Task 1 – Energy Resources

Define energy.

List four renewable and four non-renewable energy resources.

Explain the key differences between renewable and non-renewable energy sources.

Task 2 – Energy Demands

Tricky thinking:

Extension Task: Energy Deba

Imagine you are a government advisor. Write a short argument for or against investing more in nuclear energy as a solution to energy demands.

Task 3 – Renewable Energy Pros and Cons

For renewable energy resource give its main advantage and disadvantage:

Task 4: Calculations

A wind turbine produces 3 MW of power. If it operates for 5 hours, how much energy is generated? (Use Energy = Power × Time)

A solar panel has an efficiency of 20% and receives 1000 J of sunlight energy. How much useful electrical energy does it produce?

A factory requires 5000 kWh of energy daily. If it switches to 100% renewable energy using wind turbines producing 50 kW each, how many turbines are needed to meet this demand if each turbine runs for 10 hours per day?

A motor receives **500 J** of electrical energy and converts **400 J** into useful kinetic energy. Calculate its efficiency.

An old filament bulb takes in **60 J** of electrical energy but only produces **6 J** of light energy. Calculate its efficiency.

A **2 kg** block of metal is heated from **25°C to 100°C** using **30,000 J** of energy. The specific heat capacity of the metal is **unknown.** Calculate its specific heat capacity.



Challenge Calculations:

A roller coaster car of mass **500 kg** is at the top of a **50 m** hill.

a) Calculate its gravitational potential energy (GPE) at the top.

b) Assuming no energy is lost to friction, how fast is it moving when it reaches the bottom?

A spring with a spring constant of **200 N/m** is compressed by **0.1 m** and used to launch a **0.5 kg** block horizontally.

a) Calculate the **elastic potential energy (EPE)** stored in the spring.