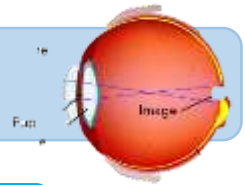




# Knowledge Organiser – Light (Year 6)



## Key Vocabulary

- Blocked** To stop or make passage through difficult
- Light** The bright form of energy given off by something (e.g. the sun) that makes it possible to see.
- Light source** An object that makes its own light. Examples of light sources: lamps, the sun, lap tops.
- Opaque** If an object or substance is opaque, you cannot see through it.
- Reflection** The process by which light is sent back from a surface.
- Refraction** The bending of light. The reason light bends when it passes between two materials is because it changes speed.
- Shadows** A shadow is a dark shape on a surface that is made when something stands between a light and the surface.
- Translucent** Light passes through it, but the light is scattered, so you cannot see clearly through it.
- Transparent** Light completely passes through an object or material, and you can see clearly through it clearly.



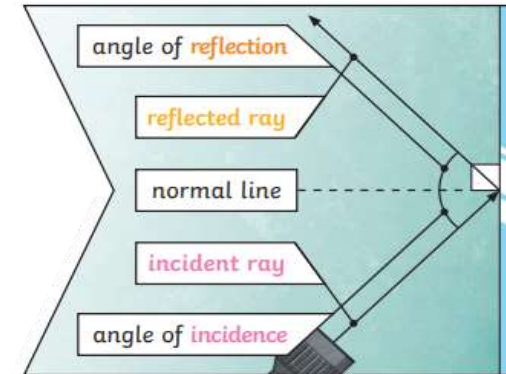
## How does light travel?

We need light to be able to see things. Light waves travel out from sources of light **in straight lines**. These lines are often called **rays or beams of light**. Light travels as a wave. But unlike waves of water or sound waves, it does not need a medium to travel through. This means light can travel through a vacuum - a completely airless space.



## The Law of Reflection

The **Law of Reflection** states that the angle of incidence is equal to the **angle of reflection**. Whenever light is reflected from a surface, it obeys this law. The angle of reflection is the angle between the normal line and the reflected ray light. The **angle of incidence** is the angle between the normal line and the incident ray of light.

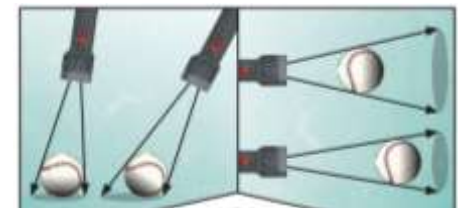
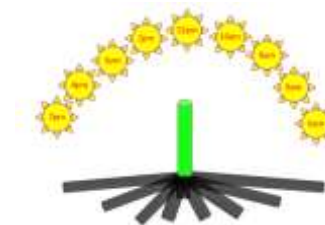
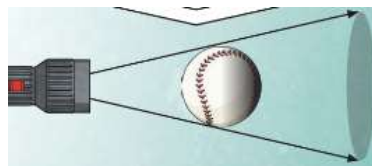


## Shadows

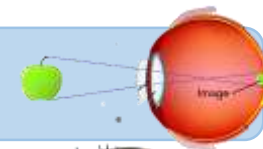
Shadows are formed when light from a source is blocked by an opaque object. A shadow is not a reflection, even though it is often the same shape as the object.



Shadows can also be elongated or shortened depending on the angle of the light source. A shadow is also larger when the object is closer to the light source. This is because it blocks more of the light.



# Knowledge Organiser – Light (Year 6)



## Refraction

Light waves travel at a different speed when they go through other transparent materials, such as water or glass. This causes the rays of light to change direction and bend. This is known as **refraction**.

Refraction creates illusions. Because **light bends** when it travels between air and water or glass, objects seen through these materials **look bent or distorted**.

The spoon in this water looks as if it is bent. This is because light bends when it moves from air to water. When light bends in this way, it is called **refraction**.



## The Colours of the Spectrum

**Sir Isaac Newton** shone a light through a transparent prism, separating out light into the colours of the rainbow (red, orange, yellow, green, blue, indigo and violet) - the colours of the **spectrum**. All the colours together merge and make visible light.



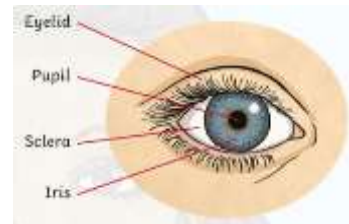
A **prism** is a **solid 3D shape with flat sides**. The two ends are an equal shape and size. A transparent prism separates out visible light into all the colours of the spectrum.



## How do our eyes see?



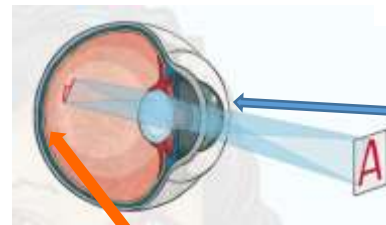
Our eyes are amazing! From the moment we open our eyes in the morning, they are constantly at work. They take in information about the world around us, and constantly send images to the brain to be processed. The eye is made up of many different parts.



The **sclera** is the white part of the eye. It provides a protective coating, which covers most of the eye.

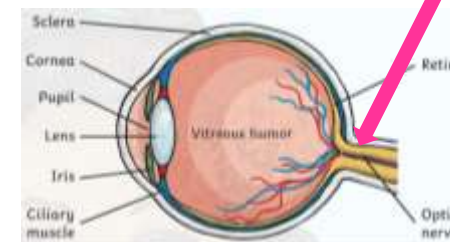
The **iris** is the colourful part of the eye. It can change in size to control how much light goes through the **pupil**.

The **pupil** looks like a black circle in the centre of the eye, but it is really an opening in the iris which lets light enter the eye. The pupil can change in size; it gets smaller in very bright conditions and larger in dark conditions.



The **cornea** is the clear dome that sits in front of the iris. It helps your eye focus as light passes through.

The **retina** is in the very back of the eye. The retina takes the light the eye receives and changes it into nerve signals so the brain can understand what the eye is seeing. When the image hits the retina, it is actually upside down!



The **optic nerve** carries the messages from the eye to the brain. The messages it sends to the brain are still upside down but amazingly the brain knows how to flip this image up the right way!



# Knowledge Organiser – Walmley: Maps and Mapping (Year 6)

## Key Vocabulary

### Compass

A **compass** is an instrument used for navigation and orientation that shows direction relative to North, East, South and West.

### Grid Reference

A **grid reference** is the unique reference to a feature or location on a map, whose position can be found by reading the numbered grid lines eastwards (eastings) then northwards (northings).

### Hemisphere

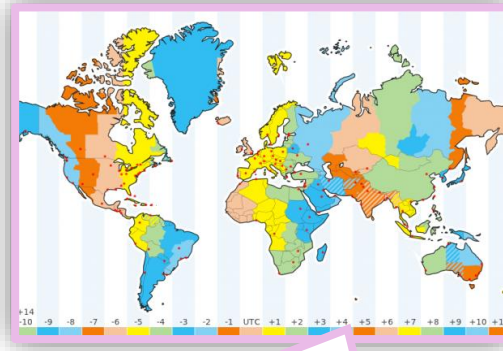
A **hemisphere** is half of Earth, usually divided into the Northern or Southern hemisphere by the Equator or Eastern and Western hemispheres by a line that runs through the poles.

### Latitude

The **latitude** of a place is its distance from the equator.

### Longitude

The **longitude** of a place is its distance to the west or east of a line passing through Greenwich.



## Time Zones

Earth is divided into 24 standard meridians. These meridians are the centre of 24 standard time zones (although some of these follow political boundaries). Time zones are determined by the rotation of Earth around the sun and are designed to ensure maximum amount of daylight.

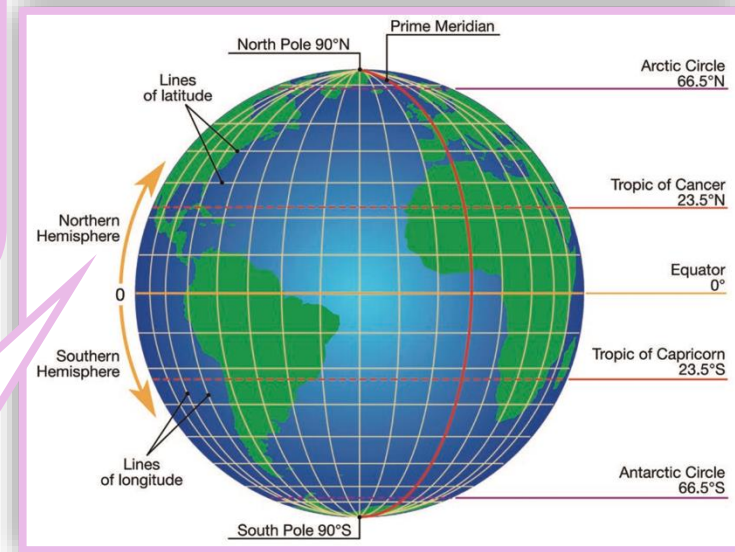


Latitude and longitude enable us to pinpoint every place of Earth in relation to the Equator and the Greenwich Meridian.

## Reading Grid References

To make it easier for us to locate a particular place on a map, maps usually have grids superimposed on them with grid codes used to find an exact location.

You read the horizontal grid reference from left to right (West to East). These horizontal numbers or letters are called Eastings. You then read the vertical grid reference from bottom to top (South to North) and these numbers or letters are called Northings.



## Meridian

The **meridian** is a line of constant longitude that passes through a given place on the surface of Earth and the poles.

## Ordnance Survey (OS)

The **OS** is the UK's national mapping agency that produces digital and paper maps of England, Scotland and Wales at different scales.

## OS Symbols

**OS symbols** are the standard conventions used by the OS to represent features on an OS map.

## Residential

A **residential** area contains houses rather than offices or factories.

## Rural

**Rural** places are far away from large towns or cities.

## Urban

**Urban** means belonging to or relating to a town or city.

## Time Zones

A **time zone** is one of the areas into which the world is divided where the time is calculated as being a particular number of hours behind or ahead of GMT.

+	Place of worship	Gravel pit
Current or former place of worship	with lower	Other pit or quarry
with spire, minaret or dome		
Building; important building	BP/BS	Boundary post/stone
Glasshouse	CG	Cattle grid
Youth hostel	CH	Clubhouse
Bunkhouse/camping barn/other hostel	FB	Footbridge
Bus or coach station	MP; MS	Milepost; milestone
Lighthouse; disused lighthouse; beacon	Mon	Monument
Triangulation pillar; mast	PO	Post office
Windmill, with or without sails	Pol Sta	Police station
Wind pump; wind turbine	Sch	School
Electricity transmission line	TH	Town hall
pylon pole	NTL	Normal tidal limit
Slopes	-W; Spr	Well; spring

An example of some OS symbols.

## Contours

Brown contour lines show high and low areas of land. The contour lines join up areas of the same height and when close together it means the hill or mountain is steep.

## Fieldwork

**Sketch maps** – Simple drawings of the landscape. They show things that are sometimes hidden in photographs or maps. They may be shown as bird's-eye view or as a drawing of the horizon.

**Ground photographs** – Taken during fieldwork and then annotated to show any features. Annotations are detailed labels with an explanation of what is shown. They can focus on physical and human features and include key terms.

An 8-point compass rose.



## Ordnance Survey (OS)

OS maps show physical and human features as symbols. This makes the maps easier to read. Each OS map has a key to show what the symbols mean.

OS maps come in different scales:

- Large-scale maps – 1:1,250, 1:1:2,500 and 1:10,000. Features appear larger on the map – used for individual towns and cities.
- Small-scale maps – 1:25,000, 1:50,000 and 1:100,000. Features appear smaller on the map – used to show larger areas or regions.



An example of a sketch map.