**Curriculum Related Expectations**

HT2: Year 9 Genes Inheritance / Earth Climate / Wave Effects / Earth Structure

**Students can define the following terms:**

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| Inherited characteristics | Global warming |
| DNA | Fossil fuels |
| Chromosomes | Carbon sink |
| Gene | Greenhouse effect |
| Ultrasound | Ultraviolet (UV) |
| Microphone | Loudspeaker |
| Pressure wave | Rock cycle |
| Weathering | Erosion |
| Minerals | Sedimentary rocks |
| Igneous rocks | Metamorphic rocks |
| Strata |  |

**Students know:**

* Inherited characteristics are the result of genetic information, in the form of sections of DNA called genes, being transferred from parents to offspring during reproduction.
* Chromosomes are long pieces of DNA which contain many genes. Gametes, carrying half the total number of chromosomes of each parent, combine during fertilisation.
* The DNA of every individual is different, except for identical twins.
* There is more than one version of each gene e.g. different blood groups.
* Carbon is recycled through natural processes in the atmosphere, ecosystems, oceans and the Earth's crust (such as photosynthesis and respiration) as well as human activities (burning fuels).
* Greenhouse gases reduce the amount of energy lost from the Earth through radiation and therefore the temperature has been rising as the concentration of those gases has risen.
* Scientists have evidence that global warming caused by human activity is causing changes in climate.
* Methane and carbon dioxide are greenhouse gases.
* Earth's atmosphere contains around 78% nitrogen, 21% oxygen, <1% carbon dioxide, plus small amounts of other gases.
* When a wave travels through a substance, particles move to and fro. Energy is transferred in the direction of movement of the wave. Waves of higher amplitude or higher frequency transfer more energy.
* Sedimentary, igneous and metamorphic rocks can be interconverted over millions of years through weathering and erosion, heat and pressure, and melting and cooling.
* The three rock layers inside Earth are the crust, the mantle, and the core.

**Students can:**

* Use a diagram to show the relationship between DNA, chromosomes and genes.
* Use a diagram to show how genes are inherited.
* Explain how a change in the DNA (mutation) may affect an organism and its future offspring.
* Explain why offspring from the same parents look similar but are not usually identical.
* Suggest arguments for and against genetic modification.
* Suggest benefits from scientists knowing all the genes in the human genome.
* Determine how the number of chromosomes changes during cell division, production of sex cells and fertilisation.
* Find out why scientist Watson, Crick and Franklin were so important.
* Use a diagram to show how carbon is recycled in the environment and through living things.
* Describe how human activities affect the carbon cycle.
* Describe how global warming can impact on climate and local weather patterns.
* Evaluate the implications of a proposal to reduce carbon emissions.
* Evaluate claims that human activity is causing global warming or climate change.
* Compare the relative effects of human-produced and natural global warming.
* Explain differences in the damage done to living cells by light and other waves, in terms of their frequency.
* Explain how audio equipment converts sound into a changing pattern of electric current.
* Suggest reasons why sound waves can agitate a liquid for cleaning objects, or massage muscles for physiotherapy.
* Evaluate electricity production by wave energy using data for different locations and weather conditions.
* Explain why a rock has a particular property based on how it was formed.
* Identify the causes of weathering and erosion and describe how they occur.
* Construct a labelled diagram to identify the processes of the rock cycle.
* Identify circumstances that indicate fast processes of change on Earth and those that indicate slower processes.
* Predict planetary conditions from descriptions of rocks on other planets.
* Describe similarities and differences between the rock cycle and everyday physical and chemical processes.