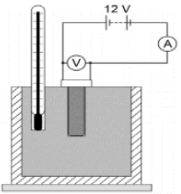


1.	What is a system?	A system is an object or group of objects.
2.	What happens to the energy in a system when the system changes?	The way the energy is stored changes.
3.	What are the energy store changes when a ball is thrown upwards?	The person throwing the ball supplies kinetic energy which causes the ball to rise. The ball slows down as it rises, which causes the store of kinetic energy to transfer to gravitational potential energy.
4.	What are the energy store changes when a moving object hits an obstacle?	The moving object has a store of kinetic energy, which is transferred to other stores when it hits the obstacle and suddenly stops. Some of these stores include elastic potential energy in squashing objects and vibrational energy as a sound is emitted.
5.	What are the energy store changes when an object is accelerated by a constant force?	When a constant force is applied across a distance, work is done on the object. This work is transferred to a store of kinetic energy in the object, causing it to move.
6.	What are the energy store changes when a vehicle applies its brakes to slow down?	A moving vehicle has a store of kinetic energy, and when the brakes are applied there is a large amount of friction. As this happens, heat energy is released.
7.	What are the energy store changes when water is boiled in an electric kettle?	The kettle transfers a store of electrical energy to heat energy, which is transferred to the water to heat it up as the molecules have more vibrational energy.
8.	If 500 J of electrical energy is used by a kettle, how much heat energy will the water have gained?	500 J
9.	What store of energy is associated with movement?	Kinetic energy
10.	What is the word equation for kinetic energy?	kinetic energy = $\frac{1}{2}$ x mass x (speed) ²
11.	What is the symbol equation for kinetic energy?	$E_k = \frac{1}{2}mv^2$
12.	What are the units of kinetic energy?	Joules, J
13.	What store of energy is associated with a stretched spring?	Elastic potential energy
14.	Give the word equation for elastic potential energy?	elastic potential energy = $\frac{1}{2}$ x spring constant x (extension) ²
15.	Give the symbol equation for elastic potential energy?	$E_e = \frac{1}{2}ke^2$
16.	What are the units of elastic potential energy?	Joules, J
17.	What store of energy is associated with the height of an object above ground level?	Gravitational potential energy
18.	Give the word equation for gravitational potential energy?	g p e = mass x gravitational field strength x height
19.	Give the symbol equation for gravitational potential energy?	$E_p = mgh$
20.	What are the units of gravitational potential energy?	Joules, J

21.	What is the store of energy that is associated with temperature changes?	Thermal energy
22.	Give the word equation for the change in thermal energy?	change in thermal energy = mass x specific heat capacity x temperature change
23.	Give the symbol equation for the change in thermal energy?	$\Delta E = mc\Delta\theta$
24.	What is the unit of specific heat capacity?	J/kg °C
25.	What is the specific heat capacity of a substance?	It is the amount of energy required to raise the temperature of 1 kg of the substance by 1 °C.
26.	 <p>In the specific heat capacity required practical, why is it important to insulate the block?</p>	So that all of the thermal energy transferred to the block is used to increase its temperature, and is not dissipated to the surroundings.
27.	What is the definition of power?	Power is defined as the rate at which energy is transferred or the rate at which work is done.
28.	What is the word equation for power?	Power = $\frac{\text{energy transferred}}{\text{time}}$, Power = $\frac{\text{work done}}{\text{time}}$
29.	What is the symbol equation for power?	$P = \frac{E}{t}$, $P = \frac{W}{t}$
30.	What is the unit of power?	Watts, W
31.	What does 1 Watt mean?	An energy transfer of 1 Joule per second.
32.	Compare the power of two electric motors that both lift the same weight through the same height but one does it faster.	The one which does it faster has the greater power.
33.	What is the principle of conservation of energy?	Energy cannot be created or destroyed, it can only be transferred usefully, stored or dissipated.
34.	When there are energy transfers in a closed system, what happens to the total energy of the system?	There is no net change to the total energy.
35.	What does it mean when we say that energy is "wasted"?	In all system changes energy is dissipated, so that it is stored in less useful ways - such as thermal energy.
36.	Give some examples of how to reduce unwanted energy transfers.	Thermal insulation, lubrication...
37.	What does thermal conductivity mean?	The higher the thermal conductivity of a material the higher the rate of energy transfer by conduction across the material.
38.	What factors affect the rate of cooling of a building?	The thickness and thermal conductivity of its walls.
39.	In the insulation required practical, what is the independent variable?	The type and thickness of insulating materials
40.	What does the efficiency of an energy transfer tell?	How much of the input energy is transferred usefully
41.	What is the word equation for efficiency of an energy transfer?	efficiency = $\frac{\text{useful output energy transfer}}{\text{total input energy transfer}}$
42.	What is the word equation for efficiency of a power output?	efficiency = $\frac{\text{useful power output}}{\text{total power output}}$
43.	How can the efficiency of an energy transfer be increased?	By using lubrication or insulation
44.	What is the definition of a renewable energy resource?	It is one that can be replenished as it is used.

45.	What are some examples of renewable energy resources?	Biofuel, wind, hydro-electricity, geothermal, tidal, solar, wave
46.	What is the definition of non-renewable energy?	It is one that cannot be replenished.
47.	What are some examples of non-renewable energy resources?	Fossil fuels (coal, oil, natural gas), nuclear
48.	What are some uses of energy resources?	Transport, electricity generation, heating.
49.	Why are some energy resources more reliable than others?	Some resources rely on the weather (such as solar and wind power) which may not always be favourable, but some resources are always accessible.
50.	What environmental impact do some resources cause?	Burning fossil fuels and biofuel release CO ₂ into the atmosphere which contributes to global warming.
51.	Although we know that these environmental issues arise, why can we not always deal with them?	There may be political, social, ethical or economic considerations.
52.	What is the equation linking kinetic energy, mass and velocity?	$E_k = 0.5mv^2$
53.	What are the units of energy?	joules
54.	What are the units of mass?	kilograms
55.	What are the units of velocity?	metres per second
56.	What is the equation linking gravitationa field strength, gravitational potential energy and height?	$E_p = mgh$
57.	What are the units of gravitational field strength?	newtons per kilogram
58.	What is the equation linking energy transferred, power and time?	$P = E/t$
59.	What are the units of power?	Watts
60.	What is the definition of power?	Power is the rate of transfer of energy or the rate of doing work
61.	What is the equation linking power, time and work done?	$P = W/t$
62.	What are the units of work done?	joules
63.	What is the equation for calculating efficiency from energy?	Efficiency = useful energy output/total energy input
64.	What is the equation for calculating efficiency from power?	Efficiency = useful power output/useful power input
65.	What is the type of energy transferred when a force moves through a distance?	Mechanical transfer
66.	Mechanical transfer is...?	The energy transfer when a force moves through a distance
67.	Electrical transfer is...?	energy transferred when a charge moves?
68.	What is the energy transferred when a charge moves?	electrical transfer
69.	What is the energy transferred by electromagnetic radiation?	Radiation transfer
70.	Radiation transfer is...?	The energy transferred by electromagnetic radiation.
71.	Heat transfer is...?	Energy transferred when an object is heated.

72.	When an object is heated the energy transfer is a...?	heat transfer
73.	List the 4 energy transfer pathways.	Mechanical, electrical, radiation and heat.
74.	List 4 energy stores.	Four from: chemical, kinetic, gravitational potential, elastic potential, nuclear, magnetic, electrostatic, Thermal
75.	Energy stored in objects which move.	kinetic
76.	What is a kinetic energy store	Energy stored in objects which move
77.	Chemical energy is stored as...?	chemicals waiting to react
78.	A battery is a store of _____ energy.	chemical
79.	Food is a store of _____ energy.	chemical
80.	A moving object is a store of _____ energy	kinetic
81.	What is a gravitational potential store?	energy stored in objects raised up against the force of gravity.
82.	A rock at the top of a hill is a store of _____ energy.	gravitational potential
83.	What is an elastic potential store?	Energy stored in an object which has been stretched or compressed.
84.	A compressed spring is a store of _____ energy	elastic potential
85.	An inflated balloon is a store of _____ energy	elastic potential
86.	The internal energy store is...	energy stored in the movement of particles.
87.	The internal energy store of an object can be changed by...?	heating or cooling
88.	Energy stored in the nuclei of atoms is in the _____ store.	nuclear
89.	What is a nuclear energy store?	Energy stored in the nuclei of atoms that can fuse or split.
90.	What is the name of the process in which the nuclei of atoms fuse together?	fusion
91.	What is the name of the process in which the nucleus of an atom splits?	fission
92.	What is the magnetic energy store?	Energy stored in magnets that are attracting or repelling
93.	What is the electrostatic energy store?	Energy stored in electric charges that are attracting or repelling
94.	Name two non-renewable energy resources	Fossil fuels, nuclear fuel
95.	What are some advantages of fossil fuels as an energy resource?	reliable, cheap
96.	What is a reliable energy source	one which can produce energy all the time.
97.	What are some disadvantages of fossil fuels?	carbon dioxide (greenhouse gas) produced leading to global warming. Can produce sulphur dioxide causing acid rain.
98.	What are some advantages of nuclear fuel?	No carbon dioxide produced, reliable.
99.	What are some disadvantages of nuclear fuel?	nuclear waste remains radioactive for thousands of years. Expensive to build and decommission
100.	List 4 renewable energy resources.	Any 4 from: biofuel, wind, hydroelectricity, geothermal, tidal, wave, solar.

101.	What are some advantages of biofuels?	carbon neutral, reliable
102.	What are some disadvantages of biofuels?	production of fuel can damage ecosystems and reduce variety of crops grown
103.	What are some advantages of wind power?	No carbon dioxide produced
104.	What are some disadvantages of wind power?	unreliable, expensive to construct
105.	What are some advantages of hydroelectricity?	No carbon dioxide produced
106.	What are some disadvantages of hydroelectricity?	blocks rivers preventing fish migration, unreliable (may not produce electricity during droughts)
107.	What are some advantages of geothermal energy?	doesn't damage ecosystems, reliable.
108.	What are some disadvantages of geothermal energy?	fluids drawn from ground may contain greenhouse gases such as CO ₂ and methane. These contribute to global warming
109.	What are some advantages of tidal energy?	No carbon dioxide produced.
110.	What are some disadvantages of tidal energy?	unreliable - tides vary, may damage tidal ecosystem
111.	What are some advantages of wave power?	No carbon dioxide produced
112.	What are some disadvantages of wave power?	unreliable - may not produce electricity when calm seas
113.	What are some advantages of solar power?	No carbon dioxide produced
114.	What are some disadvantages of solar power?	unreliable - no electricity produced at night and limited on cloudy days. Expensive to construct.
115.	What term is used to describe energy becoming spread out or transferred to a "wasted" store?	dissipation
116.	What term is used to describe a method for reducing unwanted energy transfers by reducing friction?	lubrication
117.	What is a thermal insulator?	A non-conductive material which reduces thermal energy transfers.
118.	What is the name for a method of reducing energy transfers by the use of non-conductive materials?	insulation
119.	What is the law of conservation of energy?	Energy cannot be created and destroyed but only transferred from one store to another.
120.	Define specific heat capacity	The energy needed to raise the temperature 1 kg of a material by 1°C