Holy Family Catholic School – Faculty of Science and Physiology

Science Autumn Term 2 Year 8

| Learning Intention | Vocab | Concept | Retrieval | Success Criteria | Hinge Questions for this lesson | Red Zone |
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| **Week 9 Lesson 1**<br>Inset Day | | | | | | |
| **Week 9 Lesson 2**<br>**Assessment**<br><br>**Marked Piece 1** | | | | | | |
| **Week 9 Lesson 3**<br>**Assessment Review** | | | | | | |
| **Week 10 lesson 1**<br>How does sound move?<br>1 Moving sound | wave<br>energy<br>vibration<br>air<br>particle<br>pitch<br>loudness | Waves and Radiation | particles, sold/liquid/gas | 1. Use a model incorporating the idea of vibrations to explain how sound travels through different materials.<br>2. Use the terms frequency, amplitude, speed to describe waves.<br>3. Recall that waves transfer energy without transferring matter.<br>4. Explain why sounds are fainter further from the source in terms of the waves spreading out. | If an astronaut claps their hands while floating in the empty vacuum of deep space, what would happen?<br>A) The sound would be very quiet because the air is thin.<br>B) The sound would travel forever because there is nothing to stop it.<br>C) There would be no sound at all because there are no particles to vibrate | Jasmine is deaf. She blows up a balloon and holds it near to John's mouth. She cannot hear John's voice, but she can tell that he is speaking, by feeling the balloon.<br><br>When John speaks what happens to the air around him?<br><br>How can Jasmine tell when John is speaking, by feeling the balloon?<br><br>John shouts loudly. How will the balloon feel different to Jasmine now? |
| **Week 10 Lesson 2**<br>How do we measure the speed of sound? | wave<br>energy<br>vibration<br>air<br>particle | Waves and Radiation | particles, sold/liquid/gas sound travels in waves, waves are vibrations | 1. Use a model incorporating the idea of vibrations to explain how sound travels through different materials.<br>2. Use the terms frequency, | Which equipment and calculation are needed to find the speed of sound in air?<br>A) A thermometer and a ruler; then add them | A rocket exploded making a loud sound and a bright flash.<br>Peter, Sabrina and Jan were standing at different distances from the rocket. When the rocket exploded, who heard the sound |

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| 2 Speed of sound | louder<br>quieter | | | amplitude, speed to describe waves.<br>3. Recall that waves transfer energy without transferring matter.<br>4. Explain why sounds are fainter further from the source in terms of the waves spreading out. | together.<br>B) A stopwatch and a long tape measure; then divide distance by time.<br>C) An ammeter and a voltmeter; then multiply them together. | first explain why. Who heard the loudest sound, explain why. |
| **Week 10**<br>**Lesson 3**<br>How do humans detect sound?<br>3 Detecting sound | Ear drum,<br>Cochlea,<br>Ear bones (Ossicles) | Waves and Radiation | sound travels in waves,<br>waves are vibrations | 1. Compare how sounds travel through different materials.<br>2. Recall the units for loudness.<br>3. Evaluate different materials used for soundproofing/ sound insulation. | 1. Describe the functions of the parts of the ear.<br>2. Describe how microphones convert sound into electrical signals. | The diagram shows part of an ear. Sound waves enter the ear and travel down the ear canal. What happens when they reach the ear drum? What happens to the ear drum when the pitch of the sound is increased. What happens to the ear drum when the sound is made louder?<br>Stretch: Explain how a person's ear can be damaged by loud sounds. |
| **Week 11**<br>**Lesson 1**<br>How does sound travel through different materials?<br>4 Sound proofing | louder<br>quieter<br>Ear drum,<br>Cochlea,<br>Ear bones (Ossicles)<br>reflect<br>absorb | Waves and Radiation | particles,<br>sold/liquid/gas<br>sound travels in waves,<br>waves are vibrations | 1. Recall that different animals have different hearing ranges.<br>2. State the meaning of: ultrasound, infrasound.<br>3. Describe some uses of ultrasound.<br>4. State the meaning of: absorb, transmit, reflect.<br>5. Calculate depth or | 1. Compare how sounds travel through different materials.<br>2. Recall the units for loudness.<br>3. Evaluate different materials used for soundproofing/ sound insulation. | Should under 16s be made to wear ear defenders at music concerts? You are going to write a blog for a music website answering the question above. You should describe in your blog:<br>How loud sounds damage hearing.<br>How ear defenders protect hearing.<br>If music at a concert could |

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| 5 Using sounds | | | | distance from time and velocity of ultrasound | | damage hearing.<br>Discuss the use of ear defenders and suitable materials to make the them.<br>Challenge- would it make a difference if the concert was indoor or outdoor? |
| **Week 11 Lesson 2** What are waves and what are their properties? 6 Comparing waves | ultrasound, infrasound | Waves and Radiation | cause of sound, describing waves | 1. Model transverse and longitudinal waves.<br>2. Compare longitudinal and transverse waves.<br>3. State the meaning of superposition, and give examples. | 1. Recall that different animals have different hearing ranges.<br>2. State the meaning of: ultrasound, infrasound.<br>3. Describe some uses of ultrasound.<br>4. State the meaning of: absorb, transmit, reflect.<br>5. Calculate depth or distance from time and velocity of ultrasound | Ultrasound waves are very high frequency sound waves. They cannot be heard by humans.<br>Ultrasound waves can be used to clean jewellery. The jewellery is put into a container of cleaning fluid which can produce ultrasounds. Explain how you think this would work. |
| **Week 11 Lesson 3** How do we see objects? Lesson 1 - How do we see objects | amplitude, wavelength, energy, direction | Waves and Radiation | cause of sound, describing waves | 1. State the meaning of: reflect, scatter, transmit, absorb.<br>2. Use the ray model of light to explain how we see things that are not sources of light.<br>3. Describe some uses of plane mirrors.<br>4. Describe the difference between even reflection and | 1. Model transverse and longitudinal waves.<br>2. Compare longitudinal and transverse waves.<br>3. State the meaning of superposition, and give examples. | Compare transverse and longitudinal waves [6 marks] |

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| | | | | scattering, and recall the law of reflection. | | |
| **Week 12 Lesson 1** How do mirrors work? Lesson 2 - How are images formed in mirrors | ray, light, line, normal, angle of reflection | Waves and Radiation | light, shadows, sun, moon | 1. State the meaning of: convex mirror, concave mirror.<br>2. Describe the characteristics of the image formed by a plane mirror.<br>3. Use ray diagrams to explain the formation of an image in a plane mirror.<br>4. Use ray diagrams to explain some of the features of images in periscopes. | 1. State the meaning of: reflect, scatter, transmit, absorb.<br>2. Use the ray model of light to explain how we see things that are not sources of light.<br>3. Describe some uses of plane mirrors.<br>4. Describe the difference between even reflection and scattering, and recall the law of reflection. | Draw a ray of light on each diagram to Predict where the light will go. |
| **Week 12 Lesson 2** Reflection investigation | concave, convex, reflect, normal, angle of reflection | Waves and Radiation | rays of light only travel in straight lines, waves can be absorbed, reflected and transmitted | 1. To plan an investigation into the factors affecting the output from a solar panel.<br>2. Draw a results table<br>3. Record results. | 1. State the meaning of: convex mirror, concave mirror.<br>2. Describe the characteristics of the image formed by a plane mirror.<br>3. Use ray diagrams to explain the formation of an image in a plane mirror.<br>4. Use ray diagrams to explain some of the features of images in periscopes. | Complete the periscope task where you have to draw the ray of light through the periscope and explain how it works. |
| **Week 12 Lesson 3 Inset day** | | | | | | |
| **Week 13 Lesson 1 Inset day** | | | | | | |

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| **Week 13 Lesson 2** Reflection investigation | concave, convex, reflect, normal, angle of reflection | Thinking Like a Scientist<br>Experimental and Investigative Skills<br>Analysis and Evaluation<br>SI units and Calculating | Variables<br><br>Fair test<br><br>Evaluations<br><br>Graphs<br><br>Energy stores | Draw a graph.<br><br>Evaluate data and practical. | 1. To plan an investigation into the factors affecting the output from a solar panel.<br>2. Draw a results table<br>3. Record results. | Evaluate data and practical. |
| **Week 13 Lesson 3** What is refraction? Lesson 3 - How is light refracted | concave, convex, reflect, normal, angle of reflection | Thinking Like a Scientist<br><br>Experimental and Investigative Skills<br><br>Analysis and Evaluation<br><br>SI units and Calculating | Variables<br><br>Fair test<br><br>Evaluations<br><br>Graphs<br><br>Energy stores | 1. State the meaning of: refraction, angle of refraction, refracted ray, convex lens, converging lens.<br>2. Describe how light and sound move differently in different materials<br>3. Draw ray diagrams to describe the refraction of light as it passes into and out of different media.<br>4. State the meaning of: total internal reflection, critical angle.<br>5. Describe some uses of total internal reflection such as in optical fibres and in binoculars. | Draw a graph.<br><br>Evaluate data and practical. | Evaluate data and practical. |

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| **Week 14 Lesson 1** Refraction investigation | reflect, refract, normal, speed | Waves and Radiation | rays of light only travel in straight lines, waves can be absorbed, reflected and transmitted | 1. To plan an investigation into the factors affecting the output from a solar panel.<br>2. Draw a results table<br>3. Record results. | 1. State the meaning of: refraction, angle of refraction, refracted ray, convex lens, converging lens.<br>2. Describe how light and sound move differently in different materials<br>3. Draw ray diagrams to describe the refraction of light as it passes into and out of different media.<br>4. State the meaning of: total internal reflection, critical angle.<br>5. Describe some uses of total internal reflection such as in optical fibres and in binoculars. | Why do swimming pools need to state the depth?<br>Why can't we just look in and see? |
| **Week 14 Lesson 2** Refraction investigation Lesson 3 - How is light refracted 6 Marker – Marked piece 2 | reflect, refract, normal, speed | Thinking Like a Scientist<br><br>Experimental and Investigative Skills<br><br>Analysis and Evaluation | Variables<br><br>Fair test<br><br>Evaluations<br><br>Graphs<br><br>Energy stores | Draw a graph.<br><br>Evaluate data and practical. | 1. To plan an investigation into the factors affecting the output from a solar panel.<br>2. Draw a results table<br>3. Record results. | Evaluate data and practical. |

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| | | SI units and Calculating | | | | |
| **Week 14 Lesson 3** How do lenses affect light rays? Lesson 4 - Refraction in lenses | reflect, refract, normal, speed | Thinking Like a Scientist<br><br>Experimental and Investigative Skills<br><br>Analysis and Evaluation<br><br>SI units and Calculating | Variables<br><br>Fair test<br><br>Evaluations<br><br>Graphs<br><br>Energy stores | 1. Describe some uses of lenses.<br>2. Describe the effects of convex lenses on parallel beams of light.<br>3. Describe the effects of concave lenses on parallel beams of light.<br>4. Describe the causes and effects of long-sight and short-sight and how different types of lens are used to correct these defects.<br>(5. Explain how different types of lens are used to correct long-sight and short-sight.) | Draw a graph.<br><br>Evaluate data and practical. | Evaluate data and practical. |
| **Week 15 Lesson 1** How are cameras and eyes similar? Lesson 5 - cameras and eyes | Refraction, Converge, Diverge, Focus | Waves and Radiation | - Light travels in straight lines – Understanding this helps explain how lenses bend or redirect light.<br>- Refraction – Knowing that | 1. State the primary colours for light.<br>2. Identify the parts of the eye (including rods and cones) and state their functions.<br>3. Identify the parts of a camera and state their functions. | 1. Describe some uses of lenses.<br>2. Describe the effects of convex lenses on parallel beams of light.<br>3. Describe the effects of concave lenses on parallel beams of light.<br>4. Describe the causes and effects of long-sight and | Design an experiment to investigate how convex and concave lenses affect parallel light rays. Predict the outcomes and explain how the shape of each lens influences the direction of light. |

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| | | | light changes direction when it passes through different materials is essential for grasping how lenses work. | 4. Compare the parts of the eye and a camera. | short-sight and how different types of lens are used to correct these defects.<br>(5. Explain how different types of lens are used to correct long-sight and short-sight.) | |
| **Week 15 Lesson 2**<br>How do we see colour?<br>Lesson 6 - colour | Lens, Aperture, Retina/Sensor, Image Formation | Waves and Radiation | - Basic parts of the human eye – Familiarity with the cornea, lens, retina, and pupil helps in comparing them to camera components.<br>- Light enters the eye to form images – Knowing that vision depends on light forming an image on the retina sets the stage for | 1. Describe how to split light into different colours using a prism.<br>2. Correctly use the terms: spectrum, dispersion.<br>3. Recall the colours of the visible spectrum, in order.<br>4. Recall the structure of the eye and how it helps us see colour. | 1. State the primary colours for light.<br>2. Identify the parts of the eye (including rods and cones) and state their functions.<br>3. Identify the parts of a camera and state their functions.<br>4. Compare the parts of the eye and a camera. | Compare the structure and function of a human eye and a digital camera. Create a labelled diagram and explain how each part contributes to image formation. Evaluate which system is more efficient in low-light conditions and justify your reasoning |

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| | | | understanding camera function. | | | |
| **Week 15 Lesson 3** How does coloured light behave? Lesson 7 - extended writing | Light, Retina, Cones, Perception | Waves and Radiation | - White light is made of many colours – This helps explain how different colours are perceived.<br>- The eye has cone cells for colour detection – Knowing about cone cells and their sensitivity to red, green, and blue light is crucial. | 1. Describe how the colour of light affects the appearance of an object.<br>2. Describe how filters can be used to make coloured light.<br>(3. Explain how paints of different colours can be made by colour subtraction.) | 1. Describe how to split light into different colours using a prism.<br>2. Correctly use the terms: spectrum, dispersion.<br>3. Recall the colours of the visible spectrum, in order.<br>4. Recall the structure of the eye and how it helps us see colour. | Explain how colour blindness affects the way people perceive colour. Use your understanding of cone cells and light wavelengths to describe the biological cause and suggest how technology can help people with colour vision deficiencies |