

Subject Learning Manual: Integrated Science

1. Our Expectations

We expect that the students will show an interest in exploring contemporary science and related issues. They will demonstrate fundamental scientific knowledge, creativity, basic communication and critical thinking skills in science and technology learning activities.

The long term goal of science education is to help students develop an interest in science and to master the essential scientific knowledge and skills to become life-long learners in science and technology.

2. Curriculum Framework

The F.1 I.S. curriculum is divided into 5 parts.

I. Introducing Science

- ◆ Scientific investigations
- ◆ Science laboratory, laboratory equipment and apparatus
- ◆ Laboratory safety
- ◆ Measurements of length, temperature, weight, volume and time in science
- ◆ Concept of fair test

II. Looking at living things

- ◆ The characteristics of living things
- ◆ The differences between plant and animal life
- ◆ The use of simple key to classify animals and plants

III. Cells and human reproduction

- ◆ The use of microscope
- ◆ The structure of animal cells and plant cells
- ◆ Asexual and sexual reproduction
- ◆ The male and female reproductive systems
- ◆ The process of sexual reproduction in human
- ◆ Puberty and secondary sexual characteristics
- ◆ Different birth control methods

IV. Energy change and energy sources

- ◆ Different forms of energy
- ◆ Energy conversions
- ◆ Fuels
- ◆ Generating electricity
- ◆ Energy sources and us

V. Matter

- ◆ Different states of matters
- ◆ Particle theory
- ◆ Explain the different states of matter by Particle model

3. Learning Outcomes

After completion of F.1 I.S. curriculum, the students should achieve the following learning outcomes.

Scientific investigation

- ◆ To propose hypothesis and devise methods for testing them
- ◆ To plan and conduct scientific investigations
- ◆ Acquire the skills to make accurate measurement
- ◆ Use of apparatus and equipments in science laboratory
- ◆ To evaluate the fairness of tests and draw conclusions based on findings

Life and Living

- ◆ To appreciate the diversity of life and to understand the basic principles of classification systems
- ◆ To recognize that cell is the basic unit of life
- ◆ To develop a basic understanding of some of the life processes
- ◆ To appreciate and understand how a new life is born and be aware of the physiological and emotional changes during puberty

Energy and change

- ◆ To identify processes of energy transfer and conditions that affect them
- ◆ To identify forms and transformations of energy in sequences of interactions
- ◆ To aware the energy crisis and the ways to solve it

Matter

- ◆ To understand the evidences supporting the particle theory
- ◆ To explain the states of matter by particle model

4. Learning Strategy

The following are ways to help students in learning I.S. effectively.

- ◆ Students should be attentive during the lessons. Pay attention especially the teacher explain the concept or the procedure of the experiments
- ◆ Understanding the concepts is more important than memorizing the content. If there is any things not understand, raise your hands to ask teacher
- ◆ Read the textbook after the lessons. Underline the important points in the textbooks.

- ◆ After the experiment or activities. Record the results in the answer books immediately. Try to make conclusion from the results of the experiments.
- ◆ Spell the important vocabularies, dictate the vocabularies as necessary
- ◆ Do more exercises so that you can apply the concepts or knowledge in answering the questions
- ◆ More active participate in various kinds of learning activities e.g. carrying out experiments and activities. Cooperate actively with other classmates in the activities.
- ◆ Learn to transfer skills and learning form one context to other contexts in science. Transferability of process of investigation and acquisition of new knowledge will help students continue to learn.

5. Subject Characteristics

Integrated Science curriculum emphasizes a balanced approach towards the acquisition of scientific knowledge, attitudes and skills through carefully organized activities.

Many hand-on activities provide opportunities for developing students' generic skills as well as values and attitudes.

6. Appendices

I. Glossary

Chapter 1

Scientists scientific investigation hypothesis experiments laboratory apparatus
 equipment Bunsen burner Thermometer Temperature Measuring cylinder
 volume Stop watch Time interval fair test controlled variables

Chapter 2

Characteristics react to stimuli excrete habitats variations classification
 backbone vertebrates invertebrates scales Amphibian Reptiles Mammals
 mammary glands

Chapter 3

Microscopes magnification chloroplasts Cell membrane Nucleus
 Cytoplasm Vacuole Cell wall Reproduction offspring ovulation
 mating fertilization embryo implantation pregnant placenta
 Puberty sex hormones menstrual cycle Menstruation birth control
 methods

Chapter 4

Chemical energy Kinetic energy Potential energy Electrical energy
 energy conversion energy converter Motor Generator turbine
 Global warming greenhouse effect Acid rain Hydroelectric power
 Nuclear power Geothermal power

Chapter 5

melting boiling freezing condensation Particle Theory
 Brownian motion particle model