Year 8 Using Energy Revision Answer Key

1. **What is energy and what is the unit used to measure energy?**

Energy is the ability to do work. The unit used to measure energy is the Joule.

1. **What is kinetic energy? Give an example of kinetic energy.**

Kinetic is the energy of moving objects. A person running or a moving car both have kinetic energy.

1. **What is potential energy? Give an example of potential energy.**

Potential energy is stored energy. Food, batteries or raised objects have potential energy.

1. **Describe each of the following types of energy and give an example of an object that has that form of energy.**
   1. **Gravitational**

Gravitational potential energy is the energy in raised objects. An example would be a person standing on a diving board.

* 1. **Elastic**

Elastic energy is the energy stored in stretched or compressed objects. Examples of elastic energy are a stretched elastic band or a compressed spring.

* 1. **Magnetic**

Magnets have a magnetic field around them and are able to attract magnetic materials within the field. An example would be a magnet attracting an iron nail.

* 1. **Chemical**

Chemical energy is energy stored within a substance that can be released when the substance is burnt or a chemical reaction occurs. Some examples of chemical energy are foods, fuels and batteries.

* 1. **Light**

Light energy is produced by luminescent objects for example the sun or light bulbs.

* 1. **Sound**

Sound energy is produced by vibrating objects. Examples of objects that produce sound energy are a ruler when it is placed over the edge of a table and flicked and the vibrations of your vocal cords when you speak.

* 1. **Heat**

Heat is a measure of the energy of vibrating particles in an object. An increase in temperature causes particles to move faster. An example of heat energy is the energy produced from a fire.

* 1. **Electrical**

Electrical energy is the movement of electrons through wires in a circuit. Household appliances use electrical energy and transform it into other useful forms of energy.

1. **For each of the situations below, list the forms of energy present.**
   1. **A boy bounces a basketball**

Kinetic, sound and heat

* 1. **A candle burns**

Chemical, light and heat

* 1. **A cat climbs a tree**

Gravitational, kinetic, sound, chemical, heat

* 1. **A ball rolls down a hill**

Kinetic, gravitational and heat

* 1. **A slingshot is stretched and then released**

Elastic, sound, kinetic and heat

* 1. **A battery operated torch is switched on**

Chemical, light and heat

* 1. **A hot air balloon sails above the clouds**

Heat, kinetic, gravitational, light, sound

1. **Classify each example below as having kinetic or potential energy. Give a reason for your choice.**
   1. **A swimmer about to dive off a high dive platform**

Potential energy because the energy is stored by being off the ground.

* 1. **A swimmer doing backstroke**

Kinetic energy because the swimmer is moving.

* 1. **A ball rolling down a hill**

Kinetic energy because the ball is moving.

* 1. **A hamburger sitting on a plate**

Potential energy because there is chemical energy stored in chemical bonds in the food.

* 1. **A stretched elastic band**

Potential energy because there is elastic energy stored in the stretched elastic band.

* 1. **A car driving down a street**

Kinetic energy because the car is moving.

1. **What is an energy transfer? Give an example of an energy transfer.**

An energy transfer is the movement of energy from one object to another without it changing form. Examples of energy transfers are kinetic energy being transferred from your foot to a ball when it is kicked or the flow of heat from your hand to a metal spoon.

1. **What is an energy transformation? Give an example of an energy transformation.**

An energy transformation is the conversion of one type of energy into another type of energy. Examples of energy transformations are the chemical energy in a battery being converted into electrical, light and heat by a torch or electrical energy being converted into kinetic, sound and waste heat energy by a fan.

1. **What is an energy flow diagram?**

An energy flow diagram shows the way energy is passed on or changed in a particular situation.

1. **Draw an energy flow diagram for the following situations.**
   1. **A burning candle**

Chemical → Light + Heat

* 1. **An electric fan**Electrical → Kinetic + Sound + Heat
  2. **A battery operated radio**

Chemical → Electrical → Sound + Heat

* 1. **A television**

Electrical → Light + Sound + Heat

1. **Describe the law of conservation of energy.**

The law of conservation of energy states that energy cannot be created or destroyed. It can only be transferred from one object to another or changed from one form to another.

1. **What is energy efficiency?**

Energy efficiency is a measure of how much energy put into an object is converted into useful energy. It is usually expressed as a percentage. The higher the percentage of energy converted into useful forms, the greater the energy efficiency of the device.

1. **What happens to waste energy?**

If one object wastes energy, then it is always gained by another object, usually in the form of heat.

1. **Calculate the energy efficiency of the following objects using the formula on the right.**
   1. **120J of energy is put into a light bulb. 30J of energy is converted into light and 90J is converted into heat.**

30 x 100 = 25% efficient

120

* 1. **A hairdryer uses 800J of electrical energy and converts 600J into heat energy and 200J of sound energy.**

600 x 100 = 75% efficient

800

* 1. **A TV takes in 900J of electrical energy and gives out 450J of light energy, 360J of sound energy and 90J of heat energy.**

810 x 100 = 90% efficient

900

* 1. **List the appliances in order from least efficient to most efficient.**

The appliances from least efficient to most efficient are light bulb, hairdryer then TV.

1. **Household appliances often have an energy rating. Describe how the efficiency is shown on energy rating labels.**

The energy efficiency of household appliances is shown using stars on energy rating labels. The number of stars reflects how efficient the appliance is. The more stars on the label, the more efficient the appliance.