Physics Unit 2 Energy Fact Sheet

Energy resources	
1. List 3 general uses of energy sources	**Transport, generating electricity, heating**
2. What is a non-renewable energy resource?	**Cannot be replenished**
3. What is a renewable energy resource?	**Can be replenished as it is used**
4. List 2 non-renewable energy resources available on Earth	**Fossil fuels, nuclear fuel**
5. List 7 renewable energy resources available on Earth	**Bio-fuel, wind, hydroelectric, geothermal, tides, Sun, water waves**
6. Name 3 fossil fuels	**Coal, oil, gas**
7. Name 2 nuclear fuels	Uranium, plutonium
8. Name 3 biofuels	Wood, straw, nut shells, ethanol
9. List 3 energy resources which use water	**Hydroelectric, waves, tidal**
10. Which energy resource uses energy from the Sun?	**Solar**
11. Which energy resource is using heat from the ground?	**Geothermal**
12. Which energy resource uses water flowing down a mountain?	**Hydroelectric**
13. Which energy resource uses a dam to hold back water?	**Tidal**
14. Which energy resources produce carbon dioxide as they are used?	**Fossil fuels**
15. Which energy resources cause visual pollution?	**All can**
16. Which energy resources destroy habitats?	All can, but especially hydroelectric and tidal as they interfere with rivers
17. List reasons why science doesn't have the power to deal with the environmental problems of using energy resources	Need to consider cost (economic), politics, social issues and ethical issues
Electricity Distribution	
1. How is electricity distributed around the country?	**National Grid**
2. Name the parts of the National Grid	• **Cables** • **Pylons** • **Transformers**
3. What type of transformer is used at the start of the National Grid? Why?	• Step up

	• To increase the voltage, which reduces the current
4. What type of transformer is used at the end of the National Grid? Why?	• Step down • To decrease the voltage, which increases the current
5. Why is does the National Grid transmit electricity at a high voltage?	Lower current So less energy is lost

Energy stores and systems

1. What do we call an object or group of objects?	System
2. How do we describe a system if nothing is added or taken away from it?	Closed

Energy transfers

1. State the units for energy	**Joules (J)**
2. Energy cannot be _____ or _____	**Created or destroyed**
3. Describe the changes in energy when water is boiled in an electric kettle	**Electrical→ thermal + sound**
4. Describe the energy changes for a TV	**Electrical → sound + light + thermal**
5. Describe the energy changes for a washing machine	**Electrical → kinetic + sound + thermal**
6. Describe the energy changes for an electric drill	**Electrical → kinetic + sound + thermal**
7. In a closed system, the total energy before the change =	The total energy after the change
8. Describe the changes in energy when an object moves upwards	Kinetic → gravitational potential + thermal
9. Describe the changes in energy when a moving object hits an obstacle	Kinetic → elastic + sound + thermal
10. Describe the changes in energy when a vehicle slows down	Kinetic → thermal

Efficiency

1. What happens to energy which is not usefully transferred?	**Wasted**
2. State the useful and wasted energy from an electric drill	**Useful: kinetic** **Wasted: thermal, (sound-radiation)**
3. State the useful and wasted energy from a washing machine	Useful: kinetic, thermal Wasted: thermal, (sound-radiation)
4. Which form of energy is wasted by all electrical devices?	**Thermal (heat)**
5. If a device doesn't waste much energy, we say it is very …….	**Efficient**

6. **How do you calculate efficiency if you know energy values?**	**Efficiency = useful output energy ÷ total input energy**
7. **How do you calculate efficiency if you know power values?**	**Efficiency = useful power output ÷ total power input**

Reducing energy loss	
1. What can we do to reduce the heat loss from an object?	Insulate it
2. What can we do to reduce heat loss due to friction?	Lubricate the moving parts
3. A material which transfers heat quickly is described as a good ……	Conductor of heat
4. The higher the thermal conductivity, the ….. energy is transferred	faster
5. The higher the thermal conductivity of house walls, the …. house will cool down	faster

Calculating energy transferred	
1. What 2 factors determine how much energy an appliance transfers? ÷	• Time it is used for • Its power
2. **How do you calculate energy transferred?**	**Energy transferred = power x time**
3. **What are the units for power?**	**Watts (W)**

Power and work	
1. **What is power?**	**Rate at which energy is transferred or Rate at which work is done**
2. **How do you calculate power? (2 equations)**	**Power = energy transferred ÷time Power = work done ÷ time**
3. **What are the units for work?**	**Joules (J)**
4. An energy transfer of 1J per second =	1 Watt
5. Motor A lifts 10N 3m in 30 seconds. Motor B lifts 10N 3m in 60 seconds. Which motor is more powerful? Explain	• Motor A • because it does the same work but faster

Gravitational potential energy	
1. **When do objects have gravitational potential energy?**	**When they are above the ground**
2. **What are the units for gravitational potential energy?**	**Joules (J)**
3. **How do you calculate gravitational potential energy?**	**= mass x gravitational field strength x height**
4. What are the units for gravitational field strength?	N/kg

Kinetic energy	

1. When do objects have kinetic energy?	**When they are moving**
2. What are the units for kinetic energy?	**Joules (J)**
3. How do you calculate kinetic energy?	= ½ x mass x speed x speed *or* = ½ x mass x speed^2
4. What are the units for speed?	m/s
Elastic potential energy	
1. When do objects have elastic potential energy?	**When it is stretched**
2. What are the units for elastic potential energy?	**Joules (J)**
3. What are the units for the spring constant?	N/m

SKILLS SECTION.

4marks per question:
- Equation written down
- Substitution of numbers into the equation
- Number answer
- Units on the

1. An electric drill has a power input of 200W. Its useful power output is 50W. Calculate its efficiency as a percentage. (4)	Efficiency = useful power out ÷ total power input (50/200) x 100 =25 %
2. A TV converts 800J of electrical energy into 400J heat, 200J light and 200J sound. Calculate its efficiency as a decimal (4)	Efficiency= useful energy out ÷ total energy in 400/800 =0.5
3. An electrical device has a power of 10W and is used for 300 seconds. Calculate the energy which it has transferred (4)	**Energy = power x time** **10 x 300 = 3,000 J**
4. An electrical device uses 150J of energy in 3 seconds. Calculate the power of the appliance (4)	Power = energy ÷ time 150/3 = 50 W
5. If 600J of work are done in 100 seconds, what is the power? (4)	Power = work down ÷ time 600/100 = 6W
6. A fish of 1kg mass is moving at 3m/s. Calculate the kinetic energy of the fish (4)	K_E = ½ x mass x speed x speed = ½ x 1 x 3 x 3 = 4.5 J
7. A person is 60kg and is lifted 2m up from the ground. Calculate the gravitational potential energy (4)	**GP = mass x gravitational strength x height** **= 60 x 10 x 2** **= 1200J**
8. Calculate the elastic potential energy of a bungee rope when it is stretched 3m. The spring constant for the rope is 7.	$E_e = ½\ k\ e^2$ = ½ x 7 x 3^2 = 31.5J

Higher Tier / Triple

There are no additional facts for higher tier or for triple for this unit