

# MARINA INTERNATIONAL SCHOOL

## SCIENCE SCHEME OF WORK

### FORM 2 - TERM 1

WEEK	TOPIC	TOPIC DETAILS
1.1	SCIENTIFIC ENQUIRY	<ul style="list-style-type: none"><li>• Ideas and evidence</li><li>• Discuss the importance of developing empirical questions which can be investigated collecting evidence, developing explanation and using creative thinking</li><li>• Test prediction with reference to evidence gained</li><li>• Plan investigative work</li><li>• Obtain and present evidence</li></ul>
2.1	SCIENTIFIC ENQUIRY	<ul style="list-style-type: none"><li>• Consider evidence and approach</li><li>• Making simple calculations</li><li>• Identify Trends and patterns in results (correlations)</li><li>• Compare results with predictions</li><li>• Identify anomalous results and suggest improvement to investigations</li><li>• Interpret data from secondary sources.</li><li>• Discuss explanation for results using scientific knowledge and understanding</li><li>• Present conclusion to others in appropriate ways</li></ul>
3.1	PLANT NUTRITION (PHOTOSYNTHESIS)	<p>Explore how plants need carbon dioxide, water and light for photosynthesis in order to make biomass and oxygen Elicit from learners what is needed for the photosynthesis process to occur (carbon dioxide, water and sunlight) and what is produced (sugar and oxygen) during the process. Summarise with a word equation of this process:</p> <p>carbon dioxide + water <math>\xrightarrow{\text{light @ chloroplasts}}</math> biomass + oxygen</p> <p>Show learners a diagram of the basic structure of a leaf. Ask learners to discuss: Which cells have chloroplasts?</p>

WEEK	TOPIC	TOPIC DETAILS
3.2	PLANT NUTRITION (PHOTOSYNTHESIS)	<ul style="list-style-type: none"> <li>• How does carbon dioxide get to these cells?</li> <li>• How does water get to these cells?</li> <li>• How does light get to these cells?</li> </ul> <p>Learners then discuss which cells they think will do the most photosynthesis and how they are adapted for this process. Then learners discuss:</p> <ul style="list-style-type: none"> <li>• How does waste oxygen leave these cells?</li> <li>• How does sugar travel from the leaves to other parts of the plant?</li> </ul> <p>Then learners discuss:</p> <ul style="list-style-type: none"> <li>• How does waste oxygen leave these cells?</li> <li>• How does sugar travel from the leaves to other parts of the plant?</li> </ul>
4.1	PLANT NUTRITION	<ul style="list-style-type: none"> <li>• Explore how plants need carbon dioxide, water and light for photosynthesis in order to make biomass and oxygen</li> <li>• Make predictions using scientific knowledge and understanding</li> </ul>
5.1	HUMAN NUTRITION	<ul style="list-style-type: none"> <li>• Identify the constituents of a balanced diet and the functions of various nutrients. Secondary sources can be used</li> <li>• Understand the relationship between diet and fitness</li> </ul>
6.1	HUMAN NUTRITION	<ul style="list-style-type: none"> <li>• Identify the constituents of a balanced diet and the functions of various nutrients. Secondary sources can be used</li> <li>• Understand the effects of nutritional deficiencies</li> </ul>
7.1	HUMAN NUTRITION	<ul style="list-style-type: none"> <li>• Understand the relationship between diet and fitness</li> <li>• Interpret data from secondary sources</li> <li>• Discuss how conception, growth, development, behavior and health can be affected by diet, drugs and disease.</li> <li>• Understand the function of enzymes as biological catalysts in breaking down food to simple chemicals</li> </ul>
8.1	HUMAN NUTRITION	<ul style="list-style-type: none"> <li>• Recognize the organs of the alimentary canal and know their functions. Secondary sources can be used</li> <li>• Understand the function of enzymes as biological catalysts in breaking down food to simple chemicals</li> </ul>
9.1	ELEMENTS, MIXTURES AND COMPOUNDS	<ul style="list-style-type: none"> <li>• Show how the particle theory of matter can be used to explain the properties of solids, liquids and gases, including changes of state, gas pressure and diffusion including changes of state, gas pressure and diffusion</li> </ul>

<b>WEEK</b>	<b>TOPIC</b>	<b>TOPIC DETAILS</b>
10.1	ELEMENTS, MIXTURES AND COMPOUNDS	<ul style="list-style-type: none"> <li>• Understand that elements are made of atoms</li> <li>• Give chemical symbols for the first twenty elements of the Periodic Table</li> <li>• Distinguish between elements, compounds and mixtures</li> <li>• Use a word equation to describe a common reaction. Secondary sources can be used.</li> </ul>
11.1	LIGHT	<ul style="list-style-type: none"> <li>• Use light travelling in a straight line to explain the formation of shadows and other phenomena</li> <li>• Describe how non-luminous objects are seen</li> <li>• explain the formation of shadows and other phenomena</li> </ul>
12.1	LIGHT	<ul style="list-style-type: none"> <li>• Describe reflection at a plane surface and use the law of reflection</li> <li>• Investigate refraction at the boundary between air and glass or air and water</li> </ul>
13.1	LIGHT	<ul style="list-style-type: none"> <li>• Explain the dispersion of white light</li> <li>• Explain color addition and subtraction, and the absorption and reflection of colored light</li> <li>• Describe how non-luminous objects are seen</li> </ul>

# SCIENCE SCHEME OF WORK

## FORM 2 - TERM 2

WEEK	TOPIC	TOPIC DETAILS
1.1	TRANSPORT IN PLANTS	<ul style="list-style-type: none"><li>• Describe the absorption and transport of water and mineral salts in flowering plants</li><li>• Conclude that root hair cells are adapted to their function by having a large surface area in contact with the soil for better absorption. They take up water and mineral salts.</li></ul>
2.1	TRANSPORT IN PLANTS	<ul style="list-style-type: none"><li>• Describe the absorption and transport of water and mineral salts in flowering plants</li><li>• Conclude that root hair cells are adapted to their function by having a large surface area in contact with the soil for better absorption. They take up water and mineral salts.</li></ul>
3.1	TRANSPORT SYSTEM IN ANIMALS	<ul style="list-style-type: none"><li>• Recognize and model the basic components of the circulatory system and know their functions</li><li>• Give examples of animals with different types of circulatory systems</li></ul>
4.1	TRANSPORT SYSTEM IN ANIMALS	<ul style="list-style-type: none"><li>• Conclude that a circulatory system transports substance around an organism. Humans have a double circulatory system. This means that blood passes through the heart twice on one complete circuit of the body.</li></ul>
5.1	TRANSPORT IN ANIMAL (THE HEART)	<ul style="list-style-type: none"><li>• Use either dissection or diagrams to explain the anatomy of the mammalian heart.</li><li>• Make sure that learners can identify the left and the right side of the heart in a real structure and on diagrams</li><li>• Learners label a diagram of the heart, including the main internal features and the blood vessels that enter and leave the heart.</li></ul>

WEEK	TOPIC	TOPIC DETAILS
6.1	GAS EXCHANGE	<ul style="list-style-type: none"> <li>• Recognize the basic components of the respiratory system and know their functions</li> <li>• Explain gaseous exchange</li> <li>• Conclude that parts of the respiratory system are adapted to get the oxygen in the air into the alveoli where it can get into the blood.</li> </ul> <ul style="list-style-type: none"> <li>• Demonstrate a model of a lung using a balloon in a bell jar. Identify features of the model lung (e.g. diaphragm, lung, trachea, rib cage).</li> <li>• Demonstrate that the air is drawn into the lung because the volume around the lung increases (i.e. the air is not pushed into the lung). Learners can try to explain this using their understanding of pressure in gases.</li> <li>• Define breathing as the contraction and relaxation of muscles (the intercostal muscles and diaphragm).</li> <li>• Compare this with ventilation (the movement of air into and out of the lungs – inspiration and expiration).</li> </ul>
7.1	GAS EXCHANGE	<ul style="list-style-type: none"> <li>• Describe the effects of smoking. Secondary sources can be used</li> <li>• Show learners some images of people and organs that have been damaged by smoking. These could include lungs affected by cancer, amputations, effects of mouth cancer, etc.</li> <li>• Discuss how conception, growth, development, behavior and health can be affected by diet, drugs and disease</li> </ul>
8.1	RESPIRATION	<ul style="list-style-type: none"> <li>• Define and describe aerobic respiration, and use the word equation</li> </ul>
9.1	METALS AND NON METALS	<ul style="list-style-type: none"> <li>• Describe and explain the differences between metals and non-metals</li> <li>• Show learners the names and symbols of less-known metals (e.g. tungsten, molybdenum) and non-metals (e.g. selenium, arsenic). Ask them to predict whether each is a metal or a non-metal based on its position in the Periodic Table.</li> </ul> <ul style="list-style-type: none"> <li>• Conclude that metals and non-metals have, generally, different properties. In the Periodic Table metals are found in the middle and to the left and non-metals are found to the right.</li> </ul>

WEEK	TOPIC	TOPIC DETAILS
10.1	METALS AND NON METALS	<ul style="list-style-type: none"> <li>• Describe chemical reactions which are not useful, e.g. rusting</li> <li>• Show a picture of a rusty car or a bicycle. What is rusting? What are differences between corrosion and rusting?</li> <li>• Introduce the terms 'corrosion' and 'rusting'. Explain that rusting is an example of corrosion. Rusting is the name given to the corrosion of iron and alloys containing iron (e.g. steel).</li>   <li>• Why does iron rust? What are the conditions necessary for the formation of rust?</li> <li>• Explain that rusting requires oxygen and water</li> <li>• Preventing rusting</li> <li>• Summarize ways of preventing rust from forming e.g. painting, greasing, galvanizing, plastic coating</li> </ul>
11.1	SOUND	<ul style="list-style-type: none"> <li>• Explain the properties of sound in terms of movement of air particles</li> <li>• Conclude that vibrations cause sound. The vibrations from the sound source cause air particles to vibrate. These, in turn, cause parts of the ear to vibrate. When hair cells vibrate they send nervous signals to the brain.</li> </ul>
12.1	SOUND	<ul style="list-style-type: none"> <li>• Recognize the link between loudness and amplitude, pitch and frequency, using an oscilloscope.</li>   <li>• Discuss and control risks to themselves and others.</li> <li>• Conclude that the ear contains sound receptors. These can be damaged by loud sounds.</li> </ul>

# SCIENCE SCHEME OF WORK

## FORM 2 - TERM 3

WEEK	TOPIC	TOPIC DETAILS
1.1	REPRODUCTION	<ul style="list-style-type: none"><li>• Describe the human reproductive system, including the menstrual cycle, fertilization and fetal development</li><li>• Discuss with learners the functions of the different parts</li></ul>
2.1	REPRODUCTION	<ul style="list-style-type: none"><li>• Discuss the physical and emotional changes that take place during adolescence</li><li>• Revise the physical and emotional changes that occur in puberty. Learners sort cards into changes that happen to boys, girls or both.</li><li>• Explain that the menstrual cycle is numbered from the first day of menstruation. Explain that the menstrual cycle is controlled by hormones. Give learners the following information:<ul style="list-style-type: none"><li>• Hormone 1 controls ovulation from the ovary.</li><li>• Hormone 2 stops a thick uterus lining breaking down.</li><li>• Hormone 3 causes the uterus lining to get thicker. It also causes hormone 1 to be produced.</li></ul></li></ul>
3.1	REPRODUCTION (FERTILIZATION	<ul style="list-style-type: none"><li>• Describe fertilization as the fusing of the sperm nucleus and the egg nucleus. Learners identify their adaptations and link them to their functions.</li><li>• Explain that the sperm is deposited in the vagina. They have to swim to the egg. The egg is moved down the oviduct</li><li>• Explain that identical twins are due to one fertilized egg dividing to form two fetuses. Non-identical twins are due to two eggs each being fertilized by different sperm.</li></ul>
3.2	REPRODUCTION (FERTILIZATION	<ul style="list-style-type: none"><li>• Discuss how conception, growth, development, behavior and health can be affected by diet, drugs and disease</li></ul>
4.1	CHEMICAL REACTIONS	<ul style="list-style-type: none"><li>• Use a word equation to describe a common reaction. Secondary sources can be used.</li></ul>

WEEK	TOPIC	TOPIC DETAILS
5.1	CHEMICAL REACTION	<ul style="list-style-type: none"> <li>• Name some common compounds including oxides, hydroxides, chlorides, sulfates and carbonates.</li> <li>• Preparation of sulfates</li> <li>• Give learners sets of cards describing the main steps of the reaction between a metal and hydrochloric acid. Learners put the steps in the correct order.</li> </ul>
6.1	CHEMICAL REACTIONS	<ul style="list-style-type: none"> <li>• Use a word equation to describe a common reaction. Secondary sources can be used.</li> <li>• Name some common compounds including oxides,</li> <li>• Preparation of oxides</li> <li>• Learners write a word equation and identify the reactants and products from the sentence 'Carbon burns in oxygen to produce carbon dioxide'.</li> <li>• Learners prepare one or more oxides. Possible investigations include: <ul style="list-style-type: none"> <li>• Burn charcoal.</li> <li>• Collect the gas produced and use limewater to identify it as carbon dioxide.</li> <li>• Preparing metal hydroxides</li> </ul> </li> </ul>
7.1	FORCES	<ul style="list-style-type: none"> <li>• Calculate average speeds, including through the use of timing gates.</li> <li>• Identify important variables; choose which variables to change, control and measure.</li> <li>• Make predictions using scientific knowledge and understanding.</li> </ul>
8.1	FORCES	<ul style="list-style-type: none"> <li>• Make simple calculations.</li> <li>• Interpret simple distance/time graphs.</li> </ul>
9.1	MAGNETS	<ul style="list-style-type: none"> <li>• Describe the properties of magnets.</li> </ul>
10.1	MAGNETS	<ul style="list-style-type: none"> <li>• Recognize and reproduce the magnetic field pattern of a bar magnet</li> <li>• Conclude that magnetic field lines radiate out from magnets. They get weaker with distance and are concentrated around the poles. They have a direction of north pole to south pole.</li> </ul>
11.1	MAGNETS	<ul style="list-style-type: none"> <li>• Construct and use an electromagnet</li> </ul>