Curriculum

Curriculum Grid	2009689											
	Gears			Wheels and Axles			Levers			Pulleys		
	Principle Models	Main Model	Problem-Solving Model	Principle Models	Main Model	Problem-Solving Model	Principle Models	Main Model	Problem-Solving Model	Principle Models	Main Model	Problem-Solving Model
Science (English National Curriculum)												
Scientific enquiry												
That it is important to test ideas using evidence from observation and measurement	●	●	●	●	●	●	●	●	●	●	●	●
Ask questions that can be investigated scientifically and decide how to find answers	●	●	●	●	●	●	●	●	●	●	●	●
Consider what sources of information, including first-hand experience and a range of other sources, they will use to answer questions	●	●	●	●	●	●	●	●	●	●	●	●
Make a fair test or comparison by changing one factor and observing or measuring the effect while keeping other factors the same	●	●	●	●	●	●	●	●	●	●	●	●
Use simple equipment and materials appropriately and take action to control risks	●	●	●	●	●	●	●	●	●	●	●	●
Make systematic observations and measurements	●	●	●	●	●	●	●	●	●	●	●	●
Use observations, measurements or other data to draw conclusions	●	●	●	●	●	●	●	●	●	●	●	●
Decide whether these conclusions agree with any prediction made and/or whether they enable further predictions to be made		●	●		●	●		●	●		●	●
Use their scientific knowledge and understanding to explain observations, measurements or other data or conclusions	●	●	●	●	●	●	●	●	●	●	●	●
Physical processes												
About friction, including air resistance, as a force that slows moving objects and may prevent objects from starting to move				●	●	●						
That when objects are pushed or pulled, an opposing pull or push can be felt	●	●	●	●	●	●	●	●	●	●	●	●
How to measure forces and identify the direction in which they act	●	●	●	●	●	●	●	●	●	●	●	●
Design & Technology (English National Curriculum)												
Developing, planning and communicating ideas												
Generate ideas for products after thinking about who will use them and what they will be used for, using information from a number of sources, including ICT-based sources			●			●			●			●
Develop ideas and explain them clearly, putting together a list of what they want their design to achieve			●			●			●			●
Plan what they have to do, suggesting a sequence of actions and alternatives, if needed			●			●			●			●
Communicate design ideas in different ways as these develop, bearing in mind aesthetic qualities, and the uses and purposes for which the product is intended			●			●			●			●
Working with tools, equipment, materials and components to make quality products												
Measure, mark out, cut and shape a range of materials, and assemble, join and combine components and materials accurately	●	●	●	●	●	●	●	●	●	●	●	●
Evaluating processes and products												
Reflect on the progress of their work as they design and make, identifying ways they could improve their products			●			●			●			●
Carry out appropriate tests before making any improvements			●			●			●			●
Recognise that the quality of a product depends on how well it is made and how well it meets its intended purpose	●	●	●	●	●	●	●	●	●	●	●	●
Knowledge and understanding of materials and components												
How mechanisms can be used to make things move in different ways, using a range of equipment including an ICT control program	●	●	●	●	●	●	●	●	●	●	●	●

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Mathematics (English National Curriculum)												
Number (Fractions, percentages and ratio)												
Solve simple problems involving ratio and direct proportion	●	●	●	●	●	●	●	●	●	●	●	●
Number (solving numerical problems)												
Choose and use an appropriate way to calculate and explain their methods and reasoning			●			●			●			●
Shape, space and measures (problem solving)												
Approach spatial problems flexibly, including trying alternative approaches to overcome difficulties			●			●			●			●
Shape, space and measures (reasoning)												
Use mathematical reasoning to explain features of shape and space	●	●	●	●	●	●	●	●	●	●	●	●
Shape, space and measures (understanding properties of shape)												
visualise 3-D shapes from 2-D drawings	●	●	●	●	●	●	●	●	●	●	●	●
Shape, space and measures (Understanding properties of position and movement)												
Make and draw with increasing accuracy 2-D and 3-D shapes and patterns; recognise reflective symmetry in regular polygons; recognise their geometrical features and properties including angles, faces, pairs of parallel lines and symmetry, and use these to classify shapes and solve problems	●	●	●	●	●	●	●	●	●	●	●	●
Visualise and describe movements using appropriate language	●	●	●	●	●	●	●	●	●	●	●	●
Transform objects in practical situations; transform images using ICT; visualise and predict the position of a shape following a rotation, reflection or translation	●	●	●	●	●	●	●	●	●	●	●	●
Understanding measures												
Recognise the need for standard units of length, mass and capacity, choose which ones are suitable for a task, and use them to make sensible estimates in everyday situations; convert one metric unit to another; know the rough metric equivalents of imperial units still in daily use	●	●	●	●	●	●	●	●	●	●	●	●

Curriculum Highlights

	Gears Principle & Main Models	Wheels and Axles Principle & Main Models	Levers Principle & Main Models	Pulleys Principle & Main Models
Design & Technology curriculum				
Making simple machines	• Identify gears as either spur or crown gear. • Build a model which will gear up and increase speed of rotation. • Build a model which will gear down and decrease speed of rotation. • Arrange gears so they turn in the same direction, in opposite directions, or at 90 degrees to each other as desired. • Recognise that how fast or how slowly one gear makes another turn depends on the number of teeth on the gears and their position.	• Identify a wheel and axle as a simple machine. • Build a wheeled model which turns a corner easily. • Build a model that can be steered. • Identify where friction might be found.	• Identify a lever as a rod or arm that tilts around a pivot to produce useful motion. • Describe the pivot, effort and load. • Recognise that the effectiveness of a lever depends on the arrangement of the pivot point, effort and load. • Identify first class levers.	• Identify a pulley wheel. • Build a model which will gear up and increase speed of rotation. • Build a model which will gear down and decrease speed of rotation. • Arrange pulleys so that the drive pulley turns in the same direction as the driven pulley. • Recognise that the turning ratio of one pulley to another is determined by the size of the pulleys. • Arrange pulley wheels so they turn in the same direction, in opposite directions, or at 90 degrees to each other as desired.
Designing, making and testing simple machines	Problem solving activity – popcorn cart	Problem solving activity – wheelbarrow	Problem solving activity – railway crossing barrier	Problem solving activity – crane
Science curriculum				
Investigating simple machines, scientific inquiry, speed, fair testing, predicting and measuring, collecting data, and describing outcomes.	• Investigate the performance of gears.	• Investigate a single fixed axle. • Investigate separate axles.	• Investigate the performance of levers	• Investigate the performance of pulleys
Mathematics curriculum				
Counting, drawing geometric shapes, calculating, measuring, predicting outcomes, and problem solving	• Predict outcomes of various trials • Count teeth on gears and count rotations. • Draw geometric shapes	• Predict outcomes of various trials • Measure with standard units of measure	• Predict outcomes of various trials • Measure with standard units of measure	• Predict outcomes of various trials • Count rotations