Year 7 Science knowledge organiser

Module - Energy
Topic – Energy costs and energy transfers
Length of topic – Approx. 8 lessons
Method of assessment – Summative and Levelled assessment

Links to prior learning

KS2 Year 4 Electricity topic

- identify common appliances that run on electricity

Knowledge to be taught.

- We pay for our domestic electricity usage based on the amount of energy transferred.
- Electricity is generated by a combination of resources which each have advantages and disadvantages.
- 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.

To be secure I must show…

- I can compare the energy usage and cost of running different home devices.
- I can explain the advantages and disadvantages of different energy resources.
- I can represent the energy transfers from a renewable or non-renewable resource to an electrical device in the home.
- I can describe how the energy of an object depends on its speed, temperature, height or whether it is stretched or compressed.
- I can show how energy is transferred between energy stores in a range of real-life examples.
- I can calculate the useful energy and the amount dissipated, given values of input and output energy.
- I can explain how energy is dissipated in a range of situations.

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

Levelled assessment – Where does electricity come from?

Pupils will need to show they can:

- Use diagrams with brief descriptions to explain how electricity can be generated using coal and wind.
- Describe the difference between *renewable* and *non-renewable* resources.
- Give reasons for the merits for using both coal and wind to generate electricity
- Draw an accurate Sankey diagram showing the energy transfer through a television

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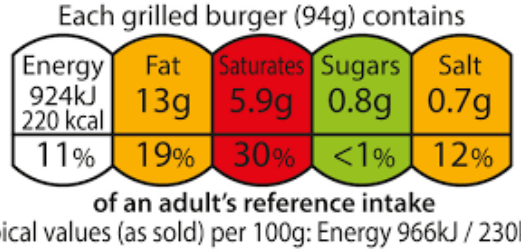
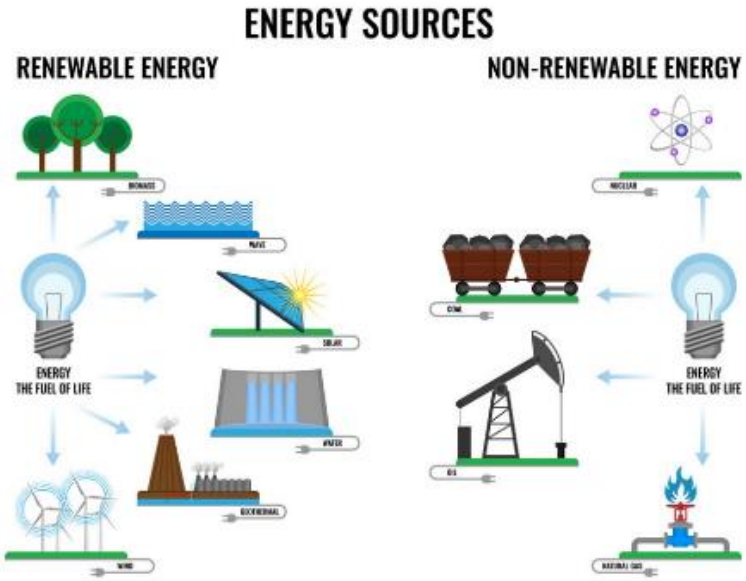
Facts

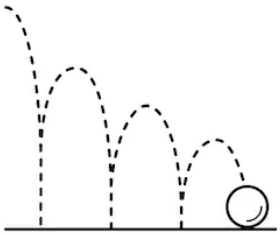
Food labels list the energy content of food in kilojoules (kJ).



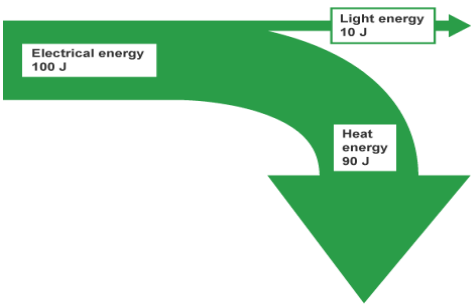
Electricity is generated by a combination of renewable and non-renewable resources which each have advantages and disadvantages.



Bouncing balls cannot go on forever as energy is dissipated.



You can show energy transfers in a Sankey diagram. The thicker the arrow, the greater the amount of energy involved.



Keywords

Chemical energy store: Emptied during chemical reactions when energy is transferred to the surroundings.
Dissipated: Become spread out wastefully.
Elastic energy store: Filled when a material is stretched or compressed.
Energy resource: Something with stored energy that can be released in a useful way.
Finite resource: Resource that can only be used once and is in limited supply. For example, oil is a finite resource.
Fossil fuels: Non-renewable energy resources formed from the remains of ancient plants or animals. Examples are coal, crude oil and natural gas.
Joules: The unit of work or energy, written as J.
Kinetic energy store: Filled when an object speeds up.
Generator: Device that converts kinetic energy into electrical energy.
Geothermal: Energy from the heat of the Earth.
Gravitational potential energy store: Filled when an object is raised.
Non-renewable: An energy resource that cannot be replaced and will be used up.
Nuclear fuels: Radioactive materials, usually uranium or plutonium, used in nuclear reactors.
Power: How quickly energy is transferred by a device (watts).
Renewable: An energy resource that can be replaced and will not run out. Examples are solar, wind, waves, geothermal and biomass.
Thermal energy store: Filled when an object is warmed up.
Turbine: Revolving machine with blades that are turned by wind, water or steam. Turbines in a power station turn the generators.
Watt: The unit of power.