CLIL

STEAM

MATERIALS • UDA 1: Natural Resources, Raw Materials, and Manufactured Materials

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1. CREATE YOUR OWN MAP

Have a look at the mind map, then sketch your own version in your exercise book.

RAW MATERIALS

They come from natural resources, which can be either renewable or non-renewable.

MANUFACTURED MATERIALS

They come from the processing of raw materials.
They are classified based on...

their origin into materials that are:

- Natural
- Artificial
- Synthetic

on their chemical composition into:

- Metals
- Polymers
- Ceramics
- Composites

CONTINUE

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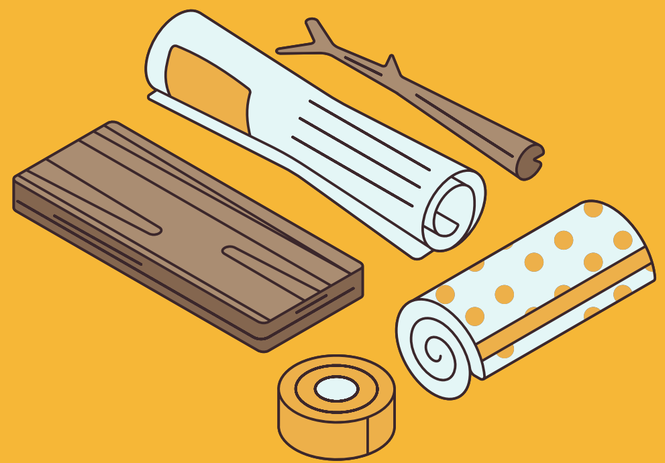
1. CREATE YOUR OWN MAP

Have a look at the mind map, then sketch your own version in your exercise book.



MANUFACTURED MATERIALS

They have the following properties:

- Chemical-physical properties
- Mechanical properties
- Technological properties

They undergo **various processing techniques** and have **multiple applications.**

They present sustainability challenges:

- Many are finite resources
- Not all are recyclable
- Industrial processes consume large amounts of energy, emit CO_2, and release pollutants into the atmosphere

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2. CREATE YOUR OWN TEST

a. Indicate whether the following statements are true (T) or false (F).

1. Natural resources are always renewable.

T F

2. Materials are derived from raw materials after undergoing processing.

T F

3. The mechanical properties of materials include electrical conductivity.

T F

4. Materials can be classified based on their origin.

T F

5. The sustainable management of raw materials helps reduce environmental impact.

T F

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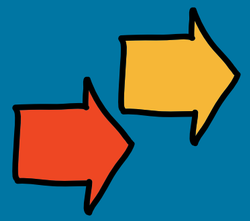
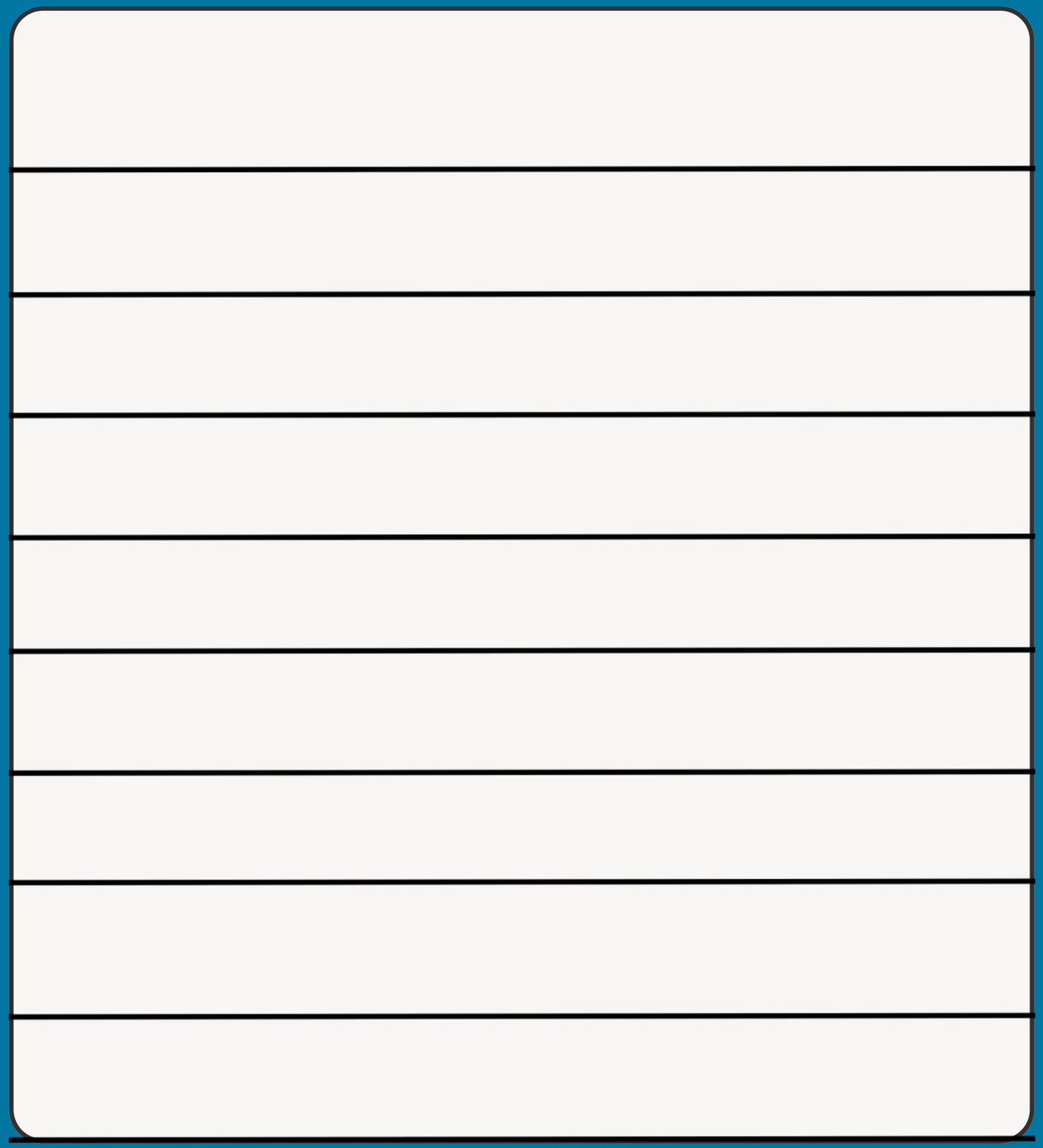
2. CREATE YOUR OWN TEST

b. Create Three New True/False Questions to Share with the Class





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3. ANALYSIS OF RAW MATERIAL AVAILABILITY DATA

The table presents the availability of fossil fuels (crude oil, natural gas, and coal) **in 2023 for the world's leading producers. Choose the most appropriate type of chart or diagram to represent the data.** You can draw it on graph paper or millimetre paper, or create it using a charting tool such as Microsoft Excel, Google Sheets, or any online graphing application.

COUNTRY	CRUDE OIL (million barrels per day)	NATURAL GAS (billion cubic metres per year)	COAL (million tonnes per year)
USA 	12,2	1000	386
SAUDI ARABIA 	10,7	123,5	100
RUSSIA 	10,7	800	450
CHINA 	5,3	210	4200
INDIA 	3	36	850

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3. SUMMARY:

CRUDE OIL

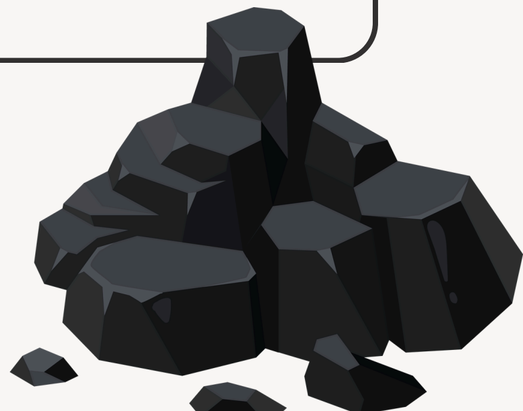
The United States and Saudi Arabia were the largest crude oil producers in 2023, with Russia at a similar level. China and India produced considerably lower volumes.

NATURAL GAS

The United States was the world's leading natural gas producer, followed by Russia and China, while India had a significantly lower output.

COAL

China dominated global coal production, followed by India and Russia. The United States and Saudi Arabia were not among the top coal-producing nations.



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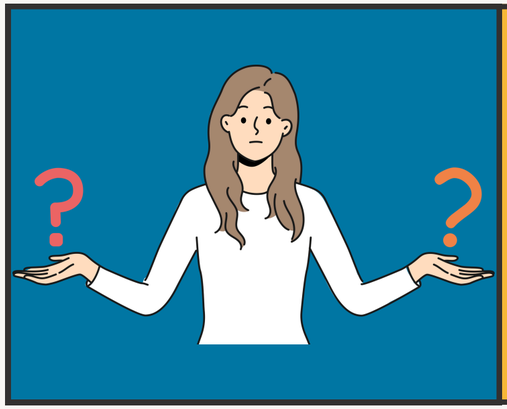
4. CLASSIFICATION OF RESOURCES: RENEWABLE AND NON-RENEWABLE



Objective

To understand the difference between renewable and non-renewable resources, their significance, and their uses.

Activity

Create a research project to identify and classify various natural resources as renewable or non-renewable.

Materials and Tools

- Internet access for researching images and scientific articles
- Two posters to display in the classroom

5.EXTRACTION OF METALS FROM ORE

Objective

To introduce the processes involved in extracting raw materials and to understand the environmental impact of mining.

Activity

Simulate the extraction of metal ores through a mining activity using chocolate chip biscuits.

Materials and Tools

- Chocolate chip biscuits
- Toothpicks
- Paper plates

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Objective

To understand the properties of materials, particularly electrical conductivity, and to apply principles of physics and engineering.

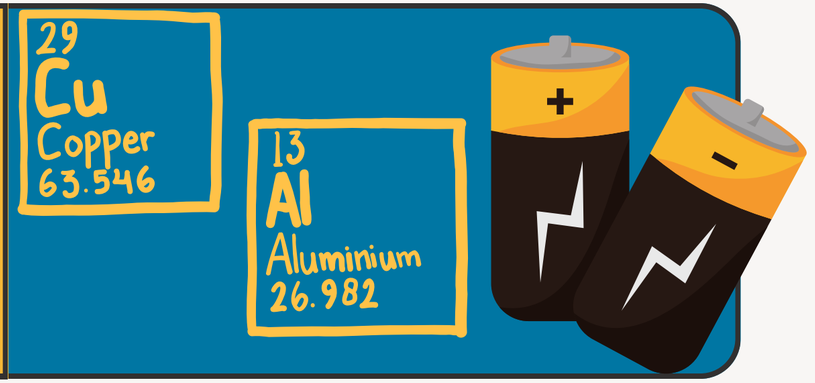
Activity

Test a variety of materials (metals, plastic, glass, rubber) to determine their electrical conductivity.

6.ANALYSIS OF ELECTRICAL CONDUCTIVITY IN MATERIALS

Materials and Tools

- Battery
- Conductive wires
- Light bulbs
- Various materials for testing (copper, aluminium, plastic, glass, rubber)



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EXPERIMENTAL PROCEDURE

1 CONNECTING THE CIRCUIT

Connect the conductive wires to the battery terminals and the light bulb, forming a closed electrical circuit.

2 INSERTING THE MATERIALS

Place the material to be tested (e.g., a piece of metal or plastic) between the conductive wires, breaking the circuit.

3 OBSERVATION

- If the light bulb illuminates, the material is a conductor (it allows electric current to flow).
- If the light bulb remains off, the material is an insulator (it prevents the flow of electricity).

4 REPEATING THE EXPERIMENT

Test a variety of materials and observe which allow the light bulb to illuminate.