Energy And Work Done😵

Types of Energy And the transfer of energy🥵

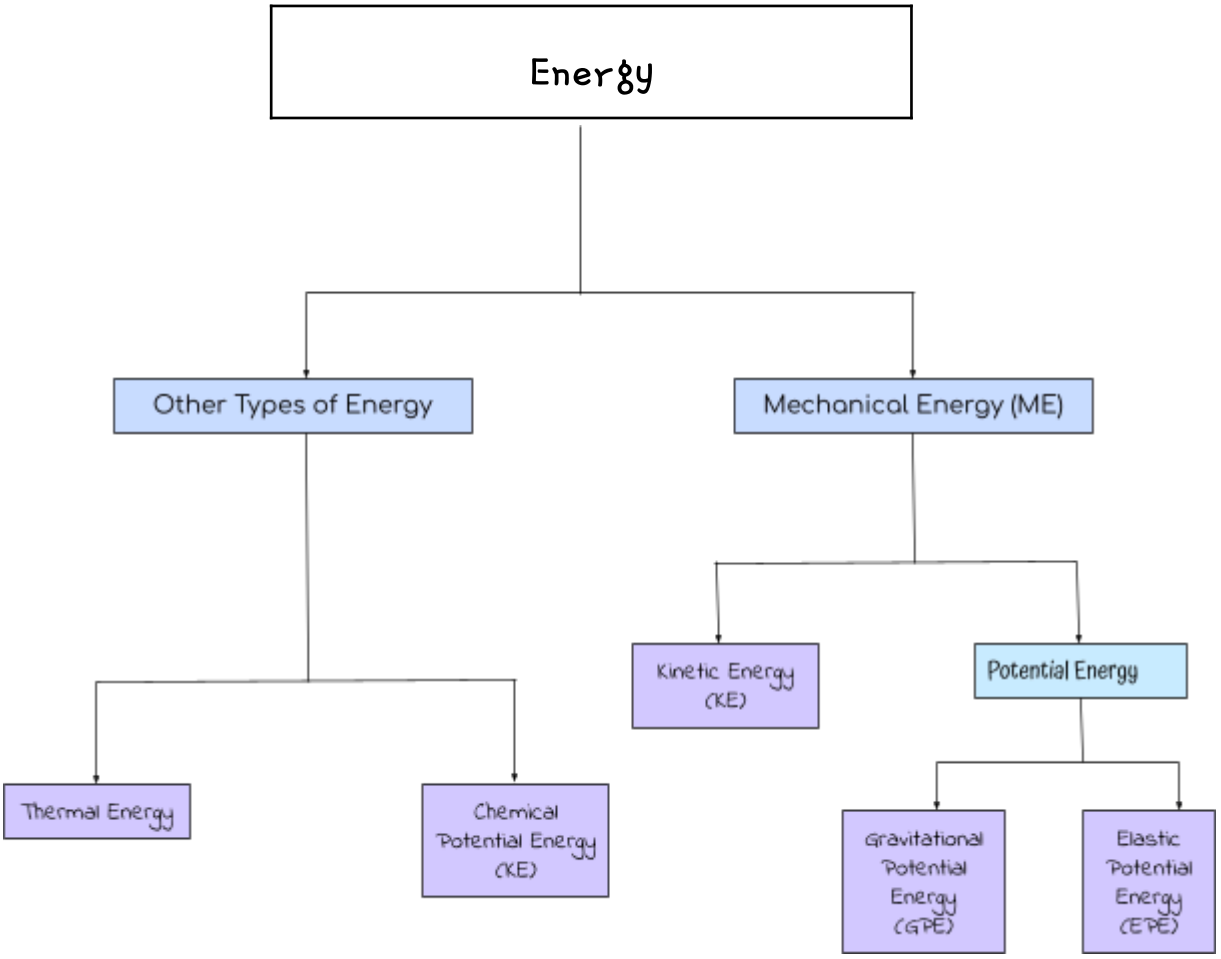
1.ENERGY

Definition Of Energy And Its Types

Energy is defined as the capacity to do work

SI Unit: Joules (J)

There are Different types of energy stores (a way in which energy can be stored)



Energy Transfers In Objects

The *Principle Of Conservation Of Energy* states that

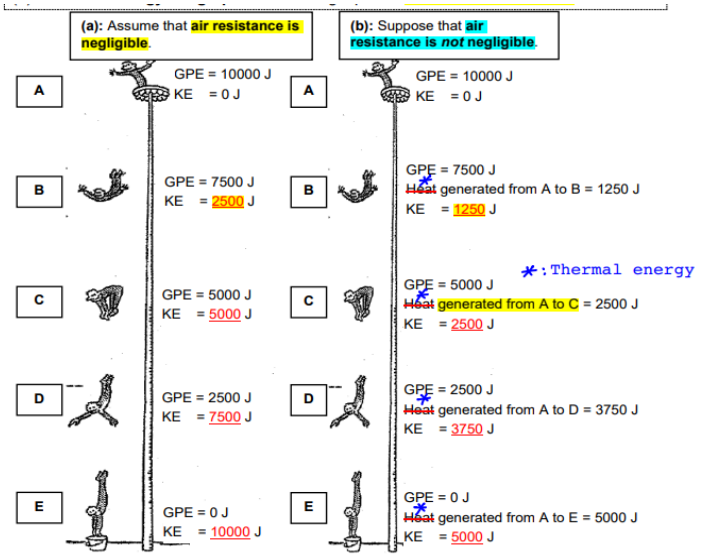
❤ Energy Cannot be created or destroyed

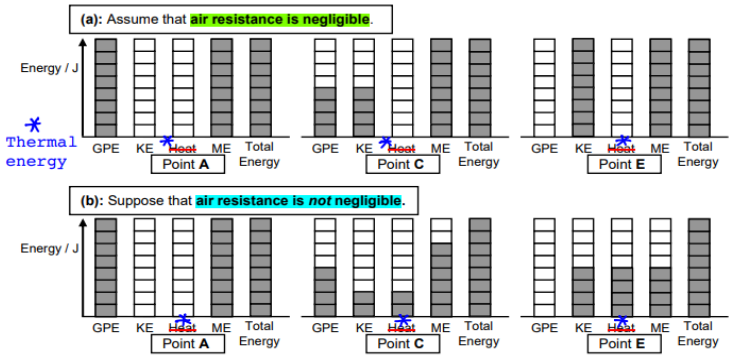
❤ Energy can be *transferred* from one *store* to another

❤ The total energy of an isolated system is constant (Note: no net external force)

Without Air Resistance vs With Air Resistance

No Thermal energy created	Themal energy is created


(a): Assume that air resistance is negligible.
(b): Suppose that air resistance is not negligible.
A
B
C
D
E
GPE = 10000 J
KE = 0 J
GPE = 7500 J
KE = 2500 J
GPE = 5000 J
KE = 5000 J
GPE = 2500 J
KE = 7500 J
GPE = 0 J
KE = 10000 J
GPE = 10000 J
KE = 0 J
GPE = 7500 J
Heat generated from A to B = 1250 J
KE = 1250 J
GPE = 5000 J
Heat generated from A to C = 2500 J
KE = 2500 J
GPE = 2500 J
Heat generated from A to D = 3750 J
KE = 3750 J
GPE = 0 J
Heat generated from A to E = 5000 J
KE = 5000 J
*: Thermal energy


(a): Assume that air resistance is negligible.
Energy / J
Thermal energy
GPE
KE
Heat
ME
Total Energy
Point A
Point C
Point E
(b): Suppose that air resistance is not negligible.
Energy / J
GPE
KE
Heat
ME
Total Energy
Point A
Point C
Point E

2.WORK DONE

Definition Of Work Done And Its Formula

Work done is the product of the force and the distance moved in the erection of the force.

Work is only done when:

1. Is there a force acting on the object by another object
2. Does the object move?
3. Is the movement of object in the direction of the force

Formula

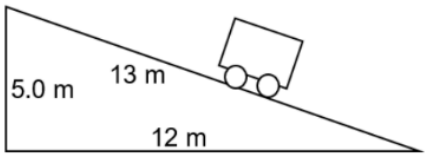
$W = F \times d$

Work done(Joules,J)= Force(Newtons,N)× distance(metres,m)

Answers must be in 2 or 3 s.f.!

Work done against Gravity

7. A car of mass 1000 kg travels up a slope as shown in the diagram.
What is the work done against gravity?
Assume that the gravitational field strength is 10 N/kg.



Working	Rationale
W = mg = 1000 kg x 10 N/kg = 10000 N. Work done = Force x distance Work done = 10000 N x 5.0 m = 50000 N m = **50000 J**	When calculating work done against gravity, we must consider the gravitational force (i.e. weight) of the object. Recall the work done equation. To calculate **work done against gravity**, use the **gravitational force** and the distance moved against gravity (vertical distance).

Note: Must use the vertical distance!!!

Therefore,

1.Work done against push force: Use push force

2.Work done against friction: Use frictional force

3.Work done against gravity: use vertical distance with weight

3. Why S.I. Units are the same for Energy and Work Done?

When work is done on an object, energy is transferred. This may change the energy of the object

Model Answer:
Work os done on(the object) by the (type of force,if by another object, state that it is exerted by(the other object))
Which (increases/decreases) its (type of energy related to the force)