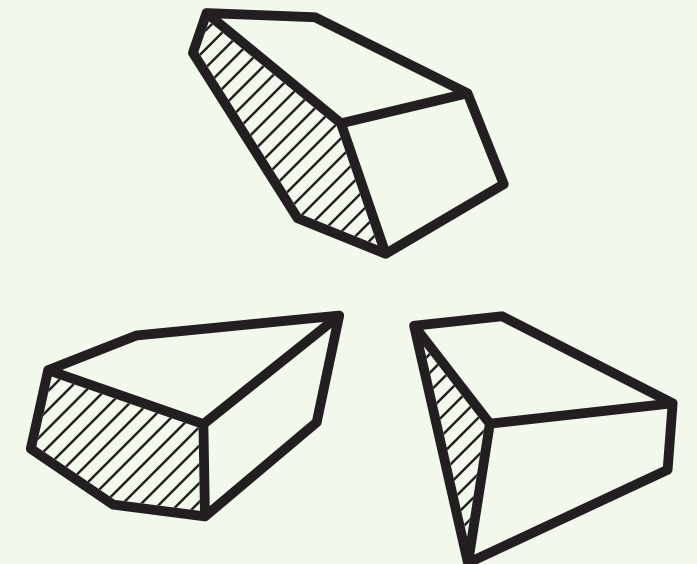
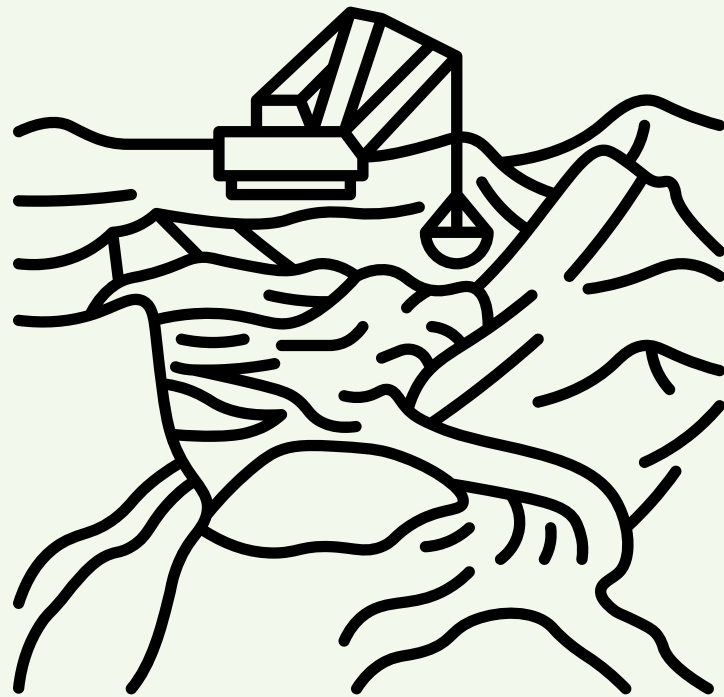


COAL AND PETROLEUM

TOPIC 2: COAL AND PETROLEUM



INTRODUCTION

Have you ever seen a bike/car being filled up with petrol or diesel? If you have, have you wondered why they are filled with petrol, diesel or such kind of fuel? there is a reason behind it. As they are substances made up of hydrocarbons. They are required to fuel a combustible vehicles like a car or a bike. In a gist we will study about this in this chapter. I hope you are ready to learn!!



01

NATURAL RESOURCES



WHAT ARE NATURAL RESOURCES

Natural resources are all the materials that are obtained from nature. Quite Easy right? but there is more to it, natural resources are used for every day tasks, and even powerful tasks like producing thermal energy, etc. All the things are indirectly derived from natural resources, even artificial polymers like nylon, rayon, etc are indirectly derived from natural resources.



Utilization Of Natural Resources

Natural resources are imminent resources for human kind and they should be used with planning. Let's see an example

1. Resources like carbon dioxide from the air. minerals from the soil, and presence of sunlight are utilized in the process of photosynthesis.

Natural resources could be divided into two different types:-

1. Living Natural Resources
2. Non- living natural resources

they both are self explanatory



02

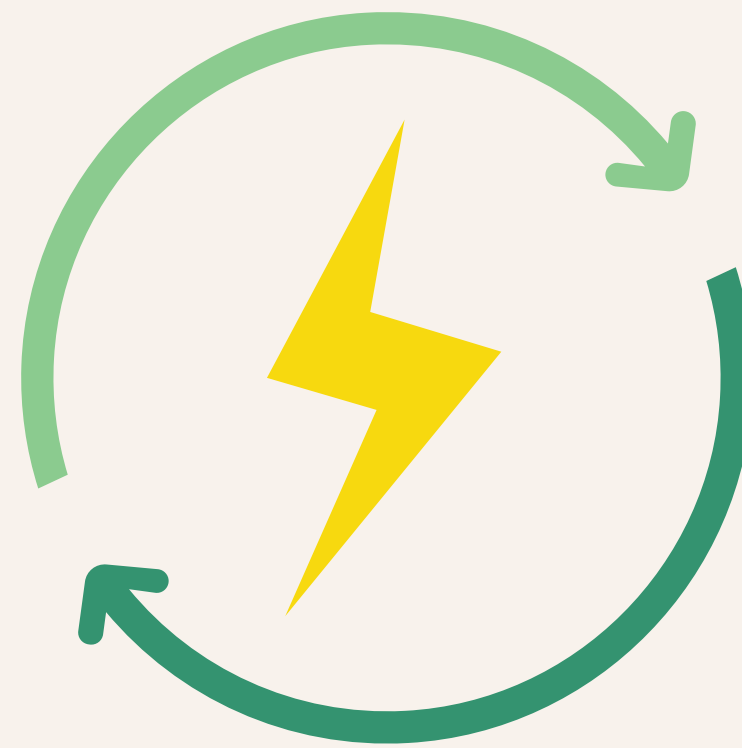
RENEWABLE & NON-RENEWABLE RESOURCES



RENEWABLE RESOURCES

Renewable natural resources are those that regenerate naturally in a relatively short period of time.

Example - Solar Energy, Thermal Energy, Biofuel, Wind Power, Hydal Power etc.

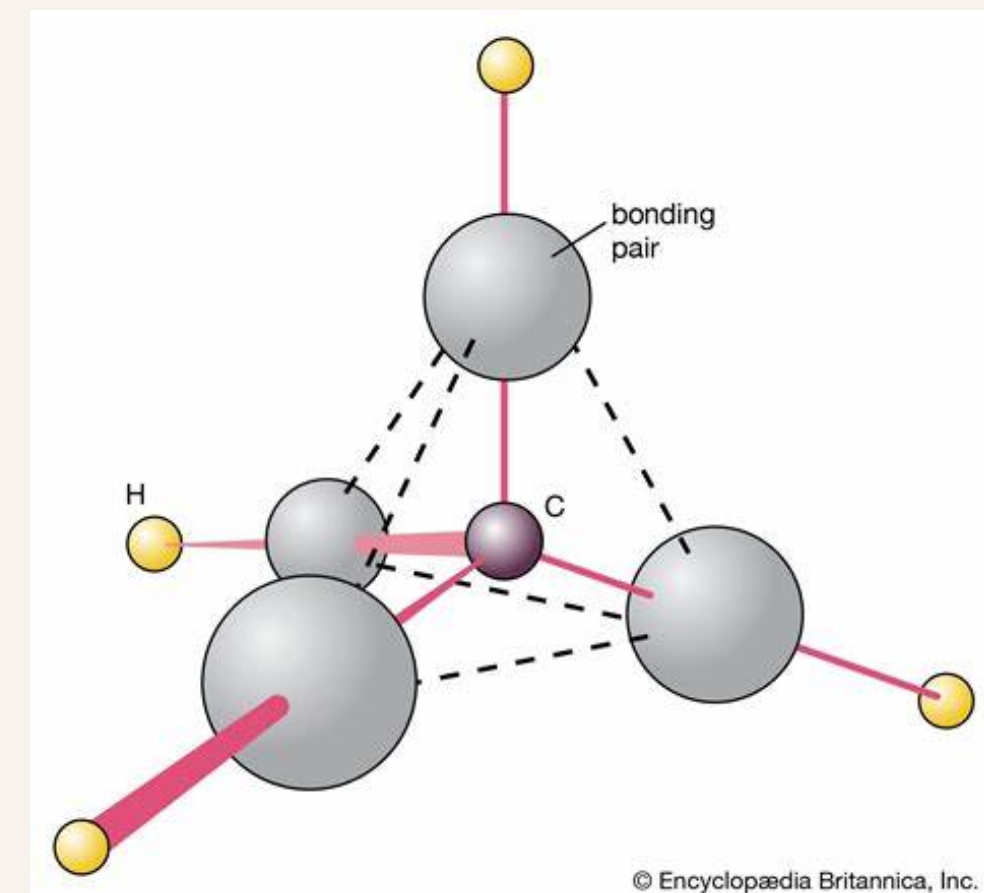


NON-RENEWABLE RESOURCES



Renewable natural resources are those that regenerate naturally in a relatively short period of time.

Example - solar energy, thermal energy, biofuel, wind power.etc.



ACTIVITY 1: SORTING

Materials Needed:

- Two bowls or boxes (labeled "Renewable" and "Non-Renewable")
- Small items or pictures, like:
 - Leaves (for trees)
 - Small rocks (for coal)
 - Toy car (for petroleum)
 - Toy windmill (for wind energy)
 - Battery (for solar energy)



Steps:

1. Set Up:

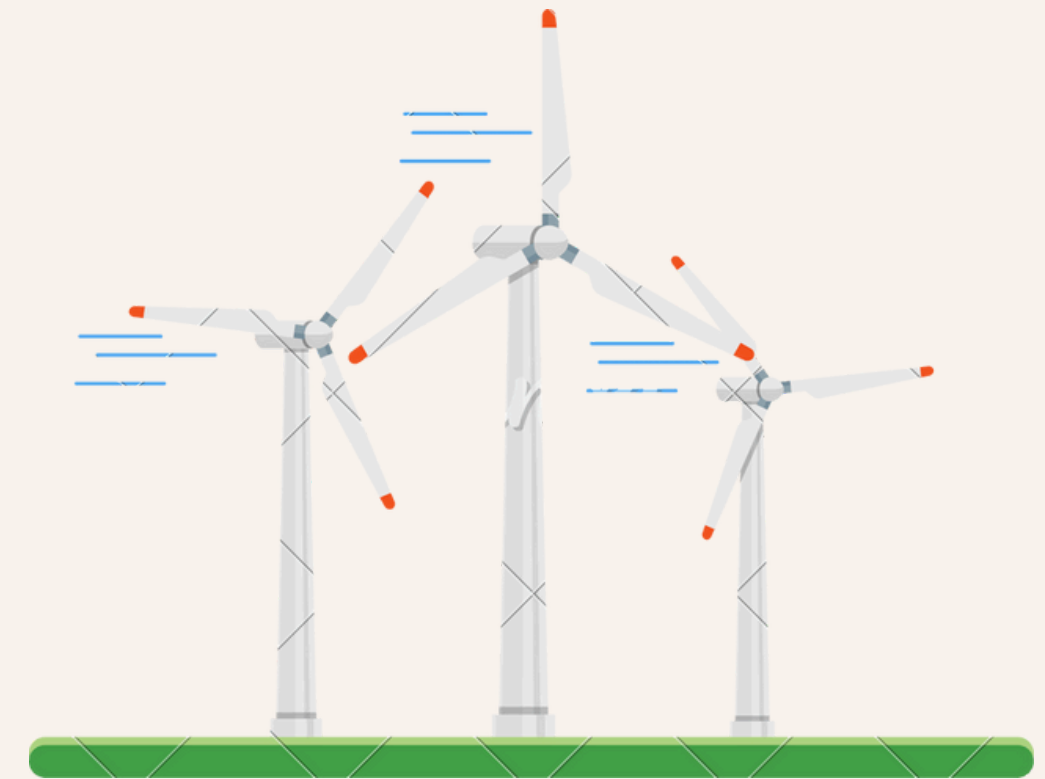
- Place the two labeled bowls on a table.
- Spread out the small items or pictures in front of the children.

2. Activity:

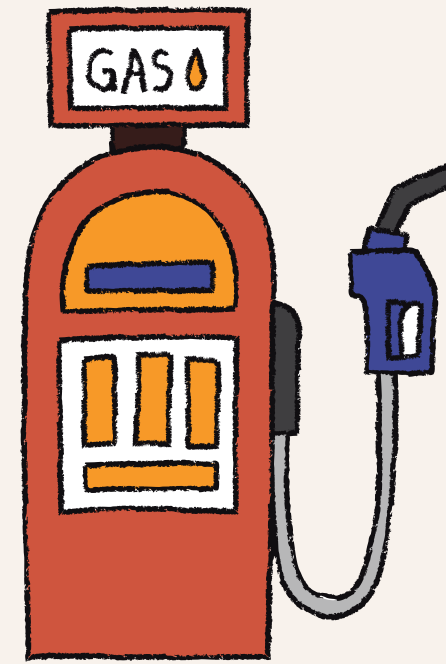
- Ask the children to sort the items into the correct bowls based on whether they think the item is renewable (like wind or solar energy) or non-renewable (like coal or oil).

3. Discussion:

- Go through each bowl and explain why each item is renewable or non-renewable.



03

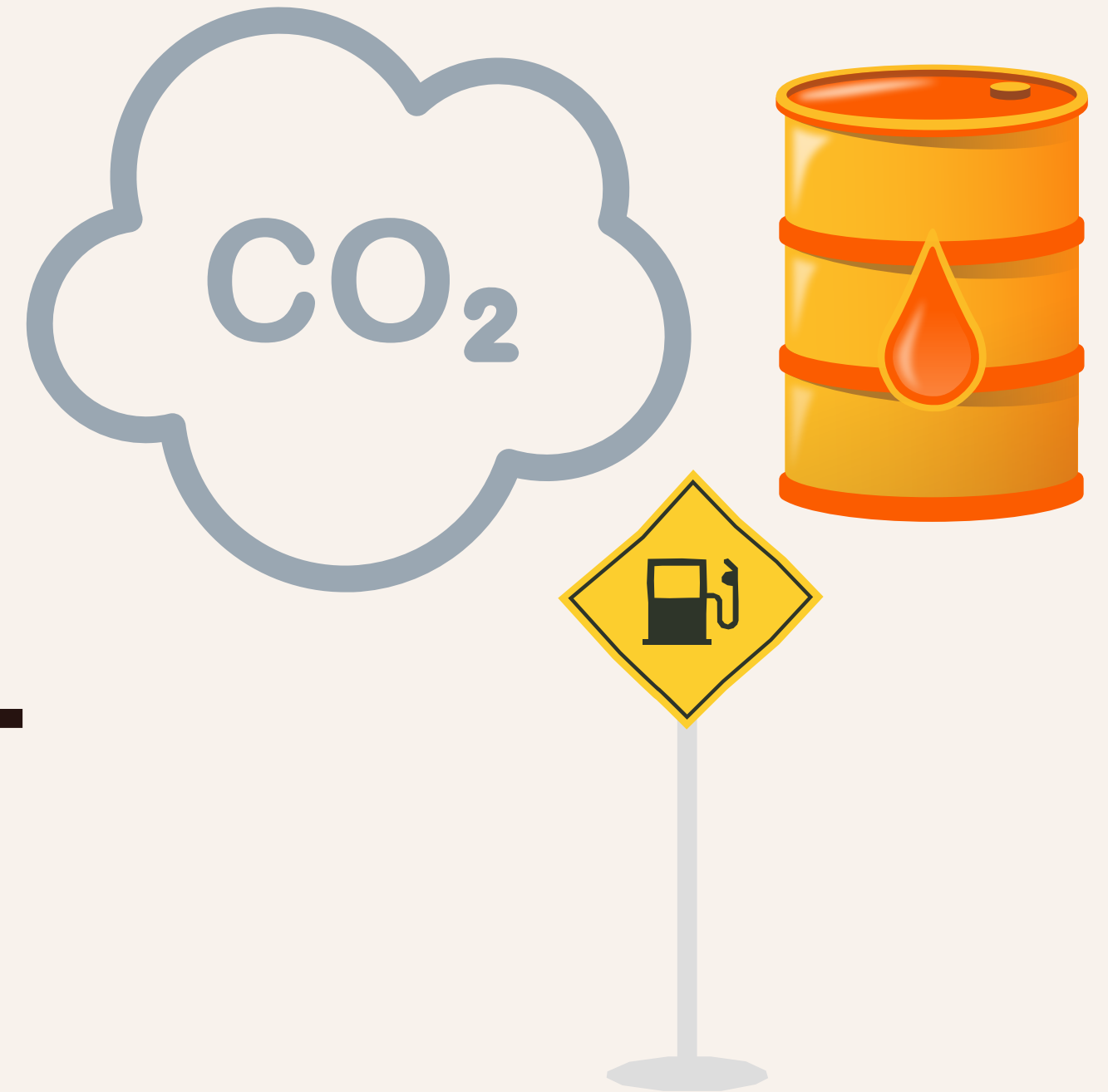


COAL AND PETROLEUM



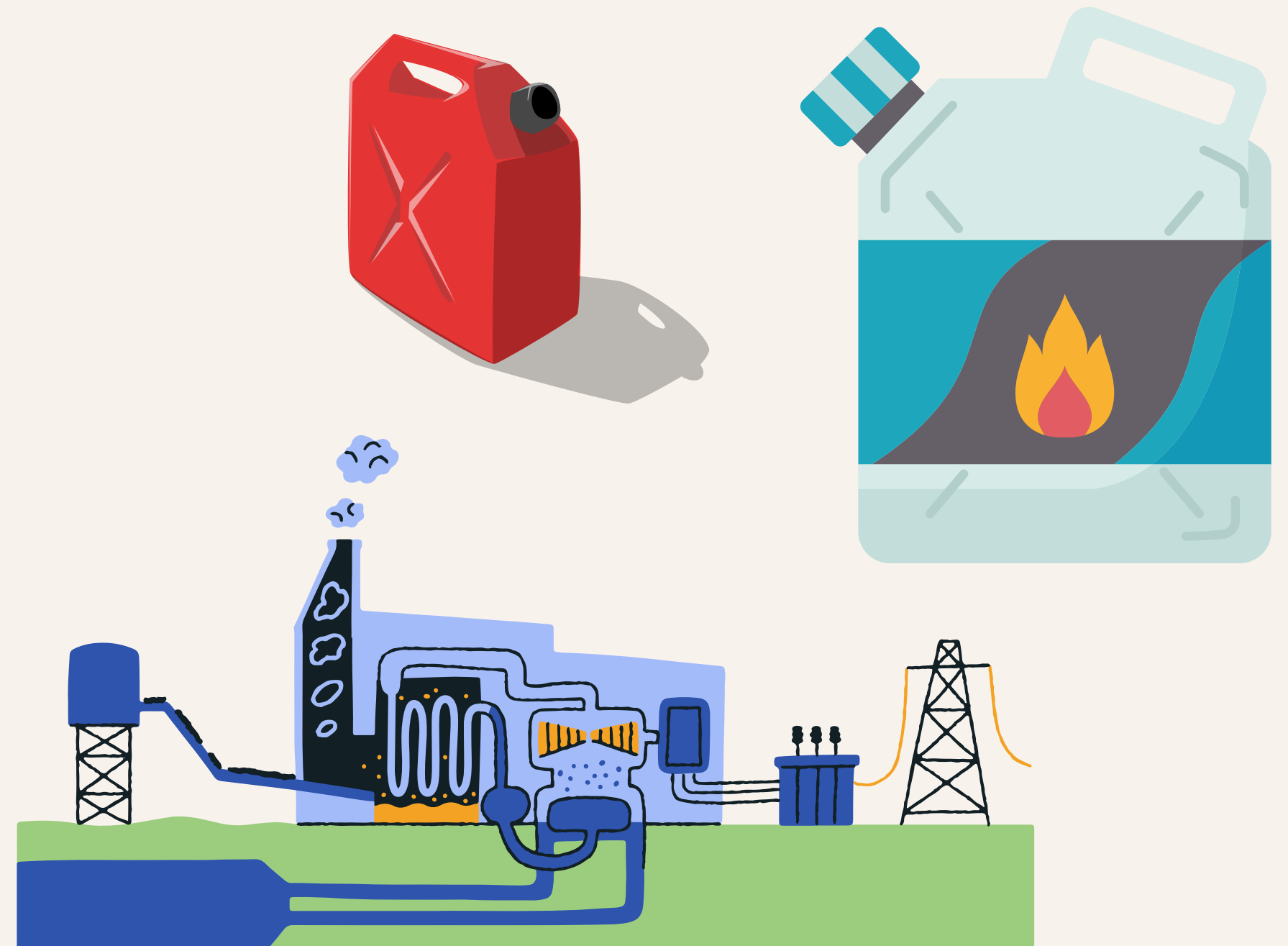
CONTENTS

- 1. FUELS**
- 2. FOSSIL FUELS**
- 3. COAL**
- 4. DISTILLATION OF COAL**
- 5. PETROLEUM**
- 6. NATURAL GAS**



WHAT ARE FUELS?

Have you ever seen petrol being added to a vehicle or a thermal power plant. They both are different but serves the same purpose, producing heat and in thew process generating energy. So we could say that fuel is a substance that can be used to produce heat at a reasonable cost.



ACTIVITY 2:

Materials Needed:

- Crayons or colored pencils
- A large piece of paper or board
- Small objects like pebbles, dry leaves, or small toys (to represent plants and animals)



Steps:

1. Setup:

- On the large paper or board, draw the Earth's layers (land, underground, etc.).
- Scatter the small objects (pebbles, leaves, toys) on the surface to represent plants and animals.

2. Activity:

- Formation Simulation: Explain that over millions of years, the plants and animals get buried under layers of soil and rock. Ask the children to help "bury" the objects by drawing layers of soil and rock on top of them.
- Extraction Simulation: After the objects are buried, explain that these materials turn into fossil fuels like coal and petroleum. Ask the children to act as "miners" and carefully "dig" through the layers they've drawn to collect the fossil fuels (the objects).

3. Discussion:

- Once the objects (fossil fuels) are "extracted," explain how they are used to make energy for things like cars, electricity, and heating. Discuss how fossil fuels are limited and can't be replaced once used.

4. Optional Extension:

- Draw factories and cars to show how fossil fuels are burned for energy, and talk about pollution as a result.

FOSSIL FUELS

PETROLEUM, NATURAL GASSES, COAL
are these terms familiar to you.
If yes, you are correct. They all are similar
as they are fuels (specifically fossil fuels).

Fossils which are buried for thousands of
years which get decomposed into simpler
substances like fuels are known as fossil
fuels



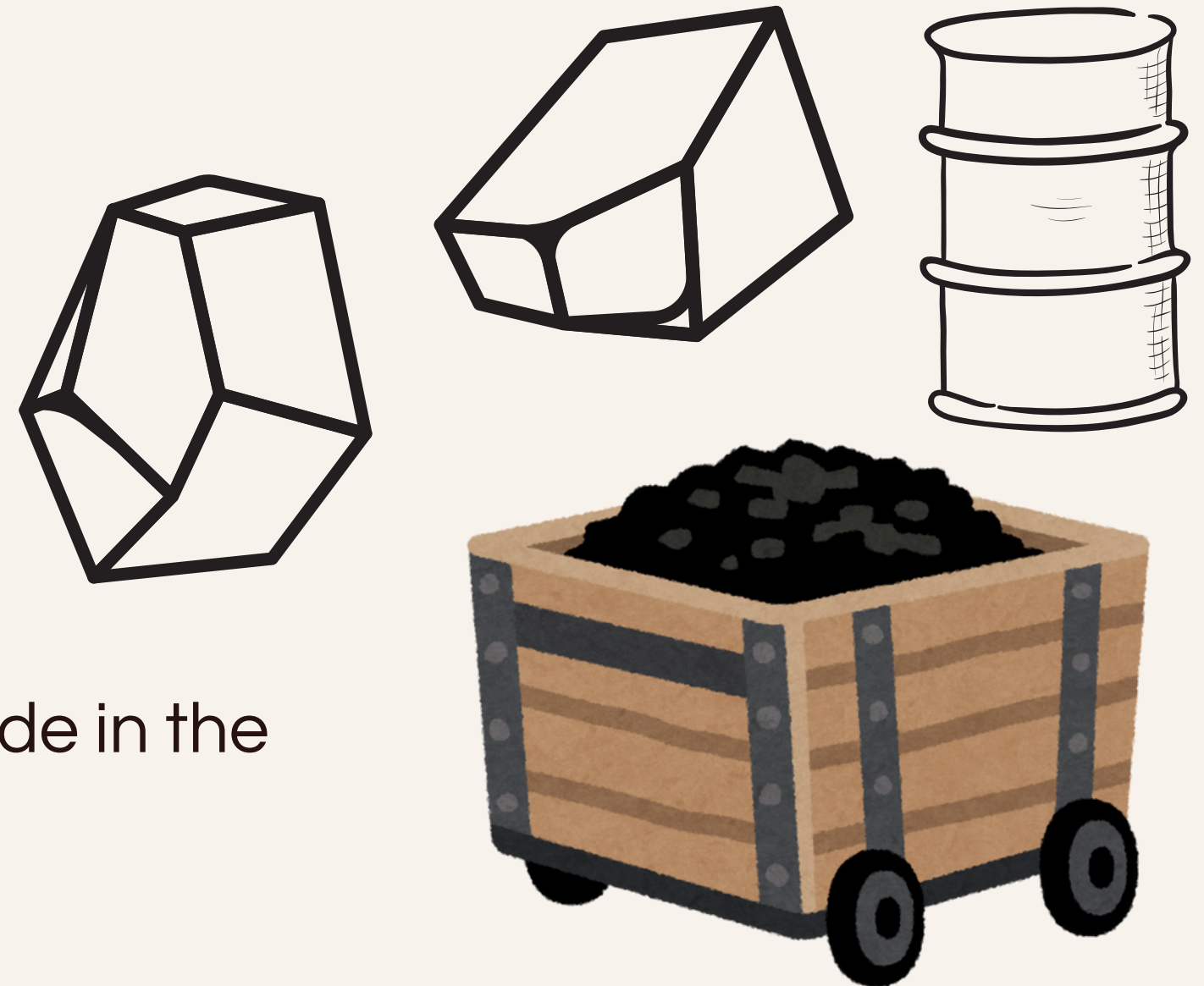
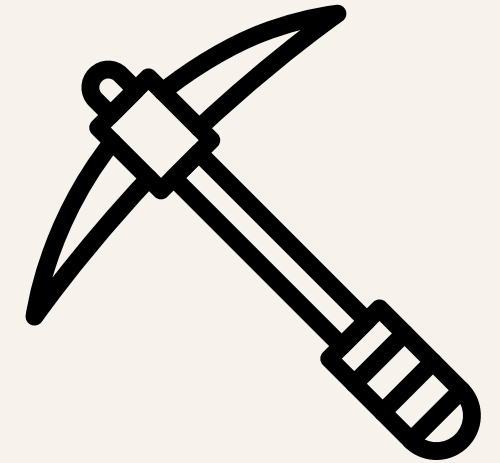
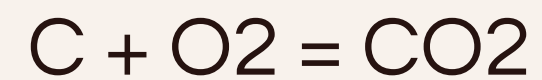
COAL: DESCRIPTION

COAL is a fossil fuel (you already know this now), COAL is mostly used to produce thermal anergy which is done by generating heat.
COAL was first made about 300 million years ago.

There are bout four different types of coal:-

1. Anthracite: Made up of about 96% of carbon.
2. Bituminous Coal: Made up of about 60% of carbon
3. Ignite: Made up of about 38% of carbon.

When coal is heated in the air is produces carbon dioxide in the atmosphere:



COAL

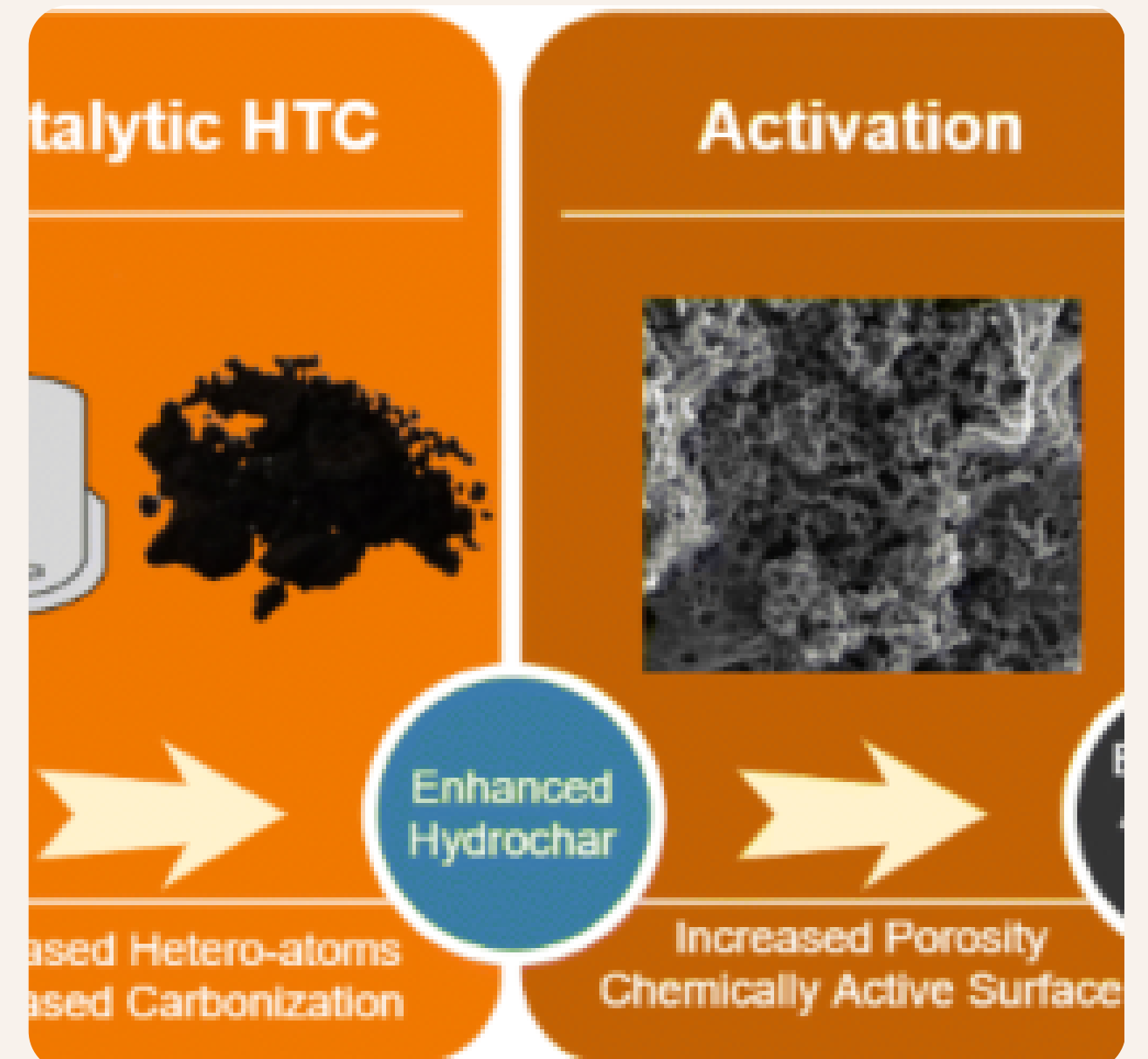


CARBONIZATION

Carbonization is the process of transforming a material into carbon or a carbon-rich substance through heating.

Process:

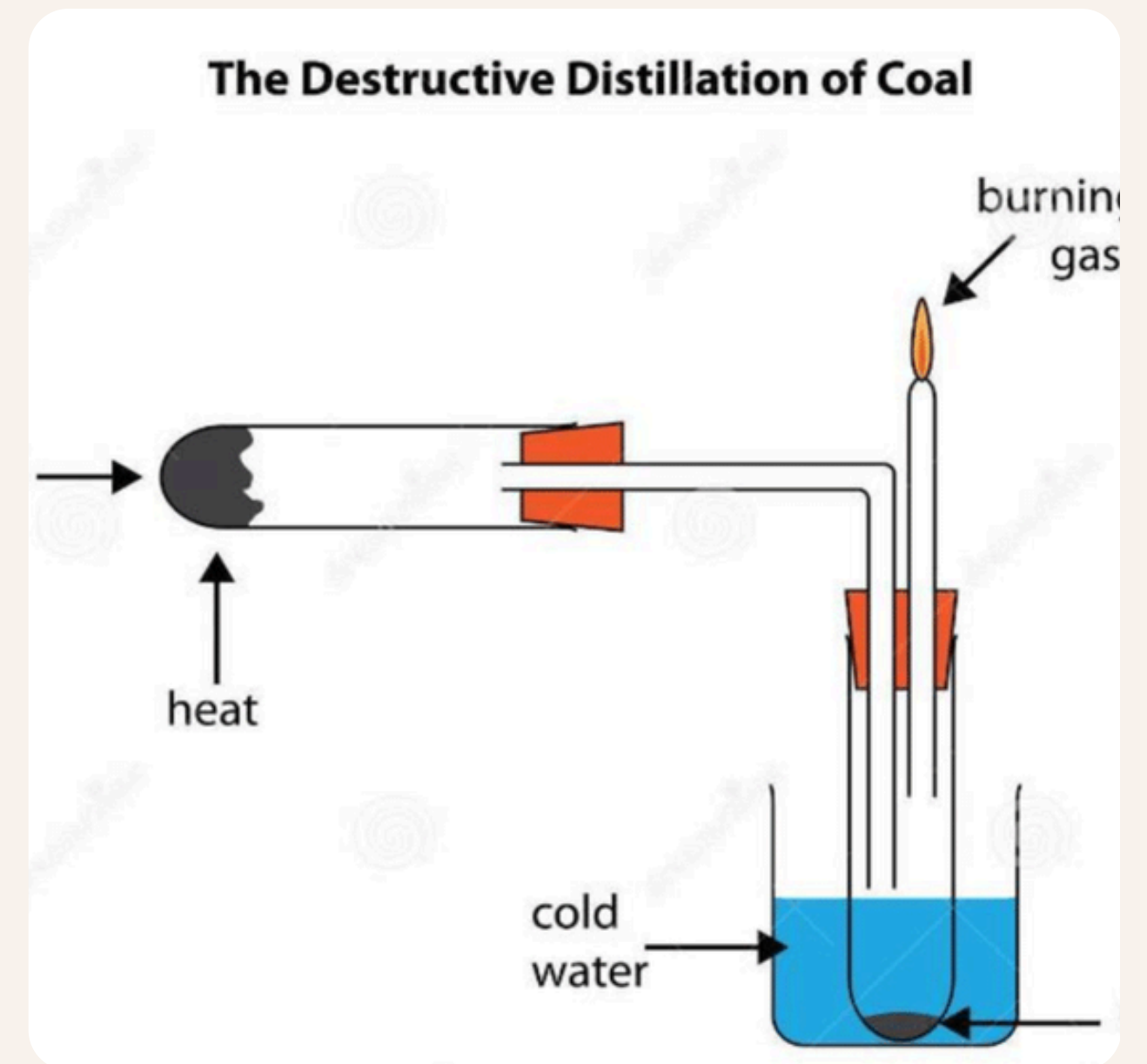
1. Heat the Material: The material (like wood) is heated strongly in the absence of air.
2. Breakdown: The heat breaks down the material, removing non-carbon substances like water and gases.
3. Form Carbon: The remaining substance is mostly carbon, resulting in products like charcoal.



DISTILLATION OF COAL

The distillation of coal is carried out at at least 1000 degree celsius in the absence of air. It includes organic and inorganic products such as:-

1. COKE
2. COAL TAR
3. COAL GAS
4. AMMONIUM COMPOUNDS



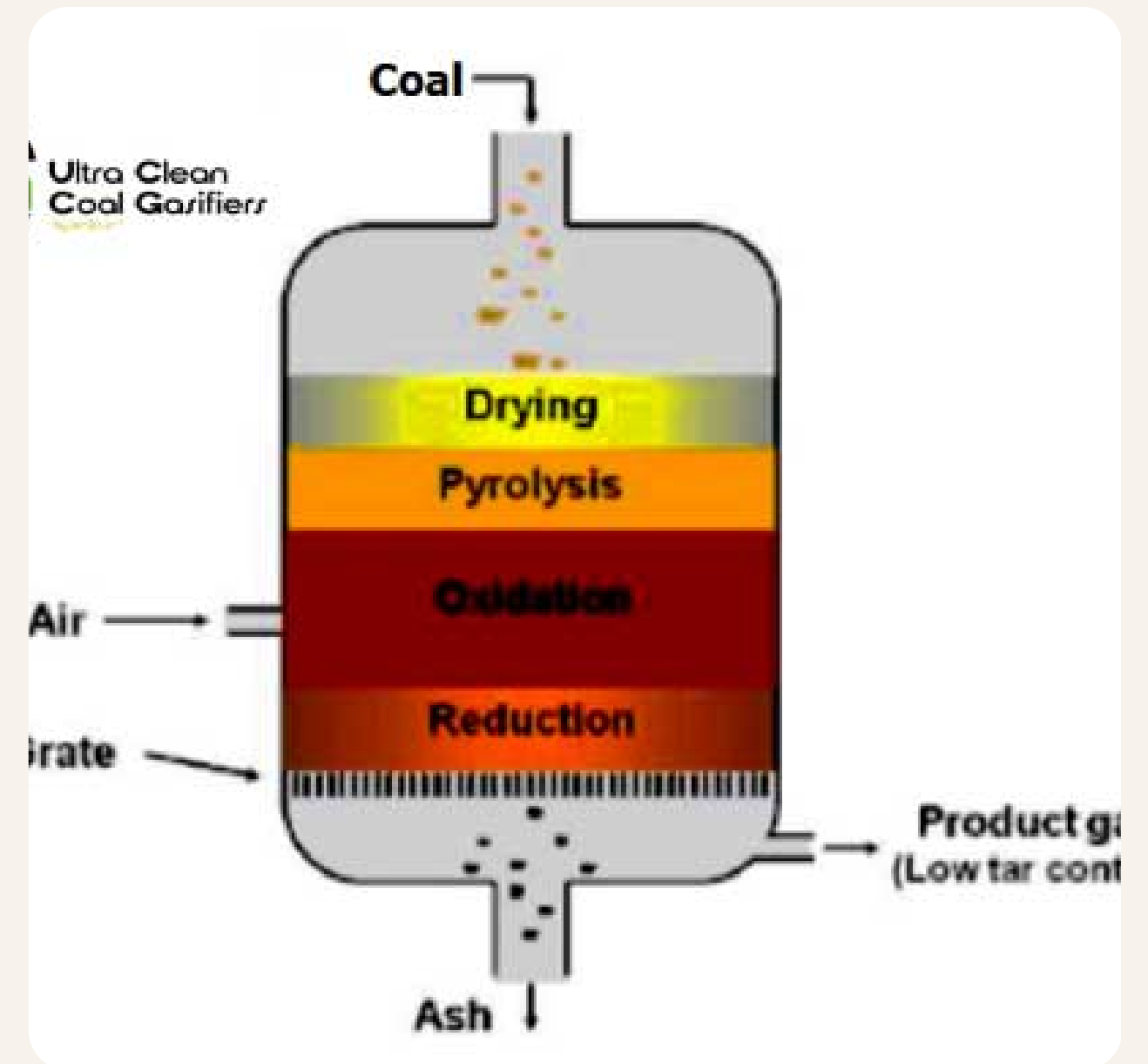
COKE: DESCRIPTION

Coke is a type of fuel made from coal through a heating process that removes impurities. The coal is heated to a very high temperature in the absence of air, which drives off water, gases, and other non-carbon materials. The result is a hard, black substance primarily composed of carbon. Coke is valued for its ability to burn very hot and clean, making it ideal for industrial applications, particularly in steel production.



COAL GAS: DESCRIPTION

Coal gas is a type of gas produced by heating coal in the absence of air. During this process, known as gasification, coal is heated to high temperatures, causing it to release gases like hydrogen, methane, and carbon monoxide. These gases are collected and used as fuel for heating and lighting. Coal gas was commonly used in the past for street lighting and domestic heating before natural gas became more widely available.



COAL TAR: DESCRIPTION

Coal tar is a thick, black liquid produced from coal during the process of gasification. When coal is heated in the absence of air, it releases gases and leaves behind a liquid that contains a mix of chemicals, including tar. This tar is collected and used in various industrial applications, such as in making road surfaces and waterproofing materials. Coal tar is also used in some medical treatments for skin conditions.



PETROLEUM



Petroleum is regarded as a valuable resource in modern times. Whether they would be lightweight motorcycles or large tractors. All of them are driven by petroleum-based products like diesel or petrol. Petroleum was formed under the sea bed with layers of sand and clay. Hence it is a fossil fuel.

आधुनिक समय में पेट्रोलियम को एक मूल्यवान संसाधन माना जाता है। चाहे वे हल्की मोटरसाइकिलें हों या बड़े ट्रैक्टर। ये सभी डीजल या पेट्रोल जैसे पेट्रोलियम-आधारित उत्पादों द्वारा संचालित होते हैं। पेट्रोलियम का निर्माण समुद्र तल के नीचे रेत और मिट्टी की परतों से हुआ था। अतः यह एक जीवाश्म ईंधन है।





REFINING OF PETROLEUM

petroleum.tiiny.site

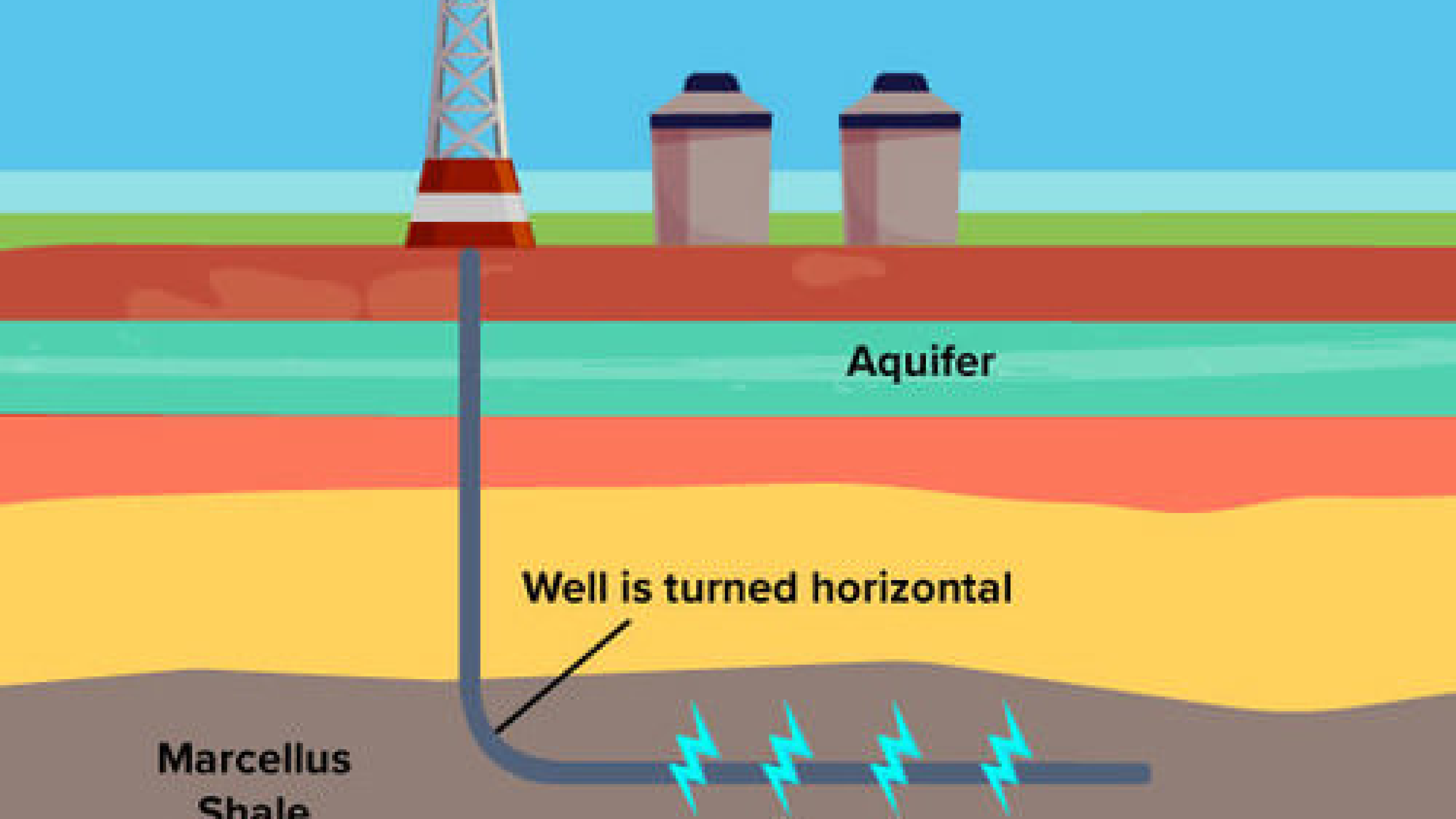


NATURAL GAS: DESCRIPTION

Natural gas is a type of fuel that comes from deep under the Earth's surface. It is formed from the remains of plants and animals that lived millions of years ago. This gas is mostly made of a substance called methane.

We use natural gas in many ways. It is often used to cook food in kitchens, heat our homes, and make electricity in power plants. Factories also use it to create products like plastic and fertilizers. Since it burns cleaner than coal or oil, natural gas is a popular choice for energy.





Aquifer

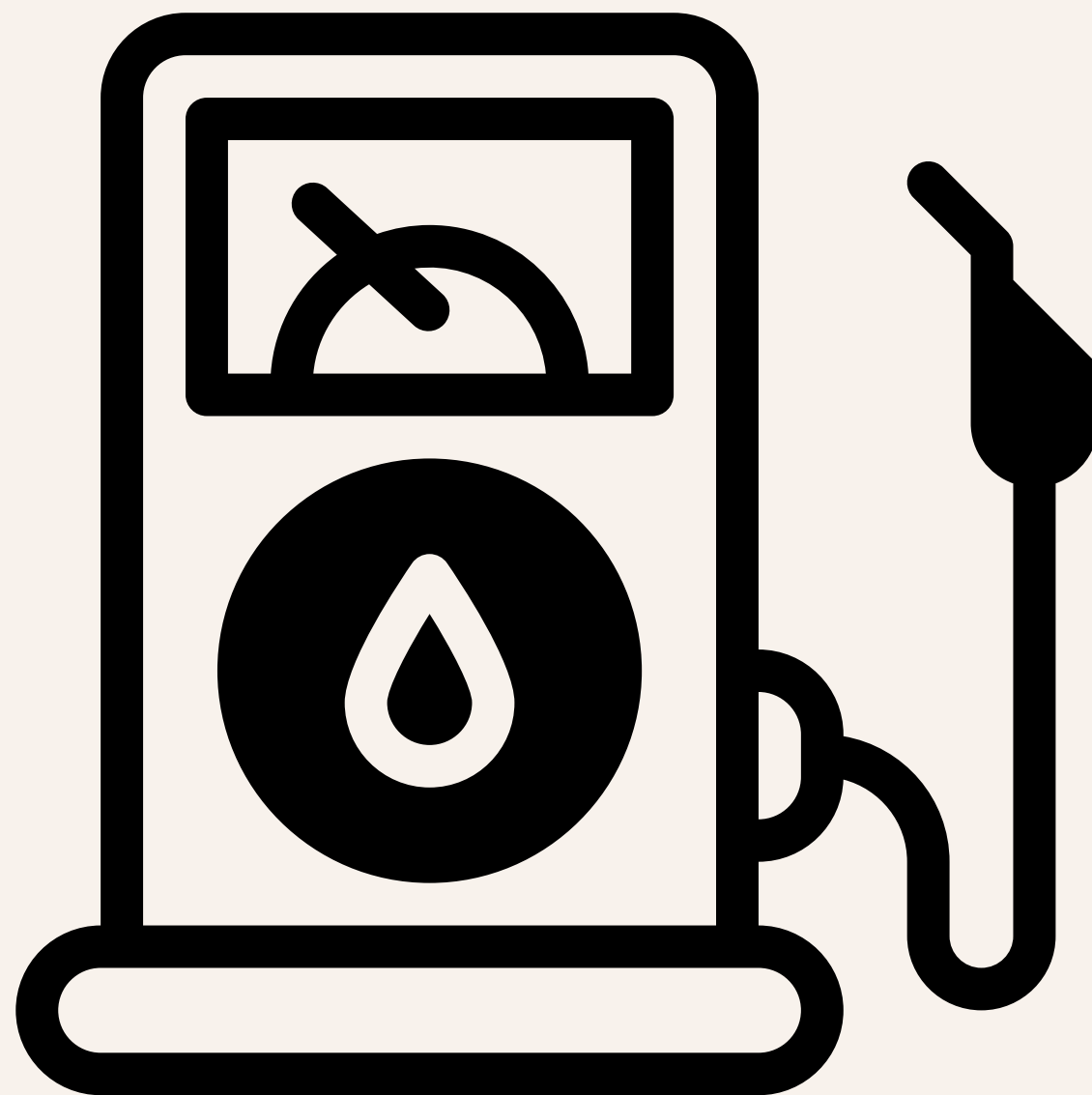
Well is turned horizontal

Marcellus
Shale

04



CONCLUSION



CONCLUSION: THE END

In conclusion, fossil fuels like coal and petroleum have both advantages and disadvantages. They provide a lot of energy, are easy to transport, and have been used for many years to power our homes, factories, and vehicles. However, they also cause pollution, harm the environment, and contribute to global warming. Fossil fuels are also non-renewable, which means they will eventually run out. So, while they are helpful now, we need to find cleaner, renewable energy sources for the future.



THE END

FOR MORE RESOURCES

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