**Curriculum Related Expectations**

HT2: Year 8 Energy Transfers / Earth Universe / Genes Variation / Waves Sound

**Students can define the following terms:**

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| Thermal energy store | Gravitational potential energy store |
| Chemical energy store | Elastic energy store |
| Kinetic energy store | Dissipated |
| Galaxy | Orbit |
| Light year | Exoplanet |
| Stars | Species |
| Variation | Continuous variation |
| Discontinuous variation | Vibration |
| Longitudinal wave | Volume |
| Pitch | Amplitude |
| Wavelength | Frequency |
| Vacuum | Oscilloscope |
| Absorption | Auditory range |
| Echo |  |

**Students know:**

* We can describe how jobs get done using an energy model where energy is transferred from one store at the start to another at the end.
* When energy is transferred, the total is conserved, but some energy is dissipated, reducing the useful energy.
* The solar system can be modelled as planets rotating on tilted axes while orbiting the Sun, moons orbiting planets, and sunlight spreading out and being reflected. This explains day and year length, seasons and the visibility of objects from Earth.
* Our solar system is a tiny part of a galaxy, one of many billions in the Universe. Light takes minutes to reach Earth from the Sun, four years from our nearest star and billions of years from other galaxies.
* There is variation between individuals of the same species. Some variation is inherited, some is caused by the environment, and some is a combination.
* Variation between individuals is important for the survival of a species, helping it to avoid extinction in an always changing environment.
* Sound consists of vibrations which travel as a longitudinal wave through substances. The denser the medium, the faster sound travels.
* The greater the amplitude of the waveform, the louder the sound. The greater the frequency (and therefore the shorter the wavelength), the higher the pitch.
* Sound does not travel through a vacuum.
* The speed of sound in air is 330 m/s, a million times slower than light.

**Students can:**

* Describe how the energy of an object depends on its speed, temperature, height or whether it is stretched or compressed.
* Show how energy is transferred between energy stores in a range of real-life examples.
* Calculate the useful energy and the amount dissipated, given values of input and output energy.
* Explain how energy is dissipated in a range of situations.
* Compare the percentages of energy wasted by renewable energy sources.
* Explain why processes such as swinging pendulums or bouncing balls cannot go on forever, in terms of energy.
* Evaluate analogies and explanations for the transfer of energy.
* Describe the appearance of planets or moons from diagrams showing their position in relation to the Earth and Sun.
* Explain why places on the Earth experience different daylight hours and amounts of sunlight during the year.
* Describe how space exploration and observations of stars are affected by the scale of the universe.
* Explain the choice of particular units for measuring distance.
* Predict patterns in day length, the Sun's intensity or an object's shadow at different latitudes.
* Make deductions from observation data of planets, stars and galaxies.
* Compare explanations from different periods in history about the motion of objects and structure of the Universe.
* Explain whether characteristics are inherited, environmental or both.
* Plot bar charts or line graphs to show discontinuous or continuous variation data.
* Explain how variation helps a particular species in a changing environment.
* Explain how characteristics of a species are adapted to particular environmental conditions.
* Predict implications of a change in the environment on a population.
* Use the ideas of variation to explain why one species may adapt better than another to an environmental change.
* Critique a claim that a particular characteristic is inherited or environmental.
* Explain observations where sound is reflected, transmitted or absorbed by different media.
* Explain observations of how sound travels using the idea of a longitudinal wave.
* Describe the amplitude and frequency of a wave from a diagram or oscilloscope picture.
* Use drawings of waves to describe how sound waves change with volume or pitch.
* Suggest the effects of particular ear problems on a person's hearing.
* Evaluate the data behind a claim for a sound creation or blocking device, using the properties of sound waves.
* Use diagrams to compare the waveforms a musical instrument makes when playing different pitches or volumes.