now, look at the first sentence, can you guess, from the context, what single means? That means the plane in the earlier days need only ...	- One
	- One ground crew to look after it.
- Then, underline the word 'then' in sentence 2.	Students underline the word.
- From the context, do you think 'then' here is a marker? Right, 'then' here doesn't show any sequence of events. It has different meaning. It is a pronoun. What does it refer to?	- No, ma'am we don't think so.
	- In the earlier days of aviation.
- Very good. Next, underline 'so' please.	Students underline the word.
- Is it a pronoun too?	- No ma'am.
- Well, it is a marker. What does it indicate?	- Reason.
- It shows reason and the result. What is the reason?	- Aircraft were simpler then.
- And what is the effect?	- Only one man was needed.

Teacher	Students
- What qualifications did that man have to have?	- He understood engines, was good electrician,a carpenter and a metalworker.
- In sentence 4, 'he' refers back to ...	- One man.
- So please draw an arrow from 'he' to 'one man'	Students draw arrows.
- Here again in sentence 5, 'therefore' shows...	- Reason and the effect.
Then what is sentence 5?	- The effect of the reason.
So the effect is ...	- a great many specialists are required.
- What do the words 'these men' in sentence 7 refer to?	- Many specicalists.
- Draw an arrow from 'these men' to 'many specialists' please.	Students draw arrows.
What about the word 'they'?	
What does it refer back to?	- These men.
- Class, what is the main idea of the paragraphs you've read?	- One man can't do all important jobs on modern jet.
- What kind is the paragraph?	- An introduction
- Does the introduction have to be in one long paragraph?	- No, ma'am, it can be separated into shorter paragraphs.

Teacher	Students
- Good, now read the next paragraph please.	Students read silently.
In sentence 10, what does 'he' refer to"	- A jet engine mechanic.
- There are two 'thems' in this sentence.	
- What does the first 'them' refer to?	- Wears and cracks.
- How about the second one?	- Damaged and faulty parts.
- In the next sentence, if he removes the parts out, what will he do next?	- He will put the engine back.
- How do you know?	- From the word 'then'
- Yes, 'then' indicates...	- Sequence of events.
- What information do you get from this paragraph?	- The first specialist of ground crew is the jet engine mechanic and the description of his job.
- Please go on to the next paragraph.	Students read silently.
- What kind of information do you get from this passage?	- The second type of specialist.
- What is he?	- The airframe mechanic.
- What is his job?	- He is responsible for the maintenance of the fuselage,

Teacher	Students
	the wings, the tails and the landing gear, and the proper connections of wire, fuel and oil tube.
- Go on the the next paragraph, then. What kind of communicative function is in sentence 14? Yes, Copy this down please Teacher writes on the blackboard There are + {several / number} kind of N.P.	- Classification. Students copy.
- Look at 'since' in sentence 16. It is a marker. What does it indicate?	- Reason.
- Why the instrument must work perfectly?	- Because it is vital that the aircrew know their altitude, airspeed, directions and the the condition of the plane in which they fly.
- What does 'they' refer to?	- The aircrew.
- Can you guess from the context the meaning of 'vital'?	- Yes, it means very important.

Teacher	Students
- What information do you get from this paragraph?	- That there are many avionic specialists. And the first one is an avionics instrument systems.
- What is his duty?	- His duty is being responsible for the accuracy of the instruments on the pilot's panel and the instruments used by a navigator.
- Very good. Then read the next paragraph.	Students read silently.
- Please underline the words 'if, it and one'.	Students underline the words.
- 'If' is a marker. What does it show?	- Conditional cause - effect.
- What is the condition?	- The problem is serious.
- What is the effect?	- He takes the entire radio out.
- 'He' refers to ...	- the communications specialist.
- What do 'it' and 'one' refer to?	- The radio.
- So draw an arrow from these two words to radio.	Students draw arrows.
What information do you get from the paragraph?	- That the avionics communications is another specialist ground crew.

Teacher	Students
– What is his job?	- His job involves the maintenance of the plane's radio.
- Now we come to the last paragraph, read it please.	Students read silently.
- How many things can the avionics specialist do?	- Two things
What are they?	- Maintaining special navigation equipment and repairing computors.
- Underline 'in addition' in sentence 25. What does this marker show?	- What is more, or addition.
- So what is more than it can feel the enemy's radar waves?	- It can send other waves to confuse or blind the enemy's radar.
- What is the sentence 'this is called electronic warfare'? What kind of rhetoric function is it?	- A definition.
What is called electronic warfare?	- The avionics equipment that can feel the enemy's radar and send out other waves to confuse or blind the enemy's radar.

Teacher	Students
- Who is responsible for this kind of equipment?	- The electronic warfare system specialist.
- Right you're very good at reading now.	
Generalization	
Please let's have a look at the whole passage together.	
- What is the communicative function of this passage?	- A classification.
- What does it classify?	- The ground crew specialists.
- How many kinds are there the specialists?	- There are five kinds of these specialists.
- What are they?	- The jet engine mechanic, the airframe mechanic, the avionics instrument system specialist, the avionics communications specialist and the electronics warfare system specialist.
- How does the passage give you these classification? By giving pattern sentence like 'there are five kinds of specialists?'	- No, ma'am.

Teacher	Students
- Then how do you know?	- The passage implies by using the sentence 'They have many titles in sentences.
- Very good. Now let's review on something which we have talked about. Teacher asks one student to come out at the blackboard. 'Write on the blackboard the pattern of the classification, will you?	Student writes. There are + {several / five} + kinds of NP.
- Class can you give the example of this pattern?	- There are five kinds of specialists.
- Good. Teacher asks the student to go back to his seat. And points another one to come out.	
- Please write down the pattern of definition.	Student writes the pattern. NP. + is called + thing to define.
- Class give an example please.	The avionics equipment that can feel the enemy's radar and send out waves to confuse them + is called + electronic warfare.

Teacher	Students
- Class, copy down the patterns your friends wrote on the blackboard.	- Students copy down the patterns.
- Class, can you tell me something about connectors?	- Yes, ma'am.
So, and therefore indicate...	reason and effect.
Then indicates ...	sequence of events.
And indicates ...	addition.
If indicates ...	conditional cause - effect.
In addition indicates ...	addition.
That's very good. Now if you want to refer back to what is said before. What can you use?	- Pronoun, demonstrative.
- Only these?	- Sometimes, you can use punctuation like commas, colons
Teacher sticks chart on the blackboard.	
- Like this?	- Yes ma'am.

Teacher	Students
References - Pronoun - Demonstrative - : - , - ,...., - Then do this exercise for me.	

EXERCISE

Reading Comprehension.

A. Answer these questions.

1. Who is responsible for the aircraft when it is not flying?
2. Who repairs damage to the fuselage?
3. Who fills the fuel tanks of an aircraft? What else does he do?
4. Which member of the ground crew do you think has the most complicated job?
5. What is an electronic warfare?

B. Fill in the blanks in these sentences with the correct terms.

1. Electronic equipment carried on an aircraft is called ..... equipment.
2. The man who is responsible for an aircraft on the ground is .....
3. When a jet engine is not operating properly, the man who fixes it is the .....
4. If there is a dent in the wing of a plane, it will repaired by .....
5. The specialist who is responsible for maintenance of the system that automatically controls the flight of the aircraft is .....

C. For each phrase in the left-hand column, find the word or phrase on the right that goes with it. Write the number in the blank space.

_____ inspects engine of a fighter	1. avionics
_____ radio and radar	2. maintenance
_____ leader of the ground crew	3. jet engine mechanic
_____ several maintenance specialists	4. crew chief
_____ inspection and repair	5. airframe mechanic
_____ a 'garage' for aircraft	6. ground crew
_____ repairs the fuselage	7. hangar

ผนวก ค

แบบทดสอบสัมฤทธิผลทางการอ่าน

โทษของการทุจริตในการสอบ

"สอบได้ปรับเป็นตก สอบตกปลดจาก นนอ."

โรงเรียนนายเรืออากาศ

ปัญหาสอบระหว่างปี วิชา มศ ๕๕๐ นนอ.ชั้นปีที่ ๕

พุธที่ ๓๐ มี.ค. ๒๖ ๑๓๓๐ - ๑๕๐๐

Directions :

Read the following passages and then choose a, b, c or d which best answer the questions based on the information in the given passages.

Passage I

The sun is our greatest source of light. We get only a small amount of light from the sun and only a minimum from the stars. The sun radiates or sends out light in all directions. The earth receives this radiation from the sun. Actually the earth receives only a small amount of the radiated light which the sun emits.

Light travels at 186, 270 miles per second. It is 93,000 miles from the earth to the sun. Now, if you or your instructor will divide the speed of light into the distance to the sun, you will find that light will travel to you in 8.3 minutes. This distance and this speed is hard to imagine. In more meaningful terms, you can imagine an object traveling around the world in about $1/7^{th}$ of a second.

When we strike a match or light a cigarette lighter, the light produced glows. Thus a radiate or glowing form of energy is released. Light made by man is said to be artificial light. And, of course, light produced by

nature is called natural light. The sun is the great source of the earth's natural light. However, both natural light and artificial light come directly or indirectly from the sun. The match and the cigarette lighter fluid simply contain energy which was derived from the sun.

Light from the sun and the stars is called natural light. We also have artificial or man - made light. Artificial light can be produced either chemically or electrically. We produce chemical light by striking a match, lighting a candle, or by burning any substance. We refer to light produced electricity as electric light. Electric light may be produced in electric lamps (light bulbs). Familiar examples are : bulbs in flaslights, automobile lights, and lights in our homes and offices. The familiar light bulb used to light our homes contains tungsten wire. As electricity flows through the tungsten wire or filament, heat is produced. A hot filament may be red in color. A hotter filament would be yellow; and the hottest filament will produce white light.

For hundreds of years people didn't know what caused the familiar rainbow. Now, we know the colors of the rainbow result from refraction of sunlight. Different colors result from the bending and scattering of light by raindrops.

Late in the 17th century, Sir Issac Newton showed the white light is made up of all the colors of sunlight. In his experiment, sunlight came through a small hole in the wall of a darkened room. As the light passed through a glass prism it spread out and appeared on a white screen as a band of colors in the order : red, orange, yellow, green, blue, indigo and violet.

A memory aid to help remember colors is Roy G. Biv. This sounds like

an American name. Each letter of this name represents a color : red, orange, yellow, green, blue, indigo, violet.

---

1. According to the first paragraph, the source of light the earth gets is
   a. the sun
   b. the stars
   c. the sun and the stars
   d. the moon
2. The word 'radiate' (line 2) can be replaced by
   a. transmit
   b. emit
   c. send to
   d. shine
3. 'This distance and this speed .....' line (line 9) refers to
   a. the light travels to the earth in 8.3 minutes.
   b. the light travels in 186,270 miles per second.
   c. the distance from the earth to the sun is 93,000,000 miles.
   d. b and c are correct.
4. The speed at the light travels to the earth can be compared to
   a. an object travels around the world in 8.3 minutes.
   b. an object travels from the sun to the earth in about $1/7^{th}$. of a second.
   c. the earth moves around the sun at 186,270 miles a minutes.
   d. an object travelling around the world in about $1/7^{th}$ of a second.
5. When the match is striked, ... is produced.
   a. light
   b. glows
   c. energy
   d. speed

6. Which of the followings is <u>not</u> natural light.

a. sunrays
b. starlight
c. moonlight
d. torchlight

7. Both torchlight and starlight comes from the ..... .

a. sun
b. stars
c. universe
d. man-made light

8. The word 'radiate' in paragraph 3 refers to ..... .

a. sunlight
b. glowing form of energy
c. electrical light
d. chemical light

9. According to the third paragraph, the cigarette lighter fluid contains energy which is ..... .

a. chemically produced
b. man - made
c. derived from the sun
d. electrically produced

10. The artificial light can be produced ..... .

a. directly from the sun
b. chemically
c. electrically
d. b and c are correct

11. When we light a cigarette lighter, we produce ..... .

a. electrical light
b. natural light
c. chemical light
d. cigarette light

12. Which one is <u>not</u> an electrical light.

a. flashlight
b. table lamp
c. lighter
d. lantern

13. The bulb used to light our house ..... .

a. contains filament
b. has nothing to do with filament
c. is composed of tungsten wire
d. produced hot filament

14. The red color in the bulb shows that ..... .

a. the filament is lighted
b. electricity is produced
c. the tungsten wire is hot
d. heat is released

15. The discovery of what the rainbow is took place in ..... .

a. late 16^{th} century
b. early 17^{th} century
c. late 17^{th} century
d. early 16^{th} century

16. In conducting his experiment, Newton found out that ..... .

a. sunlight is white
b. sunlight is composed of seven colors
c. sunlight can bend
d. sunlight is made up of rainbow

17. According to the passage. The rainbow ..... .

a. results from refraction of sunlight.
b. results from scattering rain.
c. always appears after rains.
d. was discovered by Newton in early 17^{th} century.

18. The seven colors of sunlight in order are ..... .

a. red, yellow, blue, green, orange, indigo and violet
b. red, orange, yellow, blue, green, indigo and violet
c. blue, red, yellow, green, orange, indigo and violet
d. red, orange, yellow, green, blue, indigo and violet

19. Roy G.Biv. is ..... .

a. an American name
b. a scientist who conducts experiments on sunlight
c. letters represent names of the colors
d. the author of this passage

20. The best tille for this passage is ..... .

a. Natural and Artificial Light

b. Sunlight and Artificial Light

c. Chemical and Electrical Light

d. Sunrays

Passage II

People have known about magnets for many centuries. Up to the 16th century, the attracting property of magnets was considered more magical than scientific. Many legends were told about the magic of magnets. One famous story from Greece is about a magnetic mountain that would pull all the nails out of a ship. Any ship that passed near the mountain would fall apart.

In the 16th century, a man discovered another property of magnets. He found out that each magnet has a north and south pole. Futhermore, he found out that like or similar poles repel each other and unlike poles attract each other.

It was also discovered that the earth acts as a huge magnet. A bar magnet reacts to the earth as it does to any other magnet. A compass contains a magnet that rotates freely. The needle of the compass always points north and, therefore, provides a reference, This is a great help to navigator.

A substance with an electrical charge has some properties of magnet. When you comb your hair, you sometimes notice that the comb attracts small bits of paper or other light material. This is because your comb is made

of hard rubber, and it acquires an electrical charge when you comb your hair. A glass rod will also acquire an electrical charge when you rub it on silk. Your comb has a negative charge and the glass rod has a positive charge. Like charges repel each other : unlike charges attract each other. An explanation can be made in regard to the action of the electrically charged comb and glass rod. Normally, the comb and glass rod contain a certain amount of electrons. When you comb your hair, the comb acquires extra electrons. Any object with an exess of electrons has a negative charge. The glass rod losses some of its electrons when rubbed on silk. Any object that has less than its normal amount of electrons has a positive charge.

When a negatively charged comb touches a positively charged glass rod, some of the exess electrons from the comb go to the glass rod. If they do not touch each other, the transfer is usually impossible unless a conductor is used. Silver, copper and most metals are good conductors. A good conductor is any substance that allow the electrons to move freely through it. You can compare a conductor to a water pipe which allows water to go from one tank to another. An electric wire serves the same purpose.

So far you have reading about static electricity. The rubber comb and glass rod had static electricity. It is not useful to man because it is not controlled. Static electricity causes such minor things as paper to 'stick' to your comb. It also causes lightning which kills many people each year.

21. The attracting property of magnets (line 2) refers to the alility to ..... .

a. push apart
b. take part
c. draw
d. attack

22. Up to the 16th century, the property of magnets was considered ..... .

a. bionical
b. scientific
c. magical
d. ironical

23. According to the Greek story, any ship that passed near the magnetic mountain would ..... .

a. explode
b. sink abruptly
c. be destroyed
d. fall apart into pieces

24. In the 16th century as man discovered that ..... .

a. each magnet has a north and south pole
b. like poles attracts each other and unlike ones repel each other
c. unlike poles attracks each other and similar ones repel each other
d. a and c are correct

25. North pole will draw ..... .

a. any pole
b. south pole
c. north pole
d. none of those mentioned

26. The poles that repel each other are ..... .

a. north and similar
b. south and dissimilar
c. north and south
d. north and dissimilar

27. Two bar magnets repel each other because they have ..... .

a. similar poles
b. dissimilar poles
c. dislike poles
d. north pole and south pole

28. Paragraph 2 and paragraph 3 tell you about ..... .

a. the property of magnets which is considered scientific
b. the property of magnets which is magic
c. the property of manets which is bionics
d. none is correct

29. 'it' (line 10) refers to ..... .

a. a bar magnet
b. an earth
c. a compass
d. a needle

30. A magnet reacts to the earth because the earth ..... .

a. has a north pole
b. has a south pole
c. acts as any magnet
d. is very big

31. It implies in paragraph 3 that the needle of a compass is a ..... .

a. south pole
b. north pole
c. south and a north pole in one
d. magnet

32. The word 'rotate' (line 12) can be replaced by ..... .

a. move freely
b. turn around
c. move around
d. turn on an axis

33. When you comb your hair with a rubber comb, the comb will ..... .

a. gain an electrical charge
b. reduce electrical charge
c. become an electrical charge
d. decrease an electrical charge

34. Two electrically charged combs ..... .

a. draw together
b. repel each other
c. attract each other
d. pull each other

35. Any objects with an exess of electrons are ..... .

a. negatively charged
b. positively charged
c. electrically charged
d. magnetic charged

36. The transfer of electrons from the comb to the glass rod is usually possible ..... .

a. if a conductor is used
b. unless a conductor is used
c. then a conductor is used
d. although a conductor is used

37. Which of the following serves as the best conductor ?

a. a water pipe
b. a glass rod
c. a rubber comb
d. an electric wire

38. Lightning is a (n) ..... .

a. magnet
b. electrical energy
c. static electricity
d. electric current

39. The word 'this' in line 13 refers to ..... .

a. the needle of the compass
b. a reference provided by the compass
c. what is said before about the needle of the compass
d. a magnet in the compass

40. The best tittle of this passage is ..... .

a. North Pole and South Pole
b. Magnet is useful
c. The Property of a Magnet
d. A Compass

Passage III

Only one word is needed for each blank. Write the best answer after the corresponding number on the answer sheet. Your answer must be logical and grammaticerlly correct.

We usually think of the helicopter as an instrument for military uses only Its peacetime uses are, however, just as .. 41 .. . We frequently pick up a newspaper and .. 42 .. that the 'whirlybird' has performed a mission .. 43 .. great human services. Here is an imaginary .. 44 .. typical example.

A four-year old child wanders .. 45 .. its parents at a picnic high on .. 46 .. mountain, the child loses its way. The .. 47 .. and mother search for the child, but .. 48 .. are handicapped. The area is so rough .. 49 .. movement is very slow. They are unable .. 50 .. see very far in any direction, because .. 51 .. forest is so dense. The afternoon sun .. 52 .. setting and daylight is running out. The .. 53 .. is critical.

The father informs the park ranger of .. 54 .. situation. The ranger radios a message to .. 55 .. nearly airfield. In a few minutes a .. 56 .. is on the sceen searching the area .. 57 .. pilot located the child and then directs .. 58 .. ground crew to the rescue.

Very frequently we read that helicopters have .. 59 .. low over flooded areas and directed men .. 60 .. boats to the rescue of people trapped .. 61 .. rising slood waters. For many years the .. 62 .. has been used by the Coast Guard .. 63 .. shore petrol, by the Department of Agriculture .. 64 .. insect control, and by the farmers for .. 65 .. spraying of crops and orchads. The helicopter has also been used for locating and fighting fires.

ผนวก ง

รายละเอียดของการคำนวณ

ตารางแสดงการทดสอบค่า t (t-test)

คนที่	กลุ่มทดลอง	กลุ่มควบคุม	$x-\bar{x}_1$	$(x_1-\bar{x}_1)^2$	$x_2-\bar{x}_2$	$(x_2-\bar{x}_2)^2$
1	52	50	3.38	11.42	4.22	17.80
2	53	51	4.38	19.18	5.22	27.24
3	43	44	-5.62	31.58	-1.78	3.16
4	53	60	4.38	19.18	14.22	202.20
5	53	43	4.38	19.18	-2.78	7.72
6	60	46	11.38	129.50	.22	.04
7	47	55	-1.62	2.62	9.22	85.00
8	46	47	-2.62	6.86	1.22	1.48
9	45	42	-3.62	13.10	-3.78	14.28
10	46	46	-2.62	6.86	.22	.04
11	47	47	-1.62	2.62	1.22	1.48
12	49	49	.38	.14	3.22	10.36
13	40	41	-8.62	74.30	-4.78	22.84
14	49	50	.38	.14	4.22	17.80
15	45	46	-3.62	13.10	.22	.04
16	57	49	8.38	70.22	3.22	10.36
17	38	53	-10.62	112.78	7.22	52.12
18	40	44	-8.62	74.30	-1.78	3.16
19	43	45	-5.62	31.58	-.78	.60
20	51	40	2.38	5.66	-5.78	33.40
21	45	35	-3.62	13.10	-10.78	116.20
22	52	46	3.38	11.42	.22	.04
23	54	47	5.38	28.94	1.22	1.48

คนที่	กลุ่มทดลอง	กลุ่มควบคุม	$x-\bar{x}_1$	$(x_1-\bar{x}_1)^2$	$x_2-\bar{x}_2$	$(x_2-\bar{x}_2)^2$
24	45	47	-3.62	5.66	1.22	1.48
25	54	55	5.38	28.94	9.22	85.00
26	48	47	.62	.38	1.22	1.48
27	51	44	2.38	5.66	-1.78	3.16
28	50	42	1.38	1.90	-3.78	14.28
29	54	35	5.38	28.94	-10.78	116.20
30	52	43	3.38	11.42	- 2.78	7.72
31	43	39	-5.62	31.58	-6.78	45.96
32	51	37	2.37	5.66	-8.78	77.08
	$\bar{x}_1 = 48.62$	$\bar{x}_2 = 45.78$		= 817.92		= 981.20

หา t-test

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sigma_{(\bar{x}_1 - \bar{x}_2)}}$$

$\sigma_{(\bar{x}_1 - \bar{x}_2)}$ = ความคลาดเคลื่อนมาตรฐานของความแตกต่างระหว่างมัชฌิมเลขคณิต

สูตร $\sigma_{(\bar{x}_1 - \bar{x}_2)} = \sqrt{\frac{SD_1^2}{N_1} + \frac{SD_2^2}{N_2}}$

SD = ส่วนเบี่ยงเบนมาตรฐาน

$$SD_1 = \frac{\varepsilon(x_1 - \bar{x}_1)^2}{N_1}$$

$$= \sqrt{\frac{817.92}{32}}$$

$$= \sqrt{25.56} = 5.05$$

$$SD_2 = \sqrt{\frac{\varepsilon(\bar{x}_2 - \bar{x}_2)^2}{N_2}}$$

$$= \sqrt{\frac{981.20}{32}}$$

$$= \sqrt{30.66} = 5.53$$

$$\sigma_{(\bar{x}_1 - \bar{x}_2)} = \sqrt{\frac{25.56}{32} + \frac{30.66}{32}}$$

$$= \sqrt{\frac{56.22}{32}}$$

$$= \sqrt{1.75} = 1.32$$

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sigma_{(\bar{x}_1 - \bar{x}_2)}}$$

$$= \frac{48.62 - 45.78}{1.32}$$

$$= \frac{2.84}{1.32} = 2.15$$

ค่า t ตามตารางที่นัยสำคัญระดับ .05 = 1 . 96 ค่า t ที่คำนวณได้ = 2.15 ซึ่งมากกว่า 1.96 จึงสรุปได้ว่า ผลต่างระหว่างมัชฌิมเลขคณิตของทั้ง ๒ กลุ่ม แตกต่างกันอย่างมีนัยสำคัญ

x	f	fx	fx^2
31	4	124	3844
30	5	150	4500
	N = 70	$\varepsilon fx = 2836$	$\varepsilon fx^2 = 120256$

๑. หาค่า $\bar{x} = \frac{\varepsilon fx}{N} = \frac{2836}{70} = 40.51$

๒. หาค่าความแปรปรวน $\sigma^2 t = \frac{N\varepsilon fx^2 - (\varepsilon fx)^2}{N(N-1)}$

$$= \frac{70(120256) - 2836^2}{70(70-1)}$$

$$= \frac{8417920 - 8042896}{4830}$$

$$= \frac{375024}{4830}$$

$$\sigma^2 t = 77.64$$

๓. หาค่าความเชื่อถือได้จากสูตรของริชาร์ด

$$tt = \frac{n\sigma^2 t - M(n-M)}{\sigma^2 t(n-1)}$$

$$= \frac{65(77.64) - 40.51(65 - 40.51)}{77.64 \times 64}$$

$$= \frac{5046.6 - 992.08}{4968.96}$$

$$= \frac{4054.52}{4968.96}$$

$$= .8159$$

แบบสอบนี้มีค่าความเชื่อถือได้ .81

ค่าความยากง่ายและอำนาจจำแนกของแบบสอบ

	P. ความยากง่าย	R. อำนาจจำแนก
1	.51	.17
2	.32	.40
3	.28	.24
4	.39	.26
5	.65	.29
6	.85	.51
7	.88	.52
8	.87	.50
9	.82	.71
10	.86	.59
11	.79	.30
12	.64	.45
13	.49	.37
14	.79	.30
15	.81	.46
16	.79	.30
17	.83	.69
18	.85	.36
19	.81	.46
20	.68	.16
21	.50	.66
22	.76	.21
23	.74	.16
24	.78	.54

	P. ความยากง่าย	R. อำนาจจำแนก
25	.71	.61
26	.79	.30
27	.82	.24
28	.79	.30
29	.82	.24
30	.85	.36
31	.47	.52
32	.49	.37
33	.25	.27
34	.65	.29
35	.83	.41
36	.76	.54
37	.85	.36
38	.71	.76
39	.77	.35
40	.82	.24

ค่าความยากง่ายและค่าอำนาจจำแนกของแบบสอบ Cloze

	ค่าความยากง่าย (P)	ค่าอำนาจจำแนก (R)
1	.26	.21
2	.46	.21
3	.47	.32
4	.36	.23
5	.44	.17
6	.44	.17
7	.79	.30
8	.85	.36
9	.52	.42
10	.74	.26
11	.68	.24
12	.79	.30
13	.41	.22
14	.71	.18
15	.31	.23
16	.79	.30
17	.53	.21
18	.31	.23
19	.49	.15
20	.55	.16
21	.26	.23
22	.79	.30
23	.49	.15
24	.58	.22
25	.55	.27

ผนวก จ

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