



Syllabus	- الإطار المنهجي
Science	مادة العلوم
Bilingual Program	برنامج ثنائي اللغة
Grade: 7 – Piloting Edition	الصف: 7 - طبعة تجريبية
2022\2023	م 2023/2022



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## **Introduction**

Science is a key field of knowledge required to raise today's little's to become tomorrow's competent citizens. It is key to innovation, global competitiveness, and human advancement. Therefore, teaching science should fulfill the needs of the present time and prepare for future expectations. Science education should emphasize encouragement of innate curiosity and creativity yet build and guide the students to apply the scientific method of thinking. Therefore, students must be trained daily to practice the scientific approach to state hypothesis, perform experiments, collect, analyze, and interpret data, and ultimately find answers to questions. During this process, it is very important to foster students' positive attitudes towards society, environment, and general ethics.

This syllabus is made to prepare our students to be sufficiently adept as effective citizens, able to function in, contribute to an increasingly technologically driven world, and enable students to view the pursuit of science as meaningful and useful.

It has been designed to guide teachers in leading their students to successfully developing their scientific skills, knowledge, and attitude. The syllabus also involves the main aims to take into consideration when leading the science learning process. It also clearly defines the skills that are to be gained and the different levels of mental process that the student should go through during this level (grades 7-8) and accordingly, their skills and abilities to be assessed.

Taking into consideration the characteristics of the concerned age level and their developmental needs, in line with the most recent educational resources internationally available, the proposed subject topics are listed in this syllabus along with a set of a broad learning outcomes.

**The overall aims of science standards are that students should:**

1. Develop confidence, scientific knowledge, conceptual understanding through specific disciplines of biology, chemistry, and physics
2. Have a greater awareness of the role of Science and Technology in Everyday life.
3. Develop understanding of the nature, processes, and methods of science through different types of science enquiries that help them to answer scientific questions about the world around.
4. Understand the application of some basic scientific ideas and concepts in everyday situations and apply knowledge, skills, and resources in designing and making tasks.
5. Develop curiosity and excitement in science and its application and stimulate them to ask questions about science and natural phenomena.
6. Observe, ask questions, discern patterns, hypothesize, plan, experiment, design, make, measure, discuss, analyses and evaluate results and so develop a scientific approach to problem-solving.
7. Develop relevant attitudes, such as a concern for accuracy and precision, objectivity, integrity, enquiry, initiative, and inventiveness.
8. Plan, design and perform experiments to test theories and hypotheses.
9. Develop the ability to work independently and collaboratively with others when necessary.
10. Apply and use scientific knowledge, skills, and resources in designing and making tasks
11. Become actively involved in the discussion, exploration, and resolution of environmental issues
12. Be aware of the ethical, social, and environmental applications and recognize the limitations of science.
13. Be prepared towards using scientific knowledge and methods in making personal decisions.
14. Understand and apply safety in scientific and technological investigations and activities.

## **Acquiring scientific skills**

The activities are designed to help the lower secondary students to develop several thinking and practical skills that would enable them to work in a scientific manner and to help students gain and refine these skills so that the students would have the tools required to develop their skills in scientific investigations and how they understand science.

## **Attitudes and Ethics**

Attitudes that students should be encouraged to develop should include:

- Curiosity by exploring the environment and questioning what they find.
- Creativity by suggesting innovative and relevant ways to solve problems.
- Integrity by handling and communicating data and information with integrity.
- Objectivity by seeking data and information to validate observations and explanations objectively.
- Open-mindedness by accepting all knowledge as tentative and willing to change their view if the evidence is convincing.
- Perseverance by pursuing a problem until a satisfactory solution is found.
- Responsibility by showing care and concern for living things and awareness of the responsibility they have for the quality of the environment.
- Appreciate and acknowledge the achievements of previous scientists.
- Realize that with science we can bring great benefits to humanity also if it is abused can cause serious damage to the environment.

## **ICT application:**

Different activities in which students can use information and communication technology (ICT) are provided through this syllabus to play a full part in modern society. Teachers could select from the following possible uses of ICT for their science lessons:

- A digital camera to capture images, record observations and make displays.
- Computer games to help to reinforce children's basic knowledge
- The secure websites as a source of information.
- A simple database to organize and share results of investigations.
- An interactive whiteboard to enter and display information.
- using animations and simulations to visualize scientific ideas.

### **Skills to be assessed:**

Assessment is an important part of the teaching and learning process. It provides information to the teacher about a student's achievement in relation to the learning objectives. The assessment objectives of the syllabus are aligned to the three following domains:

1. Knowledge and understanding (the skills to be assessed are the ability to identify, remember, and know the meaning of basic facts, concepts, principles, match, compare and cite examples of facts).
2. Application of knowledge and understanding, analysis and evaluation of information. The skills to be assessed are the ability to:
  - Apply criteria to select from among seemingly equal alternatives.
  - Use common characteristics as a basis for classification.
  - Use information to identify patterns, report trends and draw inferences.
  - Use their observations and sense to understand the basics of science.
  - identify and recognize the component parts of a whole and interpret the relationships between those parts.
  - present reasoned explanations for phenomena, patterns, and relationships
  - locate, select, organize, and present information from a variety of sources.
  - Use information to identify patterns, report trends and draw conclusions.
  - Make necessary and accurate calculations and recognize the limitations and assumptions of data.
  - Recognize the importance of cooperative teamwork, put work plans, distribute responsibilities, and regulate and set specific targets for work.
3. Scientific enquiry skills and investigations. The skills to be assessed are the ability to:
  - Set up simple apparatus and equipment.
  - Select observations relevant to the activity.
  - record observations, and measurements.
  - select and use appropriate models of recording data or observations, for example, graphs, tables, diagrams, and drawings.
  - Recognize patterns in data from hypotheses.
  - Use and interpret tabular and graphical representations of data.
  - Draw simple conclusions from their results and observations.

## **How to use this syllabus?**

This syllabus is arranged according to the following manner:

- **Learning Objectives:** Indicate the scope of the content which provide an overview of what students are expected to achieve at the end of the unit.
- **Skills:** Indicate capacities to be acquired and developed through scientific activities and engaging students actively in the class throughout the course. Teachers should focus on the listed skills while performing the lessons.

**The numbering key:** [ Unit–Learning outcome]

e.g., **Unit 1.** (1. Cells) and the outcome 1.4 Describe the similarities and differences between the structures of plant and animal cells.

For the topics and activities refer to the textbooks that are recommended by MOE in the approved books list.

**Learning Objectives by grade**  
Grade 7 (Bilingual) - Learning outcomes

Topic	Learning Outcomes	Scientifically strands	Notes/ Suggestions
<b>Grade 7 – semester 1</b>			
1.Cells	1.1 Recognize that all organisms are made of cells and understand the difference between unicellular and multicellular organisms.	<b>Carrying out scientific enquiry models and representations</b>	<b>Biology</b>
	1.2 Identify and describe the functions of cell structures limited to: <b>(Cell membrane, cytoplasm, nucleus, cell wall, chloroplast, mitochondria, and sap vacuole).</b>		
	1.3 Explain how the structures of some specialized cells are related to their functions <b>(Including red blood cells, neurones, ciliated cells, root hair cells and palisade cells).</b>		
	1.4 Describe the similarities and differences between the structures of plant and animal cells.		
	1.5 Understand that cells can be grouped together to form tissues, organs, and organ systems.		

	1.6 Study the structure of the light microscope		
	1.7 Prepare a temporary microscopic slide for plant cell		
	1.8 Examine the structure of an animal cell using permanent slides under the microscope		
2.Maintaining life	2.1 Describe the pathway of water and mineral salts from the roots to the leaves in flowering plants, including absorption in root hair cells, transport through xylem and transpiration from the surface of leaves.	<b>- models and representations</b> <b>- Carrying out scientific enquiry: analysis, evaluation, and conclusions</b>	
	2.2 investigate an experiment to test the hypothesis about the rate of movement of water in stalk.		
	2.3 Investigate an experiment to measure the rate of transpiration		
	2.4 Describe the structure of the human excretory (renal) system and its function (limited to kidneys filtering blood to remove urea, which is excreted in urine).		
3. materials, their structures, properties, and their changes	3.1 Understand that all matter is made of atoms, with each different type of atom being a different element.	<b>- Models and representations</b> <b>- Carrying out scientific enquiry: purpose, planning, analysis, evaluation, and conclusions</b>	<b>Chemistry</b>
	3.2 State that the Periodic Table presents the known elements in an order and identify metals and non-metals as the two main groupings of elements.		
	3.3 Describe the differences between elements, compounds and mixtures, including alloys as an example of a mixture and use the particle model to represent elements, compounds and mixtures.		
	3.4 Describe the three states of matter as solid, liquid and gas in terms of the arrangement, separation, and motion of particles.		

	3.5 Understand that all substances have chemical properties and physical properties.		
	3.6 Understand that the acidity or alkalinity of a substance is a chemical property and is measured by pH.		
	3.7 Use indicators (including Universal Indicator and litmus) to distinguish between acidic, alkaline and neutral solutions.		
	3.8 Use tests to identify hydrogen, carbon dioxide and oxygen gases.		
	3.9 Understand that alloys are mixtures that have different chemical and physical properties from the constituent substances.		
	3.10 Use the particle model to explain the difference in hardness between pure metals and their alloys		
	3.11 Identify whether a chemical reaction has taken place through observations of the loss of reactants and/or the formation of products which have different properties to the reactants (including evolving a gas, formation of a precipitate or change of color).		
	3.12 Explain why a precipitate forms, in terms of a chemical reaction between soluble reactants forming at least one insoluble product.		
	3.13 Use the particle model to describe chemical reactions.		
	3.14 Describe neutralization reactions in terms of change of pH.		
	3.15 Understand that the structure of the Periodic Table is related to the atomic structure of the elements and the		

	Periodic Table can be used to predict an element's structure and properties		
	3.16 Understand that a molecule is formed when two or more atoms join chemically, through a covalent bond.		
	3.17 Describe a covalent bond as a bond made when a pair of electrons is shared by two atoms (limited to single bonds).		
	3.18 Describe an ion as an atom which has gained at least one electron to be negatively charged or lost at least one electron to be positively charged.		
	3.19 Describe an ionic bond as an attraction between a positively charged ion and a negatively charged ion.		
	3.20 Understand that the groups within the Periodic Table have trends in physical and chemical properties, using group 1 as an example.		
	3.21 Describe how the density of a substance relates to its mass in a defined volume		
	3.22 Calculate and compare densities of solids, liquids and gases.		
	3.23 Use word equations and symbol equations to describe reactions (balancing symbol equations is not required).		
	3.24 Identify examples of displacement reactions and predict products (limited to reactions involving calcium, magnesium, zinc, iron, copper, gold and silver salts).		
	3.25 Describe how to prepare some common salts by the reactions of metals with acids, and metal carbonates with		

	acids, and purify them, using filtration, evaporation and crystallization.		
	3.26 Describe the effects of concentration, surface area and temperature on the rate of reaction, and explain them using the particle model.		
4. Forces and Energy	4.1 Describe changes in energy that are a result of an event or process.	<b>- Models and representations</b>  <b>- Carrying out scientific enquiry: purpose, planning, analysis, evaluation, and conclusions</b>	
	4.2 State that energy tends to dissipate and in doing so it becomes less useful.		
	4.3 Describe gravity as a force of attraction between any two objects and describe how the size of the force is related to the masses of the objects.		
	4.4 Practice using terms mass and weight (calculation is required)		
	4.5 Define the term “density” and show how to calculate it.		
	4.6 Investigate the methods of measuring regular and irregular objects.		
	4.7 Compare the densities of solid, liquid and gases		
	4.8 Predict whether objects will float or sink in water		
5. Electricity	5.1 Understand hoe electricity flows around a circuit	<b>- Models and representations</b>  <b>- Carrying out scientific enquiry: purpose, planning, analysis, evaluation, and conclusions</b>	
	5.2 Explain how electrons can form electric current		
	5.3 Draw and compare circuit diagrams.		
	5.4 Identify the circuit symbols for cells, switches, lamps, buzzers, and ammeters		
	5.5 State the unit used to measure the current and show to measure it.		

	5.6 Explain the role of current in a series circuit.		
	5.7 Compare the differences between insulators and conductors.		
	5.8 list the uses of conductors and insulators.		
	5.9 Explain what happens to current when add or remove more cells or components.		
	5.10 List the differences between the parallel and series circuits.		
	5.11 Explain how current is flow in parallel circuits and list the advantages of parallel circuit.		
	5.12 Compare current and voltage in series and parallel circuits.		
	5.13 Describe the effects of adding cells and lamps on current and voltage in circuits		
	5.14 Set up a series and parallel circuits using their components		
	5.15 State how resistance can affects the current in a circuits and show how to calculate the resistance		
<b>Grade 7 semester 2</b>			
6. Grouping and identifying organisms	6.1 Explain the differences between living and non-living organisms.	- <b>Models and representations</b>  - <b>Carrying out scientific enquiry</b>	<b>Biology</b>
	6.2 Outline the seven characteristics of living organisms.		
	6.3 Explain the structure of viruses and discuss whether are non-living or living.		
	6.4 Define the term “species” and relate it to the similarities between organisms		
	6.5 Learn how to use a key to identify an organism and classify them into group.		
	6.6 Learn how to create a new key.		

7. Microorganisms in the environment	7.1 Outline different types of microorganisms	<b>- Models and representations</b>  <b>- Carrying out scientific enquiry: purpose, planning, analysis, evaluation, and conclusions</b>	
	7.2 Conduct an experiment to show the growth of some microorganisms on agar jelly.		
	7.3 Construct food chains and food webs, using arrows to indicate energy transfer		
	7.4 Describe the organisms in a food chain or food web using the correct terms.		
	7.5 Describe the feeding relationships in food chain and food web.		
	7.6 Define the meaning of decay.		
	7.7 Describe the relationship between decomposers and decay.		
	7.8 investigate how temperature affects decay by microorganisms.		
	7.9 Draw and interpret food webs include microorganisms as decomposers.		
	7.10 Conduct an experiment to show decomposing fruit.		
8. Reactivity	8.1 Use the reactivity series of metals to predict which metals will displace others from a solution of their salts.	<b>- Models and representations</b>  <b>- Carrying out scientific enquiry: purpose, and planning.</b>	<b>Chemistry</b>
	8.2 Carry out some displacement reactions.		
	8.3 Identify an unknown metal using displacement reactions and name some of useful displacement reactions.		
	8.4 Give some examples of salt and their uses.		
	8.5 Prepare salt by: * Reacting a metal with an acid, * Heating metal oxide with an acid. * Reacting an acid with carbonate. * Neutralization.		

	8.6 Explain how the atoms are rearrange in chemical reactions.		
	8.7 Explain what happens to the mass of reactants and products in a reaction.		
	8.8 Explain what happens to the energy involved in chemical reactions.		
	8.9 Carry out an experiment to show the law of conservation of mass and burning magnesium in air.		
9. Earth physics	9.1 Explain how sound comes from vibrations.	<b>- Models and representations</b>  <b>- Carrying out scientific enquiry: purpose, planning, analysis, evaluation, and conclusions</b>	<b>Physics</b>
	9.2 Describe how particles vibrate in a sound wave.		
	9.3 Explain why sound does not travel in a vacuum.		
	9.4 Explain how sound could be reflected.		
	9.5 Discover what can happen when sound is reflected		
	9.6 Conduct an experiment to model echo location.		
	9.7 Conduct an experiment to show how sound is reflected.		
	9.8 Describe a model of the structure of the Earth.		
	9.9 Explain how continents of Earth have changed.		
	9.10 Explain how fold mountains and volcanoes are formed.		
	9.11 Describe the formation of solar eclipses and lunar eclipses.		
10. Sound and space	10.1 Find the wavelength, the amplitude, and the frequency of sound waves.	<b>- Models and representations</b>  <b>- Carrying out scientific enquiry: purpose, planning, analysis,</b>	
	10.2 Explain how the amplitude is related to loudness and the frequency is related to pitch.		
	10.3 Recognize the amplitude and frequency from a diagram of sound wave.		
	10.4 Conduct some experiments and activities to explain the pitch, frequency, and vibrations		

	10.5 Find out how sound waves can reinforce each other to make louder sounds.	<b>evaluation, and conclusions</b>	
	10.6 Find out how sound waves can cancel each other to make no sound.		
	10.7 Conduct and interpret some activities to explain reinforcing and cancelling of sound waves.		
	10.8 Describe evidence for the formation of the Moon.		
	10.9 Describe that Nebulae are clouds of dust and gas in space.		
	10.10 Learn how stars can form in Nebulae.		
	10.11 Explain how convection currents cause movement of tectonic plates.		
	10.12 Outline the evidence that we have for tectonics plates.		

## Yearly plan for grade 7 – Academic year 2022/2023

Semester 1			Semester 2		
Topic	Stage - book	No. of lessons	Topic	Stage - book	No. of lessons
Cells	7	16	Grouping and identifying organisms	7	14
Maintaining life	9	16	Microorganisms in the environment	7	14
Materials, their changes, properties, and their structures	7 & 9	20	Reactivity	9	14
Forces and energy	7 & 9	16	Earth physics	7	12
Electricity	7&9	16	Sound and space	9	18
<b>Total</b>		<b>84</b>	<b>Total</b>		<b>72</b>

ملاحظة/ على المعلم الالتزام بتدريس مخرجات الصف الثامن لهذا العام والمرسلة العام الدراسي الماضي 2022/2021م

**Note: The teacher should teach the old outcomes for grade 8 which was sent last year 2021L2022**

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