

Physics Unit: Magnets and Forces

What does progression of knowledge look like?

Year	Progression of knowledge.
EYFS	<ul style="list-style-type: none">• Explore how things work• Explore and talk about different forces they can feel• Talk about the differences between materials and changes they notice• Explore the natural world around them• Describe what they see, hear, and feel whilst outside
1	<ul style="list-style-type: none">• Observe and describe different ways of moving• Identify similarities and differences between movement of different objects• Make suggestions about how objects can be made to move• Explore contact forces (push and pull)• Explore how objects sink or float• Know that it is not only ourselves that make things move and ask questions about what is causing movement
3	<ul style="list-style-type: none">• Compare how things move on different surfaces• Notice that some forces need contact between two objects, but magnetic forces can act at a distance• Describe magnets as having two poles• Observe how magnets attract or repel each other and attract some materials and not others• Predict whether two magnets will attract and repel each other, depending on which poles are facing• Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
5	<ul style="list-style-type: none">• Know the work of Isaac Newton and know that force is measured in Newtons by a Newton Meter• Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object• Identify the effects of air resistance• Identify the effects of water resistance• Identify the effects of friction acting between moving surfaces• Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater affect
7	<ul style="list-style-type: none">• Identify forces as being contact or non-contact.• Describe the effect of forces on an object.• Label a force diagram with arrows showing the direction of force.• Describe how forces can change the shape of an object.• Measure forces accurately using a newton meter.• Use force arrows in diagrams, adding forces in one dimension.• Describe the relationship between of force and extension of a spring.• Use Hooke's law to predict the extension of a spring.• Present data on an appropriate graph and identify the relationship between force applied and extension of a spring.• Describe what is meant by resultant force.• Calculate the resultant force of an object.• Describe the effects of opposing forces and equilibrium.• Recall the equation that links force, mass and acceleration.• Describe how mass and acceleration affect the size of a force.• Calculate the resultant force of an object using its mass and acceleration ($F = m \times a$).• Describe the effects of friction.• Determine how friction changes between different surfaces.

	<ul style="list-style-type: none"> • Explain why friction occurs. • Describe how the forces acting on a falling object change. • Explain what is meant by terminal velocity. • Interpret a graph of a falling object.
8	<ul style="list-style-type: none"> • Define the law of conservation of energy. • Describe what happens during an energy transfer. • Represent energy transfers as a diagram. • Describe energy transfers in terms of input, output, useful, and wasted energy. • Describe the energy transfers that occur in electrical appliances. • Calculate the efficiency of different appliances. • Explain why 100% efficiency is very difficult to achieve. • Compare the efficiency of different appliances. • Calculate the efficiency of an appliance from a Sankey diagram. • Construct a Sankey diagram to illustrate an energy transfer. • Describe the factors that affect the kinetic energy of an object. • Calculate the kinetic energy of an object. • Describe the factors that affect the gravitational potential energy of an object. • Describe what happens to the GPE and KE as an object falls • Calculate the gravitational potential energy of an object.
9	<ul style="list-style-type: none"> • State what is meant by a permanent magnet. • Describe how magnets interact (attraction and repulsion). • Predict whether magnets will attract or repel. • Describe how to represent magnetic fields. • Draw field lines around a magnet in detail. • Predict the magnetic fields for combinations of bar magnets. • Describe Earth's magnetic field. • Explain why the Earth has a magnetic field. • Explain the importance of the Earth's magnetic field. • State the difference between an electromagnet and a permanent magnet. • Describe how to change the strength of an electromagnet. • State the factors that affect the strength of an electromagnet. • Describe some uses of electromagnets. • Describe how a simple motor works. • Suggest ways to make a motor turn faster.