Year 8 Science knowledge organiser

Module – Energy
Topic – Work and heating and cooling
Length of topic – Approx. 10 lessons
Method of assessment – Summative assessment

Links to prior learning

KS2 Year 5 Forces topic

- Recognise that force and motion can be transferred through mechanical devices such as gears, pulleys, levers and springs, allow a smaller force to have a greater effect.

KS3 Year 7 Energy

- We can describe how jobs get done using an energy model where energy is transferred from one store at the start to another at the end.
- When energy is transferred, the total is conserved, but some energy is dissipated, reducing the useful energy.

Knowledge to be taught.

- Work is done and energy transferred when a force moves an object. The bigger the force or distance, the greater the work. Machines make work easier by reducing the force needed. Levers and pulleys do this by increasing the distance
- The thermal energy of an object depends upon its mass, temperature and what it's made of. When there is a temperature difference, energy transfers from the hotter to the cooler object.
- Thermal energy is transferred through different pathways, by particles in conduction and convection, and by radiation.

Skills to be covered

- Using scientific keywords to explain how simple machines work.
- Use the formula: work done (J) = force (N) x distance moved (m)

Working scientifically strands covered

Analyse patterns	✓
Discuss limitations	✓
Draw conclusions	✓
Present data	✓
Communicate ideas	✓
Construct explanations	✓
Critique claims	
Justify opinions	
Collect data	✓
Devise questions	✓
Plan variables	✓
Test hypothesis	✓
Estimate risks	
Examine consequences	
Review theories	
Interrogate	

Assessment

Summative assessment based on knowledge taught through the topic

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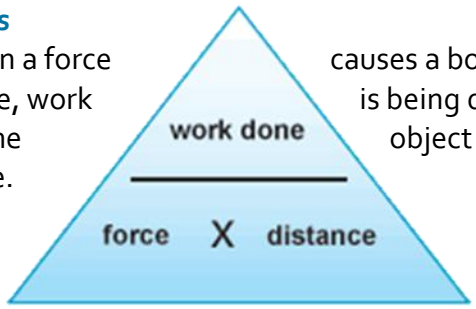
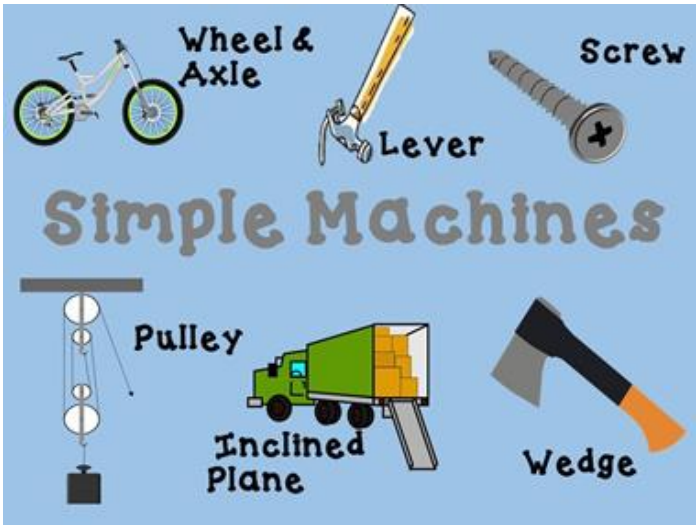
Facts

When a force causes a body to move, work is being done on the object by the force.

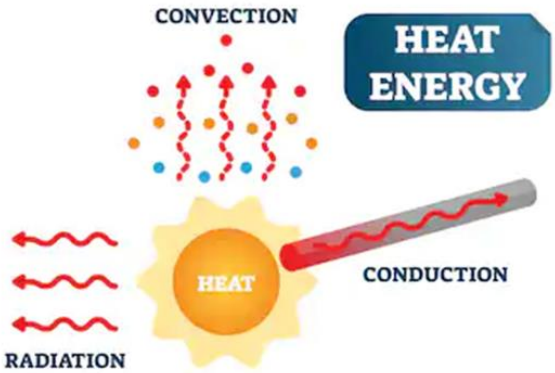


A hammer, pulley and a ramp are all simple machines designed to me work easier.



The more powerful a device is, the more energy it will transfer each second.

Radiation is why we are warmed by the Sun, even though it is millions of kilometres away in space.



Double glazing involves having two panes of glass in the window instead of just one. This reduces energy transfer by conduction.

Keywords

Conduction: The transfer of heat through a material by transferring kinetic energy from one particle to another.
Conductor: A material which allows charge to move easily through it.
Conduction: Transfer of thermal energy by the vibration of particles.
Convection: Transfer of thermal energy when particles in a heated fluid rise.
conservation of energy: The principle that the total energy of a system stays the same, that energy cannot be created or destroyed (only stored or transferred).
Deformation: When an elastic object is stretched or squashed, which requires work.
Displacement: The distance an object moves from its original position.
Energy transfers: Changes from one form of energy to another form of energy.
Infrared radiation: Electromagnetic radiation emitted from a hot object.
Input force: The force you apply to a machine.
Insulator: Material that only allows heat to travel slowly through it.
Lever: A type of machine which is a rigid bar that pivots about a point.
Output force: The force that is applied to the object moved by the machine.
Radiation: Transfer of thermal energy as a wave.
Temperature: A measure of the motion and energy of the particles.
Thermal energy: The quantity of energy stored in a substance due to the vibration of its particles.
Work: The transfer of energy when a force moves an object, in joules.