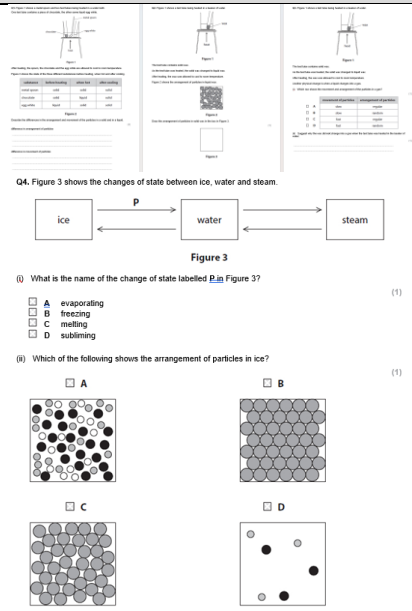
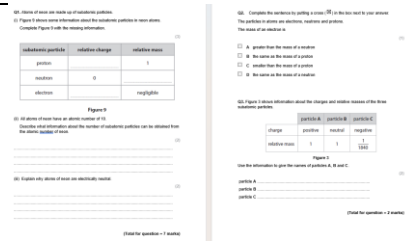
Holy Family Catholic School – Faculty of Science and Physiology

Science Autumn Term 2 Year 9

Learning Intention	Vocab	Concept	Retrieval	Success Criteria	Hinge Questions for this lesson	Red Zone
Week 9 Lesson 1 Inset Day						
Week 9 Lesson 2 **PAZ** **Marked Piece 1**						
Week 9 Lesson 3 **PAZ Review**						
Week 10 lesson 1 How can we extract metals using electrolysis? Lesson-6---Electrolysis.pptx	Electrolysis Anode Cathode Ions	Chemical Reactions Energy and Rates The Earth and Environment	metals names and properties	1. Recall that the extraction of some metals is more difficult than others, depending on the metal's reactivity 2. Describe the movement of ions in electrolysis 3. Explain why the method used to extract a metal is related to its position in the reactivity series and cost of the extraction process.	Why must aluminium be extracted using electrolysis instead of heating with carbon? A. Aluminium is less reactive than carbon B. Aluminium is more reactive than carbon C. Carbon is too expensive to use D. Aluminium is found as pure metal Misconception targeted: Students think aluminium is naturally pure or that carbon works for all metals.	Gold has been used for over 5000 years but sodium has only been available to use for just over 200 years. Explain this difference in the length of time that gold and sodium have been used for. What extraction techniques would you use for the following metal? Explain your answer. Gold Lead Zinc Aluminium

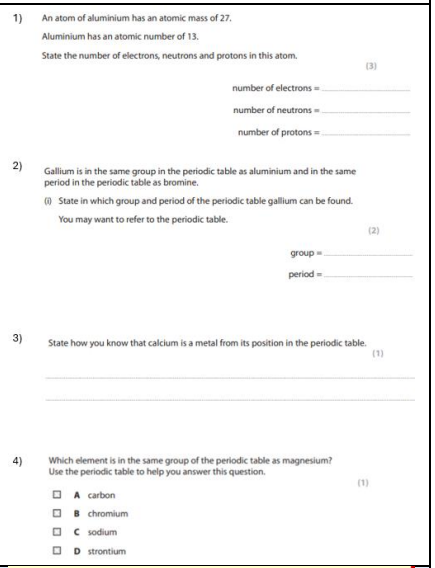
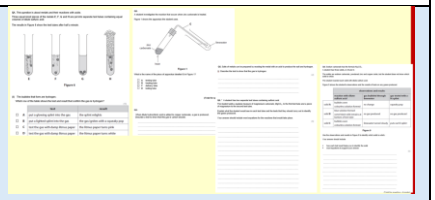
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Learning Intention	Vocab	Concept	Retrieval	Success Criteria	Hinge Questions for this lesson	Red Zone
Week 10 Lesson 2 What are the different types of particles? 1. Particles.pptx	Element Compound Mixture Compress	Particles and Matter	Review how to name substances and the behaviour of the states of matter	- define element, compound and mixture - describe structure and behaviours of solids, liquids and gases	Particles can flow past each other and take the shape of the bottom of the whole of the container in.... A – gas state only B – liquid state only C – liquid and gas state D – all states	
Week 10 Lesson 3 What do atoms look like? 2. Atomic Structure.pptx	Proton Neutron Electron Electron shell	Particles and Matter	Review use of the periodic table and element symbols	- Know the structure of atoms - Apply the elements of the Periodic Table to find the structure of atoms - Figure out the protons, neutrons, electrons, atomic mass and atomic number using given data and formulae	Hinge Question: Which statement correctly describes the structure of an atom? A. Electrons are found in the nucleus B. Protons and neutrons are in the nucleus C. Protons move around the nucleus in shells D. Neutrons have a positive charge Misconception targeted:	

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					Students confuse where particles are located and their charges.	
Week 11 Lesson 1 What does the Periodic Table tell us? 3. Periodic Table.pptx	Periodic table, protons, neutrons, electrons	Particles and Matter	Structure of the atom, periodic table	1) Learn the difference between groups and periods 2) Explain how mass numbers and atomic numbers can be used to find out the number of sub-atomic particles.	How many protons does an atom of helium have? A – 2 B – 4 C - 6	
Week 11 Lesson 2 How can we test for different gases? 4. Gas Tests.pptx	Litmus paper, limewater, splint	Chemical Reactions	Chemical reactions produce gases, litmus paper is an indicator	1) Describe how to test if a gas is carbon dioxide, hydrogen, chlorine or oxygen.	Which gas produces a squeaky pop when a lit splint is applied? A – oxygen B – hydrogen C – carbon dioxide D – chlorine	

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Week 11 Lesson 3 What happens when predators eat prey? 0. Food chains and webs.pptx	producer, consumer, predator, prey, trophic level	Ecosystems and Environmental Interactions	KS2 - describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, construct and interpret a variety of food chains, identifying producers, predators and prey.	1. Draw and interpret food chains 2. State that the arrows represent energy transfer 3. Define producer, consumer, predator, prey, carnivore, omnivore and herbivore	When a predator eats prey, energy moves: (a) From prey to predator (b) From predator to prey (c) Nowhere	Bats are mammals that can fly. In many parts of the world bats live in caves. Many other animals live in the caves and some feed on bat droppings. Bats fly out of the caves at night to catch insects. The diagram shows part of a food web which includes the organisms living in a cave. In summer, birds enter the caves and eat large numbers of beetles. Suggest why this might cause the population of millipedes to go up or go down.
Week 12 Lesson 1 How does energy and matter move around an ecosystem? 0. Biomass and Pyramids of Number.pptx	trophic level, biomass, pyramid of number	Ecosystems and Environmental Interactions	Y7 B2 - food chains	1. Explain the gains and losses of energy from living organisms. 2. Interpret models of energy transfer (pyramids of numbers and biomass). 3. Sketch pyramids of numbers and biomass 4. Explain the effects of some persistent pesticides on ecosystems.	Energy starts in: (a) Soil (b) Sun (c) Water	1. Draw 2 food chains and predict how many organisms there would be at each trophic level 2. On graph paper, construct a pyramid of number for each food chain 3. Label and colour in each trophic level – e.g. producer, primary consumer, carnivore etc

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Week 12 Lesson 2 How do organisms affect their ecosystems? **6 Marker – marked piece 2** **0. Ecosystems.pptx**	habitat, community, population, food chain, food web,	Ecosystems and Environmental Interactions	Y7 B2 - food chains and webs	1. Explain why organisms are in competition in a given habitat. 2. Explain how the distribution of organisms is controlled by the availability of resources. 3. Explain how changes in a population or community in an ecosystem affect other populations. 4. Use food webs to predict the effects of changes in populations.	What could happen if a species is removed from a food web? A. Only the population of that species would decrease; all other populations would stay the same. B. The predators of that species may decrease, and the species it fed on may increase. C. All species in the food web would immediately become extinct. D. Energy would stop entering the food web completely.	What would happen to the other organisms in the food web if all of the periwinkles died?
Week 12 Lesson 3 Inset day						
Week 13 Lesson 1 Inset day						
Week 13 Lesson 2 What is interdependence?	mutualism, parasitism, predator, prey	Ecosystems and Environmental Interactions	Y7 B2 - interdependence	1. Define mutualistic, predator-prey and parasitic relationships 2. Give examples of types of interdependence, including insects and pollination	Interdependence means: (a)Living things never change (b) Living things live alone (c) Living things need each other	1. Describe what type of interdependence is being shown between the hare and lynx 2. Describe the trend in the graph

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0. Interdependence.pptx						
Week 13 Lesson 3 What is variation? Variation.pptx	variation, characteristics	Inheritance and Evolution	KS2 - They should also appreciate that variation in offspring over time can make animals more or less able to survive in particular environments	What is variation in a species? A: differences between different species B: Difference cause only by the environment C: Differences between individuals of the same species D: Differences in inherited characteristics Correct answer: C	1. Define variation as the differences between organisms 2. Identify variation between organisms of the same type and of different types. 3. Identify examples of continuous and discontinuous variation.	Exam Questions
Week 14 Lesson 1 How can we measure variation? Presenting Variation.pptx	continuous, discontinuous	Inheritance and Evolution	Y7 B1 - variation	Which is an example of continuous variation? A: height B: Blood group C: Eye colour D: ability to roll your tongue Correct answer: A	1. Collect data about variation within the class 2. Present data in frequency diagrams, scatter graphs and bar charts. 3. Recall which type of graph is used for continuous and discontinuous variation	a What was the environmental factor in this experiment? b Plot all the results on a scatter graph. c What is the relationship between light level and leaf length? d Suggest a reason for this relationship. e Is the dependent variable in this experiment continuous, discontinuous or neither?
Week 14 Lesson 2	adaptation, inherit,	Inheritance and Evolution	Y7 B1 - variation, KS2 - identify how	Which statement about adaptations is correct?	1. Recall the definition of terms habitat and species 2. Compare similar	How is Zarg adapted to his environment?

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What are adaptations and how are they inherited? Variation and adaptations.pptx	characteristic		animals and plants are adapted to suit their environment in different ways, comparing how some living things are adapted to survive in extreme conditions	A: All adaptations are learned during life B: Adaptations always appear because an organism needs them C: Adaptations are inherited characteristics which help survival. D: Adaptations only affect animals Correct answer: C	adaptations in plants and animals that live in similar places. 3. Explain how inherited variation is caused.	
Week 14 Lesson 3 What is natural selection? 9Ae-Natural-Selection - New.pptx	natural selection, evolution, adaptation, variation,	Inheritance and Evolution	KS2 - adaptation may lead to evolution, Y7 B1 - adaptations	Which best describes natural selection? A: The strongest organisms always survive. B: Organisms change because they want to survive C: All individuals have the same change of surviving D: Organisms with helpful inherited traits are more likely to survive Correct answer: D	1. Recall that the individuals in a population are likely to vary from one another genetically. 2. Recall that variation can lead to certain organisms being better adapted to their environment and therefore more likely to survive and reproduce 3. Explain how natural selection determines the survival of certain variations of adaptations within a population.	The Galapagos have many different habitats and food types due to the unique way the islands formed. Explain how so many different species of finch evolved from just one ancestor.

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Learning Intention	Vocab	Concept	Retrieval	Success Criteria	Hinge Questions for this lesson	Red Zone
					4. Explain how natural selection can lead to evolution.	
Week 15 Lesson 1 How can changes in an environment affect survival?	adaptation, native, competition, extinction	Inheritance and Evolution	Y7 B1 - adaptations, KS2 - They should also appreciate that variation in offspring over time can make animals more or less able to survive in particular environments	Why might pollution reduce survival in a population? A: It makes organisms grow faster B: It can destroy habitats and food sources C: It increases variation D: It only affects non-living things Correct answer: B	1. Recall how changes in a physical environmental factor in a habitat affect populations and communities. 2. Explain how changes in an ecosystem can lead to endangerment and extinction. 3. Explain how particular adaptations increase the chances of survival. 4. Explain how particular adaptations limit an organism's distribution and abundance. 5. Make predictions about how changes in physical and biological factors will interact with adaptations and affect survival.	Explain the changes in population of the red squirrels since 1945.
Week 15 Lesson 2 What is biodiversity?	biodiversity, tundra, equator	Ecosystems and Environmental Interactions	Y7 B2 habitats, ecosystems, food chains and webs	1. Define biodiversity as the variety of different organisms in an ecosystem 2. Give examples of ecosystems with high and low biodiversity	Which place has high biodiversity? (a) Rainforest (b) Desert (c) Car park	Explain why biodiversity values would be different if the data had been collected in the winter compared to if the data was collected in summer.

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Learning Intention	Vocab	Concept	Retrieval	Success Criteria	Hinge Questions for this lesson	Red Zone
0. Biodiversity.pptx				3. Discuss why ecosystems with low biodiversity has a negative impact on organisms		
Week 15 Lesson 3 How do we investigate populations? Sampling Introduction.pptx	quadrat, sample, estimate, accurate	Ecosystems and Environmental Interactions	Y7 B2 - biodiversity	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.	To study populations, scientists often: (a) Take samples (b) Count all animals (c) Guess numbers	David wants to work out the population of the number of dandelions in a 100m2 field. He thinks he should sample 10m2 of the field and use this to estimate the population. Aroush thinks he should only estimate 1m2 of the field, but Raz thinks he should count all the dandelions in the field. Discuss who has the best idea and why. In your answer, include the equipment needed for sampling.