

Preface

Science plays an important role in our daily life. Science, with the aid of creativity, has produced various instruments and appliances that facilitate the running of our lives and the performance of our works. Science demands the development of our thinking skills in various aspects such as logical, analytical and critical. Science also requires us to develop the investigative skills that are essential for enquiring knowledge, making decisions and solving problems based on available data and evidences. Science is essential to the forming of a modern knowledgeable society. Therefore, all of us need to be provided with scientific knowledge in order to gain an understanding of nature as well as man-made technologies and to apply them by creative and moral means for constructive and productive purposes.

The Basic Education Core Curriculum aims to inculcate the following five key competencies among students:

1. Communication Skill
2. Thinking Skill
3. Problem – Solving Skill
4. Technology Application Skill
5. Technological Application Skill

The learning objectives emphasize on the linking of knowledge to science processes, acquiring of investigative skills, accumulation of knowledge through investigative processes, and problem-solving.

Students are required to participate in all stages of learning with activities involving practical work organized to suit each level of learning. The main learning areas are as follows:

- **Living Things and Life Processes:** Living things; basic units of living things; structures and functions of various systems of living things and life processes; 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 ecosystem; importance of natural resources, and utilization and management 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
- **Forces and Motion:** Nature of electromagnetic, gravitational and nuclear forces; forces acting on objects; motion of objects; frictional forces; moment of variety of motions in daily life

- **Energy:** Energy and life; energy transformation; properties and phenomena of light, sound, electrical circuits, electromagnet, radioactivity and nuclear reactions; interrelationship between substances and energy; energy conservation; effects of utilization of energy on life and the environment
- **Processes of Change to the Earth:** Structure and components of the Earth; geological resources; physical properties of soil, rock, water and air; properties of the Earth's surface and atmosphere; change processes of the Earth's crust; geological phenomena; factors affecting atmospheric change
- **Astronomy and Space:** Evolution of the solar system; galaxies; the universe; interrelationship and effects on living things on Earth; relationship between the sun, the moon and Earth; importance of space technology
- **Nature of Science and Technology:** Scientific processes; investigation for seeking knowledge, problem-solving, and scientific mind

Strands and Learning Standard

Strand 1: Living Things and Processes of Life

Standard Sc1.1: Understanding basic units of living things; relationship between structures and 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 other living things.

Standard Sc1.2: Understanding of process and importance of genetic transmission; evolution of living things and biodiversity affecting humans and the environment; investigative process

for seeking knowledge and scientific mind; communicating knowledge that could be applied for useful purpose

Strand 2: Life and the Environment

Standard Sc2.1: Understanding of local environment; relationship between the environment and living things; relationship between living things in the ecosystem; investigative process for seeking knowledge and scientific mind; and communicating acquired knowledge that could be applied for useful purpose

Standard Sc 2.2: Appreciating the importance of natural resources; utilization of natural resources at local, national and global levels; and application of knowledge for management of natural resources and local environment on a sustainable basis

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 purpose

Standard Sc3.2: Understanding of principles and nature of change in the states of substances; solution formation; reactions; investigative process for seeking knowledge and scientific mind; and communication of acquired knowledge that could be applied for useful purpose

Strand 4: Forces and Motion

Standard Sc4.1: Understanding of the nature of electromagnetic, gravitational and nuclear forces; investigative process of to seeking knowledge and applying acquired knowledge for useful and ethical purposes

Standard Sc4.2: Understanding the characteristics and the types of motion of natural objects; investigative process for seeking knowledge and scientific mind; and communication of acquired knowledge for useful purposes

Strand 5: Energy

Standard Sc5.1: Understanding the relationship between energy and life; energy transformation; interrelationship between substances and energy; effects of energy utilization on life and the environment; investigative process for seeking knowledge; and communication of acquired knowledge that could be applied for useful purposes

Strand 6: Change Processes of the Earth

Standard Sc6.1: Understanding of various processes on the Earth's surface and inside the Earth; relationship between various processes that cause changes in climate, topography and form of the Earth; investigative process for seeking knowledge and scientific mind; and communication of acquired knowledge that could be applied for useful purposes

Strand 7: Astronomy and Space

Standard Sc7.1: Understanding of evolution of the Solar System, galaxies and the universe; interrelationships within the Solar System and their effects on the living things on the Earth; investigative process for seeking knowledge and scientific mind; and communication of acquired knowledge for useful purpose

Standard Sc 7.2: Understanding of importance of space technology utilized for space exploration and natural resources for agriculture and communication; investigative process for seeking knowledge and scientific mind; and communication of acquired knowledge that could be ethically applied to life and the environment

Strand 8: Nature of Science and Technology

Standard Sc8.1: Application of scientific processes and scientific mind in investigation for seeking knowledge and problem-solving; knowing that most natural phenomena assume definite patterns are explainable and verifiable within the limitations of data and instruments available during particular periods of time; and understanding science, technology, society and the environment are interrelated

Learners' Quality

- Understand characteristics and main components of cells of living things; relationship of function in various systems; genetic transmission; biotechnology; diversity of living things; living things' behaviour and responses to stimuli in the environment.

- Understand components and properties of solutions; pure substances; transformation of substances through change of their state; solution forming and chemical reaction.

- Understand frictional forces; moment of forces; variety of motion in daily life; rules for energy conservation; energy transfer; heat equilibrium; reflection, refraction and density of light.

- Understand relationship between electrical quantities; principles of electrical domestic circuits; electrical energy and basic principles of electronic circuits

- Understand change processes of the Earth's crust; geological sources; factors affecting atmospheric change; reactions within the solar system and effects on various things on Earth; importance of space technology.

- Understand relationship between science and technology; development and effects of development on quality of life and the environment.

- Pose questions with prescription and control of variables; give estimates to several possible answers; plan, investigate, verify, analyse and evaluate data conformity and create bodies of knowledge.

- Communicate thoughts and knowledge obtained from investigation and verification through verbal or written presentation, display, or application of information technology.

- Apply scientific and technological knowledge and processes in life and seek additional knowledge; create projects or work pieces in accord with their interests.

- Show interest, determination, responsibility, care and honesty in investigating and seeking knowledge by applying instruments and methods that provide reliable results.

- Are aware of the value of scientific and technological knowledge applied in daily life and livelihood; show appreciation, honour and respect of inventors' rights to their achievements.

- Show recognition, care and concern, as well as appreciate behaviour for utilization and conservation of natural resources and local environment.

- Work constructively with others; be ready to express opinions and acknowledge views of others

For common understanding and correct interpretation, the curriculum prescribes various codes for learning standards and indicators. One example is shown below:

Sc 1.1 Gr 7/2	
Sc	Subject area of Science
1.1	First subject area, Standard 1
Gr7/2	Indicator 2 for Grade 7 (Mathayom 1)

Yearly Teaching Plan

Science

Grade 7 (Mathayom 1)

8 chapters

120 hours

Learning areas	Time (hours)
1. Cell as a Unit of Life <ul style="list-style-type: none">• Understanding cells• Unicellular and multicellular organisms• Diffusion and osmosis in cells	11
2. Plants <ul style="list-style-type: none">• Photosynthesis• Transport system in plants• Sexual reproductive system of flowering plants• Pollination• Development of fruits and seeds in plants• Germination of seeds• Application of vegetative reproduction in flowering plants• Stimuli and responses in plants• Biotechnology	32
3. Matter <ul style="list-style-type: none">• Classifying matter• States of matter• Changes of states	10
4. Solutions <ul style="list-style-type: none">• Solutions and solubility• Dissolution• Acids and alkalis• pH indicators	14
5. Forces and Motion <ul style="list-style-type: none">• Scalar and vector quantities• Distance and displacement• Speed and velocity	10

6. Heat <ul style="list-style-type: none"> • Heat as a form of energy • Heat flow • Benefits of heat flow • Thermal equilibrium and effects of heat an matter • Absorption and radiation of heat 	22
7. Atmosphere and Weather <ul style="list-style-type: none"> • Layers of the Earth’s atmosphere • What is weather? • Factors of weather • Monsoons, tropical cyclones and thunderstorms • How to avoid dander during severe weather • Interpreting weather forecast and their importance 	14
8. Global Issues <ul style="list-style-type: none"> • Global warming • Ozone depletion • Acid rain 	7

Note: The hours needed for each subtopic can be changed when necessary. The above allocated hours are just a suggestion. Total hours for this subject is as prescribed in the basic learning time structure, while the learners must attain the standard as prescribed in the learning standards and indicators.

Indicators and learning areas
Chapter 1 - Cell as a Unit of Life (11 hours)

Indicators	Learning Areas
<p>Sc1.1 Gr7/1 Observe and explain forms and characteristics of cells of unicellular and multicellular organisms.</p> <p>Sc1.1 Gr7/2 Observe and compare essential components of plant and animal cells.</p> <p>Sc1.1 Gr7/3 Experiment and explain functions of essential components of plant and animal cells.</p>	<ul style="list-style-type: none"> • Understanding cells • Unicellular and multicellular organisms
<p>Sc1.1 Gr7/4 Experiment and explain processes of passing substances through cells by diffusion and osmosis.</p>	<ul style="list-style-type: none"> • Diffusion and osmosis

Learning Objectives

Students will be taught to:

1. Understand the basic structure of cells and the essential components in them.
2. Compare and differentiate a plant cell and an animal cell.
3. Understand the functions of essential components in a plant cell and an animal cell.
4. Observe and explain the difference characteristics of cells of unicellular and multicellular organisms.
5. Understand the diffusion and osmosis processes in cells.

Learning Outcomes

Students will be able to:

1. Operate a microscope.
2. Identify the important structures in a typical cell and describe their functions.
3. Identify, compare and contrast a plant cell and an animal cell.
4. Carry out experiments to study human cells and plant cells.
5. Identify the important structures in a plant cell and an animal cell, and describe their functions.
6. Compare and contrast unicellular organisms and multicellular organisms.
7. Give examples of unicellular organisms and multicellular organisms.
8. Describe the diffusion and osmosis processes in cells.
9. Carry out experiments to show osmosis in cells.

Learning Areas

- Understanding cells
- Unicellular and multicellular organisms
- Diffusion and osmosis in cells

Teaching and Learning Activities

1st – 5th hours (Understanding cells)

1. Explain that all living things are made of cells including humans.
2. Show students a microscope and introduce the functions of the parts of the microscope.
3. Ask students to do Questions 1 and 2 on pages 2 and 3 of the workbook as their homework.
4. Introduce the structures of a typical cell before asking students to carry out the activities to prepare a slide of human cheek cells and onion cells.
5. Ask students to compare between animal cells and plant cells.

6. Ask students to do Questions 3 to 6 on pages 3 and 4 of the workbook as their homework.
7. Have students try Test Yourself 1.1 and discuss the answers with them.

6th – 7th hours (Unicellular and multicellular organisms)

1. Explain to students what unicellular and multicellular organisms are, with examples.
2. Proceed with the activity to understand more about these organisms.
3. Ask students to do Questions 1 to 4 on pages 4 and 5 of the workbook as their homework.
4. Have students try Test Yourself 1.2 and discuss the answers with them.

8th – 10th hours (Diffusion and osmosis in cells)

1. Explain diffusion and osmosis and how they differ.
2. Show examples of where these processes take place.
3. Carry out the activity to further explain osmosis in living animal tissues. Explain the effects of plant cells and animal cells in three different solutions due to osmosis.
4. Ask students to do Questions 1 to 4 on pages 6 and 7 of the workbook as their homework.
5. Have students try Test Yourself 1.3 and discuss the answers with them.

11th hour (Conclusion)

1. Revise the lesson using Quick Revision page 16.
2. Use Conceptual Map to help students to understand the relationship of all the subtopics learnt in this chapter.
3. Randomly select 5 objective questions and 2 subjective questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.

4. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

Emphasized Skills:

1. Observing
2. Classifying
3. Making inferences
4. Making hypothesis
5. Predicting
6. Communicating
7. Using and handling science apparatus correctly and safely
8. Handling specimen correctly and carefully

Learning Materials:

- Focus Smart Textbook Science M1
- Focus Smart Workbook Science M1
- Microscope



Learning Outcome Form

Name-Surname:

No.

Mathayom:

Date:

Chapter 1 Cell as a Unit of Life

Explanation: Summary of learning outcomes

Contents that you need for teacher to explain further:
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Feeling after learning this chapter:
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Knowledge gained from this chapter:
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Chapter 1
Cell as a Unit
of Life

Contents that you like the most in this chapter (give your reason):
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Exercises that you like and want to be selected as the outstanding work:
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Application of knowledge from this chapter on your daily life:
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Indicators and learning areas
Chapter 2 – Plants (32 hours)

Indicators	Learning Areas
<p>Sc1.1.Gr7/5 Experiment to find some factors essential for photosynthesis of plants, and explain that light, chlorophyll carbon dioxide and water are essential for photosynthesis.</p> <p>Sc1.1 Gr7/6 Experiment and explain results obtained concerning photosynthesis by plants.</p> <p>Sc1.1 Gr7/7 Explain importance of the photosynthesis process of plants on living things and the environment.</p>	<ul style="list-style-type: none"> • Photosynthesis
<p>Sc1.1 gr7/8 Experiment and explain groups of cells involved in transportation of water in plants.</p> <p>Sc1.1 Gr7/9 Observe and explain structures of the systems for transportation of water and nutrients in plants.</p>	<ul style="list-style-type: none"> • Transport system in plants
<p>Sc1.1 Gr710 Experiment and explain floral structures involved in plant reproduction.</p> <p>Sc1.1 Gr7/11 Explain sexual reproduction processes of angiosperms and plant asexual reproduction processes by referring to various parts for propagation.</p>	<ul style="list-style-type: none"> • Sexual reproductive system of flowering plants • Pollination • Development of fruits and seeds in plants • Germination of seeds

	<ul style="list-style-type: none"> • Application of vegetative reproduction in flowering plants
Sc1.1 Gr7/12 Experiment and explain responses of plants to light, water and touch.	<ul style="list-style-type: none"> • Stimuli and responses in plants
Sc1.1 Gr7/13 Explain principles and effects of biotechnological application for propagation, improved breeding and increased productivity of plants, and apply acquired knowledge for useful purposes	<ul style="list-style-type: none"> • Biotechnology

Learning Objectives

Students will be taught to:

1. Understand photosynthesis.
2. Realise the importance of photosynthesis to living things and the environment.
3. Analyse the transport system in plants. Understand the structures of a flower and their functions.
4. Analyse the sexual reproductive system of flowering plants.
5. Analyse pollination.
6. Understand the development of fruits and seeds in plants.
7. Synthesis the concept of germination of seeds.
8. Apply the vegetative reproduction in plants.
9. Understand the stimuli and responses in plants.
10. Realise the importance of biotechnology.

Learning Outcomes

Students will be able to:

1. Describe photosynthesis.
2. Carry out experiments to show the factors needed for photosynthesis.
3. List the importance of photosynthesis.
4. Describe how wilting occurs.
5. Describe what transpiration and stomata is.
6. Identify the factors affecting the rate of transpiration.
7. Investigate the pathway of water in plants.
8. Identify the location of xylem and phloem.
9. Describe the functions of xylem and phloem.
10. Identify the male and female parts of a flower.
11. Describe the functions male and female reproductive parts of a flower.
12. Describe what pollination is.
13. Relate the characteristics of the flowers to their agents of pollination.
14. Compare and contrast self-pollination and cross-pollination.
15. Identify the location where pollination occurs in a flower.
16. Describe fertilization in plants.
17. Describe the formation of fruits and seeds.
18. Identify and describe functions of the structures of a seed.
19. Carry out experiment to study the conditions needed for germination of seeds.
20. Explain with examples what vegetative reproduction is.
21. Describe the types of responses of plants toward stimuli.
22. Design and experiment to study stimuli detected by plants and the parts of plants that are responding to the stimuli.
23. Describe what biotechnology is.
24. State how we apply biotechnology.
25. Evaluate the importance of GM food.

Learning Areas

- Photosynthesis
- Transport system in plants
- Sexual reproductive system of flowering plants
- Pollination
- Development of fruits and seeds in plants
- Germination of seeds
- Application of vegetative reproduction in flowering plants
- Stimuli and responses in plants
- Biotechnology

Teaching and Learning Activities

1st – 5th hours (Photosynthesis)

1. Explain what photosynthesis is.
2. Explain the materials needed and the products produced by photosynthesis.
3. Emphasize the equation to represent photosynthesis and the factors for photosynthesis.
4. Explain the steps to test the presence of starch in leaves before proceeding to the activity to investigate the factors required for photosynthesis.
5. Lastly, explain the importance of photosynthesis using the chart on page 28.
6. Ask students to do Questions 1 to 3 on pages 15 and 16 of the workbook as their homework.
7. Have students try Test Yourself 2.1 and discuss the answers with them.

6th – 10th hours (Transport system in plants)

1. Ask students what will happen when we do not water an indoor potted plant for a week. Ask them to make inferences.
2. Explain the terms wilting and transpiration.
3. Ask students to do Questions 1 and 2 on page 17 of the workbook as their homework.
4. Get students to observe the stomata on the underside of a leaf using a good magnifying glass before explaining the function of stomata.
5. Have students do Question 3 on pages 17 and 18 of the workbook as their homework.
6. Discuss with students the factors the rate of transpiration and the roles of transpiration.
7. Explain xylem and phloem to students.
8. Carry out the activities to further explain xylem and phloem.
9. Have students do Question 4 on page 18 of the workbook as their homework.
10. Have students try Test Yourself 2.2 and discuss the answers with them.

11th – 13th hours (Sexual reproductive system of flowering plants)

1. Get a fresh hibiscus flower and refresh students' memory of the parts of a flower and their functions.
2. Get a male and a female papaya flower and have students identify them. Remind them of the male and female parts of the flower.
3. Explain the pollen grains, ovules and ovaries of a flower.
4. Ask students to do Questions 1 to 3 on pages 18 and 19 of the workbook as their homework.
5. Have students try Test Yourself 2.3 and discuss the answers with them.

14th – 16th hours (Pollination)

1. Explain to students what pollination is.
2. Describe to students the features of an insect-pollinated flower and a wind-pollinated flower. Ask students to compare the features.
3. Explain the terms self-pollination and cross-pollination and get students to compare these two methods of pollination.
4. Explain the advantages and the use of cross-pollination in agriculture.
5. Ask students to do Questions 1 to 3 on pages 20 and 21 of the workbook as their homework.
6. Have students try Test Yourself 2.4 and discuss the answers with them.

17th – 19th hours (Development of fruits and seeds in plants)

1. Explain to students how fertilization occurs in a flower. Use the diagram on page 43.
2. Carry out the activity to observe the development of pollen tube in different percentage of sugar solutions.
3. Explain also how fruits and seeds develop after a successful fertilization.
4. Ask students to do Questions 1 and 2 on pages 21 and 22 of the workbook as their homework.
5. Have students try Test Yourself 2.5 and discuss the answers with them.

20th – 22nd hours (Germination of seeds)

1. Get a mung bean and a maize grain. Discuss the structures of both beans.
2. Carry out the activity to determine the conditions required for germination of seeds. Emphasize the conditions again to students.
3. Explain the physical changes of seedlings during germination.
4. Discuss the differences between the epigeal germination and hypogeal germination.

5. Ask students to do Questions 1 to 4 on pages 22 and 24 of the workbook as their homework.
6. Have students try Test Yourself 2.6 and discuss the answers with them.

23rd – 24th hours (Application of vegetative reproduction in flowering plants)

1. Ask students to name flowering plants that can reproduce use other parts other than the seeds.
2. Explain vegetative reproduction and its advantages.
3. Ask students to do Questions 1 to 3 on pages 24 and 25 of the workbook as their homework.
4. Have students try Test Yourself 2.7 and discuss the answers with them.

25th – 29th hours (Stimuli and responses in plants)

1. Make students recall the meaning of stimuli and responses by asking them to give examples.
2. Explain the four common tropisms – phototropism, geotropism, hydrotropism and thigmotropism. Use the common examples to explain.
3. Proceed with the activity to investigate and identify the stimuli detected by plants and the parts of plants that are sensitive to stimuli.
4. Explain nastic movement and compare it to tropism.
5. Ask students to do Questions 1 to 3 on pages 25 and 27 of the workbook as their homework.
6. Have students try Test Yourself 2.8 and discuss the answers with them.

30th – 31st hours (Biotechnology)

1. Explain the meaning of biotechnology.
2. Describe the application of biotechnology in agriculture, industry, food and medicine.

3. Ask students to find more information on genetically modified food and have a debate on it.
4. Ask students to do Questions 1 to 3 on pages 27 and 28 of the workbook as their homework.
5. Have students try Test Yourself 2.9 and discuss the answers with them.

32nd hour (Conclusion)

1. Revise the lesson using Quick Revision on pages 63 and 64.
2. Use Conceptual Map to help students to understand the relationship of all the subtopics learnt in this chapter.
3. Randomly select 5 objective questions and 2 subjective questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.
4. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

Emphasized Skills:

1. Observing
2. Classifying
3. Grouping and classifying
4. Comparing and contrasting
5. Making inferences
6. Making hypothesis
7. Predicting
8. Communicating
9. Using and handling science apparatus correctly and safely
10. Handling specimen correctly and carefully

Learning Materials:

- Focus Smart Textbook Science M1
- Focus Smart Workbook Science M1
- Fresh flowering plants



Learning Outcome Form

Name-Surname:

No.

Mathayom:

Date:

Chapter 2 Plants

Explanation: Summary of learning outcomes

**Chapter 2
Plants**

Contents that you need for teacher to explain further:
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Feeling after learning this chapter:
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Knowledge gained from this chapter:
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Contents that you like the most in this chapter (give your reason):
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Exercises that you like and want to be selected as the outstanding work:
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Application of knowledge from this chapter on your daily life:
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Indicators and learning areas

Chapter 3 Matter (10 hours)

Indicators	Learning Areas
Sc3.1 Gr7/1 Experiment and classify substances into groups by using their texture or particle size as criteria and explain properties of each group of substances.	<ul style="list-style-type: none">• Classifying matter
Sc3.1 Gr7/2 Explain properties and transition of substances by using particle arrangement models.	<ul style="list-style-type: none">• States of matter• Changes of states

Learning Objectives

Students will be taught to:

1. Understand the classification of matter.
2. Understand the three states of matter.
3. Understand the changes of states of matter.

Learning Outcomes

Students will be able to:

1. Describe matter.
2. Compare and contrast elements, compound and mixtures.
3. List examples of elements, compounds and mixtures.
4. Compare and contrast solution, colloids and suspensions.
5. Compare and contrast metals, metalloids and non-metals.
6. Describe what matter is made up of.
7. Compare and contrast solids, liquids and gases.

8. Compare and contrast the arrangement and movement of particles in solids, liquids and gases.
9. Carry out experiment to study the arrangement of particles in solids, liquids and gases.
10. Describe with examples the changes of states.

Learning Areas

- Classifying matter
- States of matter
- Changes of states

Teaching and Learning Activities

1st – 3rd hours (Classifying matter)

1. Ask students to recall the term matter and give examples of matter.
2. Describe to students that matter can be divided into three groups based on the way the particles are assembled – elements, compounds and mixtures.
3. Further explain that mixtures can be divided into three groups – solutions, colloids and suspensions.
4. Other than that, elements also can be divided into three groups – metals, non-metals and metalloids.
5. Ask students to do Questions 1 and 2 on page 35 of the workbook as their homework.
6. Have students try Test Yourself 3.1 and discuss the answers with them.

4th – 6th hours (States of matter)

1. Explain to students what matter is made up of.
2. Carry the activity to show that matter is made up of small particles.
3. Explain the three states of matter – solid, liquid and gas. Discuss their properties.

4. Compare and contrast the arrangement and movement of particles in the three states.
5. Do the activity to show the arrangement of particles in the three states of matter.
6. Ask students to do Questions 1 to 3 on pages 36 and 37 of the workbook as their homework.
7. Have students try Test Yourself 3.2 and discuss the answers with them.

7th – 9th hours (Changes of states)

1. Explain to students what happens to the states of matter when the matter is heated or cooled and also if any other changes take place.
2. Ask students to do Questions 1 and 2 on pages 37 to 39 of the workbook as their homework.
3. Have students try Test Yourself 3.3 and discuss the answers with them.

10th hour (Conclusion)

1. Revise the lesson using Quick Revision on page 84.
2. Use Conceptual Map to help students to understand the relationship of all the subtopics learnt in this chapter.
3. Randomly select 5 objective questions and the subjective question from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.
4. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

Emphasized Skills:

1. Observing
2. Classifying
3. Making inferences
4. Comparing and contrasting
5. Communicating

Learning Materials:

- Focus Smart Textbook Science M1
- Focus Smart Workbook Science M1



Learning Outcome Form

Name-Surname:

No.

Mathayom:

Date:

Chapter 3 Matter

Explanation: Summary of learning outcomes

Contents that you need for teacher to explain further:
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Feeling after learning this chapter:
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Knowledge gained from this chapter:
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Chapter 3 Matter

Application of knowledge from this chapter on your daily life:
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Exercises that you like and want to be selected as the outstanding work:
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Contents that you like the most in this chapter (give your reason):
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Indicators and learning areas
Chapter 4 – Solutions (14 hours)

Indicators	Learning Areas
Sc3.1 Gr7/3 Experiment and explain acid-base properties of solutions.	<ul style="list-style-type: none">• Acids and alkalis
Sc3.1 Gr7/4 Verify pH value of solutions, and apply the knowledge gained for useful purposes.	<ul style="list-style-type: none">• pH indicators
Sc3.2 Gr7/1 Experiment and explain methods of preparing solutions with density in percentage, and discuss application of knowledge about solutions for useful purposes.	<ul style="list-style-type: none">• Solution and solubility
Sc7.3 Gr7/3 Experiment and explain factors affecting changes in the state and dissolution of substances. Sc3.2 Gr7/2 Experiment and explain change of properties, mass and energy of substances when they change state and dissolve.	<ul style="list-style-type: none">• Dissolution

Learning Objectives

Students will be taught to:

1. Analyse types of solutions based on the concentrations.
2. Understand solubility and rate of solubility.
3. Understand acid and alkali.
4. Understand pH.

Learning Objectives

1. Describe solutions.
2. Compare and contrast the three types of solution based on concentrations.
3. Explain the unit of concentration of solution.
4. Design and experiment to prepare solutions with different concentrations.
5. Describe solubility.
6. Explain the factors affecting solubility.
7. Explain the factors affecting the rate of solubility.
8. Carry out experiments to study factors affecting the rate of solubility.
9. Describe the changes during dissolution.
10. Compare and contrast acids and alkalis.
11. Carry out experiments to identify the properties of acids and alkalis.
12. Describe the role of water in acids and alkalis.
13. Describe and list pH indicators.
14. Describe uses of acids and alkalis.

Learning Areas

- Solutions and solubility
- Dissolution
- Acids and alkalis
- pH indicators

Teaching and Learning Activities

1st – 3rd hours (Solutions and solubility)

1. Explain to students the terms used in this subtopic – solution, solute, solvent, dilute solution, concentrated solution and saturated solution.
2. Compare and contrast between dilute solution, concentrated solution and saturated solution.

3. Ask students to do Questions 1 and 2 on page 46 of the workbook as their homework.
4. Discuss the metric units for concentration of solutions.
5. Explain how to prepare a solution of known concentration by using the serial dilution method and successive serial dilutions method.
6. Ask students to do Questions 3 to 5 on page 47 of the workbook as their homework.
7. Have students try Test Yourself 4.1 and discuss the answers with them.

4th – 6th hours (Dissolution)

1. Explain the term solubility. Give examples to further explain solubility.
2. Describe how factors such as nature of solvent, nature of solute, temperature and pressure affect solubility of a solute.
3. Describe the factors such as temperature, rate of stirring and size of the solute particles that affect the rate of dissolving.
4. Carry out the experiment that determines the factors that affect the rate of dissolving.
5. Explain the physical and chemical changes that may take place during dissolution.
6. Ask students to do Questions 1 to 5 on page 48 and 49 of the workbook as their homework.
7. Have students try Test Yourself 4.2 and discuss the answers with them.

7th – 10th hours (Acids and alkalis)

1. Ask students the tastes of oranges and lemons. What makes them taste like that? Discuss the types of acids that are in our fruits, food and surrounding.
2. Discuss with students the properties of acids by carrying out the activity to identify them.

3. Inform students that alkalis present in our daily detergents.
4. Carry out the activity to identify the properties of alkalis. Discuss them with students.
5. Explain the role of water in acids and alkalis.
6. Ask students to do Questions 1 to 3 on pages 49 and 50 of the workbook as their homework.
7. Have students try Test Yourself 4.3 and discuss the answers with them.

11th – 13th hours (pH indicators)

1. Explain pH scales and pH indicators.
2. Inform students of the some common pH indicators used and their color changes.
3. Ask students to do Questions 1 to 3 on pages 50 and 51 of the workbook as their homework.
4. Discuss the uses of acids and alkalis in our daily life.
5. Ask students to do Question 4 on page 51 of the workbook as their homework.
6. Have students t try Test Yourself 4.4 and discuss the answers with them.

14th hour (Conclusion)

1. Revise the lesson using Quick Revision on page 106.
2. Use Conceptual Map to help students to understand the relationship of all the subtopics learnt in this chapter.
3. Randomly select 5 objective questions and 2 subjective questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.
4. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

Emphasized Skills:

1. Observing
2. Classifying
3. Making inferences
4. Making hypothesis
5. Predicting
6. Communicating
7. Using and handling science apparatus correctly and safely
8. Handling specimen correctly and carefully

Learning Materials:

- Focus Smart Textbook Science M1
- Focus Smart Workbook Science M1



Learning Outcome Form

Name-Surname:

No.

Mathayom:

Date:

Chapter 4 Solutions

Explanation: Summary of learning outcomes

Chapter 4 Solutions

Contents that you need for teacher to explain further:
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Feeling after learning this chapter:
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Knowledge gained from this chapter:
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Contents that you like the most in this chapter (give your reason):
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Exercises that you like and want to be selected as the outstanding work:
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Application of knowledge from this chapter on your daily life:
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Indicators and learning areas
Chapter 5 – Forces and Motion (10 hours)

Indicators	Learning Areas
Sc4.1 Gr7/1 Search for data and explain scalar and vector quantities.	<ul style="list-style-type: none">• Scalar and vector quantities
Sc4.1 Gr7/2 Experiment and explain distance, speed, displacement and velocity of motion of objects.	<ul style="list-style-type: none">• Distance and displacement• Speed and velocity

Learning Objectives

Students will be taught to:

1. Understand scalar and vector quantities.
2. Understand distance and displacement.
3. Understand speed and velocity.

Learning Outcomes

Students will be able to:

1. Describe physical quantity, scalar quantity and vector quantity, with examples.
2. Compare and contrast scalar quantity and vector quantity.
3. Describe distance and displacement, with examples.
4. Calculate distance and displacement.
5. Describe speed and velocity, with examples.
6. Calculate speed and velocity.

Learning Areas

1. Scalar and vector quantities
2. Distance and displacement
3. Speed and velocity

Teaching and Learning Activities

1st – 3rd hours (Scalar and vector quantities)

1. Explain what physical quantities are and how to divide them into two groups – scalar quantities and vector quantities.
2. Discuss the differences between scalar quantities and vector quantities.
3. Use Examples 1 and 2 for further explanation.
4. Ask students to do Questions 1 to 3 on pages 57 and 58 of the workbook as their homework.
5. Have students try Test Yourself 5.1 and discuss the answers with them.

4th – 6th hours (Distance and displacement)

1. Explain and compare the term distance and displacement.
2. Use Example 3 for further explanation.
3. Ask students to do Questions 1 to 3 on pages 58 and 59 of the workbook as their homework.
4. Have students try Test Yourself 5.2 and discuss the answers with them.

7th – 9th hours (Speed and velocity)

1. Explain the term speed and velocity to students and compare them.
2. Use Example 4 for further explanation.
3. Use Hot Tips on page 118 to summarise that 4 terms to students.
4. Ask students to do Questions 1 and 2 on page 60 of the workbook as their homework.
5. Have students try Test Yourself 5.3.

10th hour (Conclusion)

1. Revise the lesson using Quick Revision on page 119.
2. Use Conceptual Map to help students to understand the relationship of all the subtopics learnt in this chapter.
3. Randomly select 5 objective questions and 2 subjective questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.
4. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

Emphasized Skills:

1. Classifying
2. Compare and contrast
3. Analyzing
4. Problem solving
5. Communicating

Learning Materials:

- Focus Smart Textbook Science M1
- Focus Smart Workbook Science M1



Learning Outcome Form

Name-Surname:

No.

Mathayom:

Date:

Chapter 5 Forces and Motion

Explanation: Summary of learning outcomes

**Chapter 5
Forces and
Motion**

Contents that you need for teacher to explain further:
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Feeling after learning this chapter:
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Knowledge gained from this chapter:
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Contents that you like the most in this chapter (give your reason):
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Exercises that you like and want to be selected as the outstanding work:
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Application of knowledge from this chapter on your daily life:
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Indicators and learning areas

Chapter 6 Heat (22 hours)

Indicators	Learning Areas
Sc5.1 Gr7/1 Experiment and explain temperature and its measurement	<ul style="list-style-type: none"> • Heat as a form of energy
Sc5.1 Gr7/2 Observe and explain heat transmission, and apply the knowledge gained for useful purposes.	<ul style="list-style-type: none"> • Heat flow • Benefits of heat flow
Sc5.1 Gr7/3 Explain heat absorption and emission through radiation, and apply the knowledge gained for useful purposes.	<ul style="list-style-type: none"> • Absorption and radiation of heat
Sc5.1 Gr7/4 Explain thermal equilibrium and effects of heat on expansion of substances, and apply the knowledge gained in daily life.	<ul style="list-style-type: none"> • Thermal equilibrium and effects of heat on matter

Learning Objectives

Students will be taught to:

1. Understand heat as a form of energy.
2. Analyse how heat flows.
3. Realise the benefits of heat flow.
4. Understand thermal equilibrium.
5. Analyse the effects of heat on matter.
6. Understand absorption and radiation of heat.

Learning Outcomes

Students will be able to:

1. Describe heat as a form of energy.
2. List sources of heat.
3. List uses of heat.
4. Compare and contrast heat and temperature.
5. Carry out experiment to show difference between heat and temperature.
6. Explain conduction, convection and radiation of heat.
7. Carry out experiments to show transfer of heat by conduction, convection and radiation.
8. Explain some phenomena occur due to heat flow such as warming of Earth by the Sun and land and sea breezes.
9. Describe how to keep building cool using the knowledge of heat flow.
10. Describe with examples heat conductors and heat insulators.
11. List the uses of heat conductors and heat insulators.
12. Carry out experiment to investigate different materials as heat insulators.
13. List the benefits of heat flow.
14. Describe thermal equilibrium.
15. Describe expansion and contraction of solids, liquids and gases.
16. Carry out experiment to observe expansion and contraction of solids, liquids and gases.
17. Describe the applications of expansion and contraction of matter.
18. Describe the use of the principle of expansion and contraction of matter in solving simple problems.
19. Describe types of surface that absorb and give out heat.
20. Carry out experiment to show types of surface that absorb or give out heat better.
21. List some applications of absorption and release of heat in daily life.

Learning Areas

- Heat as a form of energy
- Heat flow
- Benefits of heat flow
- Thermal equilibrium and effects of heat on matter
- Absorption and radiation of heat

Teaching and Learning Activities

1st – 3rd hours (Heat as a Form of Energy)

1. Carry out activity to show that the Sun gives out heat. Then explain heat is a form of energy.
2. Carry out activities that identify other sources of heat.
3. Discuss the uses of heat.
4. Ask students to do Question 1 on page 64 of the workbook as their homework.
5. Carry out activity to show the difference between heat and temperature. Ask students to compare and contrast between heat and temperature.
6. Ask students to do Question 2 on pages 64 and 65 of the workbook as their homework.
7. Have students try Test Yourself 6.1 and discuss the answers with them.

4th – 8th hours (Heat flow)

1. Explain the three ways of how heat is transferred – conduction, convection and radiation.
2. Carry out activities to show these ways of heat transfer.
3. Ask students to conclude by comparing these three ways.
4. Explain the natural phenomena that involve heat flow such as the warming of the Earth by the Sun, sea breeze and land breeze.

5. Ask students to describe the features of our houses that help to keep the houses cool. Explain how these features work.
6. Ask students to recall what heat conductors and heat insulators are, with examples.
7. Ask students to give examples of how we use heat conductors and heat insulators.
8. Carry out the experiment to investigate the different materials as heat insulators.
9. Ask students to do Questions 1 and 2 on pages 65 and 66 of the workbook as their homework.
10. Have students try Test Yourself 6.2 and discuss the answers with them.

9th – 10th hours (Benefits of heat flow)

1. Ask students to list the examples of how we benefit from heat flow.
2. Ask students to do Questions 1 and 2 on pages 66 and 67 of the workbook as their homework.
3. Have students try Test Yourself 6.3 and discuss the answers with them.

11th – 18th hours (Thermal equilibrium and effects of heat on matter)

1. Explain that heat flows from a hot object to a cooler object naturally and this will continue until both objects have the same temperature.
2. Ask students to give examples of such phenomenon in our daily life.
3. Discuss the expansion and contraction of solids, liquids and gases with the students.
4. Carry out the activity that observes the effect of heat on solids, liquids and gases.
5. Ask students to do Questions 1 to 3 on pages 67 and 68 of the workbook as their homework.

6. Discuss how we apply expansion and contraction of matter in our daily life. Use a few common examples such as mercury in thermometers, bimetallic strip in fire alarms, bimetallic strip as thermostats and bimetallic thermometers
7. Explain that we use the principle of expansion and contraction of matter to solve simple problems.
8. Ask students to do Question 4 on page 68 of the workbook as their homework.
9. Have students try Test Yourself 6.4 and discuss the answers with them.

19th – 21st hours (Absorption and radiation of heat)

1. Carry out activities to show which surfaces that absorb heat better and that gives out heat better.
2. Discuss with students the type and color of surfaces that can absorb and give out heat better.
3. Ask students to give examples of how we apply this concept in our daily life.
4. Ask students to do Questions 1 and 2 on pages 69 and 70 of the workbook as their homework.
5. Have students try Test Yourself 6.5 and discuss the answers with them.

22nd hour (Conclusion)

1. Revise the lesson using Quick Revision on pages 153 and 154.
2. Use Conceptual Map to help students to understand the relationship of all the subtopics learnt in this chapter.
3. Randomly select 5 objective questions and 2 subjective questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.

4. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

Emphasized Skills:

1. Observing
2. Classifying
3. Making inferences
4. Predicting
5. Communicating
6. Using and handling science apparatus correctly and safely
7. Handling specimen correctly and carefully

Learning Materials:

- Focus Smart Textbook Science M1
- Focus Smart Workbook Science M1



Learning Outcome Form

Name-Surname:

No.

Mathayom:

Date:

Chapter 6 Heat

Explanation: Summary of learning outcomes

**Chapter 6
Heat**

Contents that you need for teacher to explain further:
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Feeling after learning this chapter:
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Knowledge gained from this chapter:
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Contents that you like the most in this chapter (give your reason):
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Exercises that you like and want to be selected as the outstanding work:
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Application of knowledge from this chapter on your daily life:
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Indicators and learning areas
Chapter 7 - Atmosphere and Weather (14 hours)

Indicators	Learning Areas
Sc6.1 Gr7/1 Search for relevant information and explain components and division of atmospheric layers covering the Earth's surface.	<ul style="list-style-type: none"> • Layers of the Earth's atmosphere
Sc6.1 Gr7/2 Experiment and explain relationship between temperature, humidity and air pressure and climate-affecting phenomena.	<ul style="list-style-type: none"> • Weather • Factors of weather
Sc6.1 Gr7/3 Observe, analyse and discuss formation of climate phenomena affecting human beings.	<ul style="list-style-type: none"> • Monsoon, tropical cyclones and thunderstorm • How to avoid danger during severe weather
Sc6.1 Gr7/4 Search for relevant information, analyse and interpret meanings of data from weather forecasts. Sc6.1 Gr7/5 Search for, analyse and explain effects of climate on the lives of living things and the environment.	<ul style="list-style-type: none"> • Interpreting weather forecasts and their importance

Learning Objectives

Students will be taught to:

1. Describe the layers in the Earth's atmosphere.
2. Describe what weather is.
3. Describe factors of weather such as humidity, temperature and pressure.
4. Describe monsoons, tropical cyclones and thunderstorms.

5. List ways to protect ourselves during severe weather.
6. Describe weather forecasting and its importance.

Learning Outcomes

Students will be able to:

1. Describe the five layers in the Earth's atmosphere.
2. Describe weather, meteorology and weather forecast.
3. Explain how air pressure, temperature and humidity affect the weather.
4. Explain monsoons, tropical cyclones and thunderstorms.
5. List ways to protect ourselves during severe weather.
6. Explain weather forecasting, station model and weather map.

Learning Areas

- Layers of the Earth's atmosphere
- What is weather?
- Factors of weather
- Monsoons, tropical cyclones and thunderstorms
- How to avoid danger during severe weather
- Interpreting weather forecasts and their importance

Teaching and Learning Activities

1st – 3rd hours (Layers of the Earth's atmosphere))

1. Explain what atmosphere is.
2. Describe the five layers in the atmosphere – troposphere, stratosphere, mesosphere, thermosphere and exosphere.
3. Ask students to do Questions 1 to 3 on pages 77 and 78 of the workbook as their homework.
4. Have students try Test Yourself 7.1 and discuss the answers with them.

4th – 5th hours (What is weather?)

1. Explain what weather, meteorology and weather forecast are.
2. Ask students to do Questions 1 to 3 on page 78 of the workbook as their homework.
3. Have students try Test Yourself 7.2 and discuss the answers with them.

6th – 7th hours (Factors of weather)

1. Discuss the main factors that affect the weather – air pressure, temperature and humidity, and how they change with one another.
2. Ask students to do Questions 1 and 2 on page 79 of the workbook as their homework.
3. Have students try Test Yourself 7.3 and discuss the answers with them.

8th – 9th hours (Monsoons, tropical cyclones and thunderstorms)

1. Describe how monsoons, tropical cyclones and thunderstorms occur.
2. Ask students to do Questions 1 and 2 on pages 79 and 80 of the workbook as their homework.
3. Have students try Test Yourself 7.4 and discuss the answers with them.

10th – 11th hours (How to avoid danger during severe weather)

1. List what we should do to avoid danger during severe weather.
2. Ask students to do Question 1 on page 81 of the workbook as their homework.
3. Have students try Test Yourself 7.5 and discuss the answers with them.

12th – 13th hours (Interpreting weather forecasts and their importance)

1. Explain what weather forecasting is.
2. Explain also what a station model and a weather map are.
3. Explain the importance of weather forecasts.

4. Ask students to do Questions 1 to 3 on pages 81 and 82 of the workbook as their homework.
5. Have students try Test Yourself 7.6 and discuss the answers with them.

14th hour (Conclusion)

1. Revise the lesson using Quick Revision on page 173.
2. Use Conceptual Map to help students to understand the relationship of all the subtopics learnt in this chapter.
3. Randomly select 5 objective questions and the subjective question from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.
4. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

Emphasized Skills:

1. Observing
2. Predicting
3. Communicating

Learning Materials:

- Focus Smart Textbook Science M1
- Focus Smart Workbook Science M1



Learning Outcome Form

Name-Surname:

No.

Mathayom:

Date:

Chapter 7 Atmosphere and Weather

Explanation: Summary of learning outcomes

Contents that you need for teacher to explain further:
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Feeling after learning this chapter:
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Knowledge gained from this chapter:
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Chapter 7 Atmosphere and Weather

Contents that you like the most in this chapter (give your reason):
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Application of knowledge from this chapter on your daily life:
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Exercises that you like and want to be selected as the outstanding work:
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Indicators and learning areas

Chapter 8 Global Issues (7 hours)

Indicators	Learning Areas
Sc6.1 Gr7/6 Search for relevant information, analyse and explain natural factors and man-mode actions affecting changes of the Earth's temperature, ozone holes and acid rain.	<ul style="list-style-type: none">• Global warming• Ozone depletion• Acid rain
Sc6.1 Gr7/7 Search for relevant information, analyse and explain effects of global warming, ozone holes and acid rain on living things and the environment.	

Learning Objectives

Students will be taught to:

1. Understand global warming, ozone depletion and acid rain.

Learning Outcomes

Students will be able to:

1. Describe the causes of global warming, ozone depletion and acid rain.
2. Describe the effects of global warming, ozone depletion and acid rain.

Learning Areas

- Global warming
- Ozone depletion
- Acid rain

Teaching and Learning Activities

1st – 2nd hours (Global warming)

1. Explain to students what global warming is.
2. Explain the factors contributing to global warming and its effects.
3. Ask students to do Questions 1 to 4 on pages 87 and 88 of the workbook as their homework.
4. Have students try Test Yourself 8.1 and discuss the answers with them.

3rd – 4th hours (Ozone depletion)

1. Explain to students what ozone depletion is.
2. Explain the factors contributing to ozone depletion and its effects.
3. Ask students to do Questions 1 to 4 on page 88 of the workbook as their homework.
4. Have students try Test Yourself 8.2 and discuss the answers with them.

5th – 6th hours (Acid rain)

1. Explain to students what acid rain is.
2. Explain the factors contributing to acid rain and its effects.
3. Ask students to do Questions 1 to 4 on page 89 of the workbook as their homework.
4. Have students try Test Yourself 8.3 and discuss the answers with them.

7th hour (Conclusion)

1. Revise the lesson using Quick Revision on page 186.
2. Use Conceptual Map to help students to understand the relationship of all the subtopics learnt in this chapter.
3. Have students to solve the Mastery Practice.
4. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

Emphasized Skills:

1. Predicting
2. Observing
3. Generating ideas
4. Communicating

Learning Materials:

- Focus Smart Textbook Science M1
- Focus Smart Workbook Science M1



Learning Outcome Form

Name-Surname:

No.

Mathayom:

Date:

Chapter 8 Global Issues

Explanation: Summary of learning outcomes

**Chapter 8
Global Issues**

Feeling after learning this chapter:
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Contents that you need for teacher to explain further:
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Knowledge gained from this chapter:
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Contents that you like the most in this chapter (give your reason):
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Exercises that you like and want to be selected as the outstanding work:
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Application of knowledge from this chapter on your daily life:
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Notes: Strand 8: Nature of Science and Technology is inculcated in all the activities appearing in all the chapters. Through the activities, students will learn to

- pose questions about the matter studied as prescribed or in accord with their interests.
- plan for observation, exploration, verification, study and research by using their own ideas and those of their teachers.
- use suitable materials, instruments for exploration and verification and record results using simple methods.
- arrange data obtained from exploration and verification into groups and present results.
- express opinions in the course of exploration and verification.
- make a record and explain results of the exploration and verification by drawing pictures or writing short texts.
- verbally present their work to understand.