

# Edexcel GCSE Physics

## Topic 3.1-3.12 - Energy Transfers

### Flashcards

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What is the equation for gravitational potential energy? Give SI units for all quantities involved.



What is the equation for gravity potential energy?  
Give SI units for all quantities involved.

$$mgh$$

Mass x Gravitational Field Strength x  
Height

Energy (J), Mass(kg), Gravitational Field Strength (N/kg),  
Height (m)

What is the equation for kinetic energy?  
Give SI units for all quantities involved.



What is the equation for kinetic energy? Give SI units for all quantities involved.

$$\frac{1}{2} m v^2$$

$$\frac{1}{2} \times \text{Mass} \times (\text{Velocity})^2$$

Energy (J), Mass(kg), Velocity(m/s)



What is meant by the conservation of energy?



# What is meant by the conservation of energy?

- The total amount of energy in a closed system remains constant
- Energy cannot be made or destroyed but can change from one form to another



Describe the energy changes involved when a ball is thrown upwards and then returns to its starting position. Ignore air resistance.





Describe the energy changes involved when a ball is thrown upwards and then returns to its starting position. Ignore air resistance.

- Upwards: KE is converted to GPE
- Peak: Maximum GPE, zero KE
- Downwards: GPE is converted to KE

KE (Kinetic Energy), GPE (Gravitational Potential Energy)



State any changes in the **total energy** of a ball that is kicked, assuming that no external forces act.



State any changes in the **total energy** of a ball that is kicked, assuming that no external forces act.

The total energy of the system remains constant due to the conservation of energy.



Describe the energy changes that occur in a filament light-bulb.



# Describe the energy changes that occur in a filament light-bulb.

- Electrical energy is transferred into light and heat energy
- Light is a useful energy form, heat is waste energy



Describe the energy transfers for a bungee jumper.



Describe the energy transfers for a bungee jumper.

- When falling, the GPE is converted to KE of jumper
- As the cord tightens, KE is converted and stored as Elastic Potential Energy (EPE)
- At lowest point, the jumper's initial GPE equals the EPE stored in the cord



Explain why a bungee jumper slows down once the cord begins to stretch.





Explain why a bungee jumper slows down once the cord begins to stretch.

- Kinetic energy decreases since it is converted to elastic potential energy
- Since KE is proportional to  $(\text{velocity})^2$ , as KE decreases, so does velocity.



# What is waste energy?



## What is waste energy?

The energy that is not used by the device for its desired purpose, or not converted into the desired form.



State **two** equations to calculate efficiency.



State **two** equations to calculate efficiency.

= Useful Output Energy / Total Input  
Energy

= Useful Power Output / Total Power  
Input



State the consequence for energy transfer of a material with a high thermal conductivity.



State the consequence for energy transfer of a material with a high thermal conductivity.

The rate of energy transfer through the material is higher than for a material with a lower thermal conductivity.



Do double-glazed windows have a higher or lower thermal conductivity than single-glazed windows?





Do double-glazed windows have a higher or lower thermal conductivity than single-glazed windows?

Lower, meaning less energy transfers through them.



State **three** methods of reducing heat loss in a building.



State **three** methods of reducing heat loss in a building.

1. Double glazing
2. Loft and wall insulation
3. Thicker walls



How can you reduce unwanted energy transfer in a mechanical system?



How can you reduce unwanted energy transfer in a mechanical system?

Reduce friction by lubricating moving parts.



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)

