Physics: Energy

1. Energy and methods of transfer	
1. Chemical	Energy transferred during chemical reactions
2. Kinetic	Energy in moving objects
3. Gravitational potential	Energy stored in objects raised up against the force of gravity
4. Elastic potential	Energy stored in an object that has been stretched
5. Nuclear	Energy stored in the nuclei of atoms that can fuse (nuclear fusion) or split (nuclear fission)
6. Magnetic	Energy stored in magnets that are attracting or repelling
7. Electrostatic	Energy stored in electric charges that are attracting or repelling
8. Mechanical	Energy transferred when a force moves through a distance
9. Electrical	Energy transferred when a charge moves
10. Radiation	Energy transferred by electromagnetic radiation
11. Thermal	Energy a substance has because of its temperature
12. Energy transfer	Energy transferred from one store to another

3. Comparing energy use in electrical appliances		
Appliance	**Useful energy**	**Wasted energy**
20. Light bulb	Light emitted from the glowing filament	Heat energy transferred from the filament
21. Electric heater	Energy heating the surroundings	Light emitted from the glowing filament
22. Electric toaster	Energy heating the bread	Energy heating the toaster case and the air around it
23.Electric kettle	Energy heating the water	Energy heating the casing of the kettle,
24. Hairdryer	Kinetic energy of the air driven by the fan, Thermal energy heating the air.	Sound of the fan motor, energy heating the hairdryer itself.
25. Electric motor	Kinetic energy of objects driven by the motor. Gravitational potential energy of objects lifted by a motor.	Energy heating the motor and energy transferred by the sound waves generated by the motor.

4. Key Terms	
26. Watt	1 watt is equal to the rate of transferring1 joule of energy in 1 second
27. Dissipation	The energy that is not usefully transferred and stored in less useful ways
28. Closed system	An object or group of objects for which the total energy is constant
29.Work	The energy transferred by a force.

2. Equations to learn			
13. Kinetic energy	E_k=0.5 x mass x velocity^2	E_k=0.5 m v^2	Energy-Joules (J), Mass- kilograms (Kg), Velocity- metres per second (m/s)
14. GPE	GPE= mass x gravitational field strength x height	E_p= m g h	Energy-Joules (J), Mass- Kilograms (Kg), Height- metres (m), Gravitational field strength- Newtons per kilogram (N/Kg)
15. Power	Power= energy transferred ÷ time	P=E/t	Power-Watts (W), Energy transferred- Joules (J), Time- seconds (s)
16. Efficiency	Efficiency= useful energy output / total energy input		Energy- Joules (J)
17. Efficiency	Efficiency= useful power output / total power input		Power-Watts (W)
18. Work done	Work done= force applied x distance moved	W= F x d	Work done- Joules (J), Force- Newtons (N), Distance- metres (m)
19. Elastic potential energy	E_e= ½ x spring constant x extension^2	E_e= ½ke^2	Energy-Joules (J), Spring constant- newtons per metre (N/m), Extension- metres (m)

Physics: Energy Resources

Resource	Renewable or Non-renewable	Uses	Advantages	Disadvantages
Fossil Fuel – coal, oil and natural gas	Non-renewable	Electricity Transport Heating	Reliable-electricity can be generated all the time. Relatively cheap way of generating electricity.	Produces carbon dioxide a greenhouse gas that causes global warming. Can produce sulfur dioxide, a gas that causes acid rain.
Nuclear fuel	Non-renewable	Electricity	Produces no carbon dioxide Reliable- can produce electricity all the time. More energy transferred per Kg compared to fossil fuels	Produces nuclear waste that remains radioactive for thousands of years. Expensive to build and decommission power stations. Danger of explosions.
Biofuel	Renewable	Heating and electricity	Carbon neutral	Production of fuel may damage ecosystem and create a monoculture
Wind	Renewable	Electricity	No carbon dioxide produced	Unreliable during low wind, expensive to construct
Hydroelectricity	Renewable	Electricity	No carbon dioxide produced	Blocks rivers stopping fish migration, unreliable as it may not produce electricity during a drought
Geothermal	Renewable	Electricity	No carbon dioxide produced, does not damage ecosystem	Fluids drawn from the ground may contain greenhouse gases which contribute to global warming
Tidal	Renewable	Electricity	No carbon dioxide produced	Unreliable as tides vary, may damage tidal ecosystem. Height of tide varies monthly and annually.
Waves	Renewable	Electricity	No carbon dioxide produced	Unreliable, does not produce electricity during calm seas
Solar	Renewable	Electricity and heating	No carbon dioxide produced	Unreliable, does not produce electricity at night. Limited production on cloudy days.