

Holy Family Catholic School – Faculty of Science and Physiology
 Science Autumn Half-Term 2 Year 7

Learning Intention	Vocab	Concept	Retrieval	Success Criteria	Hinge Questions for this lesson	Red Zone
Week 9 Lesson 1 What are genes?	Gene, chromosome, nucleus, double helix	Inheritance and Evolution	Y7 B1 - cells, KS2 - inheritance	1. Describe what chromosomes are made of. 2. State the number of pairs of chromosomes in most human cells. 3. Recall where genes are found. 4. State that genes control characteristics (in terms of containing instructions). 5. Describe the structure of DNA. 6. Briefly describe how Franklin, Watson & Crick discovered the structure of DNA	<i>Which of the following best describes a gene?</i> a) A type of cell that controls growth b) A section of DNA that codes for a trait c) A protein found in the nucleus d) A chemical that gives cells energy	Write a paragraph linking together the words nucleus, chromosome, DNA and gene. Stretch: Draw a diagram to go along with it.
Week 9 Lesson 2 What are fungi?	yeast, carbon dioxide, microorganism	Cells and Systems	KS2 - microorganism s, Y7 B1 - cells, eukaryotic and prokaryotic	1. Describe a fungus as a type of microorganism. 2. Give examples of types of fungi. 3. State uses of fungi	<i>Which statement is true about fungi?</i> a) They are animals that live underground b) They are plants that photosynthesize c) They are organisms that absorb nutrients from other materials d) They are bacteria that cause disease	Compare and contrast yeast to an animal cell.

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Week 9 Lesson 3 How are bacteria different to plant and animal cells?	microorganism, prokaryotic, flagellum, slime capsule, plasmid	Cells and Systems	KS2 - microorganism s, Y7 B1 - cells, eukaryotic and prokaryotic	1. Identify the common organelles of bacteria. 2. Describe the functions of common organelles of bacteria. 3. Describe why bacteria are classified as being prokaryotic. 4. Change numbers to and from standard form.	<i>What makes bacterial cells different from plant and animal cells?</i> a) They have a nucleus b) They contain chloroplasts c) They are multicellular d) They lack a nucleus	Compare and contrast a bacterial cell with a plant cell.
Week 10 Lesson 1 PAZ Revision of Key Content						
Week 10 Lesson 2 PAZ Assessment						
Week 10 Lesson 3 PAZ Review						
Week 11 Lesson 1 How do I look at really tiny things?	microscopy, resolution, magnification , micrometer	Cells and Systems	KS2 - using microscopes to observe rocks	1. Name the parts of a microscope. 2. Describe how to use a light microscope to examine a slide. 3. Calculate total microscope magnification using formula	Which of the following steps and calculations is correct when using a light microscope to examine a slide at high magnification? a) Place the slide, use coarse focus on high power, and calculate magnification by multiplying eyepiece × objective	Write a method to describe how a student could view a specimen under a light microscope. In your answer, include the equation to calculate total magnification.

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					b) Use fine focus first, then place the slide, and add eyepiece and objective magnifications together c) Start with high power lens, use coarse focus, and divide eyepiece by objective magnification d) Place the slide, skip focusing, and multiply eyepiece by stage height	
Week 11 Lesson 2 How do you prepare microscope slides?	observation, specimen, stain	Cells and Systems	Y7 B1 - cells	1. Prepare a slide of animal and plant cells. 2. Write instructions of how to prepare a microscope slide. 3. Draw a biological diagram of cells.	Which of the following is the correct sequence for preparing and observing a slide of animal or plant cells under a light microscope? a) Place the slide, use high power lens first,	Describe how to take a thin section of a root nodule and view under a microscope.

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					and draw a cartoon of the cells b) Add stain, place the cover slip, use coarse focus on low power, then fine focus c) Use fine focus, add water, skip staining, and draw cells from memory d) Place the slide, use coarse focus on high power, and calculate magnification by dividing lens powers	
Week 11 Lesson 3 What types of cells are there?	specialised, palisade, root hair	Cells and Systems	Y7 B1 - cells	1. Describe how sperm cells are adapted to their function. 2. Describe how egg cells are adapted to their function. 3. Describe how ciliated epithelial cells are adapted to their function. 4. Draw conclusions about a cell's function from its adaptations.	A cell has a long tail, lots of mitochondria, and a streamlined shape. What is its most likely function? a) Absorbing nutrients in the intestine b) Sweeping mucus out of the airways c) Swimming to fertilize an egg d) Carrying oxygen around the body	Explain how sperm cells, egg cells and ciliated epithelial cells are specialised for their function.

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Week 12 Lesson 1 What are organisms made of?	tissue, organ, organ system, organism	Cells and Systems	Y7 B1 - cells	1. Define the keywords: organelle, cell, tissue, organ, organ system and organism. 2. Give examples of the above keywords. 3. Explain the hierarchy of organisation in multicellular organisms.	Which of the following correctly shows the order of biological organization in multicellular organisms, from smallest to largest? a) Organ → Tissue → Cell → Organism → Organ System → Organelle b) Organelle → Cell → Tissue → Organ → Organ System → Organism c) Cell → Organelle → Organ → Tissue → Organism → Organ System d) Organelle → Tissue → Cell → Organ System → Organ → Organism	An alien has landed and has threatened to dissect lots of humans to gain an understanding of how the human body is organised! Your task is to write to him to explain how the human body is organised from an organelle up to a whole organism so that he doesn't feel the need to chop us all up!

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Week 12 Lesson 2 What do organs do?	organ, intestine, stomach, brain	Cells and Systems	KS2 - internal organs (skeletal, muscular and digestive system), Y7 B1 - hierarchy of organisms	1. Label the important plant and animal organs 2. Locate the important organs in the body or plant 3. Describe the functions of each of the important organs	Which of the following correctly matches an organ with its location and function? a) Leaf – found underground – absorbs water b) Heart – found in the chest – pumps blood c) Root – found above ground – makes food d) Lung – found in the abdomen – digests food	1. Match up the picture of the organ with its name and its job. 2. Describe the hierarchal organisation of the human digestive system.
Week 12 Lesson 3 What is variation?	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	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.	Which of the following statements correctly describes continuous and discontinuous variation? a) Continuous variation has distinct categories, like blood type; discontinuous	Exam Questions

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					variation shows a range, like height b) Discontinuous variation shows a smooth range of values; continuous variation has fixed categories c) Continuous variation shows a range of values, like height; discontinuous variation has distinct categories, like blood type d) Both types of variation show random traits with no pattern	

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Week 13 Lesson 1 How can we measure variation?	continuous, discontinuou s	Inheritance and Evolution	Y7 B1 - variation	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	Which of the following correctly matches the type of variation with the best graph to display it? a) Continuous variation – bar chart; Discontinuous variation – scatter graph b) Continuous variation – scatter graph; Discontinuous variation – bar chart c) Continuous variation – frequency diagram; Discontinuous variation – line graph d) Continuous variation – pie chart; Discontinuous variation – histogram	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 13 Lesson 2 What are adaptations and	adaptation, inherit,	Inheritance and Evolution	Y7 B1 - variation, KS2 - identify how	1. Recall the definition of terms habitat and species 2. Compare similar	Which of the following statements is accurate	How is Zarg adapted to his environment?

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how are they inherited?	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	adaptations in plants and animals that live in similar places. 3. Explain how inherited variation is caused.	about species living in similar habitats? a) Only animals adapt to their habitats; plants do not b) Species in similar habitats often develop similar adaptations, even if they are unrelated c) Inherited variation is caused by environmental changes during an organism's life d) A habitat is defined as the group of species living together	
Week 13 Lesson 3 How does the environment affect populations and communities?	habitat, population, species, adaptation	Inheritance and Evolution	Y7 B1 - adaptations, KS2 - habitats	1. Explain how changes in a physical environmental factor in a habitat affect populations and communities. 2. Explain how environmental variation is caused. 3. Explain how particular adaptations increase the chances of survival.	Which of the following statements is correct about how environmental factors affect organisms and their survival? a) All organisms in a habitat adapt instantly when the environment changes b) Environmental variation is caused only by inherited genes	Exam Questions - Describe two ways the fish is adapted for swimming

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					c) A drought can reduce plant populations, which then affects herbivores and predators d) Adaptations always make organisms stronger and faster	
Week 14 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	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.	Which of the following best explains how environmental changes can affect a species' survival and distribution? a) All species can adapt instantly to any environmental change b) If a species is well adapted to one environment, it will thrive in all environments c) A species with adaptations suited to cold climates may struggle to survive if temperatures rise d) Environmental changes only affect predators, not prey	Explain the changes in population of the red squirrels since 1945.

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Week 14 Lesson 2 What is natural selection?	natural selection, evolution, adaptation, variation,	Inheritance and Evolution	KS2 - adaptation may lead to evolution, Y7 B1 - adaptations	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. 4. Explain how natural selection can lead to evolution.	Which of the following best explains how natural selection leads to evolution? a) All individuals in a population survive and reproduce equally b) Genetic variation means some individuals are better adapted and more likely to survive and reproduce c) Evolution happens because organisms choose to change their traits d) Natural selection removes all variation from 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.
Week 14 Lesson 3 How much energy does a person need from their food?	Calories, Metabolism, Activity level, Energy intake	Energy in Action	Basic understanding of what energy is and why the body needs it, Awareness of different types of physical activity and	1. Explain the differing energy needs of people of different ages and activity levels. 2. Explain the differing energy needs of people of different ages and activity levels. 3. Calculate the energy	A teenage athlete needs 12,000 kJ of energy per day. If their breakfast provides 3,000 kJ, lunch provides 4,500 kJ, and dinner provides 3,500 kJ, have they met their daily energy needs?	You are a nutritionist working with a diverse group of clients. Your task is to create a personalized energy plan for three individuals: A 7-year-old child who enjoys playing football twice a week A 35-year-old office worker who goes to the gym three times a week A 75-year-old retired person who

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			their impact on energy use	requirements for a particular person or activity.	a) Yes, they have exactly met their energy needs b) No, they are 1,000 kJ short c) Yes, they have exceeded their energy needs by 500 kJ d) No, they are 500 kJ short	walks daily but has limited mobility Think about how age and activity level affect energy needs.
Week 15 Lesson 1 How do we know how much energy is in food?	Calorimeter, Joules, Burning, Temperature change	Energy in Action	Familiarity with the concept of heat and temperature, Understanding of how burning substances can release energy	1. Compare the temperature rise of water when some fuels are burnt. (WS) 2. Identify situations in which an energy transfer is taking place.	In an experiment, equal volumes of water are heated using different fuels. Which result would best suggest that one fuel is more efficient than another? a) The fuel that burns with the brightest flame b) The fuel that causes the highest temperature rise in the water c) The fuel that produces the most smoke d) The fuel that takes the longest time to burn	Write a conclusion and evaluation for practical carried out.

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Week 15 Lesson 2 How can energy be stored? What is the conservation of energy?	Chemical, Kinetic, Thermal, Elastic potential, Conservation, Closed system	Energy in Action	Knowledge of different forms of energy (e.g., kinetic, thermal), Understanding that energy cannot be created or destroyed	1. Recall the law of conservation of energy. 2. Identify situations in which energy is stored. 3. Identify situations in which an energy transfer is taking place. 4. Describe energy transfer chains for given situations.	Which of the following statements correctly applies the law of conservation of energy? a) Energy can be created during chemical reactions b) Energy is destroyed when it is transferred to sound or heat c) Energy is stored in fuels and transferred during combustion d) Energy disappears when an object stops moving	You've been hired as a science consultant for a new theme park that wants to design rides and attractions based on real physics principles. Your job is to help the design team understand how energy works in everyday situations. Task Design a simple ride or machine that uses at least three types of energy. Draw or describe how energy is stored and transferred throughout its operation. Explain how the law of conservation of energy applies to your design — where does the energy go, and how is it accounted for?
Week 15 Lesson 3 What are fuels and how can we describe them?	Combustion, Hydrocarbon, Renewable, Non-renewable	Energy in Action	Awareness of common fuels (e.g., coal, petrol, wood), Understanding that fuels release energy when burned What makes a good fuel	1. Describe advantages and disadvantages of different energy resources. 2. Describe what happens in a fuel cell	Which of the following statements is accurate about energy resources and fuel cells? a) Fossil fuels are renewable and produce no pollution b) Solar energy is reliable at all times of day and weather conditions	You are the mayor of a large city and you have decided to change your existing electricity stations to a new cleaner type of fuel. Would you use coal, gas, nuclear or biofuel to do this? Explain your answer.

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					c) Fuel cells produce electricity through a chemical reaction and emit only water as a waste product d) Wind turbines work best in areas with no wind	