

OCR (B) Physics GCSE

Topic 2.1 - How much energy do we use?

Flashcards

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In which different forms can energy be stored?



In which different ways can energy be stored?

Chemical, nuclear, kinetic, gravitational, elastic, thermal, electrostatic and electromagnetic.



How is energy transferred from one form to another?



How is energy transferred from one form to another?

By working or heating.



What form of energy is stored in batteries?



What form of energy is stored in batteries?

Chemical energy.



How are electrical appliances supplied with energy?



How are electrical appliances supplied with energy?

Chemical potential in batteries or fuels is transferred to electrical energy (producing electrical current) in wires, which do work on devices such as motors and heaters.



Why is electricity a convenient way to transfer energy?



Why is electricity a convenient way to transfer energy?

It is easily transmitted across large distances, and can be used to do work in a variety of ways (e.g. moving, heating).



What is the principle of conservation of energy?



What is the principle of conservation of energy?

Energy cannot be created or destroyed;
it can only be transferred from one form
into another.



How and why is energy wasted?



How and why is energy wasted?

When energy is used to do work, energy is **dissipated** into forms other than the desired outcome. For example, light bulbs sometimes emit heat energy. It is dissipated into the surroundings, into inaccessible thermal stores.



What is the power of an appliance?



What is the power of an appliance?

A measure of the amount of energy it transfers per second (i.e. its rate of energy transfer).



What is the unit of power?



What are the units of power?

Watt (W)

This is equivalent to 1 Joule per second (J/s).

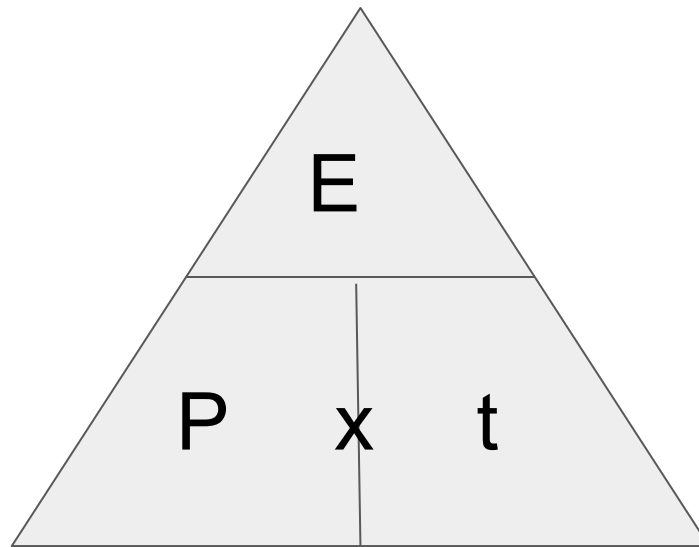


What is the equation for power?



What is the equation for power?

Power = energy \div time



What is a system?



What is a system?

An object or group of objects.



What is a closed system?



What is a closed system?

A closed system is one in which no energy is transferred into or out of the system. There is no net change to the energy of the system.



How can “wasted” (thermal) energy be reduced?



How can “wasted” energy be reduced?

Thermal insulation prevents thermal energy from being lost from a system.

An example of this is double glazing in houses, to conserve energy produced by heating appliances.



How can “wasted” energy in a motor be reduced?



How can “wasted” energy in a motor be reduced?

Lubrication; applying oil to a motor reduces friction so less energy is lost overcoming friction.



What is thermal conductivity?



What is thermal conductivity?

A measure of a material/object's ability to conduct heat.



What does a high thermal conductivity mean?



What does a high thermal conductivity mean?

The higher the thermal conductivity, the more easily heat is transmitted through the material. This results in a higher rate of energy transfer via **conduction** across the material.



How does thermal conductivity apply to buildings?



How does thermal conductivity apply to buildings?

The lower the thermal conductivity of the walls, the less easily heat is lost.

Insulating materials are useful as they have a low thermal conductivity, so they retain heat and therefore conserve energy.



What is efficiency?



What is efficiency?

The ratio of useful work done to energy supplied. It is often given as a percentage, i.e. the percentage of energy which is converted to a useful form.



Give the equation for efficiency



Give the equation for efficiency

$$\text{Efficiency} = \frac{\text{Useful energy output}}{\text{Total energy input}}$$

You can convert this to a percentage by multiplying the answer by 100



How can the efficiency of a system be increased? (Higher)



How can the efficiency of a system be increased?

(Higher)

1. **Reducing** waste output (by lubrication, thermal insulation etc).
2. **Recycling** waste output (eg. recycling thermal waste energy as input energy).



Name a diagram used to illustrate energy transfers



Name a diagram used to illustrate energy transfers

Sankey diagram



What does a Sankey diagram show?



What does a Sankey diagram show?

All of the energy transfers in a system, including energy wasted/dissipated to surroundings.



How is a Sankey diagram useful?



How is a Sankey diagram useful?

It can be used to calculate the efficiency of energy transfers.



Describe the features of a Sankey diagram



Describe the features of a Sankey diagram

- Arrows point in the direction of transfer of energy.
- The width of lines/arrows is proportional to the amount of energy transferred.

