9/12/15 Created by Tony Ford

STEM Program Years 1- 10 Year 9 Overview

Physical Sciences, Science Inquiry Skills, Science as a Human endeavour

Outcome	Concepts	Activity	Worksheets	Resources Required
SU Energy transfer through different mediums can be explained using wave and particle models SIS Formulate questions or hypotheses that can be investigated scientifically Plan, select and use appropriate investigation methods Assess risk and address ethical issues associated with these methods Select and use appropriate equipment, i Analyse patterns and trends in data, Use knowledge of scientific concepts to draw conclusions that are consistent with evidence Evaluate conclusions, including identifying sources of uncertainty and possible alternative explanations. Critically analyse the validity of information in secondary sources Communicate scientific ideas and information for a particular purpose	Heat is a form of energy that causes physical changes to objects. Temperature is a relative measure of heat contained in the kinetic energy of an object. Kinetic model shows how energy is stored in matter. Heat can affect matter in a number of ways. Heat can be transferred using particles in conduction and convection. Sound Energy moves by waves through different media. Sound exhibits all the properties of waves inc. reflection, refraction and reduction in amplitude with distance. Wave movement defines as using matter to transfer energy as the particles vibrate.	Lesson: Types of heat movement Investigating temperature and differences between water an oil in storing heat. Investigations of heat transfer. Lesson: Sound Waves. sources, properties and how it travels. Investigating production of sound and sound travel.	*9.1 Lesson 1 Heat Movement* *9.2 Investigating Temperature* *9.3 Investigating Heat Movement in Matter* *9.4 Lesson 2 Sound Waves.* *9.5 Investigating Sound waves.*	Bowls sources of hot and cold water thermometers beakers cooking oil PPE - glasses and gloves. various cups of different materials large tray measuring cylinder straws coloured dye or glitter hot plate cotton and paper spiral ruler bucket and small tin measuring tape or wheel. Thermometer stopwatch sound meter or sound sensor and data logging equipment or microphone and audio suite wind instrument stringed instrument percussion tuning forks

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Outcome	Concepts	Activity	Worksheets	Resources Required
SHE Scientific understanding, including models and theories, are contestable and are refined over time through a process of review by the scientific community Advances in scientific understanding often rely on developments in technology and technological advances are often linked to scientific discoveries People can use scientific knowledge to evaluate whether they should accept claims, explanations or predictions Advances in science and emerging sciences and technologies can significantly affect people's lives, including generating new career opportunities The values and needs of contemporary society can influence the focus of scientific research	Light Energy can be modelled as a wave with the exception that light can travel through space Latest theories of light show light as electromagnetic radiation transported by wave particles called photons. Waves have similar characteristics that can be measured. Wave amplitude diminish with distance from the source Waves can be reflected from barriers. Waves can be refracted through transparent media. Wave energy can also get absorbed at the interface of media. Light can also be absorbed reflected or refracted through media. Light intensity also decreases with distance. Light reflects so i=r. Light refracts towards the normal when entering a more dense medium. Light can be totally internally reflected instead of emerging for a dense material. Light disperses into its colours in refraction. The nature of images formed by optical lenses depends on the type of lens and the position of the object	Lesson 3: Light as a wave and properties of waves, Investigating waves in strings, water and light intensity. Investigating refraction of light through prisms and lenses. Projects: • Design a fast cooling system • Design a system that uses waves (Sound, light or motion) to do work. Robotics: 1. Make a control system based on wave energy input e.g. • echo locator • heat or light seeking • ultrasonic sentry	*9.6 Lesson 3 Nature and Properties of Light* *9.7 Investigating Waves* *9.8 Investigating Refraction* *9.9P Project Design a wave energy system* *9.10R Robotics Challenges- Proportional Control Robot*	long, thick rope or spring ribbons large tray or tote box or ripple tank small fan Small Light source (12 volt ray box lamp) Light meter or sensor and data logger metre rule Ray box or narrow light beam source. plane mirrors glass beaker pencil Ray Box and Light source or other light ray sources such as LED ray boxes. Rectangular and Triangular Glass Prisms white paper different shape lens prisms different shape circular lens or magnifying glass