GURU PELATIH dan KEPERLUAN PENGAJARAN

"Pendidikan ke arah perkembangan keintelektualan"

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Perpustakaan Negara Malaysia Data Pengkatalogan dalam Penerbitan.

Guru Pelatih dan Keperluan Pengajaran

Guru Pelatih dan Keperluan Pengajaran, PPIP, USM dan SPPS, UMS.

ISBN : 983-2514-29-1

1. Pendidikan
2. Guru Pelatih
3. Keperluan Pengajaran

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PRAKATA

Selamat menjalani proses Latihan Mengajar (LM) dan Internship (LI). Buku ini disediakan bagi memantapkan lagi Rancangan LM/LI program pendidikan guru. Rancangan LM/LI bermatlamat mengembangkan potensi pelajar bagi mencapai kecemerlangan amalan praktik di organisasi-organisasi pelajar ditempatkan. Rancangan ini penting kerana rancangan ini memberi peluang terbaik kepada pelajar sebagai bakal guru atau kakitangan untuk memahami dan mengetahui secara langsung environmen sebenar iklim profesion ini. Latihan ini di anggap sebagai kemuncak bagi program pengajian pendidikan yang diikuti sekarang khususnya di sekolah-sekolah pendidikan kerana pada tahap ini aplikasi pengetahuan teori yang telah dikuasai dapat direalisasikan dalam situasi sebenar. Pengalaman yang ditempuh dapat mengasah jati diri menghadapi cabaran profesion yang sangat dinamik ini.

Bagi mencapai matlamat dan tujuan LM/LI buku telah disusun dalam empat bahagian yang utama. Bahagian I mengulas tentang profesion pendidikan dengan fokus kepada isu dan pemasalahan profesionalisme ini khususnya dari aspek motif pemilihan kerjaya dan kelemahan-kelemahan yang ketara dikesan di kalangan guru pelatih. Bahagian II buku ini pula mengupas prosedur dan langkah terbaik mengurus dan membina hubungan pengajaran dan pembelajaran yang akrab dengan pelajar. Suatu pengajaran yang cemerlang terbina hasil dari hubungan tidak langsung yang wujud antara pengajar dan pembelajar. Bahagian ketiga buku ini menyediakan beberapa pilihan pengajaran bagi membantu guru melaksanakan pengajaran berkesan. Hal ini merujuk khususnya kepada pengajaran dalam Bahasa Inggeris bagi subjek Sains dan Matematik di peringkat sekolah menengah kini. Akhirnya buku ini memberi kupasan tentang dua wawasan pendidikan bagi mencemerlangkan lagi arena pendidikan.

Semua topik perbincangan yang terdapat dalam buku ini adalah diolah semula dari buku 'Guru Pelatih dan Keperluan Pengajaran' terbitan PPIP, USM dan dipadatkan lagi dengan pemikiran dan sumbangan tenaga akademik di SPPS, UMS. Pihak penyunting mengucapkan terima kasih kepada semua penyumbang idea bagi menghasilkan buku ini.

Menjadi harapan buku ini dapat dimanfaatkan oleh semua pihak khususnya guru-guru pelatih yang akan melalui proses latihan mengajar. Anggaplah LM dan buku ini sebagai langkah pertama paling berharga mengorak langkah ke arah penglibatan yang lebih komited terhadap profesion keguruan ini. Jadikan sebarang rintangan dan cabaran profesion ini sebagai peluang terbaik menilai diri dan meningkatkan lagi tahap ikhtisas diri. Selamat maju jaya.

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ENGLISH FOR SCIENCE & TECHNOLOGY (EST)

Introduction

In line with Malaysia's Vision 2020 to attain developed nation status, there is the need to construct a knowledge based society, especially in the fields of science and technology. English, on the other hand, has always been associated with the development of these two inter-related areas. Hence, Malaysians are expected to master the English language which has become more important as the medium of instruction in the study of science and technology. The use of English as language of science and technology is also regarded as the foundation for both present and future studies at tertiary level.

In relation to this, the Ministry of Education has proposed the implementation of English for Science & Technology (EST) in secondary schools in Malaysia in 2000. EST was later implemented in 2003, is as an elective subject to Form Four and Five students in science and technical streams. The implementation of EST is, however, compulsory and it will be taught as a separate subject from the present English language subject. In fact, schools should allocate 3 periods per week for this new subject.

What are the Aims and Objectives of EST?

The Aim: The main aim of introducing EST is "to provide students with the language basis to access and understand materials on science and technology, and to express ideas and concepts in English" (Curriculum Specs, 2003:1) underlying

The Objectives: To enable the learners to

1. obtain information by reading and understanding different text types in science and technology in English.
2. obtain information by listening to and viewing texts on science and technology in English.
3. access and understand information on the Internet and other electronic media.
4. present information on science and technology at an appropriate level in both written and spoken forms.
5. think critically and give their points of view on issues pertaining to science and technology.

EST is not distinctly different from the English language subject that we have in schools. On the other hand, they complement each other. Whereas students are exposed to the rules and regulations of the English language in their English classes, EST provides information on issues on science and technology, in the medium of English.

What is the Different between EST and General English language?

The syllabus for the general English language was revised in 2003 and is now derived from the functions of language in daily life, namely informational, interpersonal and aesthetic. The Informational component is mainly used to construct the structures of EST syllabus which involves acquiring information from various sources as in printed and electronic. Apart from that, EST syllabus reflects the interpersonal interaction and the aesthetic use of language when students are able to communicate with each other and give opinions.

What is included in the EST Syllabus?

Basically, EST aims to assist students in understanding the basic concepts and ideas in science and technology. As such, topics covered in this subject would include Science (Physics, Chemistry and Biology) Mathematics, Environmental education and various technologies.

The following is the themes and topics for EST subject:

1. Nature and Environment	eg: how weather affects the lives of people
2. Man and Living Organisms	eg: Anthrax as a bio-weapon
3. The Universe/ Astronomy/ Aerospace	eg: the Hubble telescope
4. Technology and Communications	eg: how information is stored
5. Nutrition/ Food/ Health/ Human Body	eg: genetically modified food
6. Energy/ Matter & Mass/ Force & Motion	eg: the principle of gravity
7. Natural Resources & Industrial Processes	eg: energy from the wind

In addition, teachers should employ all four skills, namely listening, speaking, reading and writing, in an integrated manner and use authentic materials as teaching aids.

Eventhough grammar is not the main focus in EST lesson, it should not be neglected. Instead of teaching grammar in isolation, it should be taught within the context of the topics for study. There are, however, certain emphases such as listed below:

- Compound nouns
- Roots of words, including the prefixes and suffixes
- Modals
- Passive construction
- Imperatives
- Conditional forms, including logical and sequence connectors and, relative clauses

Teachers should remember that the focus is not solely students' grammatical competent but more towards developing their overall language ability in the English language.

Besides that, vocabulary is also an important element in EST lesson since there will be a lot of scientific and technical register related to the topics. The emphasis is not solely on the technical jargon but towards semi-technical vocabulary for any layman. The teachers can also refer to the Word List found in the Curriculum Specifications for EST. The words can always be added based on the different themes and topics.
Apart from grammar and vocabulary, there are also other educational emphases incorporated in EST syllabus such as

- multiple intelligence
- knowledge acquisition
- values and citizenship
- learning how to learn skills
- preparation for the real world
- critical and creative thinking skills and,
- information and communications technology (ICT) skills

Planning the EST Lesson Plan

Most English Department in schools have prepared the scheme of work of EST in the beginning of the year. The lesson plans will be developed based on different themes (and topics) as specified in the scheme. (Appendix I)

What should be Taught in an EST Class?

- Anything related to science and technology

On the surface level, EST may seem similar to the general English language. However teachers have more freedom in choosing the teaching approaches and materials since there is no standard text book for this subject. They are supposed to refer to the specified themes but they can design the lesson plan on any topic based on their creativity. (Appendix 2)

In addition, teachers should employ all four skills (if possible), namely listening, speaking, reading and writing, in an integrated manner and use authentic materials as teaching aids. Teachers are encouraged to use communicative approach and to be more open with the students. Since EST is an elective subject, the students are not obliged to pass it with flying colours (though it is definitely better to get good grade) and as such EST is not an examination-oriented subject. Both teachers and students should take the opportunity to have fun and explore the English language in their EST classes. In relation to that, any interactive activities such as role-play and fieldwork could be performed during the lessons. As stated earlier, in an EST class, students are exposed to all text types within these fields and encouraged to explore the world of science and technology through the use of internet and other electronic media.

Where can I get the Teaching Materials?

There are a lot of references around such as encyclopaedia, magazines, newspapers, pamphlets, brochures and others.

What is the format of Examination of EST?

EST is an elective subject for upper secondary students but it is also included in the SPM examination. (Appendix 3)

Conclusion

In conclusion, EST provides the students with more opportunities to practise the English language. Thus, it is hoped that when the students are able to enjoy themselves in EST classes, they will be motivated to utilise English in everyday life.

EST should also be able to will equip students with better English language proficiency, particularly in knowledge related to science and technology, for their future undertaking.

APPENDIX 1

SEKOLAH MENENGAH SAINS SABAH, KOTA KINABALU
SCHEME OF WORK FOR ENGLISH FOR SCIENCE & TECHNOLOGY, FORM 4, 2004

WEEK	DATE	LEARNING AREAS	CHECKLIST
1 2 3 4 5	5 Jan 12 Jan 19 Jan 26 Jan 3 Feb	**Introduction** 1. Getting to know EST **Nature & Environment** ▪ Local and foreign settings ▪ Weather (√) ▪ Natural disasters	
Hari Raya Haji (2 Feb)			
5	4 Feb	**Ujian Setara (4-5 Feb) Form 1–5**	
6	9 Feb	Continuation/Revision	
7 8	16 Feb 23 Feb	**Nutrition/ Food/ Health/ Human Body** 1. Balanced diet 2. Genetically modified foods (√) 3. Parts of human body	
9	1 March	**PPP1 (1- 10 March) Form 1-5**	
10	11 March	Continuation/Revision	
Mid Term 1 School holidays (15-19 March)			
11 12	22 29	Continuation/Revision	
13 14 15 16	5 April 12 April 19 April 26 April	**Technology and Communications** ▪ The internet ▪ Satellite broadcast (tv/ radio) ▪ Artificial intelligence	
Wesak Day (3 May)			
Maulidur Rasul (4 May)			
17&18	5 May	**PPT (5 – 14 May) Form 1 –5**	
19 20	17 May 24 May	**Man and Living Organisms** ▪ Genetic engineering ▪ Antrax as a bioweapon (√) ▪ Cloning	
Mid Year School Holidays (31 May – 11 June)			
21 22	14 June 21 June	Continuation	
23 24 25	28 June 5 July 12 July	**Natural resources and Industrial Processes** 4. Resources from nature (minerals, woods, water, petroleum etc) 5. Industrial products	
26	19 July	**PPP2 (19 – 28 July) Form 1,2 & 4** **Trial 1 PMR & SPM**	
27	29 July	Continuation/Revision	
28 29 30	2 Aug 9 Aug 16 Aug	**Energy/ Matter & mass/ Force & motion** 6. The principle of energy 7. Types of energy (wind, wave, geothermal etc) 8. The principle of force & motion 9. How roller-coater works (√) (+ windmill, hydro-electricity for dam etc)	
Mid Term 2 School holidays			
31	30 Aug	Continuation	
32	6 Sept	**Trial 2 PMR & SPM (6-15 Sept)**	
32 33 34 35	6 Sept 13 Sept 20 Sept 27 Sept	**The Universe/ Astronomy/ Aerospace** ▪ The solar system ▪ The Hubble telescope (√) ▪ What is astronomy ▪ What is aerospace	

32 33 34 35	6 Sept 13 Sept 20 Sept 27 Sept	**The Universe/ Astronomy/ Aerospace** ▪ The solar system ▪ The Hubble telescope (√) ▪ What is astronomy ▪ What is aerospace	
36	4 Oct	**PAT (4 – 13 Oct) Form 1,2 & 4**	
37 38 39 40 41	14 Oct 18 Oct 25 Oct 1 Nov 8 Nov	**1. Revision** **2. Enrichment programmes** **3. Language activities** **4. EST Project**	

Subject : EST Form 5

Class: 5 Delta
Time: 6A (Tuesday) 15/06/04
Theme: Man and Organisms
Topic: Health
Learning Outcomes:

2.0	2.3 Comparing and contrasting information 2.4 Drawing conclusion
3.1	Present in clear, simple English

Behavioural Objectives:
By the end of the lesson the students should be able to:
i) complete a close passage
ii) transfer information from a passage to a table

Activities:

1. Completing two task sheets on health

EE: TS, FS, MI and Constructivism

Teaching Aids : Handout on health (as enclosed)

Reflection:

Subject : EST Form 5

Class: 5 Beta
Time: 6A (Thursday) 17/06/04
Theme: Man and Organisms
Topic: 20 Ways to ....
Learning Outcomes:

2.2	Identifying relevant facts and issues
2.3	Comparing and contrasting information
2.4	Drawing conclusion
3.1	Present in clear, simple English

Behavioural Objectives:
By the end of the lesson the students should be able to:
i) write 20 ways to – stay thin/ fat/ rich/ poor/ young/ healthy

Activities:

a. Group work – completing a brochure on selected topic

EE: TS, FS, MI and Constructivism.

Reflection:

APPENDIX 2.1

Matter and Mass

- Everything found everywhere in the Universe is made of matter in an incredible variety of forms.
- The examples of these forms are solids, liquids and gases

Question 1

i. Give 2 example of solid matters
   -
   -

ii. Give 2 examples of liquid matters
   -
   -

iii. Give two examples of gases matters
   -
   -

Question 2

All different kinds of matter have one thing in common – mass, which is the amount of material in any object, and shows itself as a resistance to being moved. **Explain very briefly why a truck is much harder to move than a car.**

.....
.....

Question 3

Matter can be altered in various ways. Explain how water, as most of other matters, can exist as ....

i) solid
.....
.....

ii) liquid
.....
.....

iii) gas
.....
.....

ASSESSMENT FORMAT

- PAPER 1
- PAPER 2

	PAPER 1 (6355/1)	PAPER 2 (6355/2)
Types	Subjective written test	Objective test
Questions	3 questions	30 questions
Marks	50 marks	30 marks
Duration	1 hour 15 minutes	1 hour

PAPER 1 (Section A & B)

Section A [20 marks]

Part 1

Two of our most abundant and important elements are the gases; oxygen and nitrogen. Although they are the same in many ways - both are colourless, odourless and tasteless, each one is necessary to life in a unique way.

Oxygen is very active chemically. It readily combines with other substances in a process called oxidation. For example, iron combines with oxygen in the air to produce rust.

The rapid oxidation of fuels causes combustion or fire. If a substance with a low kindling temperature, such as an oily rag is heated, oxidation may occur so rapidly that the substance will burst into flames.

In contrast to oxygen, nitrogen is comparatively inactive. It does not readily combine with other substances. Therefore, nitrogen does not support combustion. However, because many nitrogen compounds are unstable, they are used in explosives.

Questions 1- i and ii

i) Based on the text, give a summary on the uses of both gases; oxygen and nitrogen.

ii) Give other uses of oxygen and nitrogen based on your scientific knowledge on these gases.

iii) If you were a scientist, how would you combine these two gases and what would they be used for?

Based on the information in the text, complete the table below.

GASES	OXYGEN	NITROGEN
Uses	1.	2. ..... 3. .....
Differences	4. ..... 5.	6. ..... 7. .....
Similar properties	8. ..... 9. ..... 10.	

[10 marks]

Section B

You are the Research Manager of a production company. You have been asked to consider the use of robots in your company's production line. However, you have to consider the use of human labour as well. Based on the information given,select the more appropriate proposal.

Proposal A : Robots

- can do heavy work
- reliable – not get tired
- no need to pay salaries
- expensive to buy
- can only do programmed tasks/ work

Proposal B : Human Labour

- flexible – can do various tasks/ work
- creative – can produce better products
- does not require high salaries
- also needs training
- may fall ill or absent from work

Write a report to the Chief Executive Officer of your company. Your report should include the following:

- *the proposal of your choice*
- *comparisons between the two proposals*
- *reasons and elaborations for your choice*

PAPER 2 (Consists of 30 multiple choice questions)

For example: Question 1

Read the text below and answer the following question.

> Irradiation is a technique which uses radiation to preserve food. When radiation passes through food, it kills the organisms in it. In fruits and vegetables, radiation slows ripening and stops further growth. This technique also alters the molecules of the food and destroys vitamins and other nutrients. There are some reservations about the use of this technique because of fears about the levels of radioactivity in treated food.

1. One advantage of using radiation is that is

A destroys organisms present in food
B preserves vitamins and nutrients in food
C hastens the ripening of fruits and vegetables
D promotes the growth of vegetables and fruits