Year 9 Natural Resource Management Knowledge Organiser

**What are natural resources? -** A natural resource is anything people can use which comes from nature. People do not make natural resources, but gather them from the Earth. Examples of natural resources include air, water, trees, plants, soil, sun, wind, crude oil, coal, natural gas and metals such as iron.

**What are the Earth’s spheres? -** All natural resources found on our planet can be found in one of 4 spheres that combine together to make life possible on Earth. These are:

* **Atmosphere** – The thin layer of gases that surrounds the Earth. This includes all the air that we breathe, our weather, clouds, greenhouse gases and heat from the sun.
* **Biosphere** – All living matter on Earth including plants(Flora), animals (Fauna) and people. Resources here include rainforests, crops/food from plants and farming.
* **Lithosphere** – The Earth’s crust including landforms like mountain, soil and rocks. Resources in this sphere include coal, oil, natural gas, different rock types and metals.
* **Hydrosphere** - The water on the surface of the Earth in oceans, seas, lakes, rivers and rain. This includes all water on Earth, with both salt and fresh water.

**What is the difference between renewable and non-renewable resources? -** Renewable resources are naturally replaced and can be used over and over again by us. Non-renewables are the opposite of this. Once we have used a non-renewable resource we cannot reuse it again, and it will run out of supply within our lifetime.

* **Renewable resources** include: air, sunlight, wind and water. Wind, water, sunlight and geothermal heat from the Earth can all be used to create renewable energy. This is important to us today, because these ways of making energy do not produce greenhouse gases such as carbon dioxide. These gases are causing global warming, which is the cause of climate change.
* **Non-renewable resources** include: coal, natural gas, crude oil, soil and rocks. Coal, crude oil and natural gas are what as known as fossil fuels. When these are used to fuel power stations to create energy for us, they are burnt and produce greenhouse gases. Because we have been using these as a fuel source since the industrial revolution in the early 1800s, we have massively increased the amount of carbon dioxide in the atmosphere. This is trapping more heat, causing temperatures around the planet to rise and has led to the climate change we are experiencing today.

**Why do we separate resources into renewable and non-renewable?** - We now know that Earth is very old, in fact we think the planet is 4.6 billion years old. Our planet is made up of rock and metal. These are found in the lithosphere. Over billions of years the spheres that exist on and around the Earth have evolved to produce all of the natural resources that we need today. **Geological timescale** is a measure of how old Earth is according to the age of different rocks.

**What are the different types of rock and how are they used?**

**Igneous -** This is formed from molten (melted) rock after a volcanic eruption. The molten rock cools down over time and this creates large crystals which lock together. Granite and basalt are examples of igneous rock. Igneous rocks are very hard and durable. In the UK, they form in mountainous areas. People use igneous rocks to construct some buildings. Crushed granite is often used to surface roads.

**Sedimentary rocks -** Most of these rocks are formed under the sea. Rock particles are carried by rivers and washed out into the sea. On the sea bed they were buried by newer sediment, squeezed and cemented together over thousands of years. Chalk and limestone are examples of sedimentary rocks. They also include valuable rocks like coal and iron ore.

**Metamorphic rocks -** These rocks form from existing rocks that are changed by lots of heat or pressure. The rock melts and forms new minerals. Marble and slate are examples of metamorphic rocks. For example, the sedimentary rock, mudstone changes into slate.

**What is soil and how is it layered? -** Soil is the upper layer of earth in which plants grow, a dark material made of organic remains of plants and animals, water and different stones/minerals. It can be broken down into the following 5 layers:

**Humus** – This is a layer of organic matter that is about 2-3 cm thick and is made up of dead plant material such as leaves and twigs.

**Topsoil** – This layer is 5-20 cm thick and consists of organic matter and rock minerals. This is where most plants and organisms live in soil.

**Subsoil** – This layer has rock minerals as well as organic matter, which have been washed down by rainwater. It has little humus. Tree roots reach down to this layer.

**Weathered rock** – This layer contains rocks from the lowest layer, weathered and broken into chunks. The upper soil layers have developed from this.

**Bedrock** – This layer is made up of a solid mass of underlying rock. This will change depending on the natural geology of the area.

**What is a biome and what are the different types? -** A biome is a community of plants and animals that have common characteristics for the environment they exist in, such as a rainforest, desert and tundra. They are the largest type of ecosystem and can cover thousands of square kilometres. The biome we have focused on is **tropical rainforests.** These are typically found along the Equator at 0 to 10 degrees latitude and between 23 degrees north and south at the Tropics of Capricorn and Cancer.

**How are tropical rainforests layered?** – Tropical rainforests form into 4 distinct layers –

**Emergent layer** – This is where isolated, very tall trees rise above the canopy at over 50m in height.

**Canopy layer** – Consists of fully grown trees that have grown long, straight and branchless to great heights in competition to reach the sunlight.

**Under canopy layer –** Consists of small trees waiting for their chance to shoot upwards in the canopy layer.

**Shrub layer** – Consists of ferns, shade loving plants and fungi, due to a lack of light.

**What is the hydrosphere and what is water scarcity? -** The hydrosphere is all water available on Earth. Water is our most basic need. It accounts for 71 percent of the Earth’s surface. It exists in 3 states: gas, liquid and solid. Water links the Earth’s system, interconnecting its spheres. It is continuously flowing between the oceans, atmosphere and land, powered by the Sun through the **water cycle**. However, 97% of Earth’s water is saltwater and only 2.5% is **freshwater**. Only 0.013% of Earth’s water is freshwater that is easily accessible to us in rivers and lakes.

In many parts of the world, there is higher demand for water than there is supply. This is called **water scarcity**. The supply of fresh water is not spread evenly around the world. **Physical water scarcity** can be caused by naturally low rainfall, too many people, or overuse of the existing water in that country or region. Some places have enough water but can’t access the water due to high levels of **poverty**. These people can’t afford the technology to pump and pipe water to where they need it the most, which is called **economic water scarcity**.

**What is crude oil and how it is formed? Why is it useful?** – Crude oil formed from the fossils of plants and sea creatures. Between 3-400 million years ago tiny sea plants and animals died and were buried by natural **sediment** movement on the ocean floor. Between 50-100 million years ago, these were covered with even more layers of sediment forming what we now call **sedimentary rock**. Over millions of years the enormous amount of heat and pressure from these layers of rock pressing down on the layer of dead sea plant and animal life eventually turned them into oil and gas. **Crude oil** is the term used to describe the oil extracted from the ground. Once brought to the surface, it is transported by ship or pipeline to an **oil refinery**. Here the crude oil is **processed** and separated into refined oil and other raw materials such as petrol. **Petrochemical** factories also tend to locate next to oil refineries to make oil-based products such as plastics. Oil is used to fuel cars, ships and planes, to generate electricity, produce plastics and crop fertilisers and even clothes.