Year 5 science long term plan

Year 5 Term 1

Forces

Preteach – What do I already know about forces?

Lesson 1 – What is gravity?
Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.
Describe and explain how motion is affected by forces (including gravitational attractions, magnetic attraction and friction).
Explore how scientists, such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.

Lesson 2 – What is air resistance?
Identify the effects of air resistance
Describe and explain how motion is affected by forces (including gravitational attractions, magnetic attraction and friction).

Lesson 3 – 4 – What affects the amount of air resistance?
(Formal investigation write up)
Identify the effects of air resistance.
Design very effective parachutes.
Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
Vary one factor whilst keeping the others the same in an experiment.
Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.
Identifying scientific evidence that has been used to support or refute ideas or arguments.

Lesson 5 – 6 How can we affect the amount of friction?
(Formal investigation write up)
Identify the effects of friction that act between moving surfaces.
Describe and explain how motion is affected by forces (including gravitational attractions, magnetic attraction and friction).
Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

Year 5 Term 2

Properties and changes of materials

Preteach – What do I already know about properties and changes of materials?

Lesson 1 – Can I compare and group together everyday materials?
Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.
Use their knowledge of materials to suggest ways to classify (solids,liquids,gases)
Explore the work of chemists who created new materials, e.g. Spencer Silver (glue on sticky notes) or Ruth Benerito (wrinkle free cotton)

Lesson 2 – Which materials dissolve in liquid to form a solution?
Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.

Lesson 3 – Which changes are reversible?
Demonstrate that dissolving, mixing and changes of state are reversible changes.
Explore changes that are difficult to reverse, e.g.burning, rusting and reactions such as vinegar with bicarbonate of soda.

Lesson 4 – Which changes are irreversible?
Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.

Lesson 5 - 6 – Which material is best for keeping ice frozen?
(Formal investigation write up)
Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.
Work out which materials are most effective for keeping us warm or for keeping something cold.

Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

Year 5 Term 3

Earth and space

Preteach – What do I already know about the Sun, Earth and Moon?

Lesson 1 – How does the Earth move around the Sun?
Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.
Explore the work of some scientists (Ptolemy, Alhazen, Copernicus)

Lesson 2 – How can we prove that the Sun, Earth and Moon are approximately spherical objects?
Describe the Sun, Earth and Moon as approximately spherical bodies.

Lesson 3 – How does the Moon move around the Earth?
Describe the movement of the Moon relative to the Earth.

Lesson 4 – Why do we have day and night?
Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.
Compare the time of day at different places on the earth.
Begin to understand how older civilizations used the sun to create astronomical clocks, e.g. Stonehenge.

Lesson 5 – How does the Sun move across the sky?
(Formal investigation write up)
Create shadow clocks.
Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.
Identifying scientific evidence that has been used to support or refute ideas or arguments.

Year 5 Term 4

Animals, including humans

Preteach – What do I already know about how animals change and age?

Lesson 1 – How do humans change as they age?
Describe the changes as humans develop to old age.
Describe the changes experienced in puberty.
Draw a timeline to indicate stages in the growth and development of humans.

Lesson 2 – Do all animals have the same life expectancy?
Describe the changes as humans develop to old age.
Create a timeline to indicate stages of growth in certain animals, such as frogs and butterflies.

Lesson 3 – Why has life expectancy in humans changed over time?
Describe the changes as humans develop to old age.

Lesson 4 – 5 – Do older children have _____ compared to younger children?
(Formal investigation write up)
Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
Explore different ways to test an idea, choose the best way and give reasons.
Use information to help make a prediction.
Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Decide which units of measurement they need to use.
Vary one factor whilst keeping the others the same in an experiment
Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
Explain, in simple terms, a scientific idea and what evidence supports it.
Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.
Identifying scientific evidence that has been used to support or refute ideas or arguments.
Suggest how to improve their work and say why they think this.

Year 5 Term 5

Living things and their habitats

Preteach – What do I already know about life cycles?

Lesson 1 – How can we classify animals?
Recognise that living things can be grouped in a variety of ways.

Lesson 2 – What are the stages in the life cycle of a chosen animal?
(Independent research)
Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.
Reporting and presenting findings from enquiries, in oral and written forms such as displays and other presentations.
Observe their local environment and draw conclusions about life-cycles, e.g. plants in the vegetable garden or flower border.
Compare the life cycles of plants and animals in their local environment with the life cycles of those around the world, e.g. rainforests.

Lesson 3 – Do all animals have the same life cycle?
(Independent research)
Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.
Reporting and presenting findings from enquiries, in oral and written forms such as displays and other presentations.
Observe their local environment and draw conclusions about life-cycles, e.g. plants in the vegetable garden or flower border.
Compare the life cycles of plants and animals in their local environment with the life cycles of those around the world, e.g. rainforests.

Lesson 4 – How is the life process of reproduction different in some animals?
(Independent research)
Describe the life process of reproduction in some plants and animals.
Reporting and presenting findings from enquiries, in oral and written forms such as displays and other presentations

Lesson 5 – How do flowering plants reproduce?
Describe the life process of reproduction in some plants and animals.

Year 5 Term 6

Investigations (Link to water – rivers)

Lesson 1 – 2 – Does warm water freeze faster than cold water?
(Formal investigation write up)
Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.
Identifying scientific evidence that has been used to support or refute ideas or arguments.

Lesson 3 – How could I separate materials?
Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.
Demonstrate that dissolving, mixing and changes of state are reversible changes.
Describe methods for separating mixtures (filtration,distillation)

Lesson 4-5 - Which material is the best to filter water?
(Formal investigation write up)
Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.
Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.
Identifying scientific evidence that has been used to support or refute ideas or arguments.
Suggest how to improve their work and say why they think this.

Lesson 6 – What are the effects of water resistance?

Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. Identifying scientific evidence that has been used to support or refute ideas or arguments. **Lesson 7 – How do pulleys and levers change the effect of a force?** Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.	Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. Identifying scientific evidence that has been used to support or refute ideas or arguments.				Identify the effects of water resistance. Work out how water can cause resistance to floating objects.
Resources					
Focus scientist for display: Katherine Johnson - The American physicist and mathematician's calculations of orbital mechanics made possible the first and subsequent manned U.S. spaceflights. Johnson was employed for 35 years at NASA, where she calculated the trajectories, launch windows and emergency return paths for the first American in space and the first American in orbit.	**Focus scientist for display: Percy Julian**	**Famous scientist for display: Neil deGrasse Tyson - an American astrophysicist, planetary scientist, author, and science communicator.**	**Focus scientist for display: Rebecca Lee Crumpler – first African American woman to earn a medical degree and wrote one of the country's earliest medical textbooks.**	**Focus scientist for display: Maria Sibylla Merian - naturalist and nature artist known for her illustrations of insects and plants. Her works on insect development and the transformation of insects through the process of metamorphosis contributed to the advance of entomology in the late 17th and early 18th centuries.**	**Focus scientist for display: Fazlur Rahman Khan - a Bangladeshi-American structural engineer and architect who invented the tube principle, which formed the basis for modern skyscraper design.**