CLIL

STEAM

TECHNOLOGICAL FIELDS • UDA 4: Electricity and Electronics

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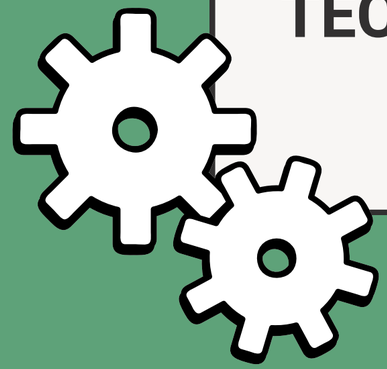

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ELECTRICITY

Movement of electrons along a conductor

Electric Current

Movement of electrons along a conductor

- Continuous (batteries) or alternating (home circuits)
- Conventional direction: from positive to negative pole
- Actual electron movement: from negative to positive pole

ELECTRONICS

Control and manipulation of small amounts of electrical energy for specific functions.

Electric Circuit

A closed path through which electric current flows

- **Power source**
- **Conductors**
- **Load**
- **Switch**

Series Connection

Devices connected in series
VT=V1+V2

Parallel Connection

Devices connected in parallel
IT=I1+I2

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Sustainability

WEEE (Waste Electrical and Electronic Equipment)

ELECTRICITY

ELECTRONICS

ELECTRICITY

Electricity Generators

- Combined **turbine** with alternator and **transformer**
- **Dynamo**

Electric Motor

Converts electrical energy into movement (the opposite of an alternator)

Batteries and Accumulators

Convert chemical energy into electrical energy

- **Non-rechargeable batteries**
- **Rechargeable accumulators**

ELECTRONICS

Electronic Components

- Resistors
- Capacitors
- Transistors
- Diodes
- Integrated microprocessors in advanced circuits soldered on boards or motherboards

Electronic Devices

- Computers
- Smartphones
- Tablets
- Televisions

2. CREATE YOUR OWN TEST

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

1. Electric current is the movement of protons along a conductor.

T F

2. The alternator converts mechanical energy into direct current.

T F

3. The turbine uses the movement of a fluid to generate mechanical energy.

T F

4. The electric motor converts electrical energy into mechanical energy.

T F

5. WEEE contains harmful materials if not disposed of properly.

T F

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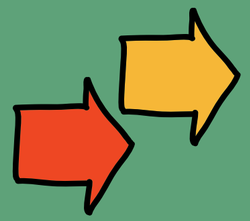
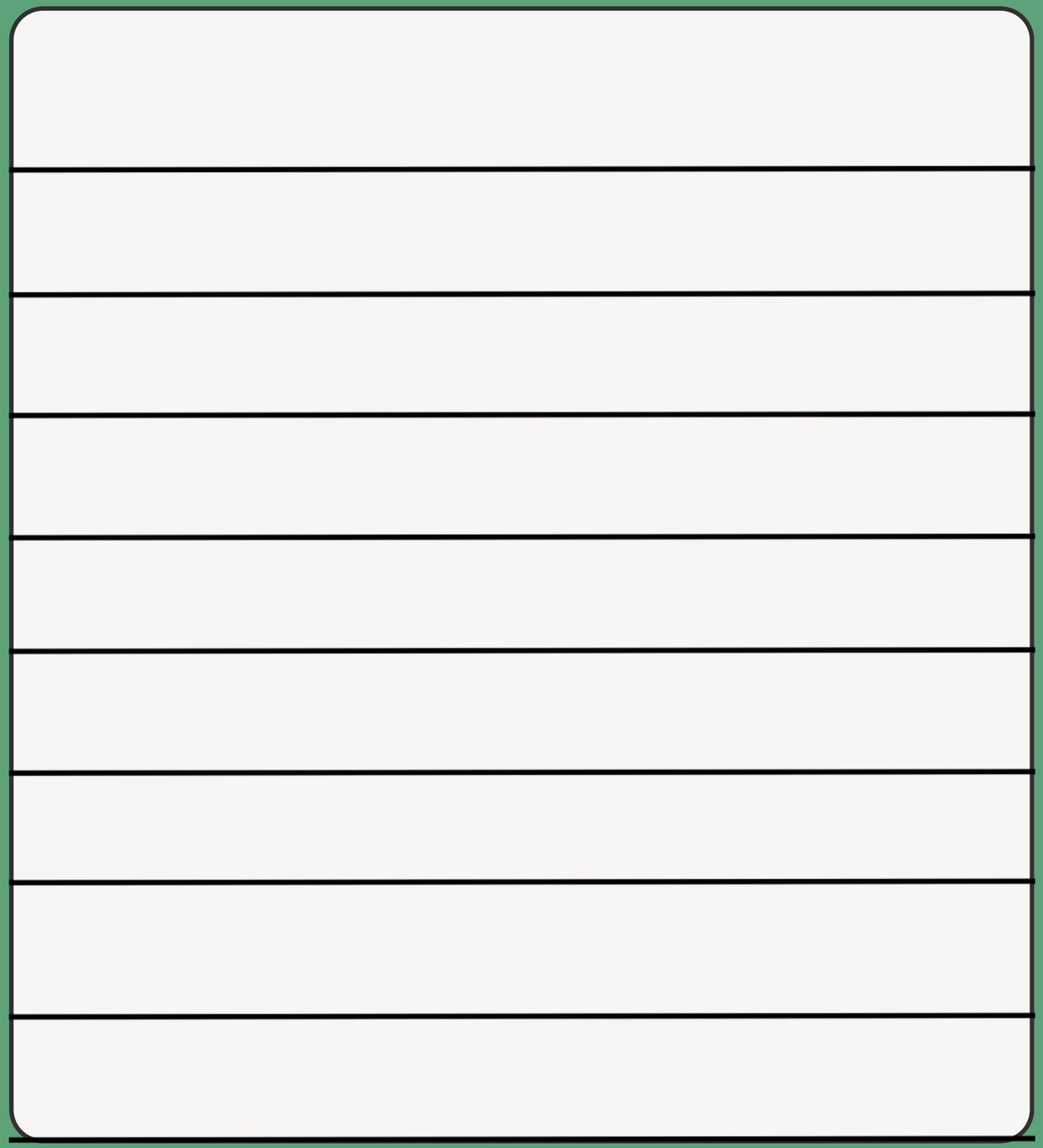
2. CREATE YOUR OWN TEST

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





3.ANALYSIS OF RENEWABLE ENERGY PRODUCTION IN ITALY

The table summarises the **electricity balance data for Italy in 2022 and 2023**, expressed in terawatt-hours (TWh, where 1 TWh equals 1 million megawatt-hours).
Represent the data in one or more graphs/charts of your choice. You can draw them on graph paper, millimetre paper, or use an Excel sheet.

Net Production	2022	2023	Percentage Change
Hydroelectric	28.4	35.5	+25%
Thermal	181.6	146.7	-19.2%
Geothermal	5.8	4.9	-15.5%
Wind	20.5	23.4	+14.1%
Photovoltaic	28.1	30.6	+8.9%

SUMMARY

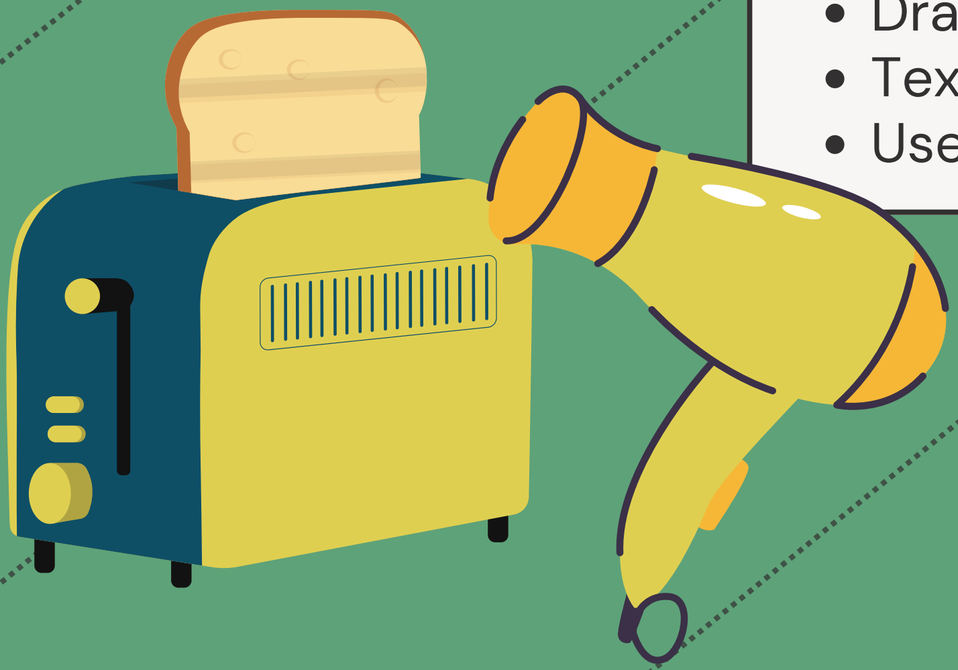
Net production has declined, with a decrease in thermal and geothermal energy production. However, the production of all other energy sources has increased.

4. APPLIANCES ANALYSIS SHEET

Objective:
To analyse how an electrical appliance works.

Materials:

- Drawing tools
- Textbook
- User manual for an appliance

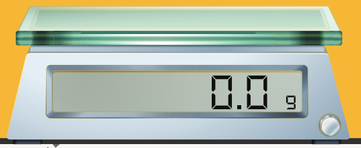


Activity:
Choose an appliance you have at home and create a technical sheet, highlighting the most significant elements from the following:

1. Name of the Appliance:
Brand and model.

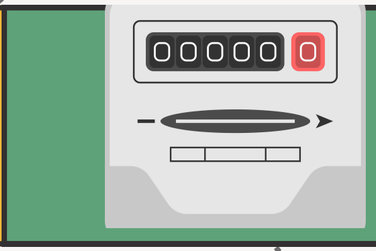
2. Type:
Refrigerator, washing machine, dryer, oven, etc.

3. Energy Consumption:
Energy efficiency rating (from A to G), annual consumption in kWh.

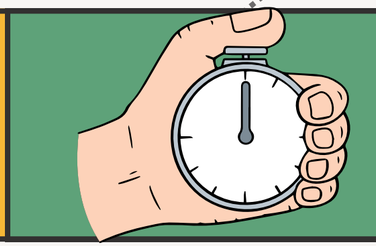


4. Capacity/Dimensions:
Usable volume, load capacity, or dimensions (in litres, kg, cm).

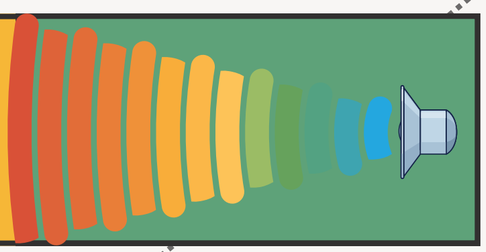
5. Technology:
Type of motor (e.g., inverter), presence of technologies such as EcoMode, No Frost, or Digital Display.



6. Special Features:
Energy-saving programs, smart functions, timer, sensors.



7. Noise Level:
Sound emission during operation (in decibels, dB).



8. Water Efficiency (if applicable)**:**
Water consumption per cycle (litres).

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9. Materials and Safety:
Type of materials used and safety systems (e.g., automatic shutdown).

10. Maintenance:
Ease of cleaning, presence of filters, removable parts.

11. Price:
Indicative cost of the appliance.

12. Environmental Impact:
Considerations regarding production, recycling, and disposal.
Alternatively, create a multimedia presentation with five slides.

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