Science

Scientific Knowledge and Conceptual Understanding: Year 5 Expectations

Please Note: There should be plenty of opportunities throughout the year for children to use the school/local environment to observe and identify a variety of plant and animal life cycles. This could be done through an ongoing/monthly nature journal to observe, record and review a variety of examples over a period of time. The unit on 'Human life cycles' can be linked to PSHEE work on 'Relationships' and the Year 5 Science unit 'Habitats and life cycles' rather than being taught as a separate unit.

Environment - Observing Life cycles

- 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.
  - Name, locate and describe the functions of the main parts of reproductive system of plants (stigma, stamen, petal, sepal, pollen, ovary).

Material Properties – Testing Material Properties

- 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 (advantages and disadvantages).
  - Compare a variety of materials and measure their effectiveness (e.g. hardness, strength, flexibility, solubility, transparency, thermal conductivity, electrical conductivity).

Temperature and Thermal Insulation

- Heat always moves from hot to cold.
- Some materials (insulators) are better at slowing down the movement of heat than others.
- Objects/liquids will warm up or cool down until they reach the temperature of their surroundings.

Material Changes - Reversible changes

- 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.
- Demonstrate that dissolving, mixing and changes of state are reversible changes.
  - Changes can occur when different materials are mixed.
  - Some material changes can be reversed and some cannot.
  - Recognise that dissolving is a reversible change and recognise everyday situations where dissolving occurs.
  - Distinguish between melting and dissolving.
  - Mixtures of solids (of different particle size) can be separated by sieving.
  - Mixtures of solids and liquids can be separated by filtering if the solid is insoluble (un-dissolved).
  - Evaporation helps us separate soluble materials from water.
  - Changes to materials can happen at different rates (factors affecting dissolving, factors affecting evaporation – amount of liquid, temperature, wind speed, etc).
  - Freezing, melting and boiling changes can be reversed (revision from YR4).

Material Changes – Irreversible 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 (producing a gas / fizzing).

Animals - Human Life Cycles

- Describe the changes as humans develop to old age.
  - Animals are alive; they move, feed, grow, use their senses, reproduce, breathe/respire and excrete.

Light and Astronomy – Earth and Space

- Describe the movement of the Earth, and other planets, relative to the Sun and each other in the solar system.
- Describe the movement of the Moon relative to the Earth.
- Describe Sun/Earth/Moon as approximately spherical bodies.
- Use the idea of the Earth's rotation to explain day and night.
  - The Earth spins once around its own axis in 24 hours, giving day and night.
  - The Earth orbits the Sun in one year.
  - We can see the Moon because the Sun's light reflects off it.
  - The Moon orbits the Earth in approximately 28 days and changes to the appearance of the moon are evidence of this.
  - Use the Earth's movement in space to explain the apparent movement of the sun across the sky.
  - The Sun appears to move across the sky from East to West and this causes shadows to change during the day.
  - Changes to shadow length over a day or changes to sunrise and sunset times over a year are evidence supporting the movement of the Earth.

Forces – Effects on Movement

- 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 (causing things to slow down)
- Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.
  - There are different types of forces (push, pull, friction, air resistance, water resistance, magnetic forces, gravity) which have different effects on objects
  - Gravity can act without direct contact between the Earth and an object.
  - Friction, air resistance and water resistance can be useful or unwanted.
  - The effects of friction, air resistance and water resistance can be reduced or increased for a preferred effect.
  - More than one force can act on an object simultaneously (either reinforcing or opposing each other).