English for Science

Unit 1: Words, Notes and Charts

Revised Edition 1999

Education Department
Hong Kong

Aims

- To activate background vocabulary with word webs and mind maps
- To help with pronunciation by breaking up a word
- To practise note-taking skills which are subject specific
- To practise listening, note-taking and giving feedback
- To describe graphs and charts
- To work with written description of charts and graphs

Materials

- EFS1.1 Student's File — Find Someone Who
- EFS1.2 Student's File — Graphs and Charts
- EFS1.3 Student's File — Describing Graphs
- EFS1.3 Teacher's Resource Kit — Sentences for ESF1.3

  (The word web, the pronunciation spot and the listening and note-taking parts do not have worksheets)

Procedure

1. The first activity should be a getting-to-know-you activity. This can take the form of a name game of some sort. A couple of options are given below.

   (These can be used whenever a teacher feels the class needs bringing together)

   A) Get the students to stand in a circle. Each student should introduce themselves to the class by saying "My name is .....". Decide to go clockwise or anti-clockwise. You should start as an example. Once each student has said his or her name, ask them to go around the circle in the other direction; again the students introduce themselves. Once the name comes round to you again, change the direction and introduce yourself and the person to your left by saying, "My name is ..... and this is .....". Each student then follows suit introducing themselves again along with the person on their left. Once or twice around the circle should be enough.

   B) Students could interview the person sitting next to them to find out the usual things, how old they are, whether they have any brothers or sisters, where they live and hobbies, etc. Then in turn each student introduces their partner to the class.

   C) If the class have been working together for some time already, then you should get a volunteer to introduce a friend to the class. The friend then introduces another student and so on until everyone has spoken and introduced someone. The last student could introduce you.

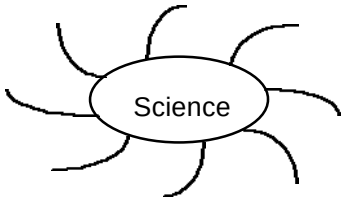
   D) Take a ball into the class. Get all the students to stand in a circle. Call one student's name and throw the ball to him/her. He/She catches it, then calls another name and throws the ball to the named person. Continue until everyone has thrown and caught the ball at least once.

   Do one or more of these. You will not need or want to do more than two. If you have a pet name game, then you should use that instead.

2 Find Someone Who..... Refer the students to **ESF1.1**. The students should walk around asking the questions until they have a name next to all of them. Once the students look as if they have exhausted the options, do a quick feedback session getting a name for each question.

3 You should then write on the black/white board the agenda for this session. You can either use this procedure and summarise it, or just write up the aims of the session. See the overall aims at the start of the unit. This agenda should be kept up for the entire session and so you should write it in a corner of the board you are not going to use during the session. An advance organiser such as this agenda helps students organise their learning. This idea can be used in all units if applicable.

4 The next activity is a "brainstorming" of scientific vocabulary. In the middle of the board, draw a circle and write the word “science” in it. From the circle, you should draw a series of legs like a spider's legs.



5 Get each student to draw one of these on a sheet of paper. The students should then write down any words that they connect with the word “science”. Allow them to work individually and then when they have stopped, get them to share ideas with a partner or in a small group of three or four.

6 Get the groups to give feedback to you and write the words they give you on the board. Not all the words will come directly from SCIENCE; some may be offshoots and so you may need to have secondary legs. For example:

Periodic table---Chemistry---SCIENCE---Physics----atomic physics---accelerator

Once you have built up a board full, get the students to categorise the vocabulary. These may fall under general headings such as Chemistry, Biology, Physics, but students should be allowed to categorise them as they see fit. These lists can be used as a reference for the future.

7 Pronunciation Attack - optional - this is not part of a systematic attack on pronunciation, but it may be a good time to do some pronunciation practice on the words that have come up during the brainstorming. If you are not sure how to pronounce some of the terms, you might want to hold this over until you have had a chance to get expert advice.

8 The next main activity is going to work towards a note-taking exercise. The text used is from the Hong Kong Advanced Level Examination Regulations and Syllabuses. Although the vocabulary is not very subject specific, it may be a good idea to have a short dictation activity. You could do this as a game. Get the students into teams of four or five. Call out the following list of words. As you do so, the teams should try to write them down.

Experimental, technology, conventions, numerical, phenomena, evaluation, critical, formulate, manipulative, hypotheses, diagrammatic, judgements.

Get a member from each group to come up to the board and write their list on the board. You may need to decide on what type of "prize" winners of mini-competitions should get. Give a prize to the team with the most correct spellings.

9 Ask the class what are the most important things to do when they take notes from a lesson. Possible answers will be:

only write down key words; write as neatly as possible; use abbreviations; if you use abbreviations be consistent; read your notes as soon as possible after taking them, etc.

10 Tell the students they are going to take some notes from a tape. There will be three sets of notes to take building up from a very simple exercise to a more difficult one. Tell the students that all of the notes are based on the syllabuses for the three main science subjects, Biology, Chemistry and Physics.

11 Tell the students they should listen to the tape and try to take notes. Play the first section of the tape and stop. Allow the students time to check their work. Ask if anyone wants to listen to the segment again. If they do then rewind the tape and play it once more. This first segment is fairly short and so the students should not need to listen to it more than once.

12 The tapescript for the first listening is shown below.

"The aims set out below describe the educational purposes of a course based on the AS Biology syllabus. Some of these aims are reflected in the assessment objectives; others are not because they cannot readily be translated into measurable objectives. All, however, are essential aims for the AS Biology course:

1. to develop students' appreciation of the wonders of the living world; and to promote respect for all living things;
2. to broaden and stimulate students' interest in learning biology; to encourage their worthy use of leisure, and to help them to acquire self-initiative in the study of biology;"

13 Get feedback from the students. Check that they have all written something. Ask the students what the listening is about, how many points have been mentioned and what they are. Write their ideas on the board. Once you are satisfied that most of the students have understood the segment, go on to the second one. This is slightly longer. Again you should prepare the students for the listening and play the tape up to three times if they need it.

14 The tapescript for the second segment appears below.

"A course of study based on this Syllabus should

1. provide a balanced course for further study and give an appreciation of the nature and the importance of physics in daily life;
2. help students to develop interest, motivation and a sense of achievement in their study of physics;
3. develop an appreciation of the developments in physics and an awareness of the relationships of physics to everyday life, and of the role of the applications of physics in the fields of engineering and technology;

4. establish a conceptual framework for physics and provide an understanding of its methodology;
5. encourage a balance between an experimental and a theoretical approach to physics;
6. develop skills relevant to the application of physics, such as experimental design, experimental technique, problem solving, mathematical analysis, critical appraisal and communication;
7. to help candidates to acquire a sense of moral and social values and readiness to becoming responsible citizens in a changing world."

15 Ask the students what the listening is about, how many points have been made and what they are. Again write the thoughts of the students on the board. Once you are satisfied that most of the students have understood the segment, go on to the third one. This is slightly longer. Again you should prepare the students for the listening and play the tape up to three times if they need it.

16 The tapescript for this segment is shown below.

AIMS AND OBJECTIVES

A major aim of the syllabus is to present chemistry not only as a body of knowledge, but also as a field of enquiry, and to bring candidates to recognize the intellectual discipline which it provides. Abilities to be fostered include those of imagination and speculation as well as acquisition of knowledge and experimental skills.

Candidates should acquire a capacity to deal with the following:

(a) Basic Concepts

1. knowledge of chemical facts, principles, methods and terminology.
2. the ability to understand and interpret scientific information presented in verbal, mathematical, diagrammatical or graphical form and to translate such information from one form to another.
3. the ability to formulate and test hypotheses.
4. the ability to interpret phenomena in terms of models, laws and principles.
5. the ability to solve problems which are unfamiliar or presented in a novel manner.

(b) Experimental Investigation

1. the appropriate manipulative skills to carry out experimentation from written instructions either given or self-devised.
2. skill in observation and recording of observations.
3. the ability to suggest apparatus and procedures for carrying out experiments.
4. the ability to interpret experimental results in terms of chemical principles.
5. an appreciation of safety aspects when carrying out experimental work.

(c) Interpretation and Application

1. the ability to organise ideas and facts and present them clearly.
2. a critical approach to information and ideas.
3. the ability to understand and to appreciate the applications of chemical knowledge in other scientific and technological studies, in industries and in society.

17 Ask the students what the listening is about, how many points have been made and what they are. Again write the thoughts of the students on the board. In groups get the students to try to reconstruct four points made in the second or third segments. They should try to get as close as possible. Allow them up to 15 minutes to do this before feeding back to you. Get each group to write two of their points on the board. Again this could be done as a competition. You may want to give out copies of the tapescript for self-study later.

18 Many of the points made in the three syllabuses are similar. One very important skill in science is the ability to interpret graphs and charts, which is the next section of the unit.

Tell the students to look at worksheet **EFS1.2**. There are six graphs on the page. To begin with, ask the students to identify the first four types of graphs. They are:

1 a bar chart

2 a line graph

3 a scattered graph

4 a pie chart

You could then ask the students what each one is best used for. Here are some suggestions:

1– *for definite totals of different substances. Useful for comparing different values at specific times.*

2– *plotting a change or changes of one property in relation to another property, perhaps temperature against time.*

3– *plotting experimental reading so that patterns of the relationship between variables will emerge.*

4– *looking at percentage constituents of a substance, e.g. 20% oxygen, 79% nitrogen, 1% rare gases.*

Your students may well have other acceptable answers.

19 Now get your students to look at the last two graphs. Tell them they are not exact models of two curves. Ask them what they look like.

The expected answers would *be "Number 5 looks like an exponential curve and number 6 looks like a sine wave".* "It looks a bit like .....". This is a useful expression when trying to describe an observation or a diagram.

20 The next section **(ESF1.3)** will look at describing graphs in slightly more detail. This activity is similar to the one in "The Business World". You have 7 graphs on worksheet 3. Below and in the resource kit are seven descriptions. In groups of four to six, the students should try to match the descriptions to the graphs.

- *The voltage was stepped up in equal values and kept at the new value for equal times. (Chart 1)*
- *The pressure fell rapidly but then it appeared to stabilise. It then dropped dramatically, levelled off and then rose sharply.(Chart 4)*
- *There was a gradual, but constant rise throughout the experiment. (Chart 2)*
- *The pressure was increased by equal amounts each time and then kept constant for the test time. It was only at the highest pressure that we saw a very slight drop which indicated a leak. (Chart 5)*
- *Initially the temperature rose rapidly. After a short time the rise began to slow down until the temperature stabilised at about 87°C. After the test the valve was opened and the pressure dropped almost immediately to zero. (Chart 7)*
- *The pressure fell slightly over the test period. (Chart 6)*
- *The current cycled between a maximum and minimum value. (Chart 3)*

21 Pronunciation Spot. The students have just read a number of phrases describing graphs. Here is a list of those phrases. As a cooler, you could go on to do some choral drilling of the pronunciation. The phrases can be found on the tape, Science Listening 2.

The voltage was stepped up
The pressure fell rapidly
it appeared to stabilise
a gradual, but constant rise
The pressure was increased
a very slight drop
the temperature rose rapidly
the temperature stabilised at about
The pressure fell slightly
The current cycled between

22 As an extra option, you could get the students to write their own descriptions of graphs and then get a partner to draw the graph from the description.

23 Review of the unit.

Ask the students to look back at what they have practised in this unit. Get them to write a short summary of it in their note books, and what they think it has helped them with.

They have practised:

- some social skills - the warmers
- asking and answering questions - the "find someone who....." and other activities
- activating their own vocabulary and vocabulary storage methods - word-webs
- pronunciation
- spelling unfamiliar words
- listening for specific purposes and note taking
- describing graphs using adverbs

24 In the next unit they will be doing "meatier stuff" like grammar, error correction, writing and reading, so if they complain about this somewhat easier unit, warn them that it is about to get more difficult.