



PROGRESSION OF KNOWLEDGE



Physics Unit: Forces and Magnets

What does progression of knowledge look like?

Year	Progression of Knowledge
EYFS	• 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	• 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	• 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 whether they are attracted to a magnet and identify some magnetic materials.
5	• 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.



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7	• 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. • 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	• 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.



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9	• 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.