

SCIENCE CEILIDH

TEACHER PACK:

Shining a Light on Plant Development

LEARNING INTENTIONS

- ▶ Identify and name different plant developmental stages
- ▶ Demonstrate understanding of how different light qualities result in different plant developmental stages
- ▶ Recognise the importance of plant biology research to society



CURRICULUM LINKS:

BIOLOGICAL SYSTEMS	SCN 2-14a	By investigating the lifecycles of plants and animals, I can recognise the different stages of their development.
PLANET EARTH	SCN 3-02a	I have collaborated on investigations into the process of photosynthesis and I can demonstrate my understanding of why plants are vital to sustaining life on Earth.
FORCES, ELECTRICITY, AND WAVES	SCN 3-11a	By exploring the refraction of light when passed through different materials, lenses and prisms, I can explain how light can be used in a variety of applications.

Light spectrum and refraction

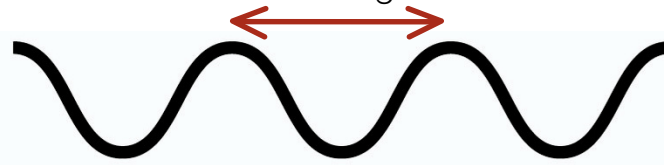
KEY LEARNING POINTS:

Light travels in **waves**.

Light waves travel in straight lines.

Light waves can be **absorbed**, **reflected**, or **refracted**.

Frequency depends on wavelength.
wavelength



long wavelengths produce low frequency waves:



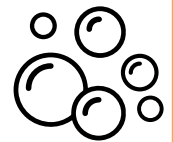
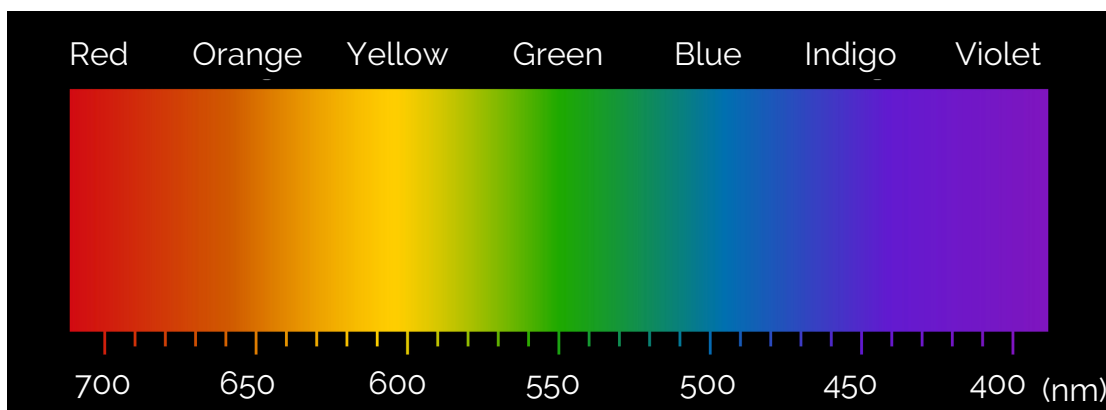
short wavelengths make high frequency waves:



VISIBLE LIGHT SPECTRUM:

Visible light contains a **spectrum** of colours, each with different properties.

Each colour in the visible light spectrum has its own band of **wavelength** and **frequency**.



!NOTE:

500nm is about the thickness of the outside of a soap bubble!

Red light has the longest wavelength of all visible colours (700nm), with violet having the shortest wavelength (400nm).

Different objects absorb and reflect light in different ways. When light travels through a prism, the light is **dispersed**. This means that the colours are separated out from each other to create a visible spectrum.



When light passes between objects with different densities, like air and glass, the light is **refracted**. In a prism, this effect separates the colour spectrum so that we can see the full range of colours within white light.

Plant Development and Light

KEY LEARNING POINTS:

Recognise the key stages of plant development.

Understand that different colours of light start different stages in plant life cycles.

Be able to match light qualities to the plant development stages they control.

Because different light wavelengths have different properties, the colour and quality of light can affect some stages of **plant development**.

Plants have special **proteins** in their **cells** which have evolved to recognise different light conditions and start different growth responses.

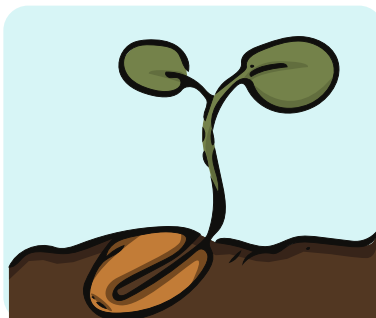
PLANT GROWTH AND RED LIGHT

Germination



Plants know when to sprout from their seeds from sensing red light through soil.

Emerging from the ground



Plants sense differences in red light in the soil, and use this so their stems and roots grow in the right direction.

Flowering



Plants use red light cues to start flowering, which helps them reproduce.

NOTE:

Sensing red light helps plants to know when to start different steps in their **development**.

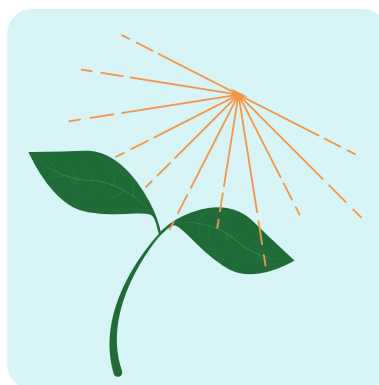
PLANT GROWTH AND BLUE LIGHT

Growing towards light sources:



Blue light sensing helps plants know which direction their stems should grow in

Leaves moving towards light sources:



Plants also use blue light to direct their leaves towards light sources!

!NOTE:

Sensing blue light helps plants improve the processes involved in **photosynthesis**.

MATCHING GAME ACTIVITY:

This is a printable activity sheet! Cut out the different labels and images below, and ask your class to match the plant development stages to their images.

In pairs, can they sort them into red and blue light responses?

RED LIGHT

Germination

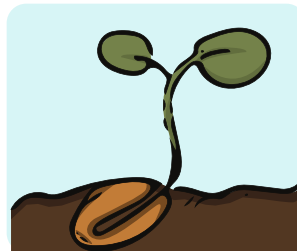


Germination



RED LIGHT

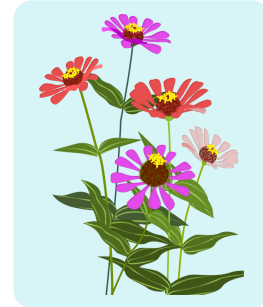
Emerging from ground



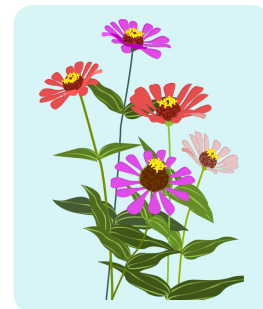
Emerging from ground



Flowering



Flowering



BLUE LIGHT

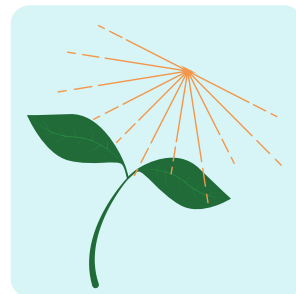


Growing towards light source

Growing towards light source



BLUE LIGHT



Leaves facing light source

Leaves facing light source

