Science

Skills

Observe carefully in order to gather data.

Phase 2

Year 2, Year 3

Examine objects for specific attributes (with specific objectives - e.g. is it watertight?)

Observe and record changes over time (sequence of a decaying plant).

Examine objects for specific properties and investigate their changing states (e.g. How does water change when it is frozen?)

Record data using a variety of strategies (e.g. flow charts, picture sequencing, key words and labelled diagrams)

Take relevant observations and use standard measuring equipment for quantities e.g. temperature, volume.

Record data orally, in pictures and/or in written words or sentences

Use a variety of instruments and tools to measure data accurately.

Phase 2

Year 2, Year 3

Use appropriate scientific tools during structured scientific investigations.

Use standard units for measurement and record in variety of ways.

Make comparisons of measurement between mass, weight, temperature and time.

Select and safely use tools and equipment to extend the sense for observation.

Select and safely use tools and equipment to observe and measure -Range of materials or object chosen by students to suit investigations e.g. 3 to 4 parachutes

Intervals may use non-standard units e.g. coarse, medium, fine

Use various measuring devices appropriately with some teacher guidance.

Use scientific vocabulary to explain their observations and experiences.

Phase 2

Year 2, Year 3

Discuss in small group situations what is observed with specific scientific vocabulary (e.g. This material is translucent and allows light to pass through).

Name and describe several attributes of an object and events in the context of a specific scientific investigation. (e.g. when I exercise my heart beats faster and I burn more energy).

Students talk about what is happening in a scientific investigation using teacher modelled scientific vocabulary

Record findings using relevant scientific vocabulary.

Students report back and try to explain their observations and findings.

Use scientific vocabulary when planning, recording and explaining findings e.g. dissolving, evaporating, prediction, evidence.

Discuss/describe findings or learning through pictures, simple tables and graphs.

Use evidence to support findings.

Identify or generate a question or problem to be explored.

Phase 2

Year 2, Year 3

Ask their own questions about the scientific inquiry (e.g. What do I need to carry out this investigations)

Use wonderings to build a scientific investigation upon (by identifying a problem suggest next steps)

Discuss scientific ideas and ask questions.

Ask questions related to the specific topic that lead to further scientific inquiry

Recall teacher led scientific investigations

Use scientific ideas to pose problems

Plan and carry out systematic investigations, manipulating variables as necessary.

Phase 2

Year 2, Year 3

Identify variables within a scientific investigation.

Identify and think of ways to solve problems during scientific investigations.

Recognize ways scientific experiments can be unfair.

Use appropriate methods to collect information from a scientific investigation.

Recognize ways scientific experiments can be unfair.

Plan the main steps of an investigation, building fair testing elements into the plans (with support).

Suggest observations and measurements required.

Recognize the variables within a fair test with teacher support e.g. measured, keep the same, change.

Make and test predictions.

Phase 2

Year 2, Year 3

Identify similarities and differences in a range of contexts using scientific vocabulary (e.g. properties: rough/smooth; hot/cold).

Make an informed prediction with explanations based on observations during scientific investigations.

Propose simple theories to test out during scientific investigations.

Discuss and describe similarities and differences in a range of contexts using scientific vocabulary (e.g. properties: rough/smooth; hot/cold).

Predict outcomes of investigations using their personal experiences.

Propose simple hypothesis to test out during scientific investigations.

Interpret and evaluate data gathered in order to draw conclusions.

Phase 2

Year 2, Year 3

Recognise repeated patterns in teacher-directed experiments (e.g. all types of elastic are stretchy).

Compare results by observing another's investigation and offer explanations (e.g. my cup held water because it is made of glass, my cup didn't because it is made of cardboard).

Identify where to go next.

Identify patterns in the data and summarize the data

Draw a simple conclusion on the basis of observations

Locate information from simple charts and graphs -Describe observations in detail and provide explanations for them

Make a simple evaluation of the investigation

Develop ability to make simple judgements based on a given criteria.

Compare and classify using given criteria (begins to suggest criteria for comparisons).

Consider scientific models and applications of these models (including their limitations).

Phase 2

Year 2, Year 3

Discuss and demonstrate their understanding using concrete examples and drawings and flow charts.

Draw conclusions and with teacher support and apply new scientific understandings to the current context (e.g. All living things need food, If I don't eat I will die because I'm a living thing).

Recount steps in a scientific investigation using labelled diagrams.

Recognise the difficulties encountered. With support, suggests how the inquiry might be improved.

Present steps in and results of an experimental procedure orally and in charts, graphs or diagrams and/or sentences.

Use simple tables and graphs to record observations and results of experiments.

Can use pictures, labels, sentences, observational drawings and tallies.

Conceptual Understandings

EARTH AND SPACE

Phase 2

Year 2, Year 3

Weather, Seasons & Cycles

Short-term weather conditions (e.g., temperature, rain, snow) can change daily, and weather patterns change over the seasons. (M)

Water can be a liquid or a solid and can be made to change from one form to the other, but the amount of water stays the same. (M)

Form of the Universe and Earth’s place in it

The Sun and Moon have basic patterns (e.g., the Sun appears every day and the Moon appears sometimes at night and sometimes during the day; the Sun and Moon appear to move from east to west across the sky; the Moon appears to change shape over the course of a month; the Sun's position in the sky changes through the seasons). (M)

The stars are innumerable, unevenly dispersed, and of unequal brightness. (M)

The Earth moves round the Sun taking about a year for one orbit. (H)

The moon orbits the Earth taking about four weeks to complete an orbit. (H)

The Sun, at the centre of the solar system, is the only object in this solar system that is a source of visible light. (H)

Form of Earth

Earth materials consist of solid rocks, soils, liquid water, and the gases of the atmosphere. (M)

The solid material beneath the soil is rock. (H)

Rocks come in many different shapes and sizes (e.g., boulders, pebbles, sand). (M)

Much of the solid surface of the Earth is covered by soil, which is a mixture of pieces of rock of various sizes and the remains of organisms. (H)

Earth's resources, including water, are used in a variety of ways. (A)

FORCES AND ENERGY

Phase 2

Year 2, Year 3

Magnetism

Objects can have an effect on other objects even when they are not in contact with them. (H)

Magnets can be used to make some things move without being touched. (V)

Gravity

When things that are unsupported fall downwards they are being pulled by the attraction of the Earth, which holds all things on the Earth. (H)

Objects near the Earth fall to the ground unless something holds them up. (M)

Forces and motion

When forces acting on an object are not equal and opposite in direction, their resulting effect is to change the object's motion, to speed it up or slow it down. Conversely, things only change their motion if there is a net force acting on them.

How quickly an object's motion is changed depends on the force acting and the object's mass. The greater the mass of an object, the longer it takes to speed it up or slow it down, a property of mass described as inertia. (H)

Forces can be exerted by one object on another through direct contact or from a distance. (A)

Forces cause changes in speed or direction of motion. (V)

Forces cause changes in position and the shape of an object. (M)

Energy

Energy is needed to make things change and in the process of change, energy is transformed from one form to another (H)

An object which transfers energy to something else is called a source of energy. (H)

The Sun supplies heat and light to Earth (M)

Heat can be produced in many ways (e.g., burning, rubbing, mixing substances together) (M)

Energy cannot be created or destroyed. (H)

Energy can be transported by radiation, as sound in air or light in air or a vacuum (H)

Light and sound are produced by a range of sources (light: sun, stars, fire, artificial sources, etc.; sound: musical instruments, vocal cords, a door closing, etc.) and can be sensed (A)

Sound is produced by vibrating objects (M)

Light travels in a straight line until it strikes an object (M)

There are different forms of energy: chemical, kinetic, potential, mechanical, heat, light, sound and magnetic energy (H)

There are different ways of classifying energy: • Kinetic, potential • Heat, light, sound • Mechanical, elastic. magnetic

LIVING THINGS

Phase 2

Year 2, Year 3

Heredity

Living things produce offspring of the same kind, but in many cases offspring are not identical with each other or their parents. (H)

Plants can reproduce in different ways (e.g. cuttings).

Life cycles are different for different organisms. (M)

Form and function of cells and organisms

Living things need water, air, food and a way of getting rid of waste and an environment which stays within a particular range of temperature in order to survive. (H)

Plants and animals have features that help them live in different environments. (M)

Characteristics of living things include movement, respiration, sensitivity, growth, reproduction, excretion, nutrition and death.

Life cycles are different for different organisms. (M)

Cycles and systems

Plants containing chlorophyll can use sunlight to make the food they need and store food that they do not immediately use. (H)

Animals need food they can break down and which comes either directly by eating plants (herbivores) or by eating animals (carnivores), which have eaten plants, or other animals, or both plants and animals (omnivore). (H)

Some source of "energy" is needed for all organisms to stay alive and grow. (V) [Energy]

From food, people obtain energy and materials for body repair and growth. (V) [Energy]

Living things are found almost everywhere in the world and that distinct environments support the life of different types of plants and animals. (M)

Plants and animals have features that help them live in different environments. (M)

Evolution and adaptation

Animals and plants are classified into groups and subgroups according to their similarities. Within groups of animals there are families and different species within these families. (H)

Human activity can impose far-reaching effects on the environment. (H)

Some kinds of organisms that once lived on Earth have completely disappeared (e.g., dinosaurs, trilobites, mammoths, horsetail trees). (M)

MATERIALS AND MATTER

Phase 2

Year 2, Year 3

Materials and matter

Different objects are made up of many different types of materials (e.g., cloth, paper, wood, metal) and have many different observable properties (e.g., color, size, shape, weight). (M)

All the 'stuff' encountered in everyday life, including air, water and different kinds of solid substances, is called material (matter) because it has mass and takes up space. (H)

Things can be done to materials to change some of their properties (e.g., heating, freezing, mixing, cutting, dissolving, bending), but not all materials respond the same way to what is done to them. (M, V)

Different materials can be combined, including by mixing, for a particular purpose. (A)