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| **Waves** | **Extension task 1** | **Extension task 2** | **Extension task 3** |
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| Investigate what happens when water waves pass through gaps (diffraction). |

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| Plan an experiment to test the hypothesis that ‘the speed of a wave in water depends on the depth of the water’. |

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| 2 | Describe a matte black surface and where it is used. | Describe how aluminium foil keeps food warm. | Describe how the absorption of light can cause chemical changes (e.g. photographs and the eye). |
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| Compare real images to the virtual images formed in mirrors. |

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|  Research the structure of the iris and the retina. Then write an explanation about how the human eye operates, to include changes in the shape of the lens and the transfer of light energy to chemical and electrical energy. |

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| Combine the concepts of reflection and refraction to describe the operation of a telescope or other optical instruments. |

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| 4 | Describe how combinations of filters and coloured surfaces operate on white or coloured light. | Explain how mixing paints differs from mixing light. They can also explain how a wide range of colours can be produced from just three colours of ink. | Research the action of receptors in the retina and explain their response to coloured light. |
| 5 | Describe the process of IVF including costings. | Think like fertility doctors. A couple having difficulty getting pregnant visits them. Write an explanation to the couple of some reasons why they may be less fertile, and suggest how a treatment might help them have a baby. | Discuss the function of the scrotum (i.e. to keep the testes away from the body because sperm production is better at lower temperatures). |
| 6 | Draw a poster to describe how an oscilloscope works. | Find out more about the link between pitch and frequency, and find the frequencies of some common notes. | Plan an investigation into the hypothesis ‘The thicker a wire in a guitar, the lower the musical note it will produce’. |
| 7 | Research different cures for hearing damage, ranging from hearing aids to surgical implants.  | Explore some of the other functions of the ear, including how our balance is regulated and the effects of ear infections. | What is sound insulation? Explain how it works.  |
| 8 | Explore the relationship between guitar string tension and frequency. | Describe the role of an amplifier and mixer in music systems. |  |
| 9 | Write a comparison of sound waves and light waves including details of their similarities, uses, speeds. |  Describe echo location and what it can be used for. | Write a report on the concept of resonance and the role it can play in the design of structures such as bridges. |
| 10 | Find out about the two main methods of embedding information into a carrier wave. These are amplitude modulation (am) and frequency modulation (fm). | Use the wave speed equation to calculate frequencies for light waves. |  |
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