*Yr8 Science L2 Light and Sound 14-7-2020 GRi*

**Light**

Light transmitted from the sun or a light bulb is known as white light. White light is actually made up of a spectrum of colours which can be revealed when shone through a prism. The spectrum contains the full range of colours in white light from red to orange, yellow, green, blue, indigo and violet.

When white light is shone through a prism, all of the colours refract. Remember, refraction is when a wave changes direction due to it changing speed. Every colour of the spectrum refracts a different amount and so leaves the prism at a slightly different direction. This means that we can see all the colours dispersed.

Although the spectrum is made up of lots of colours, we often talk about it in terms of three primary colours: red, green and blue. These three colours make up a large section of the spectrum and are the three colours our eyes detect. When these colours mix together, they can make secondary colours. Red and green make yellow. Red and blue make magenta. Green and blue make cyan. All three primary colours together make white.

Filters are another way we can change the colour of light. Filters will absorb all of the colours of white light except one which they will transmit. For example, if we shine white light through a red filter it will absorb all of the colours of light and only transmit red light. If we shone white light through a blue filter it would absorb all the colours of light and only transmit blue light.

**Questions:**

1. What are the seven colours of the spectrum?
2. Describe how we can disperse white light into the spectrum.
3. Explain how this causes dispersion. Use ‘refraction’ in your answer.
4. What are the three primary colours of light?
5. Fill in this table to show what primary colours make up the secondary colours.

|  |  |
| --- | --- |
| Secondary Colour | Made of which primary colours? |
|  |  |
|  |
|  |  |
|  |
|  |  |
|  |

1. What colour is made if all three primary colours are mixed?
2. Describe what happens if white light is shone through a green filter.

**Purple Challenge:** A blue filter is placed in front of a red filter. White light is shone through them. Describe and explain what happens to the light.

**Sound**

Any **vibrating** object can produce sound. For example, the strings on a guitar vibrate and produce a musical note. As the string vibrates, it causes **particles** in the air to vibrate. A wave of vibration travels through the air; this is a **sound wave**.

Sound waves are **longitudinal** **waves**. This means the particles **vibrate in the direction it travels**. The wave **compresses** and **rarefacts**; the distance between two points of compression is the **wavelength**.

The **frequency** of a wave is how often a wave completes a cycle per second (how often it compresses and rarefacts fully per second). The higher the frequency, the higher the **pitch**. The **amplitude** is the amount that the particles are displaced (moved) in a wave. The larger the amplitude, the **louder** the sound.

A sound wave travels through the air by **transferring energy** through the air particles. If the particles were not there sound would not be transferred like in a **vacuum**. Therefore sound waves travel **faster** when particles are **closer** **together**. In fact sound travels faster moving through solids like the ground than it does through gases like the air. Sound travels at 343 m/s in air; it travels at 1,484 m/s in water (4.3 times as fast as in air); and at 5,120 m/s in iron.

**Questions:**

1. What do these words mean [C]:
   1. Wavelength?
   2. Frequency?
   3. Amplitude?
2. Fill the gaps *(use the text above to help you)*.

As the amplitude of a wave increases, the sound becomes \_\_\_\_\_\_\_\_\_\_\_\_\_.   
As the amplitude of a wave decreases, the sound becomes \_\_\_\_\_\_\_\_\_\_\_\_\_\_.   
As the frequency of a wave increases, the pitch becomes \_\_\_\_\_\_\_\_\_\_\_\_\_.   
As the frequency of a wave decreases, the pitch becomes \_\_\_\_\_\_\_\_\_\_\_\_.

**Purple Challenge:**

A volcano erupts causing a loud noise. Three teachers are all the same distance away from it.

* Mr Redfern is simply standing looking at the volcano.
* Mr Riddle is scuba-diving in the sea next to the volcano.
* Miss Smith is blind-folded but has her ear to the ground.

Which one of them will know the volcano has erupted first?

Which one will be the first to hear the eruption? Explain why.