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| 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 = ½ 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 = ½ 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? | $$∆E=mc∆θ$$ |
| 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 | C:\Users\Charlotte\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\62D77FEA.tmpIn the specific heat capacity required practical, why is it important to insulate the block? | 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? | $Power=\frac{energy transferred}{time}$ , $Power=\frac{work done}{time}$ |
| 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? | $$efficiency=\frac{useful output energy transfer}{total input energy transfer}$$ |
| 42 | What is the word equation for efficiency of a power output? | $$efficiency=\frac{useful power output}{total power output}$$ |
| 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 CO2 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. |
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