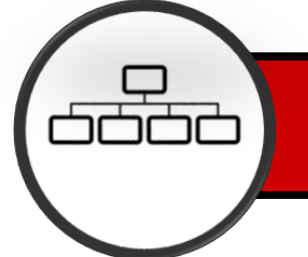


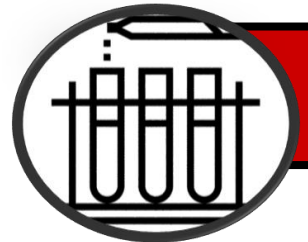
Science Concepts at GJA



Observation



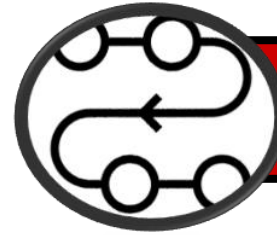
Grouping and Classifying



Investigation



Explore



Processes



Research



Data



Concept: Observation

How children's understanding of observation develops

Year 3

Pupils will observe and develop their knowledge in the following:
How magnets attract or repel each other and attract some materials and not others.
They will identify rocks around the school and report their findings.
Observe how water is transported in plants, for example, by placing cut, white carnations into coloured water and observe how water travels up the stem to the flowers.
Observe the requirements of plants for life and growth (air, light, water and nutrients from soil).
Observe a real flower and learn the names of different parts of a flower and their function.
Observe different types of seeds to understand the different ways in which seeds disperse.

Year 4

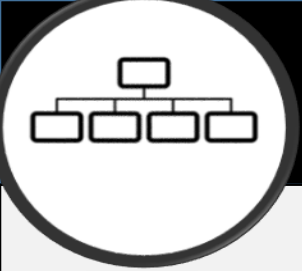
Pupils will observe and develop their knowledge in the following:
They will recognise some common conductors and insulators, and associate metals as good conductors.
Observe how sounds get fainter as the distance from the sound source increases.
Observe how some materials change state when they are heated or cooled.
Make systematic observations to describe the functions of the digestive system.

Year 5

Pupils will observe and develop their knowledge in the following:
How mixtures might be separated, by filtering, sieving and evaporating.
Water resistance by making and testing boats of different shapes.
The effect that gravity has on objects.

Year 6

Pupils will observe and develop their knowledge in the following:
Local animals and how they are adapted to their environment.
Classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals).
Observe and explain the effects of differing voltages in a circuit



Concept: Grouping and Classifying

How children's understanding of grouping and classifying develops

Year 3

Pupils will develop their knowledge about:

Contact and non-contact forces acting on objects.

Comparing and grouping together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials.

Comparing and grouping together different kinds of rocks on the basis of their appearance and simple physical properties.

Exploring different soils and identify similarities and differences between them.

Grouping animals with and without skeletons (vertebrates and invertebrates).

Grouping and classify the animals according to their diet.

Identifying and comparing different types of food according to their nutritional values.

Year 4

Pupils will develop their knowledge about:

Identifying common electrical appliances based on whether they use mains or battery power.

Comparing and grouping materials together, according to whether they are solids, liquids or gases.

Identifying the different types of human teeth and their functions.

Year 5

Pupils will develop their knowledge about:

Comparing and grouping together everyday materials on the basis of their properties.

Comparing the time of day at different places on the Earth.

Comparing the life cycles of a mammal, an amphibian, an insect and a bird.

Comparing the life expectancy of different animals, including humans.

Year 6

Pupils will develop their knowledge about:

Comparing how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels.

Classifying living things into groups.



Concept: Investigation

How children's understanding of investigation develops

Year 3

Pupils will develop their knowledge in investigation through fair tests by investigating:

How things move on different surfaces.

What happens when rocks are rubbed together or what changes occur when they are in water.

The way in which water is transported within a plant.

The amount of sugar in different drinks.

Patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.

What happens when light reflects off a mirror or other reflective surfaces.

Shadows, to find out how they are formed and what might cause the shadows to change.

Year 4

Pupils will develop their knowledge in investigation through fair tests by investigating:

Whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete circuit with a battery.

Patterns between the pitch of a sound and features of the object that produced it.

How water evaporates.

The effect of temperature on washing, drying or melting.

The simple functions of the basic organs associated with the human digestive system using systematic observation.

Year 5

Pupils will develop their knowledge in investigation through fair tests by investigating:

The time difference of day at different locations on Earth

Creating a simple model of the solar system

Constructing simple shadow clocks and sundials.

Investigate the link between the height and the shoe size of the children.

Year 6

Pupils will develop on their knowledge that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. Pupils will develop their knowledge in investigation by investigating:

The relationship between light sources, objects and shadows by using shadow puppets.



Concept: Explore

How children's understanding of exploring develops

Year 3

Pupils will explore:

What happens when rocks are rubbed together or what changes occur when they are in water.

The requirements of plants for life and growth (air, light, water, heat).

Why we need muscles to move our body.

What happens when light reflects off a mirror or other reflective surfaces.

Year 4

Pupils will explore simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.

Pupils will explore conductors and insulators of electricity and how water evaporates.

Year 5

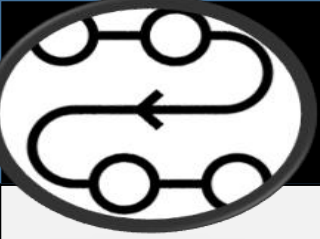
Pupils will explore that dissolving, mixing and changes of state are reversible changes.

They will design and make products that use levers, pulleys, gears and/or springs and explore their effects.

Year 6

Using the idea that light appears to travel in straight lines pupils will design and make a periscope. They will explore how light travels in straight lines from a light source.

Pupils will explore how a prism changes a ray of light to show the spectrum.



Concept: Processes

How children's understanding of processes develops

Year 3

Pupils will predict whether two magnets will attract or repel each other, depending on which poles are facing.
Identify that humans and some other animals have skeletons and muscles for support, protection and movement.
Explain the process of pollination and fertilisation.
Understand and order the stages of the life cycle of a flowering plant.

Year 4

Pupils will find patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses.
Identify and observe the processes that cause water to change state.
Construct and interpret a variety of food chains, identifying producers, predators and prey.
Explain the process of digestion in the human digestive system.

Year 5

Pupils will describe the movement of the Earth, and other planets, relative to the Sun in the solar system.
Describe the life process of reproduction in some plants and animals.

Year 6

Investigate the relationship between light sources, objects and shadows by using shadow puppets.
Understand how mirrors reflect light and how they can help us see objects.
Pupils will learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body.



Concept: Research

How children's understanding of research develops

Year 3

Pupils will develop their knowledge about how fossils are formed when things that have lived are trapped within rock.

Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.

Research different food groups and how they keep us healthy and design meals based on what they find out.

Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.

Year 4

Pupils will develop their knowledge and recognise that vibrations from sounds travel through a medium to the ear.

Research the temperature (in degrees Celsius °C) at which some materials change state when they are heated or cooled.

Identify and describe the different stages of the water cycle.

Research how changes to the environment have affected endangered species.

Year 5

Pupils will develop their knowledge about how chemists create new materials, for example, Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton.

Pupils will research how scientists, for example, Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.

Pupils will research about the work of naturalists and animal behaviourists, for example, David Attenborough and Jane Goodall.

Describe Sun, Earth and Moon as spherical

Year 6

Pupils will research about the work and develop their knowledge about palaeontologists such as Mary Anning and how Charles Darwin and Alfred Wallace developed their ideas on evolution.

Know that light comes from a variety of sources.

Recognise that living things have changed over time and that fossils provide information about living things.

Research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.



Concept: Data

How children's understanding of data develops

Year 3	Pupils will collect data on the requirements of plants for life and growth (air, light, water, heat). Look for patterns in data and what happens to shadows when the light source moves or the distance between the light source and the object changes.
Year 4	Pupils will collect data from a simple practical enquiry to explain the functions of human teeth. Use classification keys to group, identify and name a variety of living things in their local and wider environment.
Year 5	Record findings about how primary children grow in height using relevant scientific language, tables and graphs.
Year 6	Pupils will collect data on different activities and their impact on heart rate. They will collect data on the identify the impact of different circuits.