NAME _____ CLASS _____

CONDUCTORS AND INSULATORS

A **conductor** is a material that lets electricity flow through it easily. Most metals are good conductors.

An **insulator** is a material that does not let electricity flow through it easily. Insulators keep us safe from electric shocks.

1 Sort the materials into conductors and insulators. 10 marks

WORD BANK Copper | Plastic (PVC) | Aluminium | Rubber | Glass | Steel | Dry wood | Graphite (pencil lead) | Gold | Air

CONDUCTORS	INSULATORS

2 A mains cable has a copper core and a PVC plastic covering. Explain why each material is used. 4 marks

Copper core	PVC covering

THE NATIONAL GRID

The **National Grid** is the network of cables and pylons that carries electricity across the country. Electricity is sent at a very **high voltage** (up to 400,000 V) so that less energy is wasted as heat in the cables. Transformers change the voltage up and down.

3 Complete the flow diagram using the word bank. 4 marks

WORD BANK Step-up transformer | Step-down transformer | Homes (230 V) | Pylons and cables

Power station → [ ] → [ ] → [ ] → [ ]

STORING ELECTRICAL ENERGY

Electrical energy is often needed away from a socket, so we store it as **chemical energy** in **cells**. Two or more cells joined together make a **battery**.

When cells are joined end to end (in **series**), their voltages add up. For example, two 1.5 V cells give 3 V.

4 Calculate the total voltage. 4 marks

CELLS JOINED IN SERIES	TOTAL VOLTAGE
2 × 1.5 V AA cells	
4 × 1.5 V AA cells	
3 × 1.2 V rechargeable cells	
6 × 1.5 V cells	



5 Give **two** products that need batteries and explain why each one can't simply plug into the wall. 4 marks

6 Rechargeable or disposable? Tick the box that matches each statement. 4 marks

STATEMENT	RECHARGEABLE	DISPOSABLE
Can be used hundreds of times		
Usually cheaper to buy at first		
Creates less waste over its life		
Thrown away after one use		

7 Why must batteries never be put in the household bin? Where should they go instead? 3 marks