



Name: **Key**.....

Worksheet 2: Energy Transfer
and conservation
Grade 6 CS all sections




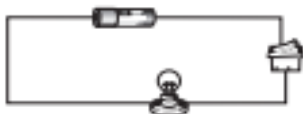
Date:

Objectives:

- Understand how energy transfers from one form to another.
- Identify useful and dissipated energy.
- Calculate useful and dissipated (wasted) energy and draw a Sankey diagram.

Question 1:

State the useful energy transformation that takes place in each case.

object	energy from	energy to
car 	chemical	kinetic
light bulb 	electrical	Light -----
wood-burning fire 	chemical	Thermal -----
battery in a circuit 	Chemical -----	electrical

Question 2: **Select** the appropriate word from the list below to show the energy transfer taking place in each part of the hair dryer shown in the picture:

chemical

elastic potential

electrical

kinetic

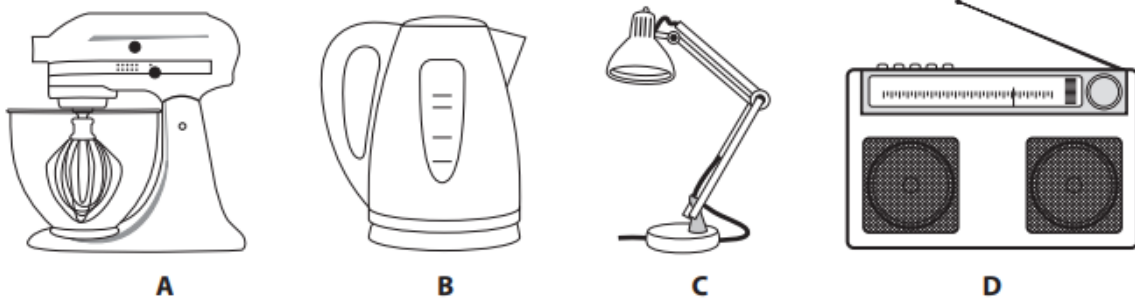
nuclear

sound

thermal

Question 3:

The diagram shows some electrical appliances:

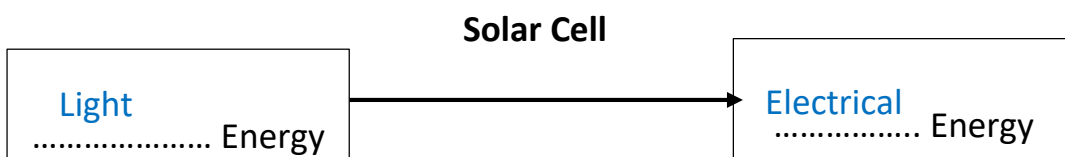
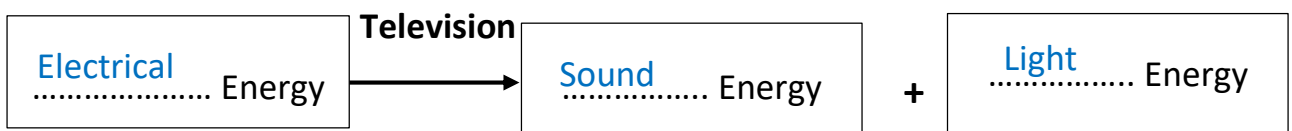
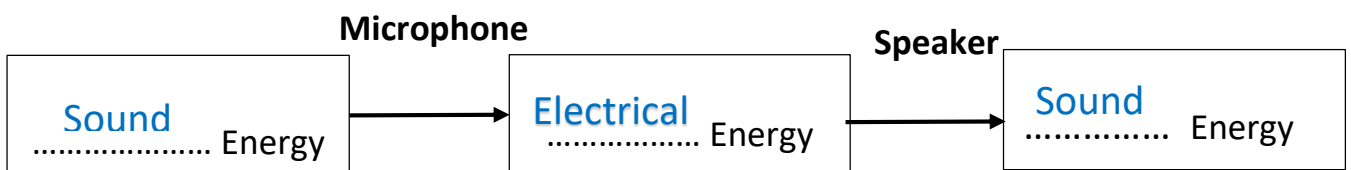
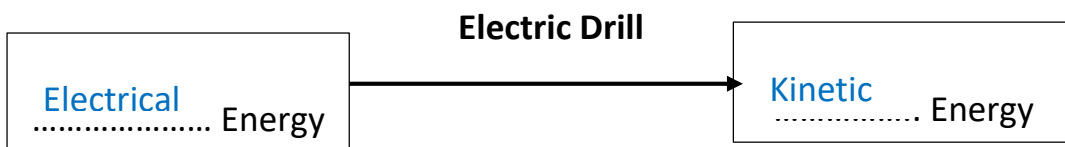
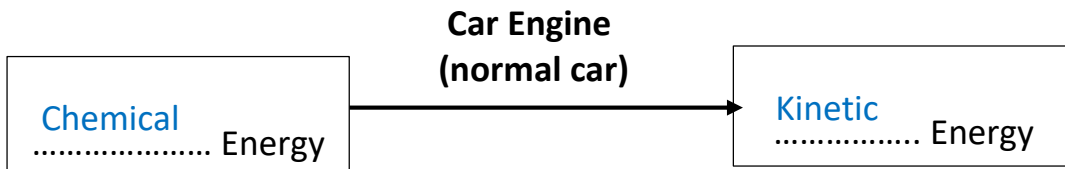
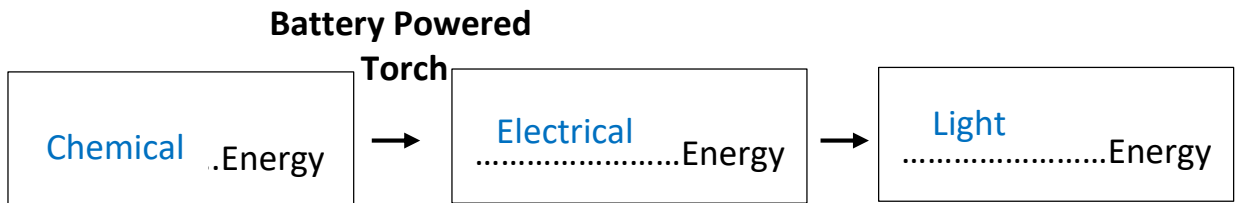


Write down the letter of the appliance that is designed to:

- a) Transfer electrical energy to **thermal energy**? **B**
- b) Transfer electrical energy to **kinetic energy**? **A**
- c) Transfer electrical energy to **sound energy**? **D**
- d) Transfer electrical energy to **light energy**? **C**

Question 4:

Identify the useful energy transformation taking place in each of the following devices:



Question 5 :

For the following devices **state** what type of Energy is used from this list:

Chemical Kinetic Thermal Sound Electrical Light

Light bulb:

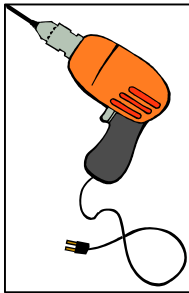


Input Energy: **Electrical Energy**

Useful Energy: **Light Energy**

Dissipated (Wasted) Energy: **Thermal Energy**

Electric Drill:



Input Energy: **Electrical Energy**

Useful Energy: **Kinetic Energy**

Dissipated (Wasted) Energy: **Sound & Thermal Energy**

TV:



Input Energy: **Electrical Energy**

Useful Energy: **Light & Sound Energy**

Dissipated (Wasted) Energy: **Thermal Energy**

Normal Car engine:



Input Energy: **Chemical Energy**

Useful Energy: **Kinetic Energy**

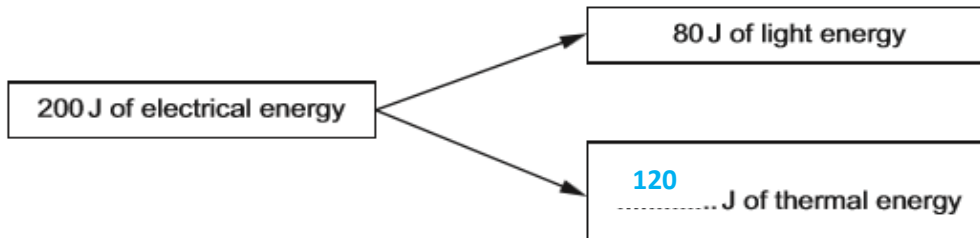
Dissipated (Wasted) Energy: **Thermal & Sound**

Question 6:

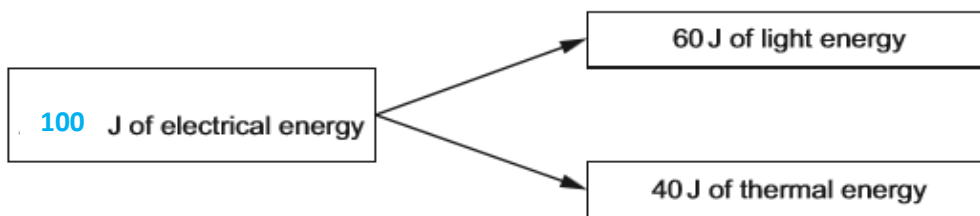
Energy is always conserved.

Complete the energy diagrams to show that energy is conserved.

(a)

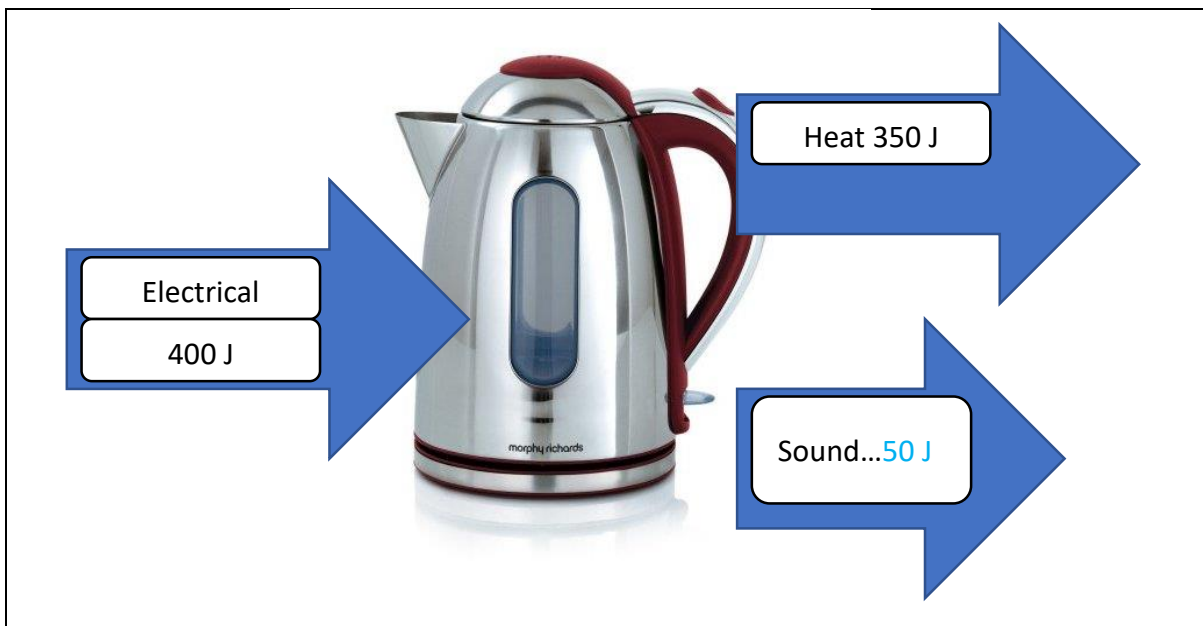


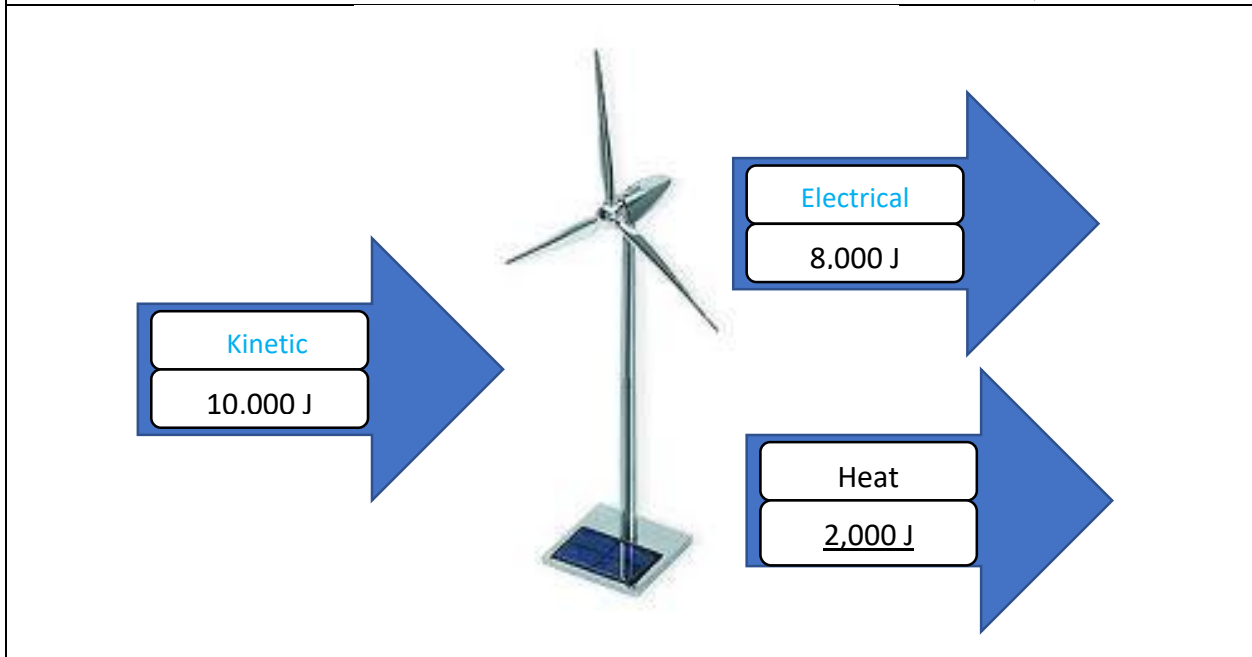
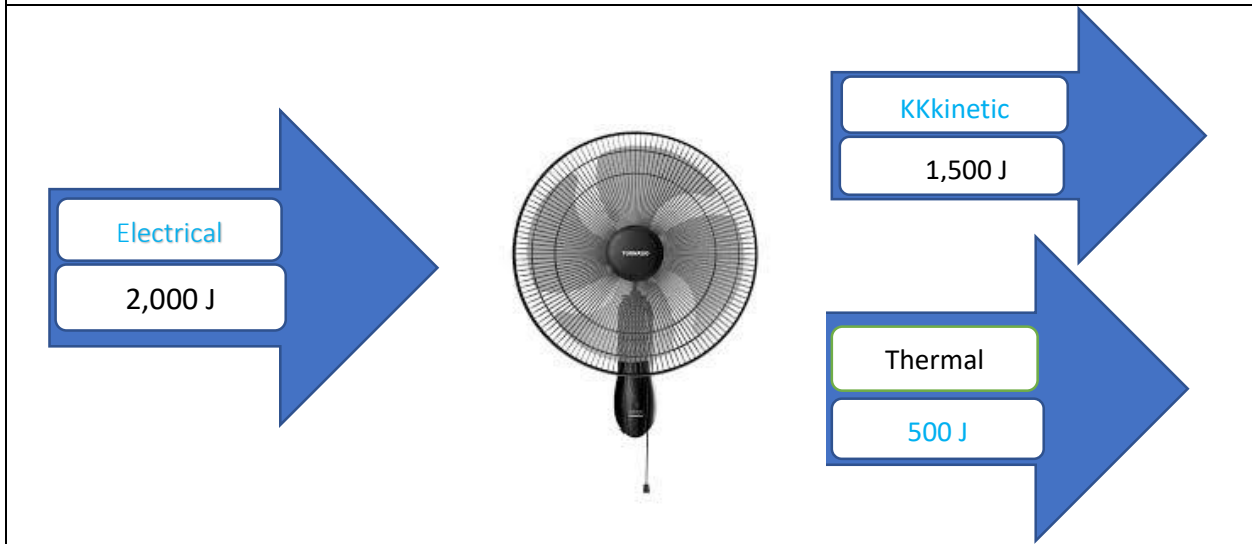
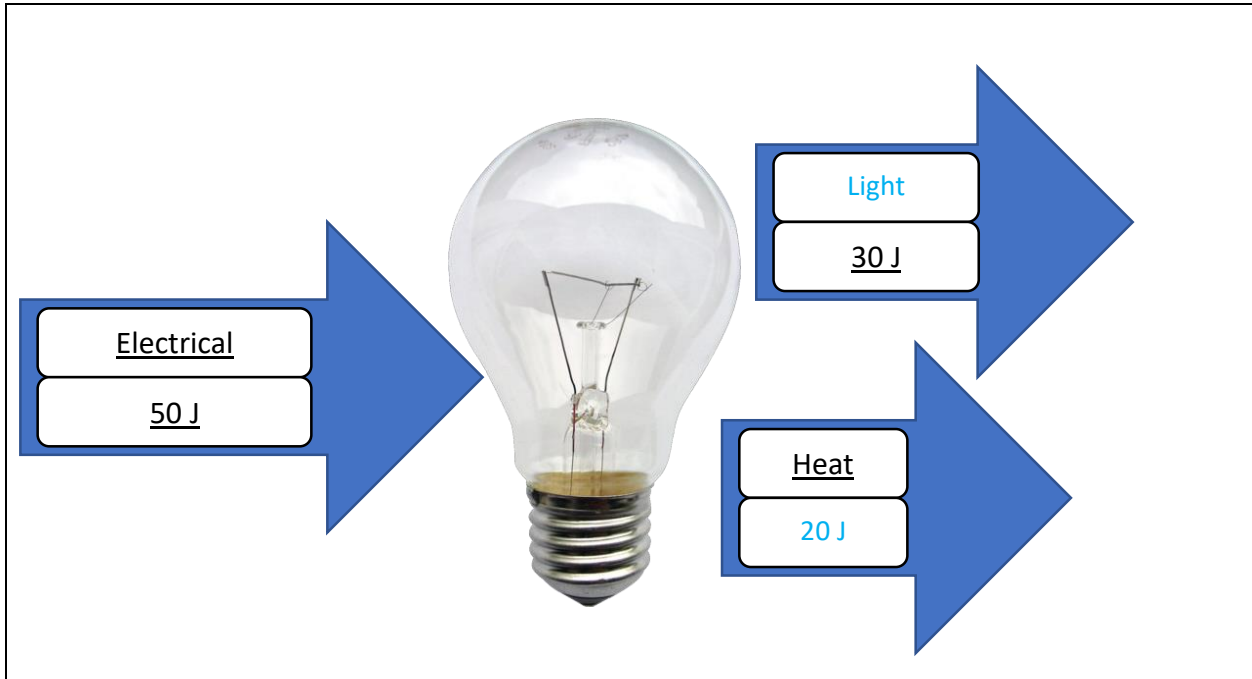
(b)



Question 7:

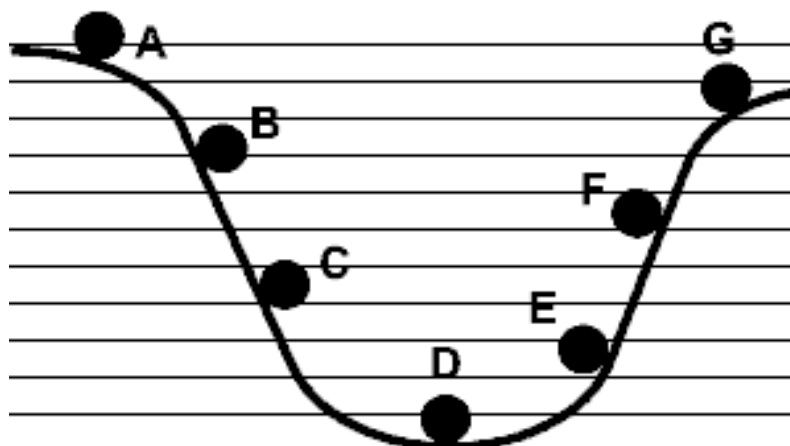
For each example of an energy transfer, fill in the missing boxes with the **energy type** and the **amount of energy** it takes up.





Question 8: This diagram shows a ball rolling from A to G .

Study the diagram and answer the following questions:



a) Which letter shows the ball when it has the maximum kinetic energy?

_____D_____.

b) Which letter shows the ball when it has the maximum gravitational potential energy? _____A_____.

c) Which letter shows the ball when it has the least gravitational potential energy? _____D_____.

d) Which letter shows the ball when it has the least kinetic energy?

_____A_____.

e) Which letter shows the ball when it has just a little more kinetic energy than A? _____G_____.

Note: at any of the points, the total energy of the ball is the same and equals to:

Gravitational potential energy (GPE) + Kinetic Energy

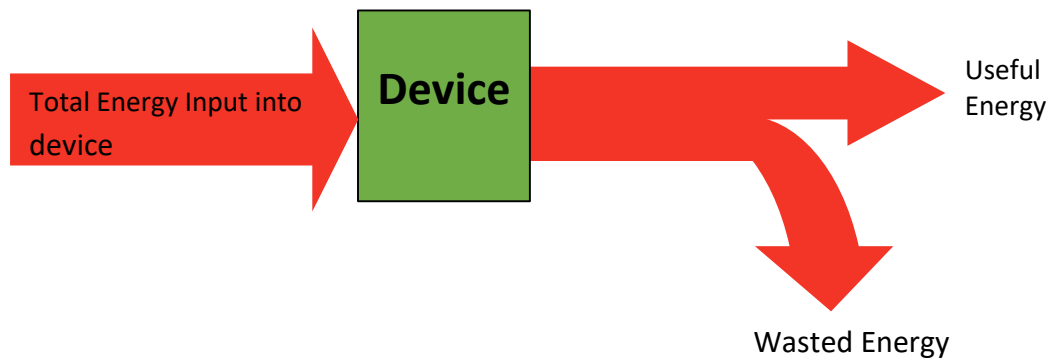
Question 9:

A Sankey diagram represents the energy transfer through a device. Knowing that energy **cannot be created or destroyed**, energy input must equal the total energy output:

$$\text{Total input energy} = \text{useful energy delivered} + \text{energy wasted}$$

A Sankey diagram shows this:

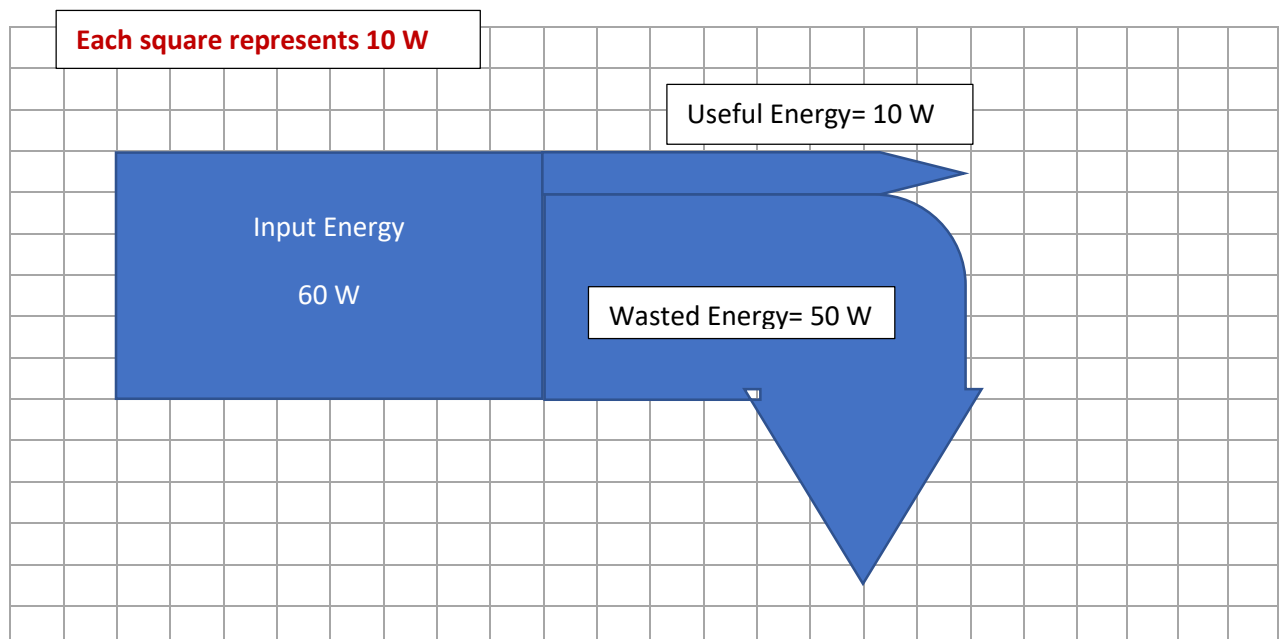
Note: the **width** of the arrows demonstrates the **amount** of energy.



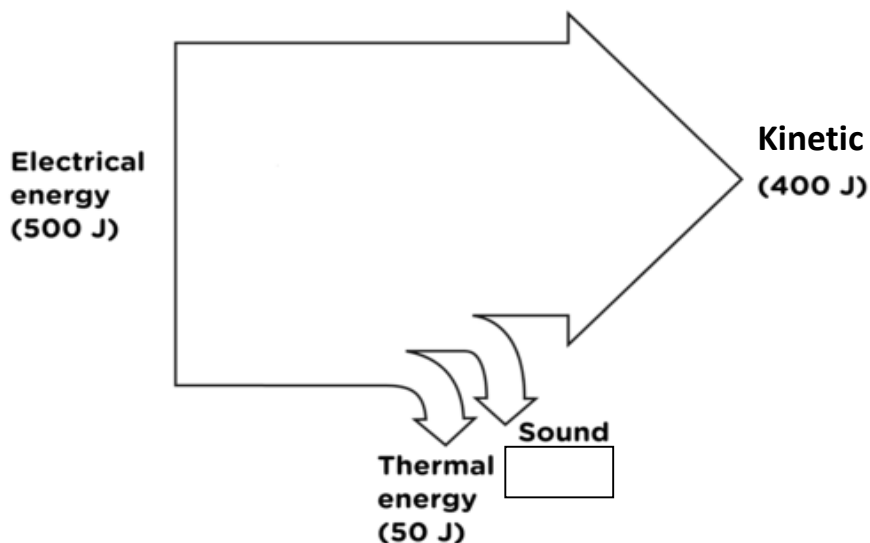
Draw your own Sankey diagram for a 60W filament bulb given that:

- Total input energy = 60W
- Useful (light) energy = 10W
- Waste (heat) energy = 50W

Use the squares below as a guide for drawing your arrows.



Question 10: The following Sankey diagram shows the energy transfer in an electric device.



Study the Sankey diagram shown above, and answer the following questions accordingly:

- What is the **useful form/ forms of energy** produced by this device?
 _____ **Kinetic Energy** _____.
- What is the amount of **useful energy** produced? Include the Unit.
 _____ **400 J** _____.
- What is the **dissipated (wasted) form/ forms of energy** produced by this device? **_ Sound and Thermal Energy** _____.
- Calculate the amount of **sound energy** produced by this device.
 _____ **$500 - 400 - 50 = 50 \text{ J}$** _____.
- What is the total amount of **dissipated (wasted) energy** produced by this device? **_ 100 J** _____.
- What is the **input** energy for this device? **_ Electrical Energy** _____.
- Think of a device that this Sankey diagram may represent?
 _____ **Electric Drill/ Cake mixer /... _____**.
- Is this device efficient or inefficient? Explain your answer.

This device is efficient. It produces more useful energy than wasted.