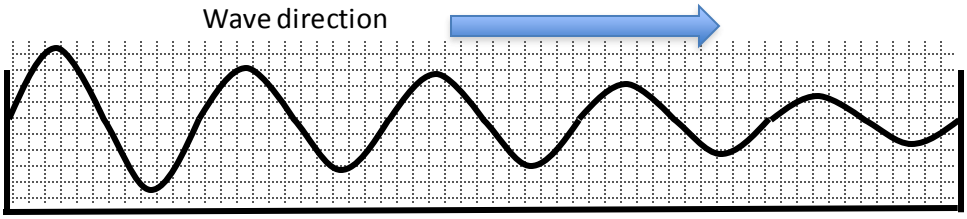
N5 : WAVES & RADIATION KEY AREAS
1. Wave parameters and behaviours
Energy can be transferred as waves. Determination of frequency, period, wavelength, amplitude and wave speed for longitudinal and transverse waves. Use of the relationships between wave speed, frequency, period, wavelength, distance and time. Diffraction and practical limitations. Comparison of long wave and short-wave diffraction.

1. The following wave pattern was created in a physics lab.



Using your knowledge of physics, describe the properties of the wave along the trace and discuss how this wave pattern can be changed.

2. When a girl uses her phone in different parts of the house she notices that she gets different signal strengths.

   Using your knowledge of physics, explain the difference in reception quality.

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2. Electromagnetic spectrum
Relative frequency and wavelength of bands of the electromagnetic spectrum with reference to typical sources, detectors and applications. Qualitative relationship between the frequency and energy associated with a form of radiati on. All radiations in the electromagnetic spectrum travel at the speed of light.

3. A newspaper article quotes a mobile provider as saying' The new 4G transmits a faster signal' A competitor has come into the debate pointing out that these high frequency signals may not be picked behind buildings.

   Using your knowledge of physics, comment on the accuracy of this news report.

4. Take one part of the electromagnetic spectrum and describe its practical application in society.

5. Which part of the electromagnetic spectrum do you think is the most useful in your opinion. Using your knowledge of physics, back up your opinion.

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3. Light
Refraction of light including identification of the normal, angle of incidence and angle of refraction. Description of refraction in terms of change of wave speed.

6. As some people get older their eyesight often deteriorates making it difficult for them to read text close up.

   Using your knowledge of physics, comment on how this eyesight problem can be rectified.

7. Neil sees the colours of the rainbow on his inside wall. Use your knowledge of physics to ex plain this.

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4. Nuclear radiation
The nature of alpha, beta and gamma radiation: relative effect of ionisation, absorption, shielding. Background radiation sources. Absorbed dose, equivalent dose and comparison of equivalent dose due to a variety of natural and artificial sources. Applications of nuclear radiation. Activity in becquerels. Half-life and use of graphical or numerical data to determine the half-life. A qualitative description of fission and fusion, emphasising the importance of these processes in the generation of energy.

8. Radioactive particles have been discovered on Dalgety Bay beach. The particles discovered have been traced back to the radium paint that was used on the instruments using in World War II aircraft that were dumped in the River Forth in the 1940's.

9. Using your knowledge of physics, explain why we are able to detect these particles.

10. A nurse working in a hospital moves between all departments on a daily basis.

    Using your knowledge of physics, comment on the safety considerations that he needs to follow.