



Cornerstone Academy Trust

Science Overview

2022/23

Year 1:

Pupils explore all three main aspects of science, including Biology, Chemistry and Physics. The balance between the three enable pupils to explore a wide variety of content and grasp a well-rounded understanding of the world around them.

Knowledge

Biology – Animals including Humans

- To identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.
- To identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.
- To identify and name a variety of common animals that are carnivores, herbivores and omnivores.
- Identify and describe the basic structure of a variety of common flowering plants, including trees.
- Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.

Physics – Seasonal Changes

- Observe changes across the four seasons.
- Observe and describe weather associated with the seasons and how day length varies.

Chemistry – Everyday Materials

- Distinguish between an object and the material from which it is made.
- Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock.
- Describe the simple physical properties of a variety of everyday materials.

Working Scientifically

- Ask simple questions and find they can be answered in different ways.
- Use observation to suggest answers to questions.
- Gather and record data to help in answering questions.
- Observation over time.
- Observe closely using a variety of equipment.
- Identify and Classify.

Investigation/Experiments

- Time Capsule to Ancient Egypt Pupils draw and label the sensory organs on their body looking at how Egyptians originally mummified these parts. Which animals would be found in Ancient Egypt?
- What do Polar Bears Eat? Pupils investigate the diet of Polar Bears, and the impact climate change is having on their diet.
- What Material would make the best shield? Pupils test out a variety of materials considering which one would be best suited to protecting them.
- Growing Global Community Project – Growing Vegetables Pupils will learn about how different plants grown in their local area and compare them with plants that grow in schools linked with us in other countries. They will during this experiment with what plants need to grow as well as identifying different plants.
- Growing Global Community Project – Plant Hunt Pupils will learn about how different plants grown in their local area and compare them with plants that grow in schools linked with us in other countries. They will visit a local forested area to find and classify a variety of plants and trees.

Year 2

A wide variety of practical investigations enable pupils to explore scientific content to their maximum potential. Opportunities to work independently and as part of a group help to develop a deeper understanding of the different sciences.

Knowledge

Chemistry – Everyday Materials

- Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.
- Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

Biology – Plants

- Observe and describe how seeds and bulbs grow into mature plants find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.
- Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.

Biology – Living Things and Their Habitats

- Identify and name a variety of plants and animals in their habitats, including micro-habitats.
- Explore and compare the differences between things that are living, dead, and things that have never been alive.

Biology – Animals Including Humans

- Describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene.
- Notice that animals, including humans, have offspring which grow into adults find out about and describe the basic needs of animals, including humans, for survival (water, food, air).
- Identify that most living things live in habitats to which they are suited.
- Describe how different habitats provide for the basic needs of different kinds of animals and plants and how they depend on each other.

- Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different.

Working Scientifically

- Ask simple questions and recognise that they can be answered in different ways.
- Perform simple tests.
- Observe closely, using simple equipment.
- Use their observations and ideas to suggest answers to questions.
- Identify and classify.

Investigation/Experiments

- Float or Sink - Pupils investigate building a floatation device. They develop their knowledge of materials and apply forces on them (squashing, bending etc) to create better floatation devices
- Growing Investigation (Ongoing) - Pupils investigate which of a plants needs is the most important by removing different necessities for each of their test plants.
- Growing Investigation - Pupils investigate which of a plants needs is the most important by removing different necessities for each of their test plants.
- Living to Non-Living Classification - Pupils sort a variety of different objects and stimulus into living and non-living.
- Nature Map - Pupils are given a blank map of the school grounds and identification keys that suit the location. They then populate their map with all the creatures and plants they identify as they journey around the school.
- Woodlice Hunt - Here the pupils become zoologists creating records of the number of woodlice they can find in a variety of different habitats around the school grounds.

Year 3

A wide variety of practical investigations enable pupils to explore scientific content to their maximum potential. Opportunities to work independently and as part of a group help to develop a deeper understanding of the different sciences. Developing on their previous knowledge, pupils begin to link science with historical events in order to better understand them.

Knowledge

Biology – Animals Including Humans

- Identify that animals, including humans, need the right types of and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat.
- Identify that humans and some other animals have skeletons and muscles for support, protection and movement.
- Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.
- Explore the requirements of plants for life and growth (air, light, water, nutrients from soil and room to grow) and how they vary from plant to plant.
- Investigate the way in which water is transported within plants.
- Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

Chemistry – Rocks

- Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.
- Describe in simple terms how fossils are formed when things that have lived are trapped within rock.
- Recognise that soils are made from rocks and organic matter.

Physics – Light

- Recognise that they need light in order to see things and that dark is the absence of light.
- Notice that light is reflected from surfaces.
- Recognise that light from the sun can be dangerous and that there are ways to protect

their eyes.

- Recognise that shadows are formed when the light from a light source is blocked by a solid object.
- Find patterns in the way that the size of shadows change.

Physics – Forces and Magnets

- Compare how things move on different surfaces.
- Notice that some forces need contact between two objects but magnetic forces can act at a distance.
- Observe how magnets attract or repel each other and attract some materials and not others.
- Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials.
- Describe magnets as having two poles.
- Predict whether two magnets will attract or repel each other, depending on which poles are facing.

Working Scientifically

- Use straightforward scientific evidence to answer questions or to support their findings.
- Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.
- Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.
- Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.
- Make systematic and careful observations and where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.
- Identify differences, similarities or changes related to simple scientific ideas and processes.
- Gather, record, classify and present data in a variety of ways to help in answering questions.
- Set up simple practical enquiries, comparative and fair tests.

Investigation/Experiments

- A Healthy Plate - Pupils design and create a healthy plate considering the importance of a balanced diet to do so.
- Building a working Human Hand - Pupils create a working hand using strings and straws to work as the skeleton, ligaments and muscles to grip.
- Chocolate Rocks - Chocolate is used by pupils to show the different processes which create metamorphic, sedimentary and igneous rocks.
- Roots of a Plant - Pupils will examine the root system of a plant by unearthing one and then photographing and labelling key parts.
- Shadow Puppet Theatres - Pupils use their knowledge of Light and Shadow to create shadow puppet theatres.
- Floating Compass - Pupils will use their knowledge of magnetism to create a floating compass that can help them navigate their Eggy Challenge Boat.

Year 4

Pupils are taught about all three areas of science and are able to work independently and as part of a group. Whilst working, they will also use an abundance of resources to further cement their understanding of subjects. The use of videos, articles, images and practical experiments allow for all students to access the lesson successfully.

Knowledge

Biology – Animals including Humans

- Describe the simple functions of the basic parts of the digestive system in humans.
- Identify the different types of teeth in humans and their simple functions.
- Construct and interpret a variety of food chains, identifying producers, predators and prey.

Biology – Living Things and Their Habitats

- Recognise that living things can be grouped in a variety of ways.
- Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.
- Recognise that environments can change and that this can sometimes pose dangers to living things.

Chemistry – States of Matter

- Compare and group materials together, according to whether they are solids, liquids or gases.
- Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C).
- Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

Physics – Electricity

- Identify common appliances that run on electricity.
- Construct a simple series circuit identifying and naming its basic parts and their purposes, including cells, wires, bulbs, switches and buzzers.
- Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.
- Recognise some common conductors and insulators, and associate metals with being good conductors.

Physics – Sound

- Identify how sounds are made, associating some of them with something vibrating.
- Recognise that vibrations from sounds travel through a medium to the ear.
- Find patterns between the pitch of a sound and features of the object that produced it.
- Find patterns between the volume of a sound and strength of the vibrations that produce it.
- Recognise that sounds get fainter as the distance from the sound source increases.

Working Scientifically

- Making accurate observation over time.
- Setting up simple practical enquiries.
- Asking relevant scientific questions and using different enquiries to answer them.
- Using scientific evidence to support their findings.
- Identifying differences, similarities and changes related to simple scientific ideas and processes.
- Record findings using scientific language and diagrams, keys, bar charts and tables.

Investigation/Experiments

- Teeth Damage Investigation - Pupils will observe the effects of a variety of different liquids on the shell of an egg. The enamel mimicking the human tooth.
- Build your own Water Cycle - Pupils will make their own contained water cycle to observe the evaporation, condensation and precipitation process.
- Morse Code Machines - Pupils use their circuitry knowledge to develop morse code machines capable of sending secret messages.
- String Telephones - Pupils are once again challenged to send secret messages – can you send a message more swiftly through solid, liquid or gas?
- Kingfisher Field Study - In this Local Field Study led by the Kingfisher Organisation pupils will be asked to investigate an area of British Wildlife. Here pupils will consider the food chains living locally that are affected by this project title. Here pupils will look at classifying local wildlife and consider the environmental impact change can have on local community.

Year 5

Pupils are taught about all three areas of science and are able to work independently and as part of a group. The use of videos, articles, images and practical experiments allow for all students to access the lesson successfully. Pupils will also use equipment such as telescopes to better understand the learning content.

Knowledge

Physics – Earth & Space

- Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.
- Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.
- Describe the movement of the Moon relative to the Earth.
- Describe the Sun, Earth and Moon as approximately spherical bodies.
- Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.
- Identify the effects of air resistance, water resistance and friction, that act between moving surfaces.

Biology – Animals Including Humans

- Describe the changes as humans develop to old age.
- Use scientific names for major organs of body systems, including the circulatory system and identify these organs in the human body.

Chemistry – Properties and Changes of 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.
- 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.
- Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.

- Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.
- Describe the life process of reproduction in some plants and animals.
- Use keys based on observable external features to help them identify and group living things systematically recognise that feeding relationships exist between plants and animals in a habitat, and describe these relationships, using food chains.

Working Scientifically

- Research, report and present findings in a presentation.
- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- Report and present findings from enquiries, including conclusions.
- Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- Record data in classification keys and using scientific diagrams.
- Use test results to make predictions to set up further comparative and fair tests.

Investigation/Experiments

- Solar System Video Tour - Pupils create a video tour of the solar system, introducing the audience to the planets, moon, and our sun. Astronaut Training Pupils will look at the training regimes undertaken by astronauts and test their own cardiac systems seeing who has the quickest heart rate recovery after a chosen exercise.
- Crater Investigation - Pupils will test how large a crater different objects create and discover whether changing the height of the drop changes the size of the impact.
- Which material makes the best Spacesuit? Pupils test a variety of materials for their strength, waterproof and airtightness, flexibility, and visible qualities to decide which would make the best materials for a spacesuit.
- Dissolving Investigation - Pupils will plan an experiment to test how solids are dissolved into a liquid to become a solution. Pupil led investigation.
- Frog Spawn Investigation - Pupils will look at the life cycle of Frog Spawn and their place in the food chains of a British Pond Ecosystem. Pupils will study the wider ecosystems around them and world ecosystems – comparing them to the ones found in their local environment.

Year 6

Whilst working, they will also use an abundance of resources to further cement their understanding of subjects. The use of videos, articles, images and practical experiments allow for all students to access the lesson successfully. Pupils will also use more advanced technology to develop their understanding.

Knowledge

Physics – Light and Electricity

- Recognise that light appears to travel in straight lines.
- Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.
- Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.
- Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
- Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.
- Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.
- Use recognised symbols when representing a simple circuit in a diagram.

Biology – Evolution and Inheritance

- Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.
- Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.
- Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

Biology – Animals, Including Humans

- Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.
- Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.

Biology – Living Things and Their Habitats

- Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals.
- Give reasons for classifying plants and animals based on specific characteristics.

Working Scientifically

- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- Report and present 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.
- Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where appropriate.
- Identifying scientific evidence that has been used to support or refute ideas or arguments.
- Use test results to set up further experiments.

Investigation/Experiments

- Creating the Scariest Shadow - How can you make the largest shadow by altering the distance of an object from a light source?
- Design a Pressure Switch to catch a burglar - Pupils use their circuit building knowledge to design a pressure switch that will light a buzzer when the circuit is closed.
- Where do Dog Breeds come from - Pupils look at how dogs have been bred to have characteristics to fulfil different roles.
- Sugar Investigation - Pupils investigate how the teachers react to cutting sugar from their diet entirely.
- Darwin's Birds - Pupils investigate the Galapagos Island Finches and devise reasons for why their beaks have developed to be different.