Kessingland CofE Primary Academy

We are Scientists!

Throughout Key Stage 2 we will have the opportunity to gain a broad variety of skills and expand our knowledge through our scientific studies.

During **Year 3** we will develop the following scientific skills and knowledge:

Scientific Enquiry:

- Use different ideas and suggest how to find something out.
- Make and record a prediction before testing.
- Plan a fair test and explain why it was fair.
- Set up a simple fair test to make comparisons.
- Explain why they need to collect information to answer a question.
- Measure using different equipment and units of measure.
- Record their observations in different ways.
- Describe what they have found using scientific language.
- Make accurate measurements using standard units.
- Explain what they have found out and use their measurements to say whether it helps to answer their question.
- Use a range of equipment (including a data-logger) in a simple test.

Materials: Rocks:

- Compare and group together different rocks on the basis of their appearance and simple physical properties.
- Describe and explain how different rocks can be useful to us.
- Describe and explain the differences between sedimentary and igneous rocks, considering the way they are formed.
- 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.

Biology: Nutrition and the Body (Animals and Human):

- Explain the importance of a nutritionally balanced diet.
- Identify that animals, including humans, cannot make their own food: they get nutrition from what they eat.
- Describe and explain the skeletal system of a human.
- Describe and explain the muscular system of a human.

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Biology: Biodiversity - Tree of Life & Mrs. GREN:

- Identify and describe the functions of different parts of flowering plants.
- Explore the requirement of plants for life and growth.
- Explain 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.

Physics: Types of Energy:

- Identify common appliances that run on electricity.
- Recognise that they need light in order to see things.
- Recognise that dark is the absence of light.
- Describe a range of sounds and explain how they are made.
- Associate some sounds with something vibrating.
- Explain what happens to materials when they are heated or cooled.

Physics: Force & Motion:

- Observe that magnetic forces can be transmitted without direct contact.
- Observe how some magnets attract or repel each other.
- Classify which materials are attracted to magnets and which are not.
- Notice that some forces need contact between two objects, but magnetic forces can act at a distance.
- Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet.
- Identify some magnetic materials.
- Describe magnets have having two poles (N & S).
- Predict whether two magnets will attract or repel each other depending on which poles are facing.

Physics: Electricity & Electrical Components – Circuits:

- Identify common appliances that run on electricity.
- Construct a simple series electric circuit.
- Identify and name the basic part in a series circuit, including cells, wires, bulbs, switches and buzzers.

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- Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery.
- Recognise that a switch opens and closes a circuit.
- Associate a switch opening with whether or not a lamp lights in a simple series circuit.
- Recognise some common conductors and insulators.
- Associate metals with being good conductors.

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During **Year 4** we will develop the following scientific skills and knowledge:

Scientific Enquiry:

- Set up a simple fair test to make comparison.
- Plan a fair test and isolate variables, explaining why it was fair and which variables have been isolated.
- Suggest improvements and predictions.
- Decide which information needs to be collected and decide which is the best way for collecting it.
- Use their findings to draw a simple conclusion.
- Take measurements using different equipment and units of measure and record what they have found in a range of ways.
- Make accurate measurements using standard units.
- Explain their findings in different ways.
- Find any patterns in their evidence or measurements.
- Make a prediction based on something they have found out.
- Evaluate what they have found using scientific language, drawings, labelled diagrams, bar charts and tables.
- Use straightforward scientific evidence to answer questions or to support their findings.
- Identify differences, similarities or changes related to simple scientific ideas or processes.

Biology: Cells - Introducing Cells:

- Describe how nutrients, water and oxygen are transported within animals and humans.
- 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.

Biology: Digestive system & Food Chains:

- Identify and name the basic parts of the digestive system in humans.
- Describe the simple functions of the basic parts of the digestive system in humans.
- Identify the simple function of different types of teeth in humans.
- Compare the teeth of herbivores and carnivore.
- Explain what a simple food chain shows.
- Construct and interpret a variety of food chains, identifying producers, predators and prey.

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Physics: Waves & Space - Light:

- Recognise that they need light in order to see things.
- Recognise 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: Waves & Space – Orbits:

- Identify and explain the movement of the Earth and other plants relative to the sun in the solar system.
- Explain how seasons and the associated weather is created.
- Describe and explain 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.
- Explain that unsupported objects fall towards the earth because of the force of gravity acting between the earth and the falling object.

Chemistry: Principles of Chemistry – The language of Chemistry:

- Compare and group materials together, according to whether they are solids, liquids or gases.
- Explain what happens to materials when they are heated or cooled.
- Measure or research the temperature at which different materials change state in degrees Celsius.

Biology: Biodiversity - Tree of Life & Mrs. GREN:

- Recognise that living things can be grouped in a variety of ways.
- Explore and use a classification key to group, identify and name a variety of living things.
- Compare the classification of common plants and animals to living things found in other places.
- Recognise that environments can change and this can sometimes pose a danger to living things.

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During **Year 5** we will develop the following scientific skills and knowledge:

Scientific Enquiry:

- Plan and carry out a scientific enquiry to answer questions, including recognising and controlling variables where necessary.
- Make a prediction with reasons.
- Use test results to make predictions to set up comparative and fair tests.
- Present a report of their findings through writing, display and presentation.
- Take measurements using a range of scientific equipment with increasing accuracy and precision.
- Take repeat readings when appropriate.
- Record more complex data and results using scientific diagrams, labels, classification keys, tables, scatter graphs, bar and line graphs.
- Report and present findings from enquiries through written explanations and conclusions.
- Use a graph to answer scientific questions.

Chemistry: Principles of Chemistry - States of Matter:

- Compare and group materials together, according to whether they are solids, liquids or gases.
- Explain what happens to materials when they are heated or cooled.
- Measure or research the temperature at which different materials change state in degrees Celsius.
- Use measurements to explain changes to the state of water.
- Identify the part that evaporation and condensation has in the water cycle.
- Associate the rate of evaporation with temperature.

Physics: Force & Motion:

- 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.
- Compare how things move on different surfaces.
- Observe that magnetic forces can be transmitted without direct contact.
- Observe how some magnets attract or repel each other.
- Classify which materials are attracted to magnets and which are not.
- Notice that some forces need contact between two objects, but magnetic forces can act at a distance.
- Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet.

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- Identify some magnetic materials.
- Describe magnets have having two poles (N & S).
- Predict whether two magnets will attract or repel each other depending on which poles are facing.

Biology: Organ Systems

- Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.
- Identify and name the basic parts of the digestive system in humans.
- Describe the simple functions of the basic parts of the digestive system in humans.
- Describe the work of well know naturalists and animal behaviourists.

Physics: Waves and Space – Sound:

- Describe a range of sounds and explain how they are made.
- Associate some sounds with something vibrating.
- Compare sources of sound and explain how the sounds differ.
- Explain how to change a sound.
- Recognise how vibrations from sound travel through a medium to an ear.
- Find patterns between the pitch of a sound and features of the object that produce it.
- Find patterns between the volume of the sound and the strength of the vibrations that produced it.
- Recognise that sounds get fainter as the distance from the sound source increases.
- Explain how you could change the pitch of a sound.
- Investigate how different materials can affect the pitch and volume of sounds.

Biology: Ecology – Life Cycles:

- Describe the changes as humans develop to old age.
- Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.
- Describe the life cycles of common plants.

Explore Materials: Properties:

- Compare and group to get here very day materials on the basis of their properties, including hardness, solubility, transparency,

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conductivity, and response to magnets. • Explain how some materials dissolve in liquid to form a solution. • Describe how to recover a substance from a solution. • Use their knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving, evaporating. • Give reasons, based on evidence for comparative and fair tests for the particular uses of everyday materials, including metals wood and plastic. • Describe changes using scientific words. • 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. • Use the terms 'reversible' and 'irreversible'.

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During **Year 6**, the children will develop the following scientific skills and knowledge:

Scientific Enquiry:

- Explore different ways to test an idea, choose the best way, and give reasons.
- Vary one factor whilst keeping the others the same in an experiment.
- Plan and carry out an investigation by controlling variables fairly and accurately.
- Make a prediction with reasons.
- Use information to help make a prediction.
- Use test results to make further predictions and set up further comparative tests.
- Explain, in simple terms, a scientific idea and what evidence supports it.
- Present a report of their findings through writing, display and presentation.
- Explain why they have chosen specific equipment.
- Decide which units of measurement they need to use.
- Explain why a measurement needs to be repeated.
- Record their measurements in different ways.
- Take measurements using a range of scientific equipment with increasing accuracy and precision.

Using data:

- Find a pattern from their data and explain what it shows.
- Use a graph to answer scientific questions.
- Link what they have found out to other science.
- Suggest how to improve their work and say why they think this.
- Record more complex data and results using scientific diagrams, classification keys, tables, bar charts, line graphs and models.
- Report findings from investigations through written explanations and conclusions.
- Identify scientific evidence that has been used to support to refute ideas or arguments.
- 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.

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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.
- Give reasons why offspring are not identical to each other or to their parents.
- Explain the process of evolution and describe the evidence for this.
- Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

Animals and 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.
- Describe the ways in which nutrients and water and transported within animals, including humans.

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.

Electricity:

- Identify and name the basic parts of a simple electric series circuit.
- Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers, the on/off position of switches.
- Use recognised symbols when representing a simple circuit in a diagram.

Light:

- 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 object s 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.

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