Year 9 – Science 2022

<table>
<tr><th colspan="3">TERM 1</th></tr>
<tr><td rowspan="2">TIMING
Weeks: 10</td><td colspan="2">Systems for Healthy Living: Students will learn to explain the role of the nervous system in controlling and coordinating the functioning body, explain the role of the endocrine system, including its role in coordinating body functioning, discuss the interaction of the nervous and endocrine systems in coordinating the body’s response to changes in the internal and external environments, demonstrate the use of models to explain how body systems work together and explain how all the body systems work together to provide the needs of the body and maintain an internal environment that supports the functioning cells. Students will learn about disease, describe some causes of disease, describe responses of the body to microorganisms, demonstrate ways in which some diseases can be controlled and investigate how ideas of disease transmission have changed as knowledge has developed.</td></tr>
<tr><td>UNIT OVERVIEW
• Analyse interactions between components and processes within biological systems
• Describe how the coordinated function of internal systems in multicellular organisms provides cells with requirements for life, including gases, nutrients, and water, and removes cell wastes
• Describe the role of, and interaction between, the coordination systems in maintaining humans as functioning organisms
• Outline some responses of the human body to infectious and non-infectious diseases
• Describe some examples of how multicellular organisms respond to changes in their environment
• Discuss, using examples, how the values and needs of contemporary society can influence the focus of scientific research, e.g., the occurrence of diseases affecting animals and plants, an epidemic or pandemic disease in humans or lifestyle related non-infectious diseases in humans
• Discuss, using examples, how the values and needs of contemporary society can influence the focus of scientific research, e.g., the occurrence of diseases affecting animals and plants, an epidemic or pandemic disease in humans or lifestyle related non-infectious diseases in humans
• Explain how biological understanding has advanced through scientific discoveries, technological developments, and the needs of society
• Explores ways in which science living and technology have improved human health</td><td>ASSESSMENT
Task Number: 1

Nature of Task: Scientific Research

Percentage: 40

Week: 9

Reported: Semester 1</td></tr>
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<table>
<tr><th colspan="3">TERM 2</th></tr>
<tr><td rowspan="2">TIMING
Weeks: 6</td><td colspan="2">Using Energy and Electricity: Matter is made up of atoms. In these atoms, there are some smaller particles called electrons that are constantly moving. We generate electrical energy when we succeed to cause these electrons to move from one atom to the other. Through this topic students will understand how current electricity has resulted in technological developments designed to improve the efficiency in generation and use of electricity.</td></tr>
<tr><td>UNIT OVERVIEW</td><td>ASSESSMENT</td></tr>
<tr><td></td><td>• Describe voltage, current and resistance in terms of energy applied, carried, and dissipated
• Describe qualitatively the relationship between voltage, resistance and current
• Explain the relationship between resistance, voltage and current, using Ohm's Law and power consumption of devices and circuits
• Compare the characteristics and applications of series and parallel electrical circuits
• Outline recent examples where scientific or technological developments have involved specialist teams from different branches of science, engineering and technology, e.g., low-emissions electricity generation and reduction in atmospheric pollution
• Apply the law of conservation of energy to account for the total energy involved in energy transfers and transformations
• Discuss, using examples, how the values and needs of contemporary society can influence the focus of scientific research in the area of increasing efficiency of the use of electricity by individuals and society
• Discuss viewpoints and choices that need to be considered in making decisions about the use of non-renewable energy resources
• Investigate the energy efficiency of appliances and relate this to a household energy account</td><td>Task Number: 2

Nature of Task:
Semester 1 Examination

Percentage: 60

Week: 6

Reported: Semester 1</td></tr>
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<table>
<tr><th colspan="3">TERM 2 (continued)</th></tr>
<tr><td rowspan="3">TIMING
Weeks: 4</td><td colspan="2">Dynamic Earth and Earth Processes: This unit explores the changing ideas about the structure of the Earth and explains that the Earth is subject to change within and on its surface over time due to natural processes. Tectonic plates move relative to each other in three different ways to produce different landforms. The Himalayas, the world’s highest mountains were formed by the movements of tectonic plates. The theory of plate tectonics helps us understand how our planet changes. Earthquakes and volcanoes provide evidence of the interior processes of the Earth. They provide information that supports the theory of plate tectonics.</td></tr>
<tr><td>UNIT OVERVIEW</td><td>ASSESSMENT</td></tr>
<tr><td>• Outline how the theory of plate tectonics changed ideas about the structure of the Earth and continental movement over geological time
• Relate movements of the Earth's plates to mantle convection currents and gravitational forces
• Outline how the theory of plate tectonics explains earthquakes, volcanic activity and formation of new landforms
• Describe how some technological developments have increased scientific understanding of global patterns in geological activity, including in the Asia-Pacific region
• Outline how global systems rely on interactions involving the biosphere, lithosphere, hydrosphere, and atmosphere, including the carbon cycle
• Describe some impacts of natural events, including cyclones, volcanic eruptions or earthquakes, on the Earth's spheres
• Evaluate scientific evidence of some current issues affecting society that are the result of human activity on global systems, e.g. the greenhouse effect, ozone layer depletion, effect of climate change on sea levels, long-term effects of waste management and loss of biodiversity
• Discuss the reasons different groups in society may use or weight criteria differently to evaluate claims, explanations, or predictions in making decisions about contemporary issues involving interactions of the Earth's spheres</td><td></td></tr>
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<table>
<tr><th colspan="3">TERM 3</th></tr>
<tr><td rowspan="3">TIMING
Weeks: 2</td><td colspan="2">Dynamic Earth and Earth Processes (continued): This unit explores the changing ideas about the structure of the Earth and explains that the Earth is subject to change within and on its surface over time due to natural processes. Tectonic plates move relative to each other in three different ways to produce different landforms. The Himalayas, the world's highest mountains were formed by the movements of tectonic plates. The theory of plate tectonics helps us understand how our planet changes. Earthquakes and volcanoes provide evidence of the interior processes of the Earth. They provide information that supports the theory of plate tectonics.</td></tr>
<tr><td>UNIT OVERVIEW</td><td>ASSESSMENT</td></tr>
<tr><td>• Outline how the theory of plate tectonics changed ideas about the structure of the Earth and continental movement over geological time
• Relate movements of the Earth's plates to mantle convection currents and gravitational forces
• Outline how the theory of plate tectonics explains earthquakes, volcanic activity and formation of new landforms
• Describe how some technological developments have increased scientific understanding of global patterns in geological activity, including in the Asia-Pacific region
• Research how computer modelling has improved knowledge and predictability of phenomena, e.g. atmospheric pollution, ocean salinity and climate change</td><td></td></tr>
<tr><td rowspan="3">TIMING
Weeks: 6</td><td colspan="2">Invisible Waves: In this topic, students learn about the properties and uses of waves in the electromagnetic spectrum. Electromagnetic radiations provide many different forms of energy. Wave motion is the transfer of energy from place to place without the transfer of matter. Students will also investigate transverse matter waves, transverse electromagnetic waves longitudinal waves and the use of waves in communication.</td></tr>
<tr><td>UNIT OVERVIEW</td><td>ASSESSMENT</td></tr>
<tr><td>• Explain, in terms of the particle model, the processes underlying convection and conduction of heat energy
• Identify situations were waves transfer energy
• Describe qualitatively, using the wave model, the features of waves including wavelength, frequency and speed
• Explain, using the particle model, the transmission of sound in different mediums
• Relate the properties of different types of radiation in the electromagnetic spectrum to their uses in everyday life, including communications technology
• Describe the occurrence and some applications of absorption, reflection and refraction in everyday situations
• Investigate quantitatively, features of waves including frequency, wavelength and speed using v = fλ and relate this to musical instruments
• Relate scattering and dispersion of light to everyday occurrences</td><td>Task Number: 3

Nature of Task:
Skills / Practical

Percentage: 50

Week: 7

Reported: Semester 2</td></tr>
<tr><td rowspan="3">TIMING
Weeks: 2</td><td colspan="2">Atoms and the Periodic Table: See Term 4 Unit introduction</td></tr>
<tr><td colspan="2">UNIT OVERVIEW</td></tr>
<tr><td colspan="2">• Identify the atom as the smallest unit of an element and that it can be represented by a symbol
• Distinguish between the atoms of common elements comparing information about numbers of protons, neutrons and electrons
Use models to describe the arrangement of electrons in the energy levels of common elements</td></tr>
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<table>
<tr><th colspan="3">TERM 4</th></tr>
<tr><td rowspan="3">TIMING
Weeks: 6</td><td colspan="2">Atoms and the Periodic Table: Everything around us is made of matter and behaves in the way it does due to the type of matter from which it is made. Students will learn about the history of the development of our understanding of the structure of the atom and isotopes, electron levels, nuclear energy and radioactivity. Students will develop an understanding of the placement of elements in the Periodic Table.</td></tr>
<tr><td>UNIT OVERVIEW</td><td>ASSESSMENT</td></tr>
<tr><td>• Describe the organisation of elements in the Periodic Table using their atomic number
• Relate the properties of some common elements to their position in the Periodic Table
• Predict, using the Periodic Table, the properties of some common elements
• Outline some examples to show how creativity, logical reasoning and the scientific evidence available at the time, contributed to the development of the modern Periodic Table
• Conduct flame tests and explain the colours in terms of subatomic structure
• Outline historical developments of the atomic theory to demonstrate how models and theories have been contested and refined over time through a process of review by the scientific community
• Identify that all matter is made of atoms which are composed of protons, neutrons and electrons
• Describe the structure of atoms in terms of the nucleus, protons, neutrons and electrons
• Identify that natural radioactivity arises from the decay of nuclei in atoms, releasing particles and energy
• Evaluate the benefits and problems associated with medical and industrial uses of nuclear energy</td><td>Task Number: 4

Nature of Task: Semester 2 Examination

Percentage: 50

Week: 6

Reported: Semester 2</td></tr>
<tr><td rowspan="3">TIMING
Weeks: 5</td><td colspan="2">The Universe: In this topic, students will be able to describe the major features of the universe such as galaxies, stars, solar systems and nebulae. Students will be able to compare the scale of objects in the universe. Students will identify that the force of gravity exists between all objects with mass in the universe. In learning the content of this topic, students will learn to appreciate how scientific knowledge has been refined over time through new discoveries and research.</td></tr>
<tr><td>UNIT OVERVIEW</td><td>ASSESSMENT</td></tr>
<tr><td>• Outline some of the major features contained in the universe, including galaxies, stars, solar systems and nebulae
• Describe, using examples, some technological developments that have advanced scientific understanding about the universe
• Use appropriate scales to describe differences in sizes of and distances between structures making up the universe
• Relate colours of stars to their age, size and distance from the Earth
• Identify that all objects exert a force of gravity on all other objects in the universe
• Use scientific evidence to outline how the Big Bang theory can be used to explain the origin of the universe and its age
• Outline how scientific thinking about the origin of the universe is refined over time through a process of review by the scientific community</td><td></td></tr>
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