

Edexcel GCSE Physics

Topic 8.1-8.09 - Energy Changes

Flashcards

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State the law of energy conservation.



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Energy cannot be created or destroyed
(it can only be transferred into different
forms).



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



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- 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.



Describe the energy changes in a power station.



Describe the energy changes in a power station.

- Heat energy released in the reaction heats water to make steam
- Steam moves the turbine, converting kinetic energy
- Kinetic energy turns the generator
- Electrical energy as the generator generates electricity



In what ways can the energy of a system be changed?



In what ways can the energy of a system be changed?

- Through work done by forces
 - Through electrical input
 - Through heating



How can energy be changed through work done by forces?



How can energy be changed through work done by forces?

A force which moves an object (kinetic energy) causes work to be done over a distance.



What equation is used to measure the work done on an object?



What equation is used to measure the work done on an object?

Work done (J) = force (N) x distance (m)

$$W = Fd$$



Why do wasteful mechanical processes cause a rise in the temperature of the surroundings?



Why do wasteful mechanical processes cause a rise in the temperature of the surroundings?

They cause energy to be transferred by heating the surroundings.



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.

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

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

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



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.

$$E = mgh$$

Energy = Mass x Gravitational Field Strength x Height

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

Height (m)

