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**Knowledge Rich Curriculum Plan**

SCIENCE- Earths Resources and Atmosphere



| **Lesson/Learning Sequence** | **Intended Knowledge:**  *Students will know that…* | **Prior Knowledge:**  *In order to know this, students need to already know that…* | **Working Scientifically** | **Tiered Vocabulary and Reading Activity** | **Assessment** | **Support** |
| --- | --- | --- | --- | --- | --- | --- |
| ***Earth & Rock Structure*** | *There are 4 parts that make up the earths structure; inner core, outer core, mantle, crust.*  *The outermost layer is the crust which is where we live and where rocks are found. Rocks are made of one or more types of mineral or of fragments of rocks and fossils, and may also include organic remains.*  *The mantle has properties of a solid but can flow slowly like a thick liquid*  *The core is in the centre and contains magnetic metals- Iron & Nickel*  *We are surrounded by a mixture of gases called the atmosphere. The 3 main gases in our atmosphere are Nitrogen (78%), Oxygen (21%), Carbon dioxide (0.04%)*  *A pie chart can be used to show the composition of the atmosphere.*  *Humans need the crust, atmosphere and oceans in order to survive.* | *Different types of rocks have different features and may describe some of these including grains, crystals, fossils.*  *Rocks can be grouped based on their features and simple physical properties*  *Fossils are formed when a dead plant or animal gets trapped in the grains*  *Soil is made from rocks and organic matter*  *Air is a mixture.*  *(FROM GEOGRAPHY)*  *The Earth has four main layers - the inner core, the outer core, the mantle and the crust. The inner core is 5,500°C - extremely hot. It is a very dense solid made from iron and nickel. The outer core is 2,000 km thick and is a liquid. The mantle is semi-molten and about 3,000 km thick.* | *Making observations and Classifying*  *LA groups- Designing a model* | *Composition- What something is made up of*  *Fragment- A small part which has broken off something*  *Atmosphere- The gases that surround the earth (or other planets)*  *Fossil- Remains of a dead plant or animal*  *Core- The centre of something*  *Mantle- The layer of the earth between the crust and the core*  *Organic matter- Stuff containing carbon based compounds (Soil)*  *Molten- Liquified by heat* | *Home learning quiz 1*  *End of topic test Summative Assessment 2* | *Knowledge organiser (provided on Teams and in class)*  [*https://www.bbc.co.uk/bitesize/guides/zysbgk7/revision/1*](https://www.bbc.co.uk/bitesize/guides/zysbgk7/revision/1) |
| ***Features of Igneous rock*** | *Igneous rocks are formed from molten rock that has cooled and solidified. Molten rock called magma from beneath the crust, is expelled when a volcano erupts. When the magma cools, igneous rocks form.*  *Igneous rocks contain randomly arranged interlocking crystals. The size of the crystals depends on how quickly the molten magma solidified: magma that cools slowly will form an igneous rock with large crystals (Example Granite) and lava that cools quickly will form an igneous rock with small crystals (Example Obsidian)*  *This means that we get two main types of igneous rock, extrusive (outside) and intrusive (inside)*  *Igneous rocks do not contain fossils as the high temperature would destroy them* | *Igneous rocks come from volcanoes*  *Igneous rocks are hard*  *Igneous rocks have crystals* | *Making observations and Classifying* | ***Magma- hot fluid or semi-fluid material below or within the earth's crust from which lava and other igneous rock is formed on cooling.***  ***Igneous- Igneous rocks are divided into two groups, intrusive or extrusive, depending upon where the molten rock solidifies.***  ***Extrusive- Extrusive rocks are formed on the surface of the Earth from lava, which is magma that has emerged from underground.***  ***Intrusive- . Intrusive rocks are formed from magma that cools and solidifies within the crust of the planet*** | *Home learning quiz 1*  *End of topic test Summative Assessment 2* | *Knowledge organiser (provided on Teams and in class)*  [*https://www.bbc.co.uk/bitesize/guides/zgb9kqt/revision/2*](https://www.bbc.co.uk/bitesize/guides/zgb9kqt/revision/2) |
| ***Features of Sedimentary rocks*** | *Sedimentary rocks are formed from the broken remains of other rocks that become joined together. Sedimentary rocks contain rounded grains in layers. The oldest layers are at the bottom and the youngest layers are at the top.*  *A river carries, or****transports****, pieces of broken rock as it flows along. When the river reaches a lake or the sea, its load of transported rocks settles to the bottom. We say that the rocks are****deposited****. The deposited rocks build up in layers, called sediments. This process is called****sedimentation****.*  *The weight of the sediments on top squashes the sediments at the bottom. This is called****compaction****. The water is squeezed out from between the pieces of rock and crystals of different salts form. The crystals stick the pieces of rock together. This process is called****cementation****.*  *The order of these events is:*  *transport → deposition → sedimentation → compaction → cementation*  *It may take millions of years for sedimentary rocks to form.*  *Examples- Chalk, Limestone, Shale, Sandstone* | *Sedimentary rocks have layers and sometimes contain fossils.*  *Sedimentary rocks are made of grains squashed together* |  | ***Sediment***  *Grains that settle at the bottom of a liquid*  ***Transportation***  *Moved from one place to another*  ***Deposition***  *The laying down of sediment in a certain place*  ***Cementation***  *Sediment sticking together* | *Home learning quiz 1*  *End of topic test Summative Assessment 2* | *Knowledge organiser (provided on Teams and in class)*  [*https://www.bbc.co.uk/bitesize/guides/zgb9kqt/revision/2*](https://www.bbc.co.uk/bitesize/guides/zgb9kqt/revision/2) |
| ***Acid Rain Investigation*** | *Limestone is a sedimentary rock that is principally composted of the mineral Calcium Carbonate.*  *Acid rain forms when carbon dioxide or sulphur oxides or nitrous oxides (from cars and factories emissions) dissolve in the water vapour in the air to produce acid (Carbonic acid, sulphuric acid or nitric acid)*  *When acid rain comes into contact with limestone containing calcium chloride, a chemical reaction happens. New soluble substances are formed which are washed away. This is called chemical weathering. Acid rain harms fish and trees, but it also makes chemical weathering happen more quickly. Buildings and statues made from rock are damaged as a result.*  *The equation is:*  ***Calcium Carbonate + Sulphuric Acid🡪 Calcium Sulphate + Carbon Dioxide + Water***  *We can investigate the effect of acid rain on rocks using acids in the lab. (Practical Investigation- The effect of increasing concentration of acid rain on rocks) Measure the volume of carbon dioxide produced.* | *Students will know the features of igneous and sedimentary rocks..* | *Make a prediction using scientific knowledge & understanding*  *Identifying independent, dependent and control variables*  *Use apparatus and carry out techniques safely*  *Make and record observations*  *Interpret observations and draw conclusions* | ***Reactants***  *Substances that enter into and are altered in the course of a chemical reaction.*  ***Products***  *The substances formed after the chemical reaction has taken place*  ***Weathering***  *The breaking down of rocks and minerals on the surface of the Earth*  ***Concentration***  *The concentration of a solution is a measure of how 'crowded' the solute particles are. The more concentrated the solution, the more particles it contains in a given volume (the strength of the solution).* | *Home learning quiz 2*  *End of topic test Summative Assessment 2* | *Knowledge organiser (provided on Teams and in class)*  [*https://www.bbc.co.uk/bitesize/guides/z6xbkqt/revision/3*](https://www.bbc.co.uk/bitesize/guides/z6xbkqt/revision/3) |
| ***Features of Metamorphic rocks and the rock cycle*** | *Metamorphic rocks are formed from other rocks that are changed due to heat and pressure.*  *Marble is a metamorphic rock formed from limestone and slate is formed from mudstone*  *Metamorphic rocks contain interlocking grains making them non-porous and layers are visible.*  *Metamorphic rocks rarely contain fossils because any that were originally present in the sedimentary rock would be destroyed by the heat and pressure.*  *Rocks are gradually recycled over millions of years- this is the rock cycle.*  *The main stages in the rock cycle are:*  *Igneous rock is weathered. The fragments of sediment collect at the bottom or rivers. Over time they are compacted to form sedimentary rocks. When these are pushed down into the earth, the grains become squashed and slightly melted from extreme heat and pressure. If squashed down far enough these can melt to become molten rock (magma) Igneous rocks form when this magma cools and the cycle begins again.* | *Students will know the formation of igneous and sedimentary rocks.* |  | *Metamorphosed – Changed into a different physical form*  *Interlocking- Having parts that overlap/ fit together*  ***Molten- Liquified by extreme heat***  ***Melting- The process of changing state*** | *Home learning quiz 2*  *End of topic test Summative Assessment 2* | *Knowledge organiser (provided on Teams and in class)*  [*https://www.bbc.co.uk/bitesize/guides/zgb9kqt/revision/2*](https://www.bbc.co.uk/bitesize/guides/zgb9kqt/revision/2) |
| ***Weathering*** | *Define weathering to be the wearing away of rocks and erosion to be the movement of broken pieces away from the site of weathering by water, ice or wind. The two types of mechanical weathering are freeze-thawing and exfoliation. Freeze-thawing involves the rain entering the cracks in the rocks, the rain then freezes which pushes the rock further apart. Eventually, the rock completely breaks apart. Exfoliation involves the heating of a rock on a hot day, which causes the outer layer to expand. When the rock cools down, it contacts again, causing small pieces of rock to flake off. Biological weathering involves tree roots growing thick and strong underground which make their way into the cracks in a rock and can force it to break. Chemical weathering involves the reaction of acidic rainwater with limestone, chalk or marble.* | *Some students may be able to recall seeing weathering on buildings, without knowing why this occurs.* | *Evaluation of weathering techniques.* | *Weathering: the wearing away of rocks.*  *Erosion: the movement of broken pieces away from the site of weathering.* | *Home learning quiz 2*  *End of topic test Summative Assessment 2* | *Knowledge organiser (provided on Teams and in class)*  [*https://www.bbc.co.uk/bitesize/guides/zwd2mp3/revision/3*](https://www.bbc.co.uk/bitesize/guides/zwd2mp3/revision/3) |
| ***Greenhouse Effect and Global Warming*** | *Carbon dioxide, Water vapour and methane are examples of greenhouse gases. Greenhouse gases are helpful in maintaining a temperature of Earth warm enough to support life. But there are draw backs such as, extreme weather conditions, ice caps melting and loss of habitats. The greenhouse gas effect is a natural process, the sun radiates short wave UV radiation, the surface of the Earth absorbs some radiation and rest is deflected back out into space as long wave radiation. The presence of greenhouse gases means that some of the deflected radiation gets trap inside the Earth’s atmosphere leading to a raise in global temperature (global warming).*  *Human activity is causing the increase in climate change. These include farming cattle for food- production of methane, deforestation, burning fossil fuels. The effects of climate change are; coral reefs being eradicated; species extinction and rising sea levels results in less areas to inhabit.* | *A greenhouse is used to grow plants and traps heat energy from the sun helping the plants to grow*  *Global warming is causing ice caps to melt* |  | *Thermal Energy- (Heat) Internal energy within a substance.*  *Greenhouse gases- a gas that contributes to the greenhouse effect by absorbing infrared radiation.*  *Wavelength-  the distance between a point on one wave and the same point on the next wave.*  *Fossil Fuels- coal, oil and natural gas. They were formed from the remains of living organisms millions of years ago.* | *Home learning quiz 2*  *End of topic test Summative Assessment 2* | *Knowledge organiser (provided on Teams and in class)*  [*https://www.bbc.co.uk/bitesize/guides/zxy4xfr/revision/1*](https://www.bbc.co.uk/bitesize/guides/zxy4xfr/revision/1) |
| ***Earth’s Resources and Sustainability*** | *Earth’s resources are important for survival, there is competition for warmth, shelter, food and transport. Some resources, for example fossil fuels, are finite resources which are not been formed fast enough to be considered renewable. Renewable resources are resources that are being formed faster than or at the same rate as they are being used. It is important that Earth’s resources are being preserved for future generations.* | *Know the basic needs of humans for survival are food, shelter, water, temperature, oxygen, space* | *Calculating percentages, comparing values, evaluation of resources* | *Finite- Resources that are being used up faster than they can be replaced. There is a limited amount.*  *Renewable- is an energy resource that is being (or can be) replenished as it is used*  *non-renewable- is an energy resource which is not being replenished as it is being used. It will eventually run out when all reserves have been used up.*  *Sustainable- meeting today's needs and protecting the environment and resources for the future.*  *Supplementing- Adding extra*  *Agriculture- Farming*  *Synthetic- Made using chemicals (not natural)*  *Timber- Wood for building*  *Natural – Exist in nature (not synthetic)* | *Home learning quiz 2*  *End of topic test Summative Assessment 2* | *Knowledge organiser (provided on Teams and in class)*  [*https://www.bbc.co.uk/bitesize/guides/zgqhcj6/revision/1*](https://www.bbc.co.uk/bitesize/guides/zgqhcj6/revision/1) |
| ***Resources and Recycling*** | *Recycling is the process of converting waste into reusable material.* | *Earths resources are limited and need to be used in a sustainable way*  *Reuse- Use more than once*  *Reduce- Use less*  *Recycle- Use then make into something else*  *Plastics can be used more than once*  *Examples of things made from plastic*  *Plastics are polymers*  *Plastic, paper, glass, metal can all be recycled* | *Interpreting data, plotting data and drawing lines of best fit.* | ***Recycling:***  *The action or process of converting waste into reusable material*  ***Irreversible:***  *Not able to be undone or altered.*  ***Biodegradable:***  *Capable of being decomposed by bacteria or other living organisms and thereby avoiding pollution* | *Home learning quiz 2*  *End of topic test Summative Assessment 2* | *Knowledge organiser (provided on Teams and in class)*  [*https://www.bbc.co.uk/bitesize/guides/zgqhcj6/revision/1*](https://www.bbc.co.uk/bitesize/guides/zgqhcj6/revision/1) |