Ormiston Victory Academy

Subject: Physics Term 1

Victory Vitals

P1 Conservation of Energy

Principle of the conservation of energy: **Energy can never be created or destroyed**

Kinetic energy	All moving objects have kinetic energy. E_k = 0.5 x mass x speed^2 E_k = 0.5 x m x v^2 (J) (kg) (m/s)
Gravitational Potential energy	When an object moves higher off the ground E_p = mass x gravity x height moved E_p = m x g x Δh (J) (kg) (N/kg) (m)
Elastic potential energy	Energy stored in springs, elastic bands and bouncy balls E_e= 0.5 x spring constant x extension^2 E_e = 0.5 x k x e^2 (J) (N/m) (m) This equation is given in the exam

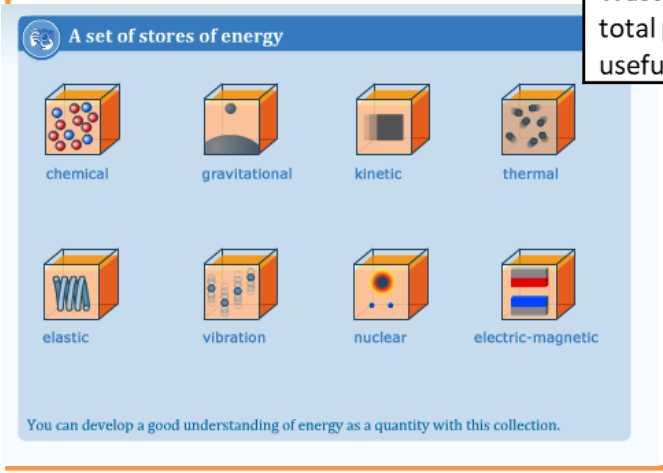
$$Efficiency = \frac{Useful}{Total} x100$$

There are no units for efficiency, your answer is either a decimal or a percentage. Every machine is always less than 100% efficient.

Efficiency and power

$$Efficiency = \frac{useful\ power}{total\ power} x100$$

Wasted power = total power input – useful power



P2 Energy Transfer by Heating

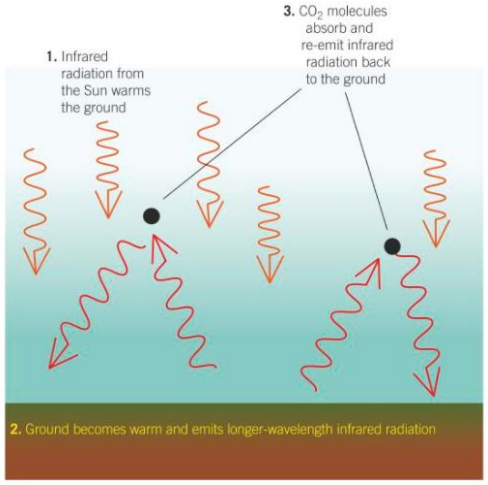
Heat is thermal energy. It can be transferred from one place to another by conduction. Metals are good conductors of heat, but non-metals and gases are usually poor conductors. Poor conductors are called insulators.

All materials have a specific heat capacity value. The higher the value of the specific heat capacity, the more energy it takes to heat up a material. Metals have low values as they are easily heated up.

Equation for specific heat capacity:
Energy = mass x specific heat capacity x change in temperature

Way to reduce heat loss from a house:
- Aluminium foil behind radiators
- Cavity wall insulation
- Loft insulation
- Thick walls
- Double glazing

The higher the temperature of an objects the more infrared radiation it emits



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Vocabulary:

Conservation of energy: energy cannot be created or destroyed

Dissipated energy: the energy that is not usefully transferred and stored in less useful ways

Efficiency: useful energy transferred by a device ÷ total energy supplied to the device

Elastic potential energy: energy stored in an elastic object as a result of it being deformed. For example, a stretched spring

Input energy: energy supplied to a device

Power: the energy transformed or transferred per second. The unit of power is the watt (W)

Spring constant: force per unit extension of a spring

Useful energy: Energy transferred to where it is wanted in the way that is wanted

Wasted energy: Energy that is not usefully transferred

Work: the energy transferred by a force. Work done (joules, J) = force (newtons, N) x distance moved in the direction of the force (metres, m)

Black body radiation: the radiation emitted by a perfect black body (a body that absorbs all the radiation that hits it)

Infrared radiation: electromagnetic waves between visible light and microwaves in the electromagnetic spectrum

Specific heat capacity: energy needed to raise the temperature of 1 kg of a substance by 1 °C

Thermal conductivity: property of a material that determines the energy transfer through it by conduction

Videos

Quizzes