Claremont Primary and Nursery School Science Curriculum

Year 5: How do forces change the way objects move?

NC link: Forces

Objectives:

- Explain what friction is and how it works
- Explain what air resistance is and how it works
- Investigate and explain air resistance
- Investigate and explain water resistance
- Explore gravity
- Use small forces for greater effect

Substantive Knowledge:

- 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.

Disciplinary knowledge (Think like a scientist):

- 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
- using test results to make predictions to set up further comparative and fair tests
- 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.

Key Vocabulary:

Force, contact force, frictional force, motion, air resistance, parachute, force, independent variable, dependent variable, controlled variable, air resistance, parachute, repeatability, precision, surface area, anomalous results, water resistance, streamlined, gravitational force, weight, contact force, non-contact force, lever, gear, pulley, machine

Claremont Primary and Nursery School Science Curriculum

Year 5: Where is the Earth in space?

NC link: Earth and Space

Objectives:

- Explain why we know the un, Earth and Moon are spherical
- Name and describe the features of planets in the solar system
- Order planets in the solar system
- Explain how planets move in our solar system
- Explain how ideas about the Solar System have changed over time
- Explain how the Earth moves
- Explain day and night and the apparent movement of the sun across the sky
- Explain how the moon orbits Planet Earth

Substantive Knowledge:

- describe the movement of the Earth, and other planets, relative to the Sun in the solar system
- describe the movement of the Moon relative to the Earth
- describe the Sun, Earth and Moon as approximately spherical bodies
- use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.

Disciplinary knowledge (Think like a scientist):

- 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
- using test results to make predictions to set up further comparative and fair tests
- 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.

Key Vocabulary:

Solar system, planets, orbit, sun, Pluto, celestial body, model, orbit, gravity, heliocentric model, geocentric model, rotate, North Pole, South Pole, axis, Earth, night, day, moon, gravitational force, satellite

Claremont Primary and Nursery School Science Curriculum

Year 5: How are the properties of materials different?

NC link: Properties and changes of materials

Objectives:

- Test materials to see if they are magnetic, transparent or hard
- Test material for electrical conductivity
- Plan and investigate an insulating heat experiment
- Evaluate our insulating heat experiment

Substantive Knowledge:

- 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
- know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- demonstrate that dissolving, mixing and changes of state are reversible changes
- 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.

Disciplinary knowledge (Think like a scientist):

- 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
- using test results to make predictions to set up further comparative and fair tests
- 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.

Key Vocabulary:

Transparent, translucent, opaque, magnetism, hardness, electrical conductor, electrical insulator, circuit, cell, bulb, independent variable, dependent variable, controlled variable, thermal insulator, thermometer, control beaker, temperature, data, conclusion, anomalous result, properties, wood, metal, plastic, lifespan

Claremont Primary and Nursery School Science Curriculum

Year 5: How do humans change as they get older?

NC link: Animals including Humans

Objectives:

- Explain the human life cycle
- Explain how babies grow and develop into children
- Describe and explain the main changes that occur during puberty
- Identify the changes that take place in late adulthood
- Describe and explain the gestation periods of mammals
- Describe and explain gestation periods and lifespan

Substantive Knowledge:

- describe the changes as humans develop to old age.

Disciplinary knowledge (Think like a scientist):

- 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
- using test results to make predictions to set up further comparative and fair tests
- 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.

Key Vocabulary:

Adolescent, baby, foetus, elderly adult, adult, life cycle, milestone, baby, toddler, child, womb, period, reproduce, puberty, hormone, life expectancy, gestation, mammal, offspring, correlation, anomaly,

Claremont Primary and Nursery School Science Curriculum

Year 5: What are the different stages of life?

NC link: Animals including Humans

Objectives:

- Explain the life cycle of a mammal
- Explain the life cycle of an amphibian
- Explain the life cycle of an insect
- Explain the life cycle of a bird

Substantive Knowledge:

- describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird

Disciplinary knowledge (Think like a scientist):

- Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas' (non-statutory).
- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- 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 a degree of trust in results, in oral and written forms such as displays and other presentations.

Key Vocabulary:

Monotreme, offspring, mammary gland, mammal, amphibian, frogspawn, tadpole, froglet, metamorphosis, larva, pupa, chrysalis, insect, bird's egg, hatchling, nestling, fledgling, adult bird,

Claremont Primary and Nursery School Science Curriculum

Year 5: How do living things reproduce?

NC link: ?

Objectives:

- Explain the sexual reproduction in mammals
- Identify and explain the reproductive parts in plants
- Explain the process of pollination
- Explain asexual reproduction in plants
- Investigate how plants are cloned
- Discuss and interpret our findings from the plant cloning investigation

Substantive Knowledge:

- Describe the life process of reproduction in some plants and animals.

Disciplinary knowledge (Think like a scientist):

- Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas (non-statutory).
- Recording data and results of increasing complexity, using scientific diagrams and labels, classification keys, tables, scatter graphs, bar charts and line graphs.
- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a 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.
- 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.
- Using test results to make predictions to set up further comparative and fair tests

Key Vocabulary:

Fertilisation, embryo, sperm cells, egg cells, sexual reproduction, anther, filament, ovule, stigma, style, ovary, pollen, stamen, pistil, pollination, fertilisation, clone, runner, tuber, bulb, asexual reproduction, independent variable, dependent variable, controlled variables, cutting, parent plant, compose, asexual reproduction

Claremont Primary and Nursery School Science Curriculum

Year 5: How can materials be changed reversibly or irreversibly?

NC link: Properties and changes of materials

Objectives:

- Explain the process of dissolving
- Explain how to separate materials by filtering and sieving
- Explain solutions and the process of evaporation
- Explain reversible changes
- Explain irreversible changes by burning
- Explain irreversible changes by acid

Substantive Knowledge:

- 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
- know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- demonstrate that dissolving, mixing and changes of state are reversible changes
- 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.

Disciplinary knowledge (Think like a scientist):

- 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
- using test results to make predictions to set up further comparative and fair tests
- 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.

Key Vocabulary:

Dissolve, soluble, insoluble, solution, substance, sieve, filter paper, mixture, filtering, mixture, states of matter, reverse, reversible change, irreversible change, chemical reaction, burning, heating, vinegar, bicarbonate of soda