**Course syllabus (ประมวลรายวิชา)**

**Subject Code** SCI 21101

**Subject** SCIENCE1

**Credit** 1.5 units

**Learning Standards** SCIENCE

**School** The Demonstration School of Suan Sunandha Rajabhat University

(English Program : Secondary Section)

**Semester** 1st Semester

**Academic Year** 2017 (B.E. 2560)

**Educational Levels** Lower Secondary Education Level (Lower secondary education grades 1-3,

also known as grades 7-9)

**Grade Level** Grade 7 (Matthayom 1)

**Curriculum** The Basic Education Core Curriculum 2001 (B.E. 2551) was announced by

The Ministry of Education.

**Learning Time** 3 hrs/ week

**Total Learning Time** 60 hrs

**Learning Area of Science**

**Why it is necessary to learn science**

Science plays an important role in our present and future world communities, as it concerns all of us in our daily lives and livelihoods. Science also involves technologies, instruments, devices and various products at our disposal, which facilitate our life and work. All these benefit from our scientific knowledge, which is combined with creativity as well as other disciplines. Science enables us to develop our thinking skills in various respects—logical, creative, analytical and critical. It also enables us to acquire essential investigative skills for seeking knowledge, and allows the ability for systematic problem-solving, and for verifiable decision-making based on diverse data and evidences. Science is essential to the modern world, which is intrinsically a knowledge society. All of us therefore need to be provided with scientific knowledge so as acquire knowledge and understanding of nature and man-made technologies that can be applied through logical, creative and moral approaches.

**What is learned in science?**

The learning area of science is aimed at enabling learners to learn this subject with emphasis on linking knowledge with processes, acquiring essential skills for investigation, building knowledge through investigative processes, seeking knowledge and solving various problems. Learners are allowed to participate in all stages of learning, with activities organized through diverse practical work suitable to their levels. The main content areas are prescribed as follows:

* **Living Things and Processes of Life:** living things; basic units of living things; structures and functions of various systems of living things and processes of life; biodiversity; genetic transmission; functioning of various systems of living things, evolution and diversity of living things and biotechnology
* **Life and the Environment:** diverse living things in the environment; relationship between living things and the environment; relationships among living things in the eco-system; importance of natural resources, and utilization andmanagement of natural resources at local, national and global levels; factors affecting survival of living things in various environments
* **Substances and Properties of Substances:** properties of materials and substances; binding forces between particles; changes in the state of substances; solution formation and chemical reaction of substances, chemical equations and separation of substances

**Strand 1: Living and Family**

**Standard Sc1.1: Understanding basic units of living things; relationship between structures an functions of living things,**

**which are interlinked; investigative process for seeking knowledge; ability to communicate acquired knowledge that could be applied to one’s life and care for living things.**

**Grade level indicators**

1. Observe and explain forms and characteristics of cells of unicellular and multicellular organisms.

2. Observe and compare essential components of plant and animal cells.

3. Experiment and explain functions of essential components of plant and animal cells.

4. Experiment and explain processes of passing substances through cells by diffusion and osmosis.

5. Experiment to find some factors essential for photosynthesis of plants, and explain that light, chlorophyll carbon dioxide and water are essential for photosynthesis.

6. Experiment and explain results obtained concerning photosynthesis by plants.

7. Explain importance of the photosynthesis process of plants on living things and the environment.

8. Experiment and explain groups of cells involved in transportation of water in plants.

9. Observe and explain structures of the systems for transportation of water and nutrients in plants.

10. Experiment and explain floral structures involved in plant reproduction.

11. Explain sexual reproduction processes of angiosperms and plant asexual reproduction processes by referring to various parts for propagation.

12. Experiment and explain responses of plants to light, water and touch.

13. Explain principles and effects of biotechnological application for propagation, improved breeding and increased productivity of plants, and apply acquired knowledge for useful purposes.

**Strand 3: Substances and Properties of Substances**

**Standard Sc3.1: Understanding of properties of substances; relationship between properties of substances and structures**

**and binding forces between particles; investigative process for seeking knowledge and scientific mind; and communicating acquired knowledge for useful purposes**

**Grade level indicators**

1. Experiment and classify substances into groups by using their texture or particle size as criteria and explain properties of each group of substances.
2. Explain properties and transition of substances by using particle arrangement models.
3. Experiment and explain acid-base properties of solutions.
4. Verify pH value of solutions, and apply the knowledge gained for useful purposes.

**Strand 3: Substances and Properties of Substances**

**Standard Sc3.2 : Understanding of principles and nature of change in the state of substances; solution formation; reaction;**

**investigative process for seeking knowledge and scientific mind; and communication of acquired knowledge that could be applied for useful purposes.**

**Grade level indicators**

1. Experiment and explain methods of preparing solutions with density in percentage, and discuss application of knowledge about solutions for useful purposes.
2. Experiment and explain change of properties, mass and energy of substances when they change state and dissolve.
3. Experiment and explain factors affecting changes in the state and dissolution of substances.

**Strand 8: Nature of Science and Technology**

**Standard Sc8.1: Application of scientific process and scientific mind in investigation for seeking knowledge and problem-**

**solving; knowing that most natural phenomena assume definite patterns that are explainable and verifiable within limitations of data and instruments available during particular periods of time; and understanding that science, technology, society and the environment are interrelatedใ**

**Grade level indicators**

1. Pose questions prescribing the issues or important variables for exploration and verification or conduct comprehensive and reliable study and research on matters of their interest.
2. Make verifiable hypotheses and plan several methods for exploration and verification.
3. Select techniques and methods for quantitative and qualitative exploration and verification yielding accurate and safe results by using appropriate materials and equipment.
4. Collect data and process it quantitatively and qualitatively.
5. Analyse and evaluate conformity of eye-witnesses with the conclusions both supporting and contradicting the hypotheses and data abnormality from exploration and verification.
6. Create models or formats explaining or showing results of exploration and verification.
7. Pose questions leading to exploration and verification of relevant matters, and apply the knowledge gained in new situations or to explain the concepts, processes and results of the project or task for others to understand.
8. Make a record and explain results of additional observation, exploration, verification and research from various sources of knowledge in order to obtain reliable data, and accept changes in the knowledge discovered when presented with new and additional data, eye-witnesses or contradictory data.
9. Display their work, write reports and/or explain the concepts, processes and results of the project or task so that others can understand.