Chemistry

Investigating materials

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| EYFS | Key knowledge | New Vocabulary |
| 1. Talks about why things happen and how things work. 2. Beginning to be interested in and describe the texture of things. 3. Uses various construction  materials. 4. Beginning to construct, stacking  blocks vertically and horizontally,  making enclosures and creating spaces. 5. Joins construction pieces  together to build and balance. 6. Realises tools can be used for a purpose. |  |  |
| Milestone 1 |  |  |
| 1. Distinguish between objects and what they are made from 2. Identify and name a variety of everyday materials 3. Describe the physical properties of materials 4. Compare and group materials based on their physical properties 5. Find out how the shape of solid objects can be changed 6. Compare and describe the suitability of a variety of materials | Know from observation how to distinguish between materials made of wood, plastic, glass, metal, water, rock  Know that an object is made from/of a material  Know that materials can be hard, soft, strong, weak, absorbent, heavy, light, solid and runny, smooth and rough; these descriptions denote the properties of a material  Know that matter (stuff) is made from tiny building blocks  Know that materials can have useful properties for a given job (including being waterproof, strong, hard, soft, flexible, rigid, light or heavy.)  Know that many types of plastic are waterproof, that steel (a type of metal) is strong, that rock is hard, that cotton wool is soft, that rubber is flexible, that rock is rigid, that polystyrene (a type of plastic) is light and that iron (a type of metal) is heavy,  Know that when objects move across a surface there is friction when they rub against each other and that sometimes this friction is larger or smaller  Know that applying forces to objects can change their shape | absorption, matter, property, wood, plastic, glass, metal, water, rock  brick, paper, cardboard, friction, movement, suitability, surface, stretch, twist, waterproof, flexible, rigid |
| Milestone 2 | | |
| 1. Compare and group rocks based on their physical properties 2. Relate simple physical properties 3. Describe formation of sedimentary fossils 4. Recognise what soils are made from 5. Compare and group materials into solids, liquids and gases 6. Observe changes in materials when heated or cooled 7. Identify the part played by evaporation and condensation in the water cycle | Know that there are three kinds of rocks: igneous, sedimentary and metamorphic  Know that the Earth has a solid crust made up of tectonic plates with molten rock beneath  Know that granite and basalt are types of igneous rock and that igneous rocks form from molten rock below the Earth’s crust  Know that limestone and sandstone are types of sedimentary rock which form when small, weathered fragments of rock or shell settle and stick together, often in layers  Know that marble and slate are types of metamorphic rock which form when rocks in Earth’s crust get squashed and heated in processes such as when tectonic plates press against each other  Know that fossils form when a plant or animal dies and is quickly covered with silt or mud so that it cannot be rotted by microbes or eaten by scavenging animals; in time layers of sediment build, squashing the mud and turning it to stone around the dead plant or animal; the materials in the body are replaced by minerals that flow in water through the rock, leaving a rock in the shape of the animal or plant that was once there  Know that soil is made from tiny particles of rock broken down by the action of weather (weathering)  Know that things are composed of a material in one of three states of matter: solid, liquid or gas  Know that things are made of particles (tiny building blocks) and that these are organized differently in different states  Know that materials can change state when temperature changes  Know that there are bonds between the particles (building blocks) in a solid; as temperature increases, these bonds are somewhat overcome as the particles absorb energy and solids can change into liquids; with a further increase in temperature, the particles become even more energetic and the bonds are overcome entirely so the liquid changes into a gas  Know that when solids turn into liquids, this is called melting and that the reverse process is called freezing  Know that when liquids turn into gases, this is called evaporation and that the reverse process is called condensation  Know that the melting point of water is 0o C and that the boiling point of water is 100o C  Know that water flows around our world in a continuous process called the water cycle  Know that, along with evaporation, water on the Earth’s surface moves to the air in which water turns into water vapour (gas) on the surface of leaves on plants  Know that rain condenses in clouds and falls to earth as rain, snow or hail in a process called precipitation  Know that water flows across the land in rivers and streams in a process called surface run-off and under the ground as groundwater | extinction, igneous, metamorphic, sedimentary, palaeontologist, weathering, molten rock, crust, tectonic plates, fossil  condensation, evaporation, reversible, boiling point, melting point, liquid, gas, thermometer, water cycle, continuous precipitation, surface run off process, |
| Milestone 3 | | |
| 1. To compare and group materials 2. To understand how some materials dissolve in liquid to form a solution 3. use knowledge of solids, liquids and gases to separate mixtures 4. to give reasons, based on comparative tests, for the use of everyday materials 5. to demonstrate that dissolving, mixing and changes state are reversible changes 6. to explain how some changes result in the formation of new materials | Know that materials can be sorted in a variety to ways based on their properties  Know that in some solid materials the bonds between particles break when surrounded by a liquid; this allows the liquid to absorb the solid; when this happens, the solid is called a solute, the liquid is called a solvent and the result is a solution; when a solid does dissolve in a liquid it is described as being soluble in that solvent (e.g. sugar in water); when it cannot it is insoluble (e.g. sand in water)  Know that a given amount of solvent can only absorb a certain amount of solid before no more will dissolve; when this happens the liquid is said to be saturated  Know that when a solvent is evaporated from a solution, the original solute is left behind; the remaining solid will often form crystals  Know how to dissolve a solute in a solvent and then how to evaporate the solvent to recover the solute  Know that a reversible change is one that can be reversed and that examples of this are mixing, dissolving and changes of state where no chemical reaction takes place  Know that an irreversible change is one that cannot be reversed and that examples of this often involve a chemical change where a new material is made, often a gas (e.g. burning, boiling an egg, the reaction of bicarbonate of soda and acid)  Know that filtering allows solids and liquids to be separated and that sieving allows solids made up of different sizes parts to be separated  Know how to separate a mixture of sand, salt and small stones by sieving (to remove the small stones), followed by dissolving in water (so the salt is absorbed), followed by filtering to remove the sand from the mixture, followed finally by evaporation of the water to recover the salt.  Know that materials’ different properties can be tested through acting upon them, including testing to find whether materials are magnetic, thermally conductive and electrically conductive; know that the various properties of different materials make them suitable for a given function | irreversible, dissolve, soluble, insoluble, solvent, solute, solution, filter, sieve, saturation, crystallization, thermal, chemistry |