



Scientific enquiry and investigation question stems

Formulate questions	What are you wondering? What might change if ...?
Observe	What do you notice? Can you describe what you have noticed? What is the most significant thing you notice?
	What is the same and what is different? How can you compare these?
	Can you see any patterns?
Carry out tests	What kind of change are you expecting to see? How can you create a test to see that change? How can you make sure your test is fair?
	Has anything changed? Can you measure how much has changed? How accurate can you make your measurements?
Record and communicate findings	Can you explain what you have observed? So what? How would you check your findings?



Biology 'big ideas', enquiry questions and substantive vocabulary

- Living things on Earth come in a huge variety of different forms that are all related because they all came from the same starting point 4.5 billion years ago.
- Living things are special collections of matter that make copies of themselves, use energy and grow.
- The different kinds of life, animals, plants and microorganisms, have evolved over millions of generations into different forms in order to survive in the environments in which they live.

<i>What kinds of life are there?</i>	<i>How do living things survive and grow?</i>	<i>What makes life go on?</i>
Is everything on Earth alive? Are all animals and plants totally different? What is a plant? What different ways can we group living things?	How do animals and plants stand up and move? Does everything grow in the same way? What eats what and why? Is all food good for us? How do humans and animals change?	Why do we need to grow old? What do living things inherit from their parents? Why have some animals become extinct?
mammal, fish, bird, reptile, amphibian kingdom, class, species carnivore, herbivore, omnivore skin, fur, hide, feathers, scales biology, zoology, botany vertebrate, invertebrate insect, arthropod, gastropod, micro-organism classification, taxonomy	water, light, temperature, nutrition, transportation skeleton, organs, muscles food chain, energy habitat prey, predator, producer, consumer leaf, root, stem, seed, fruit, flower, petal pollination, dispersal, reproduction canine, incisor, molar digestion, saliva, acid, enzyme circulatory system, heart, valve, blood vessels, veins, arteries respiration, oxygenated, de-oxygenated foetus, embryo, gestation, womb puberty	life cycle fossil inheritance, genetics adaptation, evolution



Chemistry 'big ideas', enquiry questions and substantive vocabulary

- All matter in the universe is made up of tiny building blocks.
- The arrangement, movement and type of the building blocks of matter and the forces that hold them together or push them apart explain all the properties of matter.
- Matter can change if the arrangement of these building blocks changes.

<i>What are things made from?</i>	<i>How can form change?</i>
How do we choose the right materials for a job? Are all materials the same? What different ways can we group materials? How do we use materials to protect and help us?	What are the ways in which water can be formed? What happens when things heat up and cool down? Does everything freeze and boil at the same temperature? Is it possible to separate everything from mixtures?
material, natural, man-made, synthetic wood, plastic, rubber, metal, paper, cardboard, glass, stone, brick, pottery hard, soft, bendy, stretchy, rigid, flexible, pliable absorbent, water-resistant, waterproof, pervious, impervious flammable, non-flammable shiny, dull, reflective, transparent, opaque, translucent chemistry hardness, solubility, concentration, transparency, conductivity, insulation	solid, liquid, gas, state, particles, molecules evaporation, vapour, condensation, droplets temperature, degrees Celsius, freezing, solidifying, cooling, heating, melting, boiling reversible, irreversible sieving, filtering, solution, dissolving



Physics 'big ideas', enquiry questions and substantive vocabulary

- The universe follows unbreakable rules that are all about forces, matter and energy.
- Forces are different kinds of pushes and pulls that act on all the matter that is in the universe.
- Energy, which cannot be created or destroyed, comes in many different forms and tends to move away from objects that have lots of it.

<i>What makes objects move and stop moving?</i>	<i>How does energy make things happen?</i>	<i>How can forces be changed and controlled?</i>
What can magnets do? Can anything fall upwards? Can we slow the movement of an object down or speed it up?	Where does light come from? What is darkness? How do we see? Do we perceive all images the same way? How are sounds made? How do we hear sounds? What makes a range of sounds different from each other? Why can we hear but not see round corners?	How can we use electricity to make a machine work? Does electricity flow easily through all objects? How can we make it easier to make something move?
magnetic force, magnetism, attract, repel, pole push, pull, force gravity, gravitational force, air resistance, water resistance, upthrust, friction balanced forces	light source, natural light, artificial light light, darkness, shadow reflection, mirror, refraction spectrum filament, cornea, retina, pupil, optic nerve, rods, cones sound, vibration, pitch, volume, tone ear drum, cochlea, hammer, anvil, stirrup	electrical circuit, cell, battery, wire, switch, bulb, buzzer, motor, appliance conductor, insulator machine, lever, pulley, gear, mechanics weight, Newtons, mass



Earth science 'big ideas', questions and substantive vocabulary

- The Earth is one of eight planets that orbit the sun.
- The Earth is tilted and spins on its axis leading to day and night, the seasons and the climate.
- The Earth is made up of several layers, including a thin rocky surface which is divided into tectonic plates, and the movement of these plates leads to many geological events.

What is the Earth made from?

Where do rocks come from?
Are all rocks made in the same way?
Is a fossil a rock?
Is soil a type of rock?

Earth's crust, mantle, core, plate, tectonic, fault
igneous, volcanic, eruption, lava, granite, pumice
sedimentary, sandstone, coal, chalk
fossil, fossilisation
metamorphic, slate, marble
permeable, impermeable
soil, soil type, sand, loam, clay, silt
organic, carboniferous, minerals
geology

How does the Earth's position in the solar system dictate its climate and conditions for life?

Why do we have day and night?
Is the weather the same every day?
Why does the moon seem to change shape?
How do we know the Earth is moving?

Sun, sunshine, daylight, darkness, daytime, night-time, dawn, dusk, rotation, axis
Summer, Spring, Autumn, Winter, seasons, tilt
planet, orbit, Moon, satellite, phases of the moon, waxing, waning
astronomy
solar system, galaxy, star, constellation, universe