Knowledge Organiser: Year 7: - Energy

Section 1: Key Words

Energy	The ability to do work
Energy source	Something that can be consumed to produce power e.g. coal
Fossil Fuel	The fossil fuels are coal, oil and natural gas. They are fuels because they release heat energy when they are burned. They are fossil fuels because they were formed from the remains of living organisms millions of years ago
Non-renewable	Materials that will one day run out; they are finite (have and end)
Renewable	sustainable ways of generating energy. The quickly replenish themselves and can be used again and again – although you do not use the same bit of energy energy
Wasted energy	Energy that is lost from a system and is not transferred or changed into the type of energy desired
Watt	The unit used to measure power
Power	A measure of how quickly energy is transferred
Efficiency	How much energy is transferred or changed into the type of energy you want
Kilowatt hour	The unit used to measure the amount of mains electrical energy transferred
Joule	The unit used to measure energy
Conservation of Energy	Energy can't be created or destroyed only changed from one type into another
Work done	The energy transferred when completing a task
Dissipate	The loss of energy from a system (energy wasted)

Section 2: Types of Energy

Energy Type	Example
Light Energy	Sun, light bulb, torch
Thermal Energy (heat)	Oven, electric fire
Sound Energy	Radio, speakers, TV
Electrical Energy	Electric car, laptop
Nuclear Energy	Nuclear power station, nuclear bomb
Chemical Energy	Food, batteries, coal
Gravitational Potential Energy	Book on a shelf, boulder on a cliff
Elastic Potential Energy	Bow, wind-up toy, stretch spring
Kinetic Energy (movement)	Person running, rolling ball

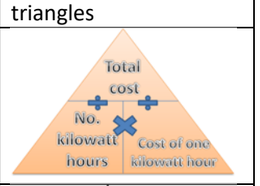
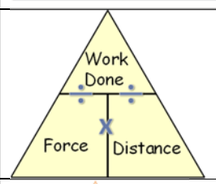
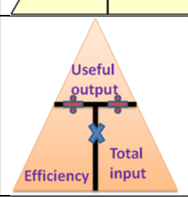
Section 3: Renewable and Non-renewable Energy Sources

Renewable Energy	Quickly replenishes its energy used. Infinite	Wind power, solar power, hydroelectric power, tidal power, geothermal power, biomass
Non-renewable Energy	Is finite (will run out). Does not quickly replace energy used	Fossil fuels – coal, oil and natural gas Nuclear power

Section 4: Advantages and Disadvantages of different Energy Sources

Energy Source	Advantages	Disadvantages
Fossil Fuels	Cheap to set up, power stations already present	Limited (will run out), causes pollution – greenhouse gases and gases that make acid rain, running costs
Nuclear power	Does not produce carbon dioxide or sulphur dioxide	Finite (will run out) danger from radioactive material
Wind power	Infinite, cheap to run, no pollution, cheap to run	Costly to build, only works when windy, noisy and ugly
Tidal power	Good for islands, potential to generate lots of energy, reliable – tide will always go in and out, doesn't release pollution	Costs a lot to build, hard to find suitable locations, could damage environment
Solar power	Infinite, building can have their own power supply, doesn't release pollution, cheap to run	Expensive to set up, only works when sunny
Geothermal power	Doesn't create any pollution, potentially infinite	Expensive to set up, only works in volcanic areas, volcanic activity may stop making station useless
Hydroelectric power	Doesn't create pollution, creates water reserves	Costly to build, can cause flooding, can have major ecological impacts
Biomass	Cheap, if replaced can be sustainable	Burning releases atmospheric pollution, replanting required

Section 5: Equations

	Equation	triangles
Cost	Cost = number of kilowatt hours x price for one kilowatt hour	
Word done	Work done = force x distance	
Efficiency	Efficiency = (useful output/total input) x 100	

Work done	Newtons per meter (N/m)
Force	Newtons (N)
Distance	Meters (m)
Efficiency	Percentage (%)

Section 6: Ways to reduce energy cost

heating	Put more jumpers on and turn off central heating
Hot water	Take showers, only boil the amount of water you need
Electrical appliances	Turn off devices that are on standby
Washing clothes	Air dry clothes, wash on a lower temperature
Heat lost from home	Install insulation – double glazing, loft/floor insulation

Section 6: Energy transfer diagrams for non-renewable power stations

Coal power station to TV

Input: Chemical energy → Intermediate: Kinetic energy → Intermediate: Electrical → Useful: sound light + Wasted thermal

Section 5: Energy Transfer Diagrams

When drawing energy transfer diagrams start with the energy in on the left of the arrow and the energy out on the right hand side. There will be waste and useful energy out

General Transfer diagram

Energy in → Useful energy out + Wasted energy out

Example

Torch

Input: Chemical energy → Useful: Light energy + Wasted: Thermal energy

Section 6: Energy transfer diagrams for renewable power stations

Wind turbine station to laptop

Input: kinetic → Intermediate: Electrical → Useful: sound light + Wasted thermal