



Year 8 Physics – Light and sound

Learning about this topic is important because: Sound and light help us understand and interact with the world around us. Every day we use our eyes and ears to communicate, stay safe and explore our surroundings. By learning how sound travels, how light behaves and how our eyes detect light, you will be able to explain many everyday phenomena, from echoes and shadows to mirrors, lenses and colour.

This builds on: Building on your prior knowledge from primary science about the five senses, light sources, shadows, reflective materials and how we hear sounds. You have also explored simple observations about how light enables us to see objects and that sound is produced by vibrations.

This leads to: This unit develops your understanding of waves by introducing sound and light as forms of energy that travel in different ways. These ideas provide the foundation for later study of wave behaviour, electromagnetic waves and optics in Key Stage 4 Physics, where you will investigate wave properties, reflection, refraction, the electromagnetic spectrum and applications such as lenses, fibre optics and ultrasound.

We will learn: 1. to describe how sounds are produced and travel through different materials. 2. to explain how the loudness and pitch of sounds are related to vibrations. 3. to describe how echoes are formed and explain some practical uses of sound. 4. to explain how light travels in straight lines. 5. to describe and explain reflection using mirrors. 6. to explain how we see objects and identify the difference between luminous and non-luminous objects. 7. to describe how the human eye detects light and forms images. 8. to explain how coloured objects appear under different coloured light.	We will develop/practise skills including: • Making careful observations • Drawing and interpreting ray diagrams • Planning and carrying out practical investigations • Recording and presenting results • Identifying patterns in data • Explaining observations using scientific ideas
Some of the vocabulary that we will use includes: sound: a vibration that travels through a medium. vibration: a repeated back-and-forth movement. medium: the substance through which sound travels. pitch: how high or low a sound appears. volume (loudness): how loud or quiet a sound is. echo: a reflected sound wave. light source: an object that produces its own light. luminous: producing its own light.	You could learn more about this topic by: • Looking at the Electricity topic on BBC Bitesize. • Completing the relevant lessons on Oak National Academy. • Using Seneca Learning to practise questions on electric circuits.



Year 8 Physics – Light and sound

non-luminous: seen because it reflects light.
reflection: when light bounces off a surface.
ray: a straight-line representation of the path taken by light.
mirror: a smooth surface that reflects light regularly.
transparent: allows most light to pass through.
translucent: allows some light to pass through but scatters it.
opaque: does not allow light to pass through.
retina: the light-sensitive layer at the back of the eye.
pupil: the opening that allows light into the eye.
lens: focuses light onto the retina.

Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are: Educake quizzes, a mid topic review and end of unit test.



Year 8 Physics - Heating and cooling

Learning about this topic is important because: Heat energy is involved in almost every part of our daily lives, from cooking food and keeping our homes warm to designing buildings and clothing. Understanding how energy is transferred by heating helps us make better decisions about saving energy, reducing costs and protecting the environment.

This builds on: This unit builds on your knowledge of energy stores and transfers from Key Stage 2 and introduces the particle model to explain how heating changes the movement of particles. You will explore temperature, thermal energy and different methods of energy transfer.

This leads to:

This unit prepares you for future learning about energy efficiency, electricity, climate science and thermal physics at Key Stage 4. Understanding heating and cooling also supports learning about changes of state and particle behaviour.

We will learn:

1. To describe the difference between temperature and thermal energy.
2. To explain how particles behave when substances are heated or cooled.
3. To describe the three methods of heat transfer: conduction, convection and radiation.
4. To explain why different materials are good or poor thermal conductors.
5. To explain how insulation reduces unwanted energy transfer.
6. To Compare the effectiveness of different insulating materials.
7. To apply knowledge of heating and cooling to real-life situations such as homes, clothing and cooking.
- 8.

We will develop/practise skills including:

- Planning and carrying out investigations.
- Recording and interpreting data.
- Identifying patterns in results.
- Explaining observations using the particle model.
- Evaluating scientific evidence.

Some of the vocabulary that we will use includes:

Temperature – A measure of how hot or cold something is, measured in degrees Celsius (°C).

Thermal energy – The energy contained within a substance due to the movement of its particles.

Heating – The transfer of thermal energy from a hotter object to a cooler one.

Cooling – The loss of thermal energy from an object.

You could learn more about this topic by:

- Looking at the **Energy** and **Heating and Cooling** topics on BBC Bitesize.
- Reviewing the relevant lessons on Oak National Academy.
- Using Educake to complete questions based on each lesson.



Year 8 Physics - Heating and cooling

Conduction – The transfer of thermal energy through a material by particles vibrating and passing energy to neighbouring particles.
Convection – The transfer of thermal energy in liquids and gases caused by the movement of warmer, less dense fluids.
Radiation – The transfer of thermal energy by infrared waves that can travel through empty space.
Insulator – A material that slows down the transfer of thermal energy.
Conductor – A material that allows thermal energy to pass through easily.
Thermal equilibrium – The point at which two objects are the same temperature and no net energy is transferred.
Particle model – A scientific model used to explain the behaviour of solids, liquids and gases.
Infrared radiation – Electromagnetic waves that transfer thermal energy.

Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are: Educake quizzes, a mid topic review and end of unit test.



Year 8 Physics - Moving by Forces

Learning about this topic is important because: Forces are all around you. When forces cause movement you can see what they do, but when something is not moving there are still forces at work. Forces are involved in some way in almost everything you do.

This builds on: This unit explores speed, forces, and motion, including effects on objects. It covers deriving equations, calculations, and distance-time graphs. Learn to use force arrows, identify balanced and unbalanced forces, and understand their impact on movement.

This leads to:

This unit deepens your understanding by introducing forces as interactions between objects, including contact and non-contact forces, using diagrams and measurements. This helps you to contextualise how forces affect motion before you progress to the next unit, Hidden forces, in Yr 9, where you will explore more complex concepts like turning forces, forces that hold objects on surfaces and buoyancy.

We will learn:

1. know and use the equation that links speed, distance and time.
2. interpret distance-time graphs.
3. describe how the speed of an object changes throughout the time that a resultant force is acting on it.
4. use the idea of resultant force to explain whether a change of speed occurs or not.
5. explain how streamlining reduces drag
6. explain how the area of a parachute affects its speed.
7. clearly describe how drag forces affect the motion of falling objects.

We will develop/practise skills including:

- Collecting data
- Using and rearranging equations
- Converting units

Some of the vocabulary that we will use includes:

Distance - a length between two points, usually measured in metres (m)

Time - a duration, usually measured in seconds (s)

Speed - the distance it travels each second

Metres per second (m/s) - the standard unit used to measure speed

Miles per hour (mph) - the unit often used to measure vehicles' speeds

Distance-time graph - A distance-time graph is used to show how far an object has travelled over a period of time.

Average speed - The overall distance travelled divided by overall time for a journey.

Gradient - The steepness of a slope, the larger the gradient the steeper a slope is.

Stationary - A stationary object is not moving. It has a speed of 0 m/s.

Resultant force - The overall effect of a set of forces acting on an object.

You could learn more about this topic by:

- looking at the Forces topic in BBC Bitesize,
- going on the website Seneca.





Year 8 Physics - Moving by Forces

Frictional force - Frictional forces act between surfaces, to oppose the movement of an object.

Gravitational force - The gravitational force on an object pulls it downwards, towards Earth.

Acceleration - A change in speed or direction of movement.

Drag - When an object moves through a liquid or a gas (a fluid), a drag force acts on it as it pushes particles out of its way.

Air resistance - The drag force on an object moving through air is called air resistance.

Streamlined - A streamlined object is shaped to reduce the drag forces acting on it.

Water resistance - The drag force on an object moving through water is called water resistance.

Parachute - A parachute is used to increase the size of drag forces. This slows down the object it is attached to.

Terminal velocity - An object reaches a terminal velocity when the drag and gravitational forces are equal.

Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are: end of unit test.



Year 8 Physics – Electric Circuits

Learning about this topic is important because: Electricity powers almost everything we use every day, from lights and mobile phones to computers and transport. Understanding how electric circuits work helps you explain how electrical devices are designed, used safely and made more energy efficient.

This builds on: This unit builds on your Key Stage 2 learning about simple electrical circuits and electrical components. You will develop your understanding of how electric current flows, how circuits are represented using symbols and how different components affect a circuit.

This leads to:

This unit prepares you for future learning about electrical power, resistance and domestic electricity at Key Stage 4. It also supports understanding of energy transfers, electromagnetism and electronic systems.

We will learn:

1. Identify the main components found in simple electrical circuits.
2. Draw and interpret circuit diagrams using standard scientific symbols.
3. Explain how electric current flows in a complete circuit.
4. Describe the difference between series and parallel circuits.
5. Predict how adding or removing components affects a circuit.
6. Explain the purpose of switches, cells, lamps, buzzers and motors.
7. Investigate how different variables affect the brightness of lamps and the operation of electrical devices.

We will develop/practise skills including:

- Constructing electrical circuits safely.
- Drawing scientific circuit diagrams.
- Planning and carrying out practical investigations.
- Recording observations accurately.
- Identifying patterns and drawing conclusions from evidence.
- Using scientific vocabulary to explain electrical phenomena.

Some of the vocabulary that we will use includes:

Circuit – A complete path that allows electric current to flow.

Current – The flow of electric charge through a circuit, measured in amperes (A).

Cell – A device that provides electrical energy to a circuit.

Battery – Two or more cells connected together.

Component – A part of an electrical circuit with a specific function.

Lamp – A component that converts electrical energy into light energy.

Motor – A component that converts electrical energy into movement.

Buzzer – A component that converts electrical energy into sound.

Switch – A component used to open or close a circuit.

Series circuit – A circuit where all components are connected in a single loop.

You could learn more about this topic by:

- Looking at the **Electricity** topic on BBC Bitesize.
- Completing the relevant lessons on Oak National Academy.
- Using Seneca Learning to practise questions on electric circuits.



Year 8 Physics – Electric Circuits

Parallel circuit – A circuit with two or more branches, giving more than one path for current.

Circuit symbol – A standard symbol used to represent a component in a circuit diagram.

Conductor – A material that allows electric current to flow easily.

Insulator – A material that does not allow electric current to flow easily.

Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are: Educake quizzes, a mid topic review and end of unit test.



Year 8 Physics – Making Images

Learning about this topic is important because: It deepens understanding by examining how light is used to form images through reflection, refraction, and lenses	
This builds on: In the Sound, light and vision unit, pupils learnt how sound waves travel through different types of medium and are absorbed and reflected, how light is reflected off mirrors, and how the eye can see objects by the light they reflect.	
This leads to: The waves unit will build on this knowledge to learn about the properties and propagation of transverse and longitudinal waves.	
We will learn: 1. the primary colours of light, describe how they mix to produce other colours, and explain how the eye detects colour. 2. what white light is, and explain why a visible spectrum can be produced from white light.to identify balanced and unbalanced forces and work out the size of a resultant force. 3. the colour of an object in white light and in coloured light. 4. how light passes through a pinhole to produce an image in a pinhole camera. 5. The properties of reflections in a plane mirror, and draw diagrams to show how reflections form. 6. How to describe and draw how a ray of light refracts when it moves from one medium to another, and explain how refraction can cause virtual images. 7. How light from an object can be focused by a converging lens to form an image.	We will develop/practise skills including: • Drawing scientific diagrams • Describe and explaining • Practical skills
Some of the vocabulary that we will use includes: Primary colour - The colours of light from which all other colours of light can be made (red, green and blue). White light - Light that consists of red, green and blue light in equal amounts so looks white. Triangular prism - A uniform 3D shape with triangular ends. Visible light spectrum - A rainbow pattern of coloured light that always occurs with the colours in the same order. Image - A representation of an object. Translucent - Describes a material that transmits some light, but through which objects cannot be seen clearly. Inverted - Describes an image that is upside down. Laterally inverted - describes an image that has been 'flipped' horizontally Virtual ray - a dashed line drawn to show where light seems to be (but is not actually) coming from Virtual image - an image that can be seen but not projected onto a screen Transmit - when light moves into and through a new medium Medium - the material that light is travelling through Refraction - when light changes direction when it enters a new medium Lens - a piece of glass or other transparent material shaped to refract light towards or away from a focus	You could learn more about this topic by: • Watching videos on this topic by Revision Monkey • Looking at the topic on BBC Bitesize • Revision and quizzes on EDUCAKE.



Year 8 Physics – Making Images

Focus - (1) a point where many rays of light from an object meet (2) the process of refracting light rays so they meet

Refraction - when light changes direction when it enters a new medium

Focal length - the distance from the centre of a lens to where the lens focuses a distant object

Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are: Investigating friction (Lesson 5) and end of unit test.