ENGLISH FOR TEACHING
MATHEMATICS AND SCIENCE (ETeMS)

PHASE 1

MODULE 5
PRIMARY

ENGLISH LANGUAGE TEACHING CENTRE,
MALAYSIA
BAHAGIAN PENDIDIKAN GURU
KEMENTERIAN PENDIDIKAN MALAYSIA

ENGLISH FOR THE TEACHING OF MATHEMATICS AND SCIENCE (ETeMS)

AIM

The overall aim of ETeMS is to enhance the English language skills of Mathematics and Science teachers to enable them to teach effectively using English as the medium of instruction.

Structure of the ETeMS Programme

ETeMS invoves 240 hours of instruction delivered through face-to-face interaction and self-instructional packages. These will be supported by a 'buddy system' whereby the teachers can get further help from identified resource persons in their locality.

The ETeMS programme is conducted in 2 phases. Each phase comprises 90 hours of face-to-face interaction and 30 hours worth of self-instructional materials.

Phase 1 will be delivered through

- 5 modules spread over 5 weeks. Each module requires 2 days of face-to-face interaction (60 hours)
- 5-day Module (30 hours)
- a self-instructional package (30 hours)

Module Contents

Each two-day module consists of a series of sessions covering a total of 12 hours of interaction. The duration of each session is between 1 to 3 hours. The components for t he various sessions are shown in the table below.

SESSION	COMPONENT
Text Lab	Interfacing with Text Word Explorer Connecting with Text Language in Action Springboard
Language Lab	Grammar Works Getting it Rights Trying it Out
Stand and Deliver	
Back to the Future	

ENGLISH FOR TEACHING
MATHEMATICS AND SCIENCE (ETeMS)

PHASE 1

MODULE 5
PRIMARY

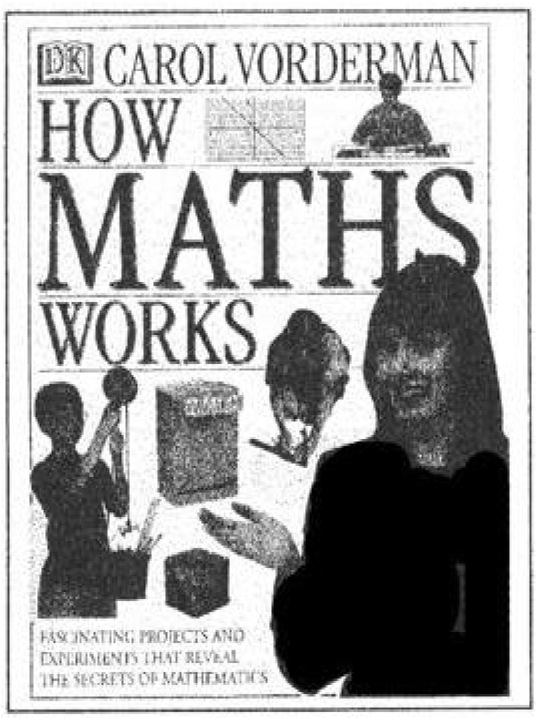
CONTENTS

TEXT LAB

INTERFACING WITH THE TEXT

The text you are about to read is taken from the Chapter MEASUREMENT in the book HOW MATHS WORKS by Carol Vorderman, Dorling Kindersley 1998. In this chapter the author talk about various systems of measurement used through the ages. This book has been written for young learners, but it has a lot of interesting information even adults would enjoy reading.

Page 1



MEASUREMENT

Precise measurement
Times in sports are measured in hundredths of a second. The difference between the gold and bronze medals in a swimming race (left), for example, might be as little as 0.02 seconds – less than the blink of an eye. Callipers measure the widths of irregular shapes such as stones and screws. This replica from a set of Chinese sliding callipers (above) has a scale on the fixed arm to show the measurement.

WHITEOUT SYSTEMS and methods of measuring, science and engineering would not have progressed as far as they have today. The concept of measurement has enabled the building of superb structures such as the Great Pyramid of Khufu, which was measured accurately in cubits thousands of years ago. Today, atomic clock are accurate to within billionths of a second. People use measurements every day, from simple calculations of weight and height to economic transactions dealing electronically in millions of standard units.

SYSTEMS OF MEASUREMENT

1 MEASUREMENTS ARE USED to gauge physical features such as length and weight, and to chart the passing of time. Scientists also measure more complex quantities such as the speed of certain objects, the forces acting on them, and the amount of electric current flowing between them. They use measurements to investigate these quantities mathematically.

2 Almost any quantity in the physical world, such as weight, height, or electric charge, can be measured. When we measure something, we define its properties in relation to special units of measurement. The height of a tree, for example, can be measured in metres or in feet. Over many centuries, people have developed systems of measurement that are accepted in most of the world.

Ancient records
This Egyptian wall Painting form the 18th dynasty (1567-1320 BC), in the comb of Menna as Thebes, shows workers measuring a field of grain and, below, recording the crop yield

3 Early units

The first units of length were based on body parts (p.92). Units of weight, volume, and power evolved from commonly used containers or from amounts that a human or an animal could move. Horsepower, for example, a unit of engine power, is based on the power that a horse can exert when pulling an object.

In 221 BC, the Chinese emperor Shih Huang Ti set standards for the Chinese system of weight measures.

4 A standard vessel for measuring wine or grain was defined not only by its weight but also by the note that it made when struck. Given a uniform shape and a fixed weight, only a vessel of a certain volume would make a particular note. For this reason, the ancient Chinese words for "wine bowl", "grain measure", and "bell" are the same.

5 Unit of weight developed as different peoples traded with each other. Standard weights, made from metal or stone, were first made by the Babylonians and Sumerians, but soon spread throughout the Middle East. The mina was a standard weight that was commonly used in this area, In some records it weight about 640 grams and in others, 978 grams. It was divided into 60 smaller units, each of which was called a siqlu. A group of 60 minae made a larger unit known as a biltu.

6 Coin for trading evolved from fixed metal weights, and were often named after the weights from which they originated. The siqlu, for example, is referred to in the Bible as the "shekel", and the biltu gave rise to the Greek coin called the "talent".

Information from stars
An octant measures the altitudes of stars. It was used to find the bearing of a ship or the time as night.

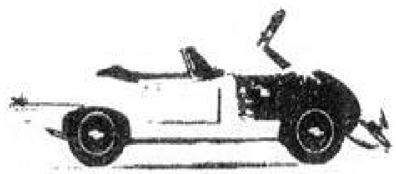
7 Imperial system

Over the centuries, many systems of measurement have been developed and refined as people have tried to find consistent measures for use in commerce. Eruopean traders in the Middle. Ages, for example, created a system called "avoirdupois". This was based on the old French words aveir de peis, meaning "weight or goods". This measurement system was one of many that gradually became part of the British imperial system. The imperial system is based on units such as inches, pounds, and pints, which have been in widespread use for more than 750 years. The system was officially introduced in the Magna Carta of 1215, and was last refined in 1968. Large and small units in the imperial system have very unusual connections, which do not follow any particular pattern. A foot for example, is 12 inches, but a yard is 3 feet, and a mile is 1760 yards. Moreover, to this day definitions of imperial units vary slightly from country to country. These problems have made the imperial system difficult to work with and have led scientists, engineers, and manufacturers in many countries to adopt the metric system.

Standard weights
The metal cylinder on the left is a standard kilogram, one of the modern SI Units of mass. Throughous history, a wide variety of different objects, many specially Made, has been employed for measuring quantities such as weight. The elephant from Burma and the Ashanti warrior from Africa are examples of traditional standard weights.

8 A system for all

Today, the metric system is the most common standard measuring system and is gaining popularity. In metric, length is given in metres, mass in kilograms, time in seconds, and current in amperes. Wherever you go in the world, you will obtain the same result if you measure an object using metric units. The system is consistent because it is based on special



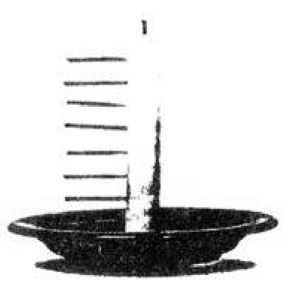
Volume and power in vehicles. The strength of motor vehicles used to be measured in horsepower. Modern vehicles are described by giving their engine size in litres, a metric unit of volume. This Jaguar E-type, at over 4 litres, is very powerful.

quantities that never vary, such as the properties of certain atoms (p. 108) and of laser light.

The metric system was first proposed in France in 1670. It was
9 designed to fulfil two important requirements: that every unit in the system could be derived from a small set of standard units, and the large units could be made by multiplying small units by 10, 100, or 1000. The system was not put into use in France until 1799. In 1875, it was also officially adopted by many other countries. The system was refined in 1960 when the Systeme International d' Unites (International System of Units) was introduced. Systeme International (SI) units are now defined using very precise, scientific methods.

At the heart of the metric
10 system is the metre. This unit of length was originally defined as 1 ten-millionth of the distance between Paris and the North Pole. In the 20th century, the metre, along with all of the other measurements in the metric system, has been refined so that it is accurate enough for high- precision scientific measurement. Today , a metre is defined in terms of waves of a certain type of laser light. Scientist today often work at astonishing degrees of accuracy, using unit such as the nanometer (which is less than one-billionth of a metre). When they study very large or small quantities, they use specially defined terms called "multipliers". "Mega", for example, is a multiplier of one million, and "micro" is one millionth. So 3 megajoules equal 3 million joules, and 7 microseconds equal 7 millionths of a second.

Candle clock This is a variation on an old type of clock. It takes 10 minutes to melt from one pointer to the next.



Measuring by sound A sonic tape measure aims a bleep at an object at the speed of sound, and calculates that object's distance from the time taken for the bleep to return

Areas are calculated by multiplying one length by another (p.98), so areas in the metric system are given in square metres. Similarly, volume (p. 102), found by multiplying three lengths together, is often measured in cubic metres.

Although most people consider the expressions "mass" and "weight" to mean the same thing, in science the words have distinct meanings (p. 106). For this reason, the metric system defines mass
11 and weight with different units. Mass is measured using the kilogram (the SI unit), while weight is given in newtons. The mass of a particular object is the same wherever it is in the Universe, but its weight varies according to the influence of local gravity.

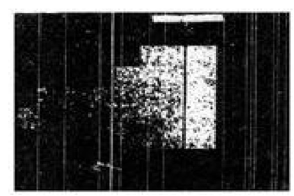
12

Times

Primitive humans measured time just by day, night, and the seasons. Later peoples devised calendars that marked time in years. A year was divided into months, based on the waxing and waning of the Moon. The Western, Muslim, and Jewish calendars are still based on the movements of the Sun or Moon. The Western calendar has been refined repeatedly since Roman times, and now gains only one day every 3200 years. The metric system uses seconds as the basic unit o time. Some of the most accurate modern timepieces are clocks containing quartz crystals (p. 108). A tomic clocks, the descendants of quartz clocks, are so accurate that they only gain or lose 1 second every 1.7 million years.

Other units

The metric system contains many other measurement units. These include the joule for measuring
energy, the Kelvin 13
and the Celsius scales for measuring temperature, and the candela for measuring the intensity of light. Many metric units are based on other, simpler units. Speed, for example, can be expressed in metres per second. Similarly, joules, which are the units of energy, can be written as kilogram square metres per second squared. The metric system has been put together so that these links can be made readily. However, many people are still reluctant to adopt it for everyday use in countries where the imperial system has been used for hundreds of years.



Swinging pendulun For Hundreds of years, the Movement in mechanical clocks was regulated by the swing of a pendulum, The time taken for each swing depends on the length of the pendulum.

Source: How Maths Works
Carol Vorderman, 1998.Dorling Kindersley

TASK 1

Look through Pages 1 and 2 of the text quickly and identify new words or phrases that have technical meanings in mathermatics or science. Give the Bahasa Melayu equivalent for each of those mathermatical terms.

Word/Phrase	Bahasa Melayu equivalent

TASK 2 *Noun Compounds*

Study the definition of ***noun compounds*** *below.*

compound
4 [count] LINGUISTICS a combination of two or more words that is used as a single word. The three different types of compound are **noun compounds** (for example 'bus stop'), adjective compounds (for example 'self-centred'), and verb compounds (for example 'wind-surf').

Macmillan English Dictionary for Advanced Learners

Use the definition above and locate ***noun compounds*** *in the text according to the meaning given in the table below.*

Noun compounds	Meaning	Location
	parts of the body	p 2 para 3
	the power equivalent to that produced by a horse	p 2 para 3
	measures for determining weight	p 2 para 4
	pole at the north of the globe	p 3 para 10
	clocks that use quartz crystals	p 3 para 12

CONNECTING WITH TEXT

TASK 3 *Skimming and Scanning*

The following statements are based on ***Pages 1 and 2****. Quickly look through that section and give the word or phrase that matches the statement.*

No	Statement	Response
1	the instrument used to measure the width of irregular shapes	
2	the year Shih Huang Ti set standards for Chinese weight measures	
3	the physical property that was measured using **mina**	
4	the name of an African tribe mentioned in the text	
5	an instrument for measuring the altitude of stars	
6	the number of yards in a mile	
7	the metric measure of current	

TASK 4 *Identifying Facts and Details*

Read **Pages 1 and 2** again carefully and answer the questions that follow.

1. What are some physical properties that can be measured
2. What do we do when we measure something?
3. Why is the same Chinese word used for **wine bowl, grain measure** and **bell**?
4. How would you define the **shekel**? Hoe many shekel are there in a **talent**?
5. What does the writer find peculiar about the imperial system of measures?

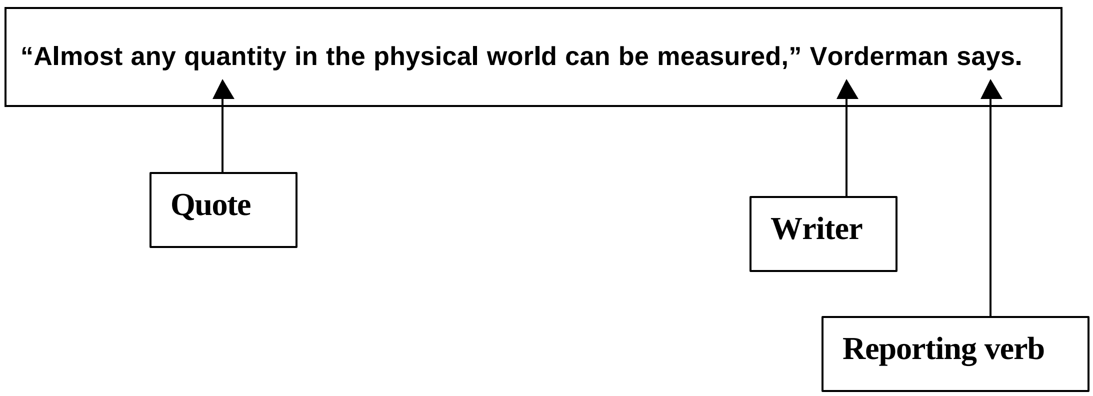
TASK 5

Read the rest of the text and discuss the following.

1. Why are metric measures the same all over the world?
2. In what way is the metric system better than the imperial system?
3. How is metre defined today?
4. What evidence is there in the text to show that atomic clocks are more accurate than quartz clocks?
5. Why are some people not willing to use the metric system today?

TASK 6 *Quoting*

If you were using information from this book for an article you are writing you may want to quote the writer directly. For example you may write:



1. The same quote may be given by using a different reporting verb. Study the list of reporting verbs given in the box below. Can any of them be used in place of **says**? Will there be a change in meaning?
2. Locate other interesting bits of information in the text. Write them in the form of quotes as given in the example above using different reporting verbs.

acknowledge	confirm	announce	argue	claim
command	complain	insist	observe	predict
remark	plead	reveal	shriek	suggest
boast	warn	urge	hint	say

SPRINGBOARD

TASK 7 *Local Measures*

Discuss with your colleagues:

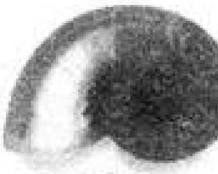
What are some interesting units of measure used locally? Which communities use them and for what purpose.
Do you think these local measures should be retained?

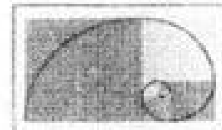
TASK 8

Below is the blurb on the back cover of the book from which the reading texts were taken. From the extracts you read do you think the comments given there accurately reflect the contents of the book? Discuss.

CAROL VORDERMAN

HOW MATHS WORKS





Written by one of Britain's foremost television personalities, Carol Vorderman, here is a stimulating guide to the wonders of mathematics packed with exciting projects for all the family

•

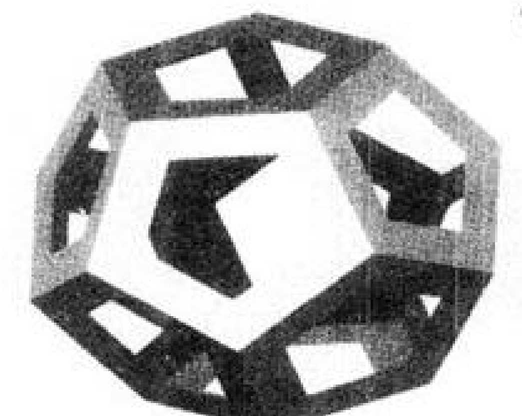
Hundreds of experiments that let you discover the answers to mathematical principles

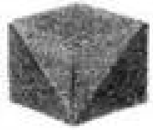
•

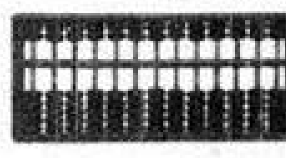
Create your own "home laboratory" with materials from around the home and in the garden

•

Specially commissioned, full-colour photographs and step-by-step instructions show clearly how to carry out each fascinating experiment







£10.99

ISBN 0-7513-1159-6

9 780751 311594

DK

A DORLING KINDERSLEY BOOK

LANGUAGE LAB 1

GRAMMAR WORKS

TASK 1 Experiment Report

Pupils studying science would sometimes need to do laboratory report writing.

Look at the sample of an experiment report done by primary children studying in Australia and in triads consider the following issues:

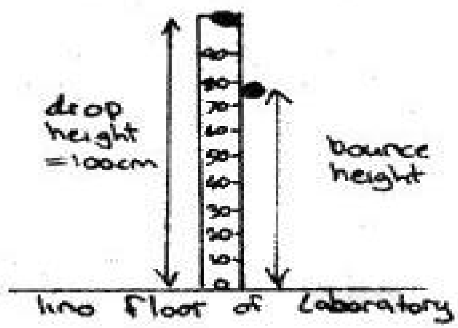
Experiment 3   8 March

BOUNCING BALLS

Aim: To find out which type of ball bounces the highest.

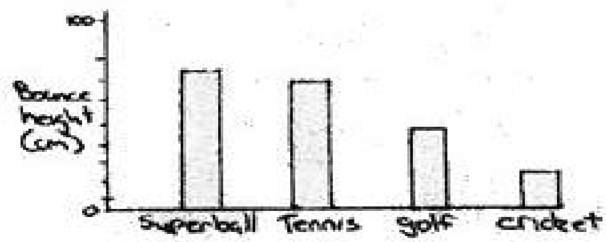
Method:

1. We decided to test 4 different balls and we made this prediction:
   Superball (highest bounce)
   golf ball
   Tennis ball
   Cricket ball (lowest bounce)
2. We set up a metre rule with the zero at the bottom.
3. We measured the bounce height for the superball three times and then calculated the average.
4. We did the same for the other three balls.



Results

	Bounce height 1	2	3	Average
Superball	73	72	70	72
golf Ball	71	70	68	70
Tennis ball	46	44	46	45
cricket ball	21	19	22	21



Conclusion:
Our prediction was correct, although we expected a greater difference between the superball and the Golf ball.

Source: Science world 7 : 2nd Edition
Stannard, P. & Williamson, K. (1999)
Macmillian Edu. Australia Pty. Ltd.

- Can you list the sub-headings found in this report? The first one has been done for you.

  Write them in the boxes provided below:

1	Experiment number
2	
3	
4	
5	
6	
7	

- Would you use this format for your pupils?

TASK 2 Infinitives

Did you notice how the aim of the sample experiment report was written?

Aim: To find out which type of ball bounces the highest.

Study the structures below:

- **To find out** which type of ball bounces the highest.
- **To determine** which metal corrodes the least.
- **To measure** the depth of an aquarium.
- **To test** the pH of a solution.

Answer the following questions:

1. What kind of pattern do the structures above have?
2. What happens to t he Verb in the structures above?

TASK 3 To + Verb

Study the table below to understand the structure for Infinitives.

In stating the aim of an experiment, one could make use of this kind of pattern:

INFINITIVE			
To	**+**	**Verb**	
To	+	find out	which ball bounces the highest
		determine	the toughness of five metal by means of the Izod test.
		examine	the alimentary system of a frog.
		study	which material is a good conductor of electricity.

Source: Azar. B.S (1989) *English Grammar*
Prentice-Hall Inc., New Jersey.

Taking into consideration the structures above, complete the aims on the next page using the words given in the box below:

determine	examine	test	show
measure	study	find out	estimate
ascertain	compare	analyse	calculate
investigate	scrutinise	discover	evaluate
probe	prove	understand	explore

1. To_____prove_______that light travels in a straight line.

2. To________________which solution is more alkaline.

3. To________________the properties of carbon dioxide.

4. To________________the size of an atom.

5. To________________the specific gravity of a liquid.

6. To________________the structure of a flower.

7. To________________the principles of the workings of a steam engine.

8. To________________the starch content in a leaf.

9. To________________the effect of the carbon content in steel.

10. To________________the resistance of two different metals.

TRYING IT OUT

TASK 4 Writing Objectives

Study the structures below and change them as in the example:

Example : Exploring the possibilities of cloning a tulip in the greenhouse.
To explore the possibilities of cloning a tulip in the greenhouse.

1. Studying the effects of artificial propagation on vegetables.

   ____

2. Finding out which element is soluble in water.

   ____

3. Comparing the effect of heat on metal and liquid.

   ____

4. Proving that wood is a poor conductor of electricity.

   ____

5. Demonstrating the process of osmosis in celery.

   ____

6. Tabulating the rate of photosynthesis as a result of carbon dioxide concentration.

   ____

7. Showing the effect of oil on water.

   ____

8. Analyzing the components of iron.

   ____

9. Investigating which ecological factors led to the extinction of the dinosaur.

   ____

10. Predicting which of the human features are controlled by inheritance only.

    ____

MORE GRAMMAR

TASK 5 Past Tens Review

Study the sentence parts below taken from the experiment report sample:

We **decided** to test…
…we **made**….
We **set up**…
We **measured**…then **calculated**…
We **did**…
We **recorded**…
Our prediction **was** correct.
…we **expected**…

You have studied this form before. See how much you can recall of what you have learned.

Tick the correct statements regarding the sentences above.

The highlighted words are ______________.	Nouns	
	Verbs	
	Adjectives	
	Adverbs	
They are words in the __________________ form.	Simple Past Tense	
	Progressive Tense	
	Perfect Tense	
	Perfect Progressive Tense	

And the rule with this tense is:

We use it to report an action that ____

Zimmerman says that this is the form that is most frequently used in scientific writing.

Sometimes reporting an action involves reporting the stages of the actins that had taken place. In this case, the following verb forms are used to describe the various stages of the actions.

- This form is used **to report a completed action:**
  (SIMPLE PAST TENSE)

Darwin { **published** / **announced** / **proposed** } his theory of evolution in 1859.

Other verb forms:

- This form is used **to report an uncompleted or recent action** :
  (PRESENT PERFECT TENSE)

Biologists / He / She { **have** / **has** } { **often** / **already** / **just** / **seldom** / **sometimes** / **not yet** / **recently** / **still not** / **usually** } **made** new discoveries.

- This form is used **to report an action that is completed before a given time:**
  (PAST PERFECT TENSE)

By the time we arrived, the bomb **{ had exploded }**.

By 1957, Russia **{ had launched }** the first Sputnik.

Source: Zimmerman, F. (1989) *English for Science*, Prentice-Hall Inc., New Jersey.

TASK 6 Active / Passive Verb Forms

Another form of verb that is frequently used in classifying and in all scientific writing is the **Passive Form.** This form is necessary because **in science, the emphasis is usually on the action** rather than on the person performing the action.

Study the difference between Active and Passive Forms of the Simple Past and Present Perfect Tenses below:

Active Sentence : Subject performs the action.
Example : SIMPLE PAST TENSE
Luigi Galvani **invented** the electric battery in 1786.
James Watson and Francis Crick **formulated** the theory of the double helix.

PRESENT PERFECT TENSE
They **have** just **discovered** the vaccine for the virus.
NASA **has launched** the rocket into space recently.

Passive Sentence : Subject receives the action.
Example : SIMPLE PAST TENSE
The electric battery **was invented** by Luigi Galvani in 1786.
The theory of the double helix **was formulated** by James Watson and Francis Crick.

PRESENT PERFECT TENSE
The vaccine for the virus **has** just **been discovered** by them.
The rocket **has** recently **been launched** into space by NASA.

Source: Zimmerman, F. (1989) English for Science Prentice-Hall Inc., New Jersey.

A *Insert either the Active or Passive form of the Simple Past Tense verb given in brackets*

1. The nucleus ___*contained*___(contain) a large amount of nucleic acid.
2. The first fossils___*were found*__(find) on rocks that are 2 billion years old.
3. The fossils of Neanderthal man ____________________ (discover) in Iraq between 1953 and 1960.
4. The first man ______________________ (appear) about 1.5 million years ago.

5. The earth ______________________ (from) about 4.6 billion years ago.

6. About 165 million years ago, giant dinosaurs _________________ (live) on the earth.

7. The first organisms ___________________(reproduce) by dividing in half.

8. About 18 million years ago, violent earthquakes along California's San Andreas Fault __________________ (rotate) the northwestern Mojave Desert about 25^0 clockwise.

B Each sentence below describes an incomplete or recently completed action.

Insert the Active or Passive form of the Present Perfect Tense of the verb or verb phrase given in brackets.

1. Air pollution ___has become___(become) a major problem in our cities.

2. Many studies___have been made_(make) to determine the effects of smog on the lungs.

3. More than a hundred elements __________________________ (discover).

4. A research _______________________________(conduct) to prove the effectiveness of the new drug.

5. Another man made satellite ____________________________(just go) into orbit.

6. For many years, scientists _____________________________ (know) there is no life on the moon.

7. Another astronaut ______________________________ (recruit) into the programme by the head of the programme.

8. Human beings ___________________________ (destroy) more living things than any other organism.

TRYING IT OUT

TASK 7 Choices

Read the text below and do the following:

A Underline the Simple Past Tense and circle the Present Perfect Tense forms found below.

B Indicate if they are in the Active or Passive forms.

How Life Began

The discover how life began, archaeologists study fossils. Fossils are the remains or imprints of plants and animals of long ago that have been preserved in the earth's crust. The smallest forms of life appear in the lowest or oldest rocks. Although scientists can calculate that the earth is 4.6 billion years old, the oldest rocks that show any trace of life are less than 2 billion years old. Therefore, about 2.5 billion years had passed on the earth when life originated. Since the oldest forms of life were all sea life, many scientists believe life began in the sea.

We do not know exactly how, but in some miraculous way, the right kind of molecules happened to combine in the ocean or in clay to form a minute organism. All life has probably evolved from that single original cell, which may have been something like the bacteria of today. This one-celled organism ate, grew, responded to its surroundings, reproduced itself, and spread throughout the oceans.

Probably those first tiny organisms were not all alike. Some were better able to obtain food or adapt to colder waters. The stronger cells survived and their characteristics were passed on to the next generation.

The early cells reproduced simply by dividing in two. After a long time, single cells became attached to one another, and each cell became specialized in a different function. Gradually organisms became more and more complex. Today, many living things are made up of a combination of cells; our bodies are composed of skin cells, muscle cells, brain cells, and so on.

The gradual migration of life from the ocean to the land was another major step that made many advances possible. Eventually plants and animals divided into males and females, an possibilities increased for developing new and varied species or types. To date, more than 400,000 species of plants and 1,200,000 species of animals have developed. Gradually, the senses of sight and hearing improved in animals and brains grew and developed. Finally intelligence progressed, leading to the development of human beings.

Source: *English for Science*, Zimmerman, F.
Prentice-Hall Inc. (1989)

LANGUAGE LAB 2

GRAMMAR WORKS

"when we are considering what caused some events, the hypotheses we generate for further testing are viewed initially only as possibilities – possible causes. Similarly, when we make decisions and try to solve problems, the options and solutions we develop are viewed as possibilities. " Source: *Infusing the Teaching of Critical and Creative Thinking into Elementary Instruction. Robert J. Swartz & Sandra Parks. Critical Thinking Press & Software, 1994.*

INTRODUCTION

Many of the technological advances which enhance the quality of our lives, like radio, TV, and the automobile, would simply not have been developed unless they had first been considered as possibilities. In one way or another, the great achievements human being have made throughout history have had their origins in ideas that people have generated for special purposes. If others had not been innovators in developing these ideas, we would not enjoy their beneficial results. This session will look at two grammatical items that are often used in generating possibilities and making predictions.

Task 1 Modal Auxiliaries

A. Study the diagram given to understand the degree of possibility. Then read the sentences given to determine their degree of possibility. Sentence 1 has been done for you as an example.

			Degree of Possibility			
			0% ↑			
It	could, might may, should will	rain tomorrow.	↕	It is	possible quite possible probable certain	that it will rain tomorrow.
			↓ 100%			

1. The science show may start at 10.00. (This means : I'm not sure. – It is quite possible, I am less than 50% certain.)

2. It might be very good. ______________________________

3. It could win a Nobel award. ______________________________

4. Nitrogen may not make people laugh. ______________________________

5. Nitrous oxide might make people laugh. ______________________________

6. There couldn't be life on Jupiter. The temperature at its cloud tops is – 110 ^{o}C.
____

7. It could rain tomorrow. ______________________________

8. It may be very well rain tomorrow. ______________________________

9. It probably will rain tomorrow.______________________________

10. It will rain tomorrow. ______________________________

B. Now, look at the notes on Modal Auxiliaries and study how the sentences from the exercise above fit in with the rules given.

FUTURE POSSIBILITY : MAY, MIGHT, COULD

SUBJECT	MAY/MIGHT/COULD*	BASE FORM OF VERB	
I You He She It We You They	**may (not)** **might (not)** **could**	**get**	cold

May, might, and could are modals. Modals have only one form.
They do not have – s in the third person singular.

NOTE	EXAMPLES
1. Use **may, might,** and **could** to talk about **future possibility.** **> BE CAREFUL!** Notice the difference between may be and maybe. Both express possibility. **May be** is a modal + verb. It is always two words. **Maybe** is not a modal. It is an adverb. It is always one word, and it comes at the beginning of the sentence.	It **may be** windy later It **might get** cold It **could rain** tomorrow. He **may be** late for his chemistry class today. _/ **Maybe** he'll take the train. X He'll maybe take the train.
2. Use **may not** and **might not** to express the possibility that something will not happen Use **couldn't** to express the idea that something is impossible. **> BE CAREFUL!** We usually do not contract *might not*, and we never contract *may not*.	There are a lot of clouds, but it **might not rain.** **A:** Is there life on Venus? **B:** There **couldn't** be. There is no oxygen or water on Venus. _/ Pressure **may not** stop internal bleeding. X Pressure mayn't stop internal bleeding.

3. **Questions about possibility** usually are not formed with may, might, or could. Instead, they are formed with the future (will, be going to, the present progressive) or phrases such as Do you think….?or Is it possible that....?	**A:** When **will** it **start** snowing? **B:** It **might start** around lunch time. **A:** **Are** you **going to drive** to work? **B:** I **might take** the bus instead. **A:** When **are** you **leaving?** **B:** I **may leave** now.
The **answers** to these questions often contain **may, might,** or **could.**	**A:** **Do you think it'll snow** tomorrow? **B:** It **could stop** tonight.
In <u>short answers to yes/no questions,</u> use **may, might,** or **could** alone.	**A:** Will magnet attract iron? **B:** It **might**.
If **be** is the main verb, it is common to include **be** in the short answer.	**A:** Will our flight **be** on time? **B:** It **might be.**

Source: Focus on Grammar:Longman,2000

Task 2	Modal Auxiliaries:- Expressing Possibility (May, Might, Could)

In the previous activity, we saw the sentence patterns used most often when expressing possibilities.

A. Using Modal Auxiliaries

One of your friends is going to make a statement giving you clues.
Listen to the clues; then make guesses as to what he/she has in mind… Use *could, may,* and *might*.

Example: “made of metal and you keep it in a pocket.”

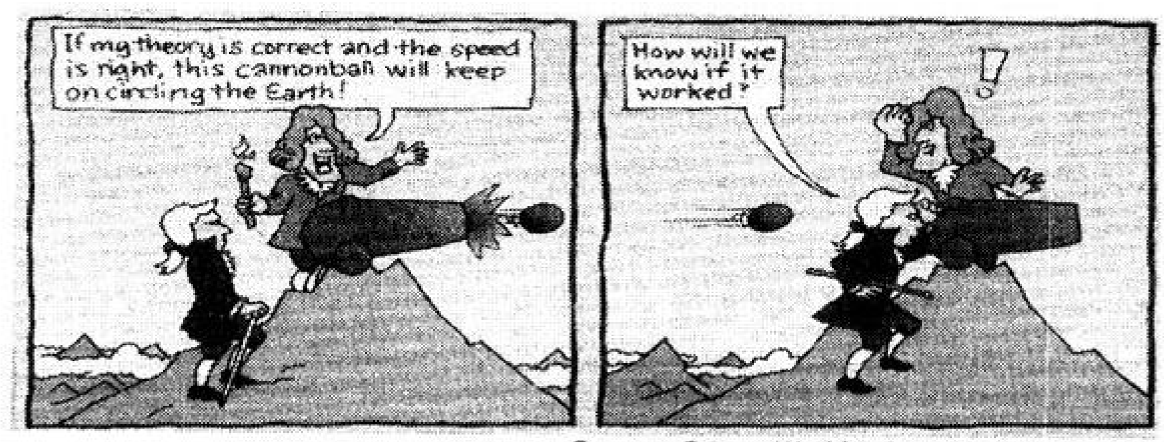
A : I’m thinking of something made of metal that you can find in my pocket. What could it be?

B : It could be a pen. It could be some keys. It might be a paper clip. It may be a small pocket knife. It could be a coin.

A : Right. I was thinking of the keys in my pocket.

1. has wheels and a motor
2. has four legs and is found on a farm.
3. is green and we can see it out that window.
4. is sour and is sometimes found in washing products.
5. produces lots of offspring but does not care for them.

Task 3	Future Time : Using Could & May /Might vs Will



Source: ScienceWorld 7.Second Edition,Anteater Publications and K.L. Books. 1995,2000

A. Study the table below

How do you refer to future time?
A Study these examples: 1 When air gets hot, *it'll* expand. 2 Look at those big black clouds: it's *going to rain.* 3 We bought our tickets for the Science exhibition yesterday. *We're leaving* at 4 o'clock this afternoon. 4 A well leaded roof *may* last longer than iron roofs. 5 Copper roofs *might* be better than lead roofs. 6 When fossil fuels *burn,* they all *produce* carbon dioxide and water. *B Now write the numbers of the examples above in the appropriate box. For example if you think the speaker of Statement 1 is very sure, then write "1" in the box on the left.* the speaker is sure: [1] the speaker is not sure: [ ] Source: *Learning and Teaching Grammar*. Jeremy Harmer. 1987.London.Longman.

B. Look at the notes on Future Time below. Use the compare and contrast graphic organizer to show the differences between the use of future possibility and future time.

FUTURE TIME CLAUSES

STATEMENTS				
MAIN CLAUSE		TIME CLAUSE		
I **will** I **am going go**			I **graduate**	
She **will** She **is going to**	**get** a job	**when**	she **graduates**	next June
They **will** They **are going to**			they **graduate**	

YES / NO QUESTIONS				
MAIN CLAUSE		TIME CLAUSE		
Will I **Am** I **going go**			I **graduate**	
Will she **Is** she **going to**	**get** a job	**when**	she **graduates**	next June?
Will they **Are** they **going to**			they **graduate**	

SHORT ANSWER		
AFFIRMATIVE		
	you	**will** **are**
Yes	she	**will** **is**
	they	**will** **are**

SHORT ANSWER		
NEGATIVE		
	You	**won't** **aren't**
No	She	**won't** **isn't**
	They	**won't** **aren't**

WH – QUESTIONS					
MAIN CLAUSE			TIME CLAUSE		
	will I **am** I **going go**			I **graduate**	
Where	**will** she **is** she **going to**	**get** a job	**when**	she **graduates**	next June?
	will they **are** they **going to**			they **graduate**	

<table>
<tr><th>NOTES</th><th>EXAMPLES</th></tr>
<tr><td>
1. When a sentence about future time has two clauses, the verb in the <u>main clause</u> is often in the future (will or be going to). The verb in the <u>time clause</u> is often in the present tense.

➢ BE CAREFUL! Do not use will or be going to in a future time clause.

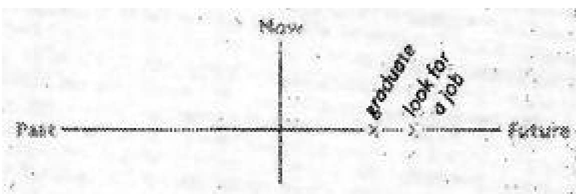
The time clause can come at the beginning or the end of the sentence. The meaning is the same. Use a <u>comma</u> after the time clause when it comes at the beginning. Do not use a comma when it comes at the end.
</td><td>
main clause time clause
• He'll look for a job when he graduates.

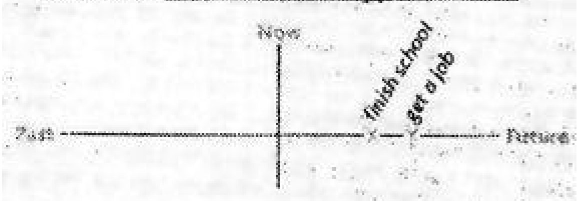
main clause time clause
• I'm going to work after I graduate.

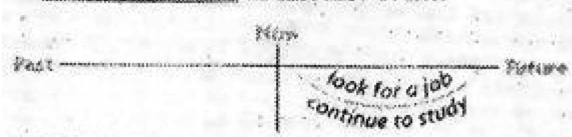
NOT <s>when he will graduate.</s>
NOT <s>after I will graduate.</s>

time clause
• Before she applies, she'll visit schools.
OR
time clause
• She'll visit schools before she applies.

NOT <s>She'll visit schools, before she applies.</s>
</td></tr>
</table>

<table>
<tr><td>
2. Here are some common time expressions you can use to begin future time clauses.
a. When after, and as soon as often introduce <u>the event that happens first.</u>


b. Before, until, and by the time often introduce <u>the event that happens second.</u>


c. While introduces an event that will happen <u>at the same time</u> as another event.


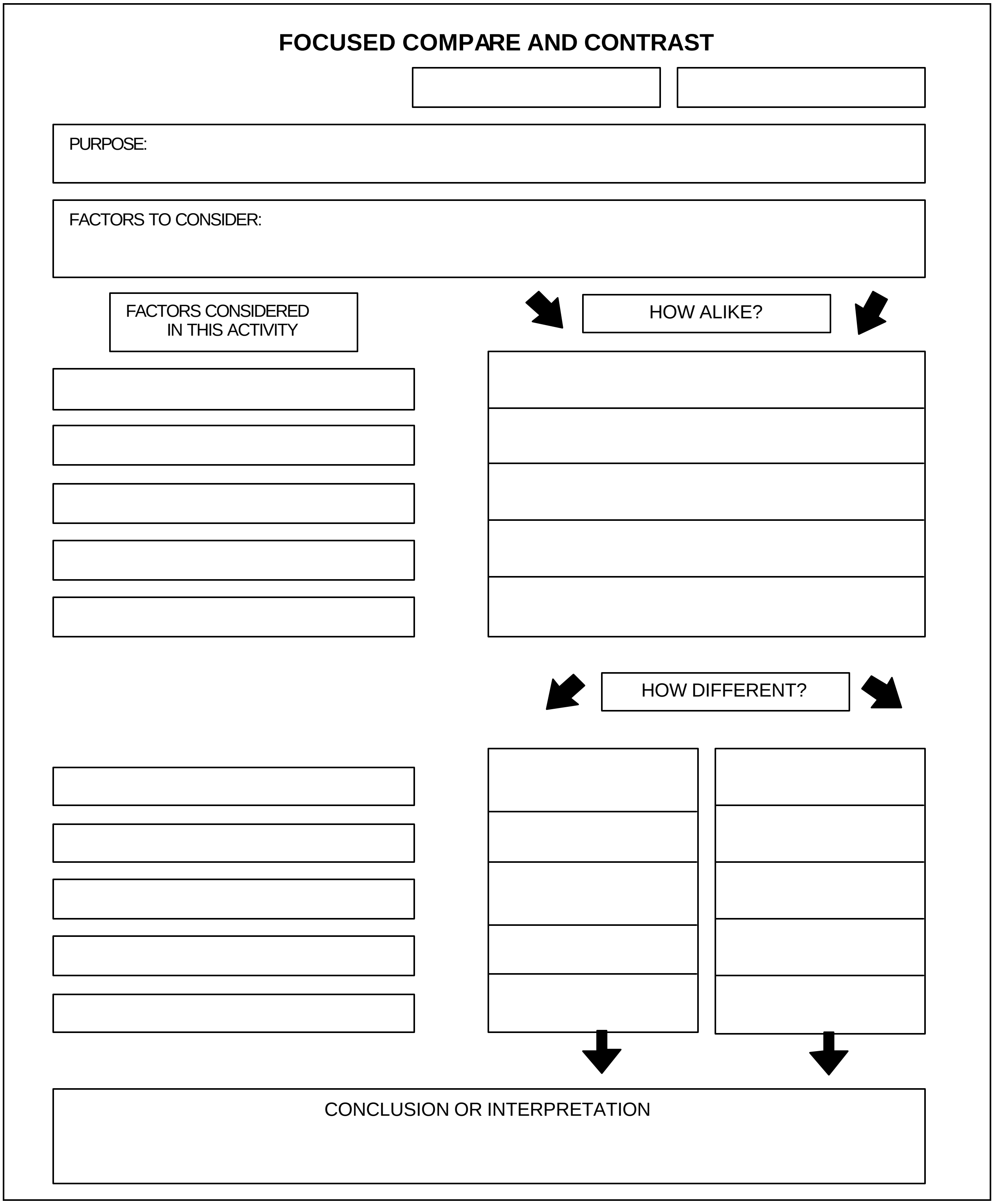
</td><td>
• When I graduate, I'll look for a job.
• I'll look for a job after I graduate.
• As soon as I graduate, I'll look for a job.
(First I'm going to graduate. Then I'll look for a job.)

• Before I get a job, I'll finish school.
• I won't get a job until I finish school.
• By the time I get a job, I'll be out of school.
(First I'll finish school. Then I'll get a job)

• While I look for a job, I'll continue to study.
(I will look for a job and study during the same time period.)
</td></tr>
</table>

Source: *Focus On Grammar*. Intermediate Course for Reference and Practice.Longman.2000

Compare and contrast graphic organizer.



Source:Swartz, J.R. & Parks, S. (1994) Infusing the Teaching of Critical and Creative Thinking Into Elementary Instruction Critical Thinking Press & Software, Calif.

GETTING IT RIGHT

Task 4 Using Future Time

A. Change the sentences by using **will** to express future time.

1. I'm going to arrive around six tomorrow to set up the science booth..
   - I'll arrive around six tomorrow.

2. Oil isn't going to dissolve in water..

   ____

3. It's going to dissolve in a solvent called tetrachloroethene.

   ____

4. Sue is going to be in the laboratory tomorrow.

   ____

5. Some bacteria cause diseases, but many aren't going to harm us.

   ____

6. Ramli and Tina are going to meet us at the planetarium.

   ____

7. They're going to be there at 7:15.

   ____

8. Halimah is going to stay home and watch TV tonight.

   ____

9. This is an important letter. I'm going to send this letter by express mail.

   ____

B. *Complete the sentences below. Use will/won't if you're sure. Use may/might if you're not sure.*

a. I ______________ be in class next Monday.

I *will be* in class next Monday. = You're sure.
I *will not (won't)* be in class next Monday. = You're sure.
I *may/might be* in class next Monday (or I *may/might not be* in class next Monday). = It's possible, but you're not sure.

1. I _______________ eat breakfast tomorrow morning. (certain)

2. I _______________ be in the science lab tomorrow. (indicating possibility)

3. I _______________ watch TV for a little while after dinner tonight. (indicating possibility)

4. We ________________ have a biology test in class tomorrow. (certain)

5. It _______________ be cloudy tomorrow. (indicating possibility)

6. The sun _________________ rise tomorrow morning. (certain)

7. I ________________ choose a career in Science after I finish school. (indicating possibility)

8. I _______________ eat dinner at a restaurant tonight. (indicating possibility)

9. I ________________ get a letter from a friend of mine tomorrow. (indicating possibility)

TRYING IT OUT

Task 5 Classroom Experiments

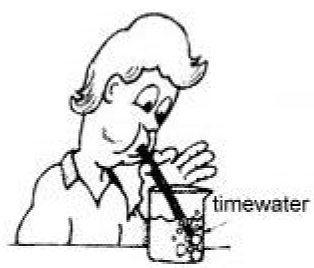
In pairs, make predictions about what will happen in each of the following experiments. Use the worksheet provided.

Materials:

- limewater
- drinking straw
- beaker (e.g. 250 ml.)
- test tube
- small piece of zinc
- dilute hydrochloric acid in dropping bottle

Experiment # 1

Pour about 50 ml. of limewater into the beaker. Blow through a drinking straw into the limewater.

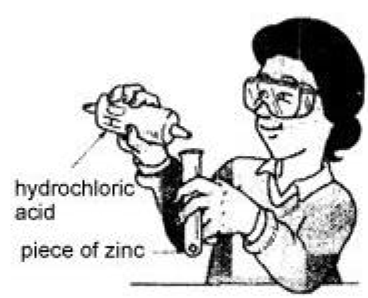


Question # 1 : What do you think will happen?
Question # 2 : What actually happened?

Experiment # 2

Place a small piece of zinc in a clean test tube. Add about 100 drops of dilute hydrochloric acid to the test tube so that the zinc is covered with acid.

Question # 1 : What do you think will happen?
Question # 2 : What actually happened?



PREDICTION	OBSERVATION
EXPERIMENT #1	EXPERIMENT #1
EXPERIMENT #2	EXPERIMENT #2

STAND & DELIVER

REVIEW

Try to recall and list the language that you learnt in this module. Discuss with your partner how you could use this language for teaching mathematics / science.

SYLLABUS STUDY

Identify one syllabus item / curriculum specification that would require you to use these language forms when teaching in the classroom.

PLAN

Script the lesson phase as you would carry it out in the classroom. Include the actual language that you would use in the classroom in you lesson notes.

DELIVER

Teach the lesson phase that you have prepared.

CHECKLIST FOR PEER FEEDBACK

Language Focus of Module:
Name of Teacher:
Subject / topic: Class:

Use this scale : 1 strongly agree 2 agree
3 disagree 4 strongly disagree

Items					
1.	The teacher's language is clear and easy to understand	1	2	3	4
2.	The teacher links the different steps with appropriate	1	2	3	4
3.	Teacher asks questions to elicit students' understanding	1	2	3	4
4.	The language used is accurate	1	2	3	4
5.	Correct technical terms are used.	1	2	3	4
6.	The teacher is fluent	1	2	3	4
7.	The teacher hardly uses Bahasa Melayu	1	2	3	4
8.	Language used in the teaching aids is accurate	1	2	3	4
9.	Teacher is able to use appropriate language to respond to students	1	2	3	4

Interesting expressions used:

Alternative expressions that could have been used:

General comments:

CHECKLIST FOR PEER FEEDBACK

Language Focus of Module:
Name of Teacher:
Subject / topic: Class:

Use this scale : 1 strongly agree 2 agree
3 disagree 4 strongly disagree

Items				
10. The teacher's language is clear and easy to understand	1	2	3	4
11. The teacher links the different steps with appropriate	1	2	3	4
12. Teacher asks questions to elicit students' understanding	1	2	3	4
13. The language used is accurate	1	2	3	4
14. Correct technical terms are used.	1	2	3	4
15. The teacher is fluent	1	2	3	4
16. The teacher hardly uses Bahasa Melayu	1	2	3	4
17. Language used in the teaching aids is accurate	1	2	3	4
18. Teacher is able to use appropriate language to respond to students	1	2	3	4

Interesting expressions used:
Alternative expressions that could have been used:
General comments:

CHECKLIST FOR PEER FEEDBACK

Language Focus of Module:

Name of Teacher:

Subject / topic: Class:

Use this scale : 1 strongly agree 2 agree
3 disagree 4 strongly disagree

Items					
19.	The teacher's language is clear and easy to understand	1	2	3	4
20.	The teacher links the different steps with appropriate	1	2	3	4
21.	Teacher asks questions to elicit students' understanding	1	2	3	4
22.	The language used is accurate	1	2	3	4
23.	Correct technical terms are used.	1	2	3	4
24.	The teacher is fluent	1	2	3	4
25.	The teacher hardly uses Bahasa Melayu	1	2	3	4
26.	Language used in the teaching aids is accurate	1	2	3	4
27.	Teacher is able to use appropriate language to respond to students	1	2	3	4

Interesting expressions used:

Alternative expressions that could have been used:

General comments:

BACK TO THE FUTURE

LOOKING IN

Progress Check-Where Am I?

Based on the action plan you designed for yourself in the previous module, record the progress you have made in the grid below.

Area identified for attention	Action planned	Action taken	Achievement

How do you feel?

Please mark the spot between the two face below to represent how you feel about the training programme you are here for.

At the end of each day, mark the spot between the two faces that represents you feelings about the sessions. Consider the speed of the process, the enjoyment, satisfaction or other feelings you have with the programme.

Use different letters of the alphabets to indicate the spot for the different times as follows:

X for beginning of the module
Y at the end of day one
Z at the end of day two.

Adapted from: Using Evaluation in Training and Development. P 105. Leslie Rae. Kogan Page. 1999

STEPPING OUT

There are five language sessions in this module. Reflect on the tasks carried out **after each session.** How useful were they in preparing you to teach Mathematics and Science in English? Rate how useful the sessions have been on a scale between 1 and 5. If you do not find the task(s) useful please indicate the reasons in the comments column.

Scale: **1 not useful** **2 partly useful** **3 useful** **4 very useful**

Areas	**1**	**2**	**3**	**4**	**Comments**
TEXT LAB					
Works Explorer					
Task					
Task					
Connecting with text Task					
Task					
Task					
Language in Action Task					
Task					
Springboard					
LANGUAGE LAB 1					
Grammar Works Task					
Task					
Getting it right Task					
Task					
Trying it out Task					
Task					
Task					
LANGUAGE LAB 2					
Grammar Works					
Task					
Task					
Getting it right Task					
Task					
Trying it out Task					
Task					
STAND AND DELIVER					
Task					

HELPING MYSELF

Based on the module that you have just completed or your own language needs, identify an area that you feel requires attention to enable you to teach Mathematics and Science in English effectively.

Write out what you plan to do before the next session. Your action plan should contain

- **Time frame** (duration of your plan)
- **Things to work on** (your objectives)
- **Things to do** (activities I proposed to carry out to achieve my objectives)
- **Thing I tried** (what I managed to do)

(√) Area/s that need attention	Action plan
Speaking ( ) Reading ( ) Vocabulary ( ) Grammar ( )	Time frame Thing to work on Thing to do Things I tried

SAMPLE 1

HELPING MYSELF

Based on the module that you have just completed or you own language needs, identify an area that you feel requires attention to enable you to teach Mathematics and Science in English effectively.

Write out what you plan to do before the next session. Your action plan should contain

- **Time frame** (duration of you plan)
- **Things to work on** (your objectives)
- **Things to do** (activities I proposed to carry out to achieve my objectives)
- **Things I tried** (what I managed to do)

(√) Area(s) that need attention	Action plan
Speaking ( ) Reading ( ) Vocabulary ( ) Grammar (√)	**Time frame** 10 – 15 September 2002 (5 days) **Thing to work on** To be able to use the auxiliaries **– 'is', 'are', 'was', 'were'** to construct 'Wh' questions accurately **Thing to do** 1. Refer to one Grammar Reference book 2. Read up on rules to construct 'Wh' questions. 3. Complete practice exercise(s) given in the book. **Thing I tried** 1. Read Collins Cobuild Students Grammar. Harper Collins 1991. 2. Practised Exercise B, p 59: Score: 67/100

SAMPLE 2

HELPING MYSELF

Based on the module that you have just completed or your own language needs, identify an area that you feel requires attention to enable you to teach Mathematics and Science in English effectively.

Write out what you plan to do before the next session. Your action plan should contain

- **Time frame** (duration of your plan)
- **Things to work on** (your objectives)
- **Things to do** (activities I proposed to carry out to achieve my objectives)
- **Things I tried** (what I managed to do)

<table>
<tr><th>Area(s) that need attention</th><th>Action plan</th></tr>
<tr><td>Speaking (√)

Reading ( )

Vocabulary ( )

Grammar ( )</td><td>Time frame
10- 15 September 2002 (5 days)

Thing to work on
To be able to talk in English for 10 minutes to the English teacher/ a friend at least 3 times.

Things to do
1. Identify someone who will collaborate with me.
2. Select a topic to talk about e.g. newspaper item
3. Identify and practice useful phrases to be used for conversation.
4. Ask for feedback on pronunciation.

Things I tried
Talked to the colleague 2 times.
Learned to pronounce 5 new words.
Learned 4 new useful phrases.</td></tr>
</table>