Lesson Plan

Optical Phenomena

In this lesson each student will learn:

- What is meant by the term 'optical weather phenomena'.
- How rainbows are formed.
- How sunlight can be split into seven colours.
- A rhyme to remember the order in which colours appear in a rainbow.

What does 'optical phenomena' mean?

Optical phenomena occur when light interacts with clouds, water or dust. The results are often spectacular.

There are lots of different meteorological optical events. For example: rainbows, coronas, Northern Lights and halos.

Northern Lights

This rare sight occurs when particles from the sun fly off into space and are attracted to the earth's magnetic field.

The sky lights up with curtains of colour when these particles hit the earth's upper atmosphere.

Corona

This is a coloured luminous ring, which surrounds the sun or moon.

It is caused by light reacting with ice crystals in the cold cirrus clouds.

Halo

This is a white luminous ring around the sun or moon and like the corona is caused by light reacting with the ice crystals in the cold cirrus clouds.

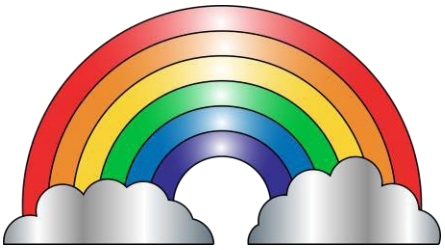
The orientation of these ice crystals determines a halo or corona.

Green Flash

At sunset or sunrise, the top edge of the sun will sometimes be bright green.

This is called 'green flash' and lasts for less than 1 second.

These are so rare that many consider them a myth.



What is a rainbow?

A rainbow is an arch of colour seen in the sky.

It is caused by sunlight shining on raindrops.

To see a rainbow, you must have the sun behind you and rain falling in front of you.

A rainbow is sunlight spread out into a spectrum of colours.

Rainbow Legends

Long ago, people believed that rainbows were magic.

- Some people believed that a rainbow was a bridge that appeared in the sky when the gods wanted to leave heaven and come to earth.
- Some believed that if you find where the end of the rainbow touches the earth, you would find a pot of gold.

How are rainbows formed?

Sunlight looks white, but it is really made up of many colours.

When sunlight enters a raindrop, it divides into various colours.

The rain reflects these colours, like a mirror. This makes a shimmering, curved, coloured rainbow.

This picture shows a prism splitting light into 7 colours.

A prism refracts light because it is a transparent device with flat, polished surfaces.

In the same way, raindrop splits light into an arc of 7 colours, making a rainbow.

Experiment 1: To show that sunlight is made up of many colours

Materials needed:

- Clear glass
- Water
- Sunlight
- Sheet of white paper
- Coloured crayons

Method:

1. Fill a clear glass half-full of water.
2. Place the glass on a piece of white paper in sunlight.
3. Tilt the glass left and right.
4. Spots of colour appear.
5. Name the colours you see and mark every colour on the piece of paper with the crayons.

Result:

The sheet of paper will have lots of different colours

Experiment 2: To show that sunlight is made up of many colours

Materials needed:

- Circles of blank cardboard
- Pencil
- Coloured pencils

Method:

1. Divide the circle into 7 segments.
2. Colour each of the segments according to the colours of the rainbow.
3. When the disc is coloured in, pierce a pencil through the centre and spin it around.

Result:

All the colours mix together to give white.

A Rainbow Rhyme

'Richard of York Gave Battle In Vain' is a phrase used to remember the colours of the rainbow and also the order they appear in the arc.

These seven colours are part of the colours of the spectrum.

The longest wavelength is red and the shortest is violet.

RED	RICHARD
ORANGE	OF
YELLOW	YORK
GREEN	GAVE
BLUE	BATTLE
INDIGO	IN
VIOLET	VAIN

Why not make up your own rainbow rhyme to help you remember?