

Enquiry Question	What are forces and are they good or bad?	
	Required Prior Knowledge	Knowledge to be taught
Substantive Knowledge	<p>Understand push and pull (EYFS)</p> <p>Can move objects by applying a force such as pushing a car (Y1)</p> <p>Know how different materials can be changed by applying a force such as squashing, bending, twisting and stretching (Y2 Materials)</p> <p>Know how things move on different surfaces. examples of forces in everyday life. range of magnets. (Y3 Magnets)</p>	<p>Explain the effects of gravity acting on an unsupported object. Give examples of friction, water resistance and air resistance. Give examples of the benefits of high/low friction, water resistance and air resistance. Demonstrate how pulleys, levers and gears work. Know that these systems can make lifting heavy objects easier.</p>
Disciplinary Knowledge		
Asking Questions		
Making Predictions		
Planning Enquiries	Set up a test to change the speed of a pendulum. Plan different types of an enquiry to answer a question.	
Observation & Measuring	Observe different forces and measure the force using different equipment. Take measurements using a range of scientific equipment.	
Recording Data	Record results in a table.	
Interpreting & Conclusions	Interpret and communicate results from data using scientific vocabulary.	

Evaluation							
Vocabulary	force, Gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears, Newton, up thrust, opposing, streamline, brake, cog, weight, mass.						
Science Capital	 Newton Isaac Newton  Galileo  Helen Margolis						
Recommended Reading	 Galileo Galilei  COPERNICUS, GALILEO AND NEWTON  ISAAC NEWTON'S LAW OF GRAVITY  Horribly Famous NEWTON and his falling apple  HOW TO BE AN Engineer  HOW TO BUILD A RACING CAR  HOW TO DESIGN THE WORLD'S BEST ROLLER COASTER						
Teaching Sequence	INTRODUCTION <ul style="list-style-type: none"> Begin with a question, demonstration or real-world example to spark curiosity and connect to the topic. Review or revisit related concepts. 		INVESTIGATION AND RECORD <ul style="list-style-type: none"> Introduce new scientific ideas or concepts through hands-on activities, experiments or observations. Guide pupils to understand the scientific concepts behind their exploration. 				ASSESSMENT <ul style="list-style-type: none"> Reflect on learning Demonstrate their understanding
Learning Questions	What is a force?	What is gravity?	What is air resistance?	What is water resistance?	What is friction?	What do levers, pulleys and gears do?	End of Topic Test
Mastery Keys	<ul style="list-style-type: none"> ➤ Can demonstrate the effect of gravity acting on an unsupported object. ➤ Can give examples of friction, water resistance and air resistance. ➤ Can give examples of when it is beneficial to have high or low friction, water resistance, and air resistance. ➤ Can demonstrate how pulleys, levers and gears work. 						



Enquiry Question	What goes on in Space?	
Substantive Knowledge	Required Prior Knowledge	Knowledge to be taught
Substantive Knowledge	<p>Know that Neil Armstrong landed on the moon (Reception) Know days are longer in summer and shorter in winter. There are different seasons with different characteristics. Know that the sun rises and sets. (Y1 Seasonal Change)</p> <p>Describe how shadows are formed. (Y3 Light)</p>	<p>Know how the earth and moon move. Know different planets in the solar system. Can understand night and day by explaining the rotation of the earth on its axis. Understand why shadows change using scientific vocabulary and the position of the sun. Explain how a sundial works. Explain why we have time zones.</p>
Disciplinary Knowledge		
Asking Questions	Raise questions and suggest reasons for similarities and differences.	
Making Predictions		
Planning Enquiries	Plan own test and control variables.	
Observation & Measuring	Use measurement to represent planets in a model.	
Recording Data	Record my work using scientific diagrams and labels. Present results in a variety of ways to answer a question.	
Interpreting & Conclusions	Use a model to discuss, communicate and justify scientific ideas using scientific vocabulary.	
Evaluation		
Vocabulary	Earth, sun, moon, Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune, Pluto (dwarf planet), spherical, solar system, rotates, star, orbit, planets, axis, night, day, season, galaxy, meteorite, celestial	

Science Capital



Neil Armstrong



Buzz Aldrin

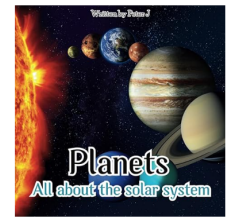
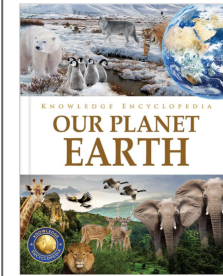
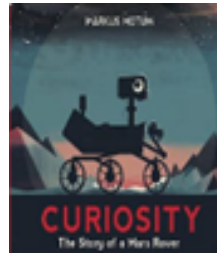


Tim Peake



Helen Sharman

Recommended Reading



Teaching Sequence

INTRODUCTION

- Begin with a question, demonstration or real-world example to spark curiosity and connect to the topic.
- Review or revisit related concepts.

INVESTIGATION AND RECORD

- Introduce new scientific ideas or concepts through hands-on activities, experiments or observations.
- Guide pupils to understand the scientific concepts behind their exploration.

ASSESSMENT

- Reflect on learning
- Demonstrate their understanding

Learning Questions

What do we already know about space?

How big are the planets?

Why does the moon move?

How do we know the Earth is round?

Why does the sun move?

What do astronauts do?

End of Topic Test

Mastery Keys

- Can show using diagrams the movement of the Earth and moon.
- Can explain the rotation of the Earth and how this causes night and day.
- Can explain evidence gathered about the position of shadows in terms of movement of the Earth.
- Can explain how a sundial works.
- Can explain why we have time zones.



Enquiry Question	What is reversible and irreversible change?	
	Required Prior Knowledge	Knowledge to be taught
Substantive Knowledge	<p>Compare the suitability of different materials including wood, metal, plastic, glass, brick, rock, paper, cardboard, water. Know that shapes of solid objects can be changed by squashing, bending, twisting and stretching. Describe similarities and differences of materials. (Y2 Materials)</p> <p>Name properties of solids, liquids and gasses. Know that materials can be changed. Test a variety of materials to answer questions. (Y4 States of Matter)</p>	<p>Explain everyday uses of materials. Explain what dissolving is. Name equipment for filtering and sieving. Know how to recover substances from solutions or mixtures by evaporation, filtering or sieving. Describe reversible and non-reversible changes to materials and give examples.</p>
Disciplinary Knowledge		
Asking Questions		
Making Predictions	Make predictions about which materials are soluble and insoluble.	
Planning Enquiries	Plan my own test based on how materials react with one another.	
Observation & Measuring	Make careful observations when heating solutions.	
Recording Data	Record results in a table.	
Interpreting & Conclusions	Use scientific language and illustrations to discuss, communicate and justify ideas.	
Evaluation	Evaluate my test.	
Vocabulary	thermal, electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/not reversible, change, burning, rusting, new material	

Science Capital

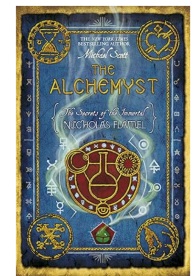
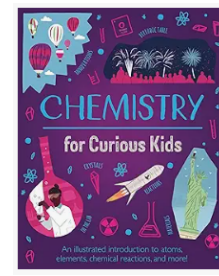
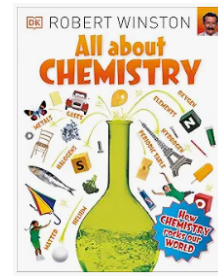
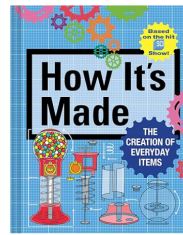
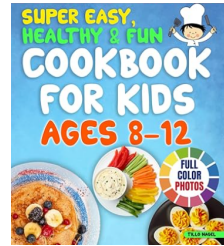
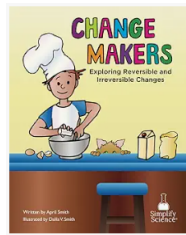


Spencer Silver



Arthur Fry

Recommended Reading



Teaching Sequence

INTRODUCTION

- Begin with a question, demonstration or real-world example to spark curiosity and connect to the topic.
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INVESTIGATION AND RECORD

- Introduce new scientific ideas or concepts through hands-on activities, experiments or observations.
- Guide pupils to understand the scientific concepts behind their exploration.

ASSESSMENT

- Reflect on learning
- Demonstrate their understanding

Learning Questions

What do we already know about materials?

Can you recover a substance from a solution?

How can you separate mixtures of solids?

What is reversible and irreversible change?

What are the properties of glue?

End of Topic Test

Mastery Keys

- Can explain what dissolving is, giving examples.
- Can use knowledge of liquids, gases and solids to suggest how materials can be recovered from solutions or mixtures by evaporation, filtering or sieving.
- Can describe simple reversible and non-reversible changes to materials, giving examples.



Enquiry Question	How can we ensure that species of living things do not become extinct?	
Substantive Knowledge	Required Prior Knowledge	Knowledge to be taught
Substantive Knowledge	Name living things in a range of habitats, giving key features that helped identify them. Give examples of how an environment might change both naturally and due to human impact. Explain how changes in the environment can be dangerous to animals and lead to extinction. Know that some animals hibernate. (Y4 Living things and their habitats)	Describe the lifecycles of mammals, amphibians and insects using diagrams. Describe similarities and differences between them. Understand the term reproduction in plants and animals.
Disciplinary Knowledge		
Asking Questions	Ask relevant questions and find ways to answer them.	
Making Predictions	Make relevant and accurate predictions.	
Planning Enquiries		
Observation & Measuring		
Recording Data	Present data in a variety of different ways to help answer my questions. Record my results using a bar chart and explain the results.	
Interpreting & Conclusions	Use oral and written forms to report conclusions.	
Evaluation	Suggest next steps based on the weakest aspects of the enquiry.	
Vocabulary	life cycle, live, young, fertilises, egg, runners, reproduce, sperm, metamorphosis, gestation, cuttings, plantlets, bulb, sexual/asexual reproduction	

Science Capital

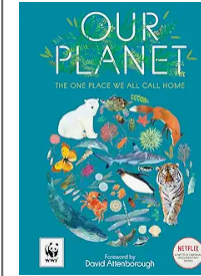
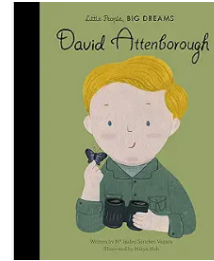
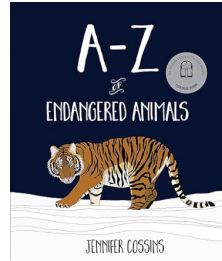
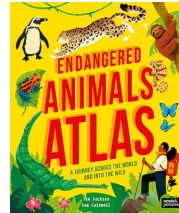
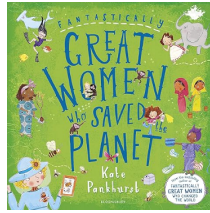


Jane Goodall



David Attenborough

Recommended Reading



Teaching Sequence

INTRODUCTION

- Begin with a question, demonstration or real-world example to spark curiosity and connect to the topic.
- Review or revisit related concepts.

INVESTIGATION AND RECORD

- Introduce new scientific ideas or concepts through hands-on activities, experiments or observations.
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ASSESSMENT

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Learning Questions

How do mammals, amphibians, insects and birds have different lifecycles?

How have people helped endangered species?

How do plants reproduce?

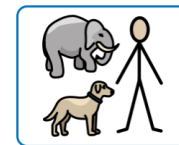
How do you grow new plants if you don't have a seed?

Are all animals pregnant for the same amount of time?

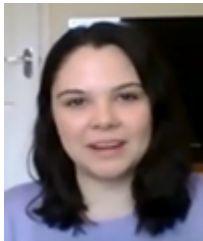

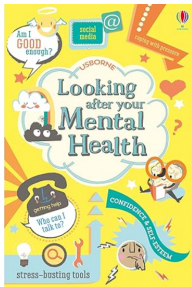
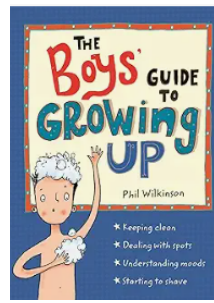


End of Topic Test

Mastery Keys

- Can describe the life cycles of mammals, amphibians and insects using diagrams.
- Can describe similarities and differences between them.



Enquiry Question	What is the lifecycle of a human?	
Substantive Knowledge	Required Prior Knowledge	Knowledge to be taught
Substantive Knowledge	Identify and label and draw main parts of the digestive system and explain the process. Know the different types of teeth in their mouth: molars, pre molars, canines and incisors and their function. Identify animals and classify based on their teeth whether they are herbivore, omnivore and carnivore. Order and draw a range of lifecycles and food chains. Identify the producer, predators and prey. (Y4 Animals incl. humans)	Explain the changes that take place in boys and girls during puberty. Explain how a baby changes physically as it grows and what it is able to do at each stage. Understand that different animals have different gestation periods. Know the importance of physical and mental health.
Disciplinary Knowledge		
Asking Questions		
Making Predictions	Make predictions on gestation periods.	
Planning Enquiries		
Observation & Measuring	Make careful observations as we grow older.	
Recording Data	Record data using scatter graphs. Record learning using scientific diagrams.	
Interpreting & Conclusions	Interpret findings to help others.	
Evaluation	Evaluate my learning.	
Vocabulary	adolescent, adult, asexual reproduction, sexual reproduction, fertilization, death, teenager, elderly, toddler, reproduction, foetus, growth, puberty, menstrual cycle, gestation.	

Science Capital	 <p>Midwife</p>					
Recommended Reading						
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Learning Questions	How do humans develop from birth to old age?	What are the stages of the human lifecycle?	How does the body change and it gets older?	What is puberty?	What is mental health?	How can we improve our mental health?
Mastery Keys	<ul style="list-style-type: none"> Can explain the changes that take place in boys and girls during puberty. Can explain how a baby changes physically as it grows and also what it is able to do. 					