Holy Family Catholic School – Faculty of Science and Physiology

Science Spring Term 1 Year 8

Learning Intention	Vocab	Concept	Retrieval	Success Criteria	Hinge Questions for this lesson	Red Zone
Week 16 Lesson 1 What is global warming?	Greenhouse, Climate, Carbon, Temperature	The Earth and Environment	- Understanding that Earth's atmosphere traps heat - Awareness that human activities (like burning fossil fuels) release greenhouse gases	1. State the meaning of the greenhouse effect. 2. Explain how carbon dioxide helps to cause the greenhouse effect. 3. Explain how human activity affects the levels of carbon dioxide in the atmosphere. 4. Explain how methods of controlling the levels of carbon dioxide work.	Which statement best explains why carbon dioxide contributes to the greenhouse effect? A) It reflects sunlight back to Earth. B) It absorbs infrared radiation and re-emits it as heat. C) It blocks oxygen from escaping the atmosphere. D) It cools the Earth by releasing energy into space.	You've been asked to write a script for a climate awareness video on tik tok. The goal is to help the public understand the role of carbon dioxide in global warming and how we can reduce its impact. Your script must include: - Definition - What is the greenhouse effect? - Carbon Dioxide's Role - How does carbon dioxide contribute to the greenhouse effect? - Human Impact - Describe two human activities that increase carbon dioxide levels. - Solutions - Explain one method used to control carbon dioxide levels and how it works.
Week 16 Lesson 2 What is the first model of the atom?	Sphere, Dalton, Indivisible, Theory	Particles and Matter	- Knowing that substances are made of atoms - Awareness that atoms have internal structure (even if simplified	1. Recall that different elements have different physical properties 2. Recall Dalton's ideas about atoms 3. Recall how to identify the chemical symbols for some common elements and vice versa 4. Recall how to record two-letter symbols correctly	Which statement is **true** about chemical symbols? A) They always start with a lowercase letter. B) Two-letter symbols use two uppercase letters. C) The first letter is uppercase, and the second (if present) is lowercase. D) They are chosen	Create a table of 10 common elements showing their name, correct chemical symbol, and one physical property. Explain why correct capitalization of symbols is important in chemistry.

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					randomly for each element.	
Week 16 Lesson 3 What are the physical trends in the periodic table?	Group, Period, Melting, Density	Particles and Matter	- Familiarity with the periodic table layout (groups and periods) - Understanding that elements have measurable properties like melting point and density	1. Explain melting, freezing and boiling points and use them to predict the state of a substance	Which statement about physical trends in the periodic table is correct? A) Melting points of alkali metals increase down the group. B) Density of alkali metals decreases down the group. C) Atomic radius increases down a group. D) Reactivity of noble gases increases down the group.	A substance has a melting point of 90°C and a boiling point of 300°C. What state is it at room temperature? This substance is in group 1 of the periodic table. What would you expect to happen to the melting point of elements as you go down the group?
Week 17 Lesson 1 What are the properties of metals and non-metals?	Conductivity, Malleable, Brittle, Insulator	Particles and Matter	- Knowing that elements can be classified based on their physical and chemical traits - Awareness of everyday examples of	1. Describe and identify trends in physical properties within the periodic table 2. Identify metals and non-metals by their properties and position in the periodic table	Which statement is **true** about metals and non-metals? A) Metals are brittle and poor conductors. B) Non-metals are malleable and good conductors. C) Metals are malleable	Compare the physical properties of metals and non-metals in terms of conductivity, malleability, and appearance. Explain how these differences relate to their atomic structure and bonding.

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			metals and non-metals		and good conductors. D) Non-metals are shiny and ductile.	
Week 17 Lesson 2 Which alkali metal is the most reactive and why?	Group 1, Reactivity, Electron, Shielding	Energy and Rates	- Understanding of the alkali metals group and their position in the periodic table - Basic idea of reactivity and how it changes down a group	1. Describe the reactions of metals with water. 2. Recall the typical properties of alkali metals 3. State that atoms can be joined up to make molecules or giant lattice structures	Which statement best describes the reaction of alkali metals with water? A) They do not react with water at all. B) They react slowly, producing a solid oxide. C) They react vigorously, producing hydrogen gas and an alkaline solution. D) They dissolve without any chemical change.	**Task:** You are given three unknown metals: Metal X, Metal Y, and Metal Z. • Metal X reacts violently with water, producing hydrogen gas and heat. • Metal Y reacts slowly with water, forming a weak alkaline solution. • Metal Z does not react with water at room temperature. **Challenge:** 1. Predict which group each metal belongs to in the periodic table and justify your reasoning.

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						2. Explain how the bonding in these metals relates to their observed properties. 3. Suggest why alkali metals are stored under oil and link this to their reactivity.
Week 17 Lesson 3 What are the properties of the halogens?	Group 7, Toxic, Colour, Reactivity	Particles and Matter	- Familiarity with the halogens group in the periodic table - Awareness that halogens react with metals to form salts	1. Recall the typical properties of halogens. 2. Recall there is usually a regular gradation in chemical properties as you go down a group. 3. Use data to identify trends in chemical properties within a group.	Which statement correctly describes the trend in reactivity of halogens as you go down Group 17? A) Reactivity increases because atoms get smaller and attract electrons more strongly. B) Reactivity decreases because atoms get larger and attract electrons less strongly. C) Reactivity stays the same because all halogens have seven outer electrons.	You are given the following data for fluorine, chlorine, bromine, and iodine: • Melting point • Boiling point • Reactivity with sodium **Challenge:** 1. **Analyse:** Identify the trend in melting and boiling points as you go down Group 7. 2. **Explain:** Use particle theory and intermolecular forces to

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					D) Reactivity decreases because they lose electrons more easily.	explain why these trends occur. 3. **Predict:** Estimate the melting and boiling points of astatine and justify your prediction based on the trend. 4. **Evaluate:** How does the trend in reactivity compare to the trend in physical properties? Why do these trends differ?
Week 18 Lesson 1 How has the periodic table changed over time?	Mendeleev, Atomic number, Prediction, Gaps	Particles and Matter Thinking Like a Scientist	- Knowing that scientific models evolve with new evidence - Awareness of early attempts to classify elements (e.g., by atomic mass)	1. Identify the alkali metals, halogens, (transition metals) and noble gases in the periodic table 2. State what elements in the same group of the periodic table share 3. Recall that the noble gases are chemically inert compared with other elements 4. Explain how Mendeleev originally arranged the periodic table by placing the	What do elements in the same group of the periodic table have in common? A) The same number of electron shells B) The same number of protons C) The same number of electrons in their outer	Mendeleev arranged the periodic table by atomic weight, but modern tables use atomic number. 1. **Analyse:** Explain why Mendeleev's arrangement worked well for most elements but caused problems for some.

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				elements in order of atomic weight	shell D) The same atomic weight	2. **Investigate:** Find two examples of elements that were placed incorrectly by atomic weight and explain why their chemical properties didn't fit the pattern. 3. **Apply:** Predict what would happen if we arranged the periodic table by melting point instead of atomic number. How would this affect grouping and trends?
Week 18 Lesson 2 How do we know if a chemical reaction has happened?	Colour, Gas, Precipitate, Temperature	Particles and Matter	- Understanding that reactions produce new substances - Familiarity with signs of chemical change (e.g., colour change,	1. Model more complex chemical reactions using word equations. 2. Describe how atoms are rearranged in chemical reactions. 3. Write simple chemical formulae from information on structure. 4. Interpret formulae to identify the types of and	Which statement correctly describes what happens during a chemical reaction? A) Atoms are destroyed and new atoms are created. B) Atoms are rearranged to form new substances.	You are given the following word equation: **Magnesium + Hydrochloric acid → Magnesium chloride + Hydrogen**

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			gas production)	ratio of atoms in a compound.	C) Molecules disappear and energy is created from nothing. D) Atoms keep the same arrangement but change their properties.	1. **Model:** Write the balanced symbol equation for this reaction. 2. **Interpret:** From the formula of magnesium chloride ($MgCl_2$), identify the types of atoms present and their ratio. 3. **Explain:** Describe how the atoms are rearranged during this reaction and why the total number of each type of atom stays the same. 4. **Extension:** Predict what would happen if calcium was used instead of magnesium and justify your reasoning.
Week 18 Lesson 3 How do metal and non-metal oxides react?	Acidic, Basic, Oxide, pH	Particles and Matter Thinking Like a Scientist	- Knowing what oxides are (compounds with oxygen) - Awareness that metal oxides tend to	1. Describe the reactions of metals with oxygen 2. Describe the reactions of non-metals with oxygen 3. Compare the physical and chemical properties of	Which statement correctly compares metal oxides and non-metal oxides?	**Scenario:** A teacher burns a piece of magnesium ribbon in oxygen and also burns sulfur in oxygen. The

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			be basic and non-metal oxides acidic	metal and non-metal oxides.	A) Both are acidic and dissolve in water to form acids. B) Metal oxides are usually basic, while non-metal oxides are usually acidic. C) Metal oxides are gases, while non-metal oxides are solids. D) Both are neutral and do not react with water.	products are magnesium oxide and sulfur dioxide. **Challenge:** 1. **Write:** Give the word equations for both reactions. 2. **Compare:** Which product is a solid and which is a gas at room temperature? Why? 3. **Test:** Predict what will happen if each product is dissolved in water. Will the solution be acidic, neutral, or alkaline? 4. **Explain:** Why do metal oxides and non-metal oxides behave differently in water? Use simple ideas about particles and bonding.
Week 19 Lesson 1 How do we	kingdom, features,	Cells and systems &	How are living things grouped in science?	1. Classify organisms into kingdoms based on characteristics.	Which of these is the correct order of	The organism you are completing these questions about is a lion; below is a list of its classification.

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classify organisms?	groups, similarities	inheritance and evolution	What is a kingdom?	2. Explain how organisms are classified, using smaller and smaller groupings of shared characteristics. 3. Identify the genus and species names from a binomial name. 4. Explain why preserving biodiversity is important (useful products, organism interactions, enriches our lives, disaster recovery).	taxonomic ranks from largest to smallest? A) Species → Genus → Family → Order → Class → Phylum → Kingdom B) Kingdom → Phylum → Class → Order → Family → Genus → Species C) Kingdom → Class → Phylum → Order → Family → Species → Genus D) Phylum → Kingdom → Class → Order → Family → Genus → Species	Animalia, Chordata, Mammalia, Carnivora, Felidae, Panthera, Leo senegalensis. Answer the following questions about lions. 1) What is the kingdom of the lion? 2) What is the binomial name of this species of lion? 3) Another lion has the binomial name of Panthera Leo persica . What section of the classification has changed?
Week 19 Lesson 2 How do we investigate populations?	quadrat, habitat, count, estimate	Thinking like a scientist, experimental and investigative skills, Analysis and evaluation, SI units and calculating & Ecosystems and environmental interactions	What is a population in biology? What is a quadrat?	1. Use a sample to calculate an estimate of population size. 2. Plan an appropriate sample size. 3. Explain the effects of too small and too big a sample size.	A 0.25m^2 quadrat in a 10m^2 field finds 25 daisies. What is the estimated population of daisies in the field? A) 25 B) 250 C) 100 D) 1000	Design a sampling strategy for estimating the population size of a daffodils in a 100 m^2 area. Justify your chosen method of sampling, your sample size and explain what would happen if your sample size were too small or too large.
Week 19 Lesson 3 How do plants reproduce?	flower, pollen, ovule, fertilisation	Cells and systems & inheritance and evolution	How do most plants reproduce? What do the male and	1. Describe the main features of asexual and sexual reproduction 2. Explain how inherited variation is caused (does	Which statement best describes how flowering plants reproduce? A) Seeds are produced after fertilisation of ovules by	Compare sexual and asexual reproduction in plants. Explain why some plants use both methods and evaluate the advantages and

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			female parts of a flower produce?	not include genes). 3. Explain the difference in outcomes of asexual and sexual reproduction in plants.	pollen B) Seeds are produced by photosynthesis in leaves C) Seeds are produced when pollen lands on the petals D) Seeds are produced by roots absorbing water	disadvantages of each in different environments.
Week 20 Lesson 1 How does plants use pollen to reproduce?	pollination, stigma, pollen tube, seed	Cells and systems & inheritance and evolution	What is pollination? What happens during fertilisation in plants?	1. Describe how the structures of a flower are adapted to their functions. 2. Describe how plants avoid self-pollination. 3. Explain why plants try to avoid self-pollination. 4. Explain how some pollen grains are adapted to their functions.	Which adaptation correctly matches the structure of a flower to its function? A) Brightly coloured petals – attract pollinators B) Stigma covered in wax – prevent pollen attachment C) Long filament – store nectar for insects D) Ovary exposed – protect seeds from damage	Describe two mechanisms a plant uses to avoid self-pollination and explain why this is important for genetic diversity.
Week 20 Lesson 2 How are seeds made?	ovary, fertilised, embryo, seed coat	Cells and systems & inheritance and evolution	What forms inside the ovary after fertilisation? Why is seed dispersal important for plants?	1. Explain the functions of the different parts of a seed. 2. Describe the importance of hybridisation in plant breeding. 3. Explain the production of seedless fruits using hybridisation.	Which process produces seeds in flowering plants? A) Pollination B) Fertilisation C) Germination D) Photosynthesis	Explain the process of fertilisation in plants and how it leads to seed formation. Include the roles of pollen, ovule, and embryo development.

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Week 20 Lesson 3 How are seeds dispersed?	wind, animals, water, explosion	Inheritance and evolution	What does dispersal mean? How do plants produce seeds?	1. Recall different methods of seed dispersal. 2. Explain the importance of seed dispersal. 3. Evaluate different methods of seed dispersal.	Which of the following is **NOT** a method of seed dispersal? A) Wind B) Water C) Animals D) Germination	Compare different seed dispersal methods (wind, water, animals, explosion) and explain how each method is adapted to the plant's environment. Consider why would a plant evolve to use more than one dispersal strategy?
Week 21 Lesson 1 How do seeds grow?	germination, water, temperature, roots	Inheritance and evolution	What conditions are needed for something to grow? What does a growing seed look like?	1. Recall how seeds germinate to produce plants. 2. Describe the life cycle of different types of plants.	Which condition is NOT essential for seed germination? A) Water B) Oxygen C) Light D) Warmth	Explain the conditions required for seed germination and why each is essential. Things to include: What happens inside the seed during germination (water, oxygen and temperature)?
Week 21 Lesson 2 How do we classify microorganisms?	bacteria, fungi, protists, microscopic	Cells and systems	What types of organisms are considered micro-organisms? Why do we need a microscope to see micro-organisms?	1. Identify organisms that are unicellular and those that are multicellular. 2. Use the key characteristics of microorganism cell structure to classify microorganisms. 3. Justify the lack of a virus kingdom.	Which group contains organisms that lack a nucleus? A) Prokaryote B) Fungi C) Protists D) Algae	Explain how microorganisms are classified into major groups (bacteria, fungi, viruses, protozoa, algae). Include the key characteristics used for classification, such as cell structure, presence of nucleus, and method of reproduction.
Week 21 Lesson 3 How unicellular organisms transport substances?	unicellular, diffusion, vacuole, reproduce	Cells and systems & Biological molecules and processes	What is the difference between diffusion and osmosis? Why do cells need	1. Define a unicellular organism. 2. Describe two model unicellular organisms. 3. Explain how amoeba and euglena survive, live and	Which statement best explains how amoeba and euglena reproduce? A) They reproduce by binary fission, where one cell splits into two	Amoeba and euglena are both unicellular organisms, but they survive in different ways. Imagine they are placed in an environment with no light and very little food. Predict which organism would

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			to exchange substances with their environment?	reproduce. 4. Compare and contrast the structure of two unicellular organisms.	identical cells. B) They reproduce by sexual reproduction, combining genetic material from two cells. C) They reproduce by budding, where a small part grows and breaks off. D) They reproduce by spores, which develop into new organisms.	survive longer and explain why, using evidence from their structures and lifestyles. Then, suggest one adaptation each organism could develop to cope with this new environment.