**Year 8 Mid-Topic Test Revision - Answers**

1. What is Energy?

The ability to do work

1. What is another name for stored energy?

Potential energy

1. There are 3 main types of stored energy:
2. Elastic potential energy eg. a stretched rubber band, windup toy.
3. Chemical potential energy eg. candle (wax) is burning to give out light and heat
4. Gravitational Potential energy. eg.\_rock positioned on the edge of a cliff
5. What is the unit for energy?

Joules (J)

1. How many joules in a kilojoule?

1000 J in a kJ

1. Convert:
2. 6 kJ to J 6000 J
3. 40 kJ to J 40000 J
4. 0.04 kJ to J 40 J
5. 30,000 J to kJ 30 kJ
6. 400 J to kJ 0.4 kJ
7. How many joules in a mega joule?

1 000 000 J in a MJ

1. Convert:
	1. 3 MJ to J 3 000 000 J
	2. 16 MJ to J 16 000 000 J
2. How many kilojoules in a mega joule?

1000 kJ in a MJ

1. Convert:
	1. 12 MJ to kJ 12000 kJ
	2. 20 MJ to kJ 20000 kJ
	3. 14 000 kJ to MJ 14 MJ
	4. 7000 kJ to MJ 7 MJ

Efficiency = Useful Energy Output x 100

Energy Input

1. Calculate the efficiency of a torch that uses 600 J of chemical potential energy to produce 40 J of light energy.

Efficiency = $\frac{40}{600} x 100$ = 6.67%

1. How much wasted energy is produced?

600 – 40 = 560 J

1. What is the main form of wasted energy produced?

Heat energy

1. If a petrol engine of a car is 25 %, how much kinetic energy will it produce when it uses a litre of fuel that contains 20 MJ of energy?

25% = $\frac{useful energy output}{20MJ} x 100$

0.25 = $\frac{useful energy output}{20MJ} $

Useful energy output = 20MJ x 0.25

 = 5 MJ of kinetic energy

1. State the energy transformation:
	1. flashlight’s batteries

chemical potential energy → light energy + heat energy

* 1. talking on the phone

sound energy → electrical energy → sound energy + heat energy

* 1. green plants undergo photosynthesis

light energy (solar) → chemical potential energy

* 1. Eating high energy food and drink, so that you can run faster.

chemical potential energy → movement (kinetic) energy

1. Complete the terminology table.

|  |  |  |
| --- | --- | --- |
| Term | Definition | Unit  |
| Energy | The ability to do work | Joules (J) |
| Temperature | The average kinetic energy of the particles in a substance | °C or K |
| Heat | The transfer of energy from one substance to another due to a difference in temperature | Joules (J) |

1. Classify the following forms of energy as potential or action energy.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| gravitational | electrical | elastic | chemical | nuclear | light | sound | kinetic |

|  |  |
| --- | --- |
| Kinetic energy (doing energy) | Potential energy (stored) |
| Electrical | Elastic |
| Light | Gravitational |
| Sound | Nuclear |
| Kinetic (movement) | Chemical |
|  |  |

1. Complete the table by using one of the types of heat transfer – Conduction, Convection and Radiation.

|  |  |
| --- | --- |
| Explanation | Type of heat transfer (conduction, convection, radiation) |
| Heat transfer by direct collision of particles | Conduction |
| Occurs mainly in solids | Conduction |
| Does not involve a transfer of matter | Conduction, convection and radiation |
| Occurs in fluids (gases and liquids) | convection |
| How the sun’s energy reaches Earth | radiation |
| Is the transfer of heat by the movement of particles | Conduction, convection |

1. Place the words into the sentences about heat transfer by convection.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| solid | strongly | energy | more | convection | gases |
| Kinetic | move | current | circular | less | free |

1. The transfer of thermal energy through a fluid is called convection.
2. Fluids are liquids and gases.
3. Convection occurs in fluids because the particles in fluids are free to move.
4. When convection is occurring, the particles in the fluid move in a circular path.
5. Particles close to the heat source gain more energy and move further apart.
6. The heated fluid becomes less dense and rises.
7. As the fluid moves away from the heat source the particles lose kinetic energy and the fluid becomes more dense.
8. Cooler more dense fluid comes into replace the rising fluid.
9. This circular path is called a convection current.
10. Convection cannot occur in a solid.
11. This is because the particles in a solid are held together too strongly.
12. Write 4 sentences explaining how heat is transferred by conduction.

|  |  |
| --- | --- |
| 1 | Energy is transferred to particles in direct contact with heat source.  |
| 2 | Particles begin to vibrate more rapidly, increasing in kinetic energy and collide with the particles next to them. |
| 3 | When collision occurs the particles transfer energy to the particles they have collided with forcing those particles to vibrate more rapidly as well. |
| 4 | These particles then collide with further particles continuing the conduction process. |

Kinetic energy is the energy an object has because of its mass and velocity(speed).

Ek= ½ mv2

Ek = kinetic energy(J)

m= mass (kg)

v= velocity (m/s)

1. Calculate the kinetic energy of a 2 kg rock that has fallen off a ledge and is travelling at 20 m/s.

Ek = ?

m = 2 kg

v = 20 m/s

Ek= ½ mv2

Ek= 0.5 x 2 x 202

Ek= 400 J

1. Which has more kinetic energy, the Road Runner or the Coyote? Explain why.

It is not possible to answer this question without more information.

Kinetic energy is dependent on both mass and speed so unless given the mass of the Road runner and Coyote, as well as the speed of each it is not possible to deduce which has the greater kinetic energy.