



DOWN AMPNEY PRIMARY SCHOOL

Term 6

Unit Overview: UKS2 Science

Forces

<u>National Curriculum Objectives</u> ❖ 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, water resistance and friction that act between moving surfaces. ❖ Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.	<u>Substantive knowledge</u> ❖ Know that a force causes an object to start moving, stop moving, speed up, slow down or change direction. ❖ Know that Gravity is a force that acts at a distance. Everything is pulled to the Earth by gravity. This causes unsupported objects to fall. ❖ Air resistance, water resistance and friction are contact forces that act between moving surfaces. The object may be moving through the air or water, or the air and water may be moving over a stationary object. ❖ A mechanism is a device that allows a small force to be increased to a larger force. The pay back is that it requires a greater movement. The small force moves a long distance and the resulting large force moves a small distance, e.g. a crowbar or bottle top remover. ❖ Pulleys, levers and gears are all mechanisms, also known as simple machines.	<u>Vocabulary</u> Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears, force metre, Newton, kilograms, acceleration, tension, upthrust, speed, incline, axle, wheel, angle, fulcrum, effort, density <u>Phonics focus</u> <u>Kilograms</u> <u>Resistance</u> <u>Tension / friction</u>
<u>Working Scientifically Skills: Enquiry type focus</u> ❖ Fair Tests: How does the surface area of a parachute affect the time it takes to fall to the ground? ❖ Identifying and classifying: Can you label and name all the forces acting on the objects in each of these situations? ❖ Observing over time: How long does a pendulum swing for before it stops? ❖ Pattern seeking: Do all objects fall through water in the same way? ❖ Research: How do submarines sink if they are full of air?	<u>Disciplinary knowledge</u> ❖ Demonstrate the effect of gravity acting on an unsupported object. ❖ Give examples of friction, water resistance and air resistance. ❖ Explore real life scenarios of when it is beneficial to have high or low friction, water resistance and air resistance. ❖ Use models to demonstrate how pulleys, levers and gears work	<u>Reading support</u> ❖ Word mats ❖ Scaffolded recording / choice of recording ❖ Pre teaching of vocab <u>Extension deeper thinking</u> ❖ 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, water resistance and friction, that act between moving surfaces. ❖ Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.



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<u>Christian Values</u> <u>Courage</u> ❖ Ask our own questions to support our own understanding of the world and understand that sharing ideas, data, and results (for further testing and development by others) is a key principle of the scientific method. <u>Respect</u> ❖ Supporting other's ideas, even if they differ to our own. ❖ Explore and celebrate research and developments that take place in many different cultures, both past and present. ❖ Explore how scientific discoveries have shaped the beliefs, cultures and politics of the modern world. <u>Trust</u> ❖ Celebrate everyone's unique ideas and working together collaboratively.	<u>British Values</u> ❖ <u>Democracy</u> Take the views and opinions of others into account. Take turns and instructions from others. ❖ <u>The rule of law</u> Understand the importance of safety rules when working scientifically make choices when planning an investigation as others may have different points of view as to where to start. ❖ <u>Tolerance</u> Scientific discoveries have come from other cultures and religious beliefs often compete with scientific understanding. ❖ <u>Mutual respect</u> Work as a team, discuss findings and Offer support and advice to others.	<u>Key People</u> ❖ Sir Isaac Newton ❖ Civil Engineer – Jyoti Sehdev <u>Possible misconceptions</u> Some children may think: ❖ the heavier the object the faster it falls, because it has more gravity acting on it. ❖ smooth surfaces have no friction. ❖ objects always travel better on smooth surfaces. ❖ a moving object has a force which is pushing it forwards and it stops when the pushing force wears out. ❖ a non-moving object has no forces acting on it. ❖ heavy objects sink and light objects float.
<u>Prior learning</u> Compare how things move on different surfaces. (Y3 - Forces and magnets) • Notice that some forces need contact between two objects, but magnetic forces can act at a distance. (Y3 - Forces and magnets) • Observe how magnets attract or repel each other and attract some materials and not others. (Y3 - Forces and magnets) • 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. (Y3 - Forces and magnets) • Describe magnets as having two poles. (Y3 - Forces and magnets) • Predict whether two magnets will attract or repel each other, depending on which poles are facing. (Y3 - Forces and magnets) <u>Future learning</u> Forces as pushes or pulls, arising from the interaction between two objects. (KS3) • Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces. (KS3) • Moment as the turning effect of a force. (KS3) • Forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water. (KS3) • Forces measured in Newtons, measurements of stretch or compression as force is changed. (KS3)		