

Year 10

Physics booklet

Topic 1 – Energy

Name: \_\_\_\_\_

# Energy

Give a definition for each of these key words:

Energy	
Kinetic energy	
Gravitational potential energy	
Elastic potential energy	
Thermal energy	
Work done	
Power rating	
Energy efficiency	
Energy transfer	
Energy resource	
Renewable energy	
Non-renewable energy	

Find equations for the following:

Kinetic energy =

Gravitational potential energy =

Work done =

Power =

Efficiency =

## Energy

Energy is measured in unit called \_\_\_\_\_. The symbol for these units is \_\_\_\_\_

The principle of conservation of energy means that the energy \_\_\_\_\_ a device is equal to the \_\_\_\_\_ a device

Energy is never created or \_\_\_\_\_ it is only \_\_\_\_\_ from one type to another. This means that the total energy we put into a device is \_\_\_\_\_ the energy we get out of the device.  
less than  
the same as  
more than

All wasted energy eventually gets transferred to the \_\_\_\_\_ and becomes spread out. This makes it difficult to \_\_\_\_\_

You need to be able to identify the type of energy being put into a device and the types of energy coming out.

### A. A Television

Energy in: \_\_\_\_\_

Energy out: \_\_\_\_\_

### B. A Portable Drill

Energy in: \_\_\_\_\_

Energy out: \_\_\_\_\_

### C. A Bungee Jumper

Energy in: \_\_\_\_\_

Energy out: \_\_\_\_\_

### D. A Washing Machine

Energy in: \_\_\_\_\_

Energy out: \_\_\_\_\_

### E. A Bow and Arrow

Energy in: \_\_\_\_\_

Energy out: \_\_\_\_\_

### F. A Filament Lamp

Energy in: \_\_\_\_\_

Energy out: \_\_\_\_\_

Some of the energy going in to a device is transformed into a type of energy that we want. We call this the

useful energy out

helpful energy out

needed energy out

Some of the energy going in to a device is transformed into a type of energy that we don't want. We call this the

unnneeded energy out

lost energy out

waste energy out

**Draw the energy transformation diagrams** for the following situations. You should include the types of energy going in, coming out and example numbers to show your understanding of the conservation of energy.

1) A pendulum swinging

3) A person sliding down a slide

2) A ball bouncing

4) A car rolling down the hill and then the brakes are

applied

Here is an example of an energy transformation diagram.

What type of energy is into the device?

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How much energy goes into the device?

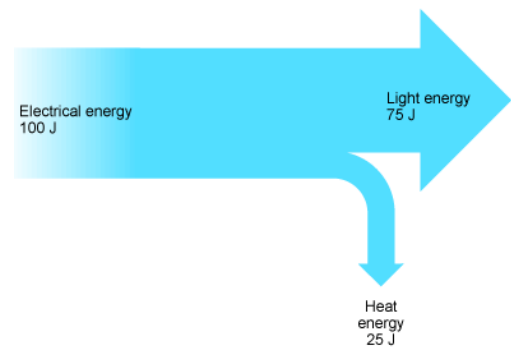
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What types of energy come out of the device?

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How much energy comes out of the device?

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## Kinetic energy calculations

This is what you really need to be able to do – use the equation exactly as it is given to you to be able to calculate kinetic energy. Try for yourself – have a go at these questions:

$$K = \frac{1}{2}mv^2$$

1. A car that travels at a speed of 20m/s and has a mass of 1200 kg.
2. A year 11 pupil with a mass of 55kg swinging back on their chair and falling off it at a speed of 0.6m/s.
3. A runner with a mass of 62kg running at a speed of 0.8m/s.
4. A tennis ball travelling at a speed of 46m/s with a mass of 58kg.
5. A dog running across a field at a speed of 1.2m/s with a mass of 3.2kg.

## Weight and Gravitational Potential Energy

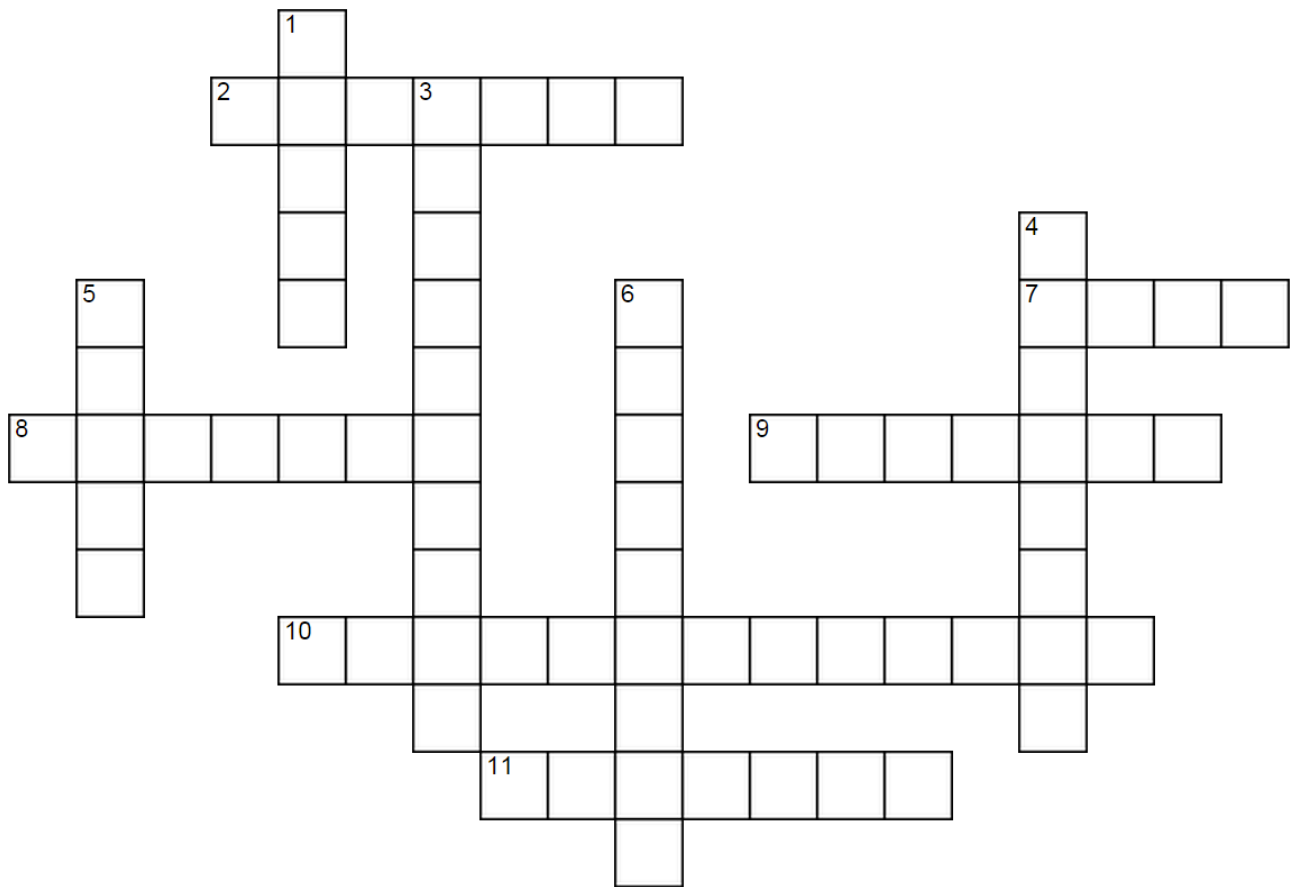
$$\text{GPE} = mgh$$

Calculate the weight for the objects in the table below.

Assuming that the object was on Earth, where acceleration due to gravity is 10N/kg, calculate the gravitational potential energy that they had.

Mass (kg)	Weight (N)	Height (m)	Gravitational Potential energy (J)
5		2	
2		6	
8		5	
20		0.6	
5000		2	
0.2		10	
67		44	

# Energy forms linkword



## CLUES

- 1 down            The energy emitted by a luminous object (5)
- 2 across         The energy of a moving object (7)
- 3 down           The energy of a moving current (9)
- 4 down           The energy released when bonds are formed between atoms (8)
- 5 down           The energy of particles in compressions and rarefactions perceived as a noise (5)
- 6 down           Three forms of energy with the capability of being released in the future (9)
- 7 down           Another name for 9 across (4)
- 8 across         The energy of the strong force between protons and neutrons (7)
- 9 across         The energy of atoms vibrating at temperatures above absolute zero (7)
- 10 across        The energy released when an object falls to a lower height (13)
- 11 across        The energy released when an object returns to its unstrained shape (7)

**WORD BANK:** THERMAL, SOUND, POTENTIAL, NUCLEAR, LIGHT, KINETIC, HEAT, GRAVITATIONAL, ELECTRICAL, ELASTIC, CHEMICAL

<b>Energy Source</b>	<b>Where the energy comes from</b>	<b>How it works</b>	<b>Advantages (+)</b>	<b>Disadvantages (-)</b>
<b>Solar energy</b>	the Sun			
<b>Wind energy</b>				
<b>Biomass energy</b>				
<b>Geothermal energy</b>				

<b>Energy Source</b>	<b>Where the energy comes from</b>	<b>How it works</b>	<b>Advantages (+)</b>	<b>Disadvantages (-)</b>
<b>Hydroelectric energy</b>				
<b>Tidal energy</b>				
<b>Wave energy</b>				
<b>Nuclear energy</b>				
<b>Fossil fuel (coal / oil) energy</b>				