



Name: .....




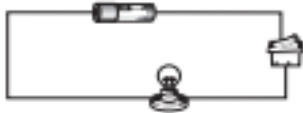
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**Objectives:**

- 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	.....
wood-burning fire 	chemical	.....
battery in a circuit 	.....	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**

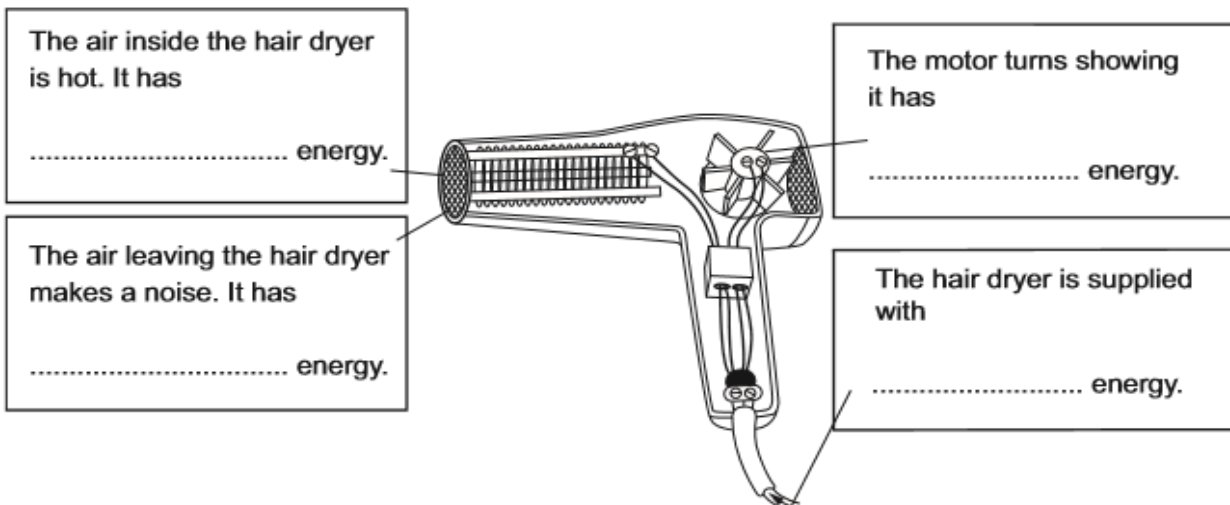
**electrical**

**kinetic**

**nuclear**

**sound**

**thermal**



**Question 3:**

The diagram shows some electrical appliances:



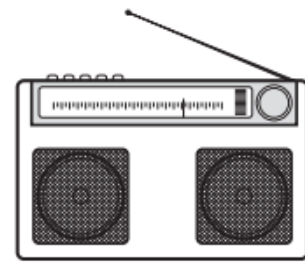
**A**



**B**



**C**



**D**

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

- a) Transfer electrical energy to **thermal energy**? .....
- b) Transfer electrical energy to **kinetic energy**? .....
- c) Transfer electrical energy to **sound energy**? .....
- d) Transfer electrical energy to **light energy**? .....



**Question 5:**

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

*Chemical      Kinetic      Thermal      Sound      Electrical      Light*

**Light bulb:**

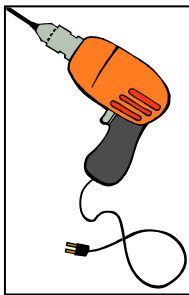


Input Energy \_\_\_\_\_

Useful Energy \_\_\_\_\_

Dissipated (Wasted) Energy \_\_\_\_\_

**Electric Drill:**



Input Energy: \_\_\_\_\_

Useful Energy: \_\_\_\_\_

Dissipated (Wasted) Energy: \_\_\_\_\_ & \_\_\_\_\_

**TV:**



Input Energy \_\_\_\_\_

Useful Energy \_\_\_\_\_ & \_\_\_\_\_

Dissipated (Wasted) Energy \_\_\_\_\_

**Normal Car engine:**



Input Energy \_\_\_\_\_

Useful Energy: \_\_\_\_\_

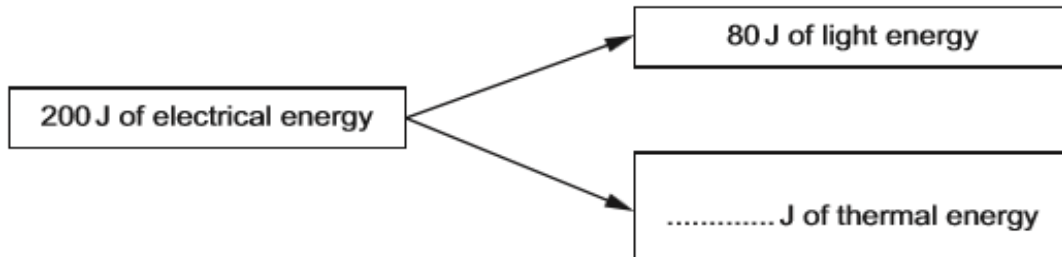
Dissipated (Wasted) Energy \_\_\_\_\_ & \_\_\_\_\_

**Question 6:**

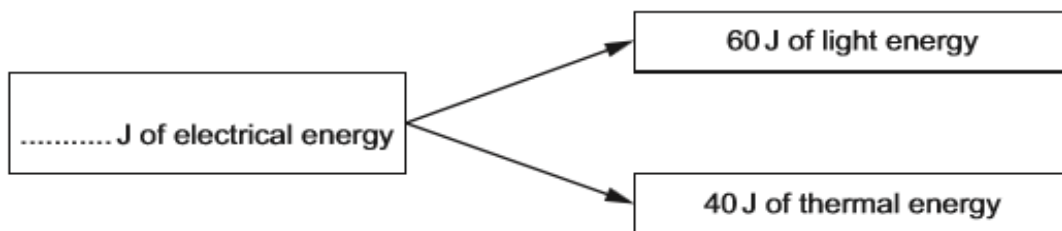
Energy is always conserved.

Complete the energy diagrams to show that energy is conserved.

(a)

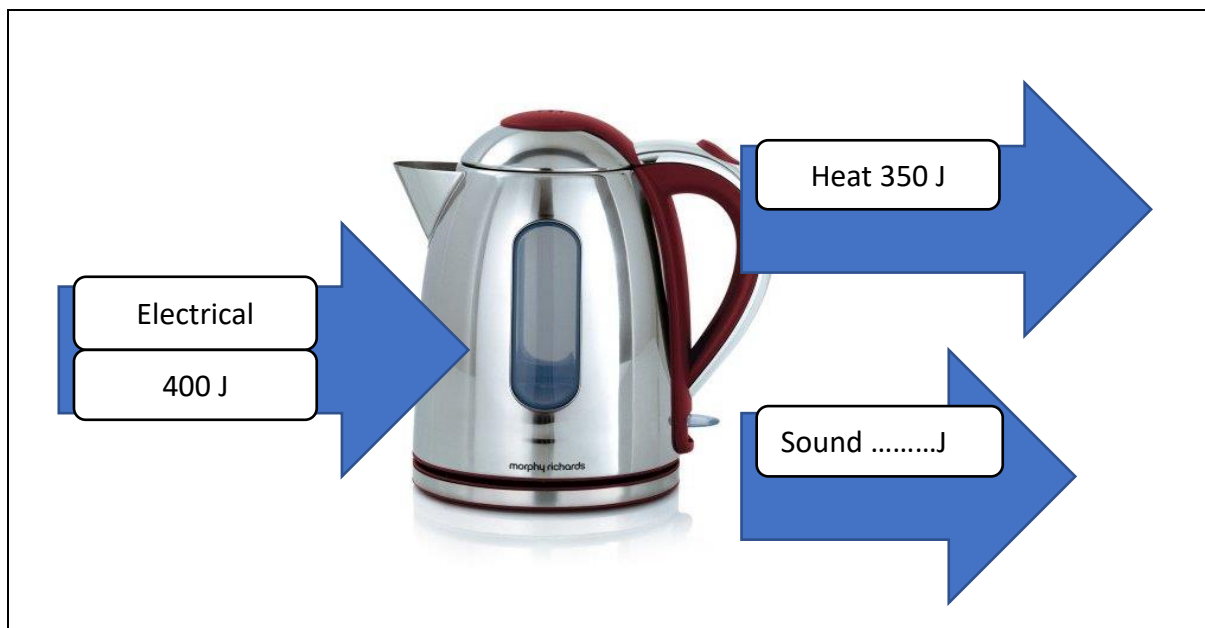


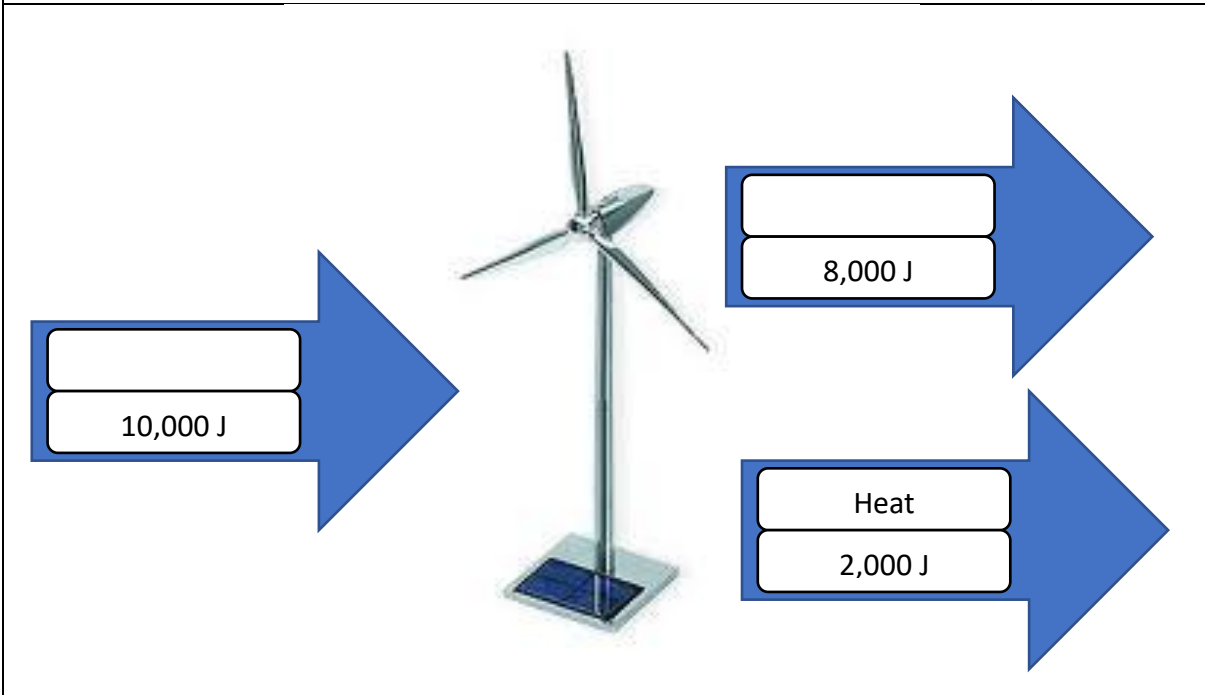
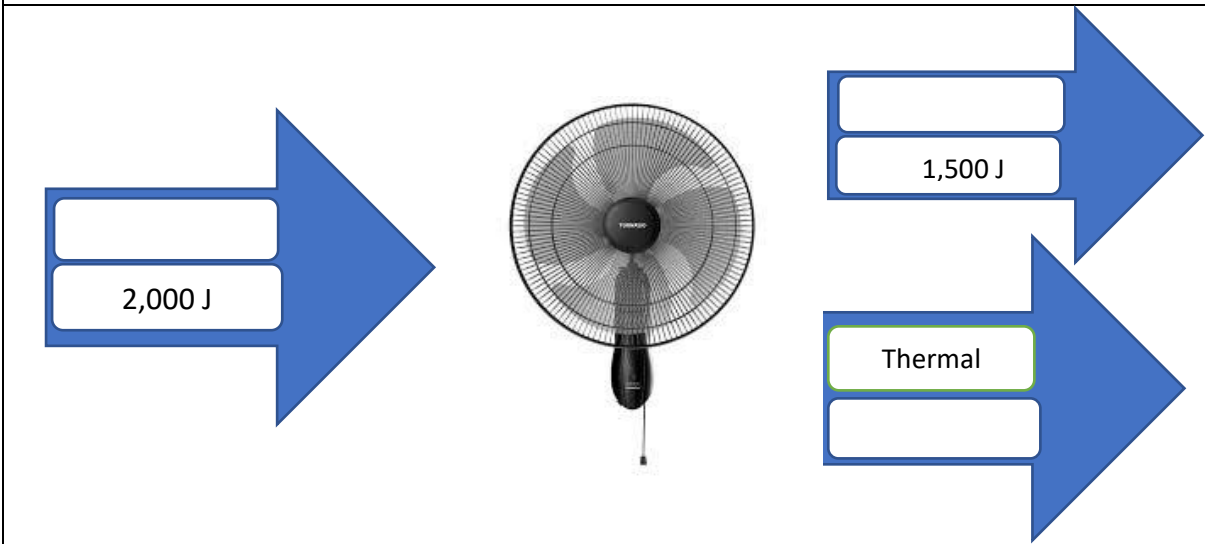
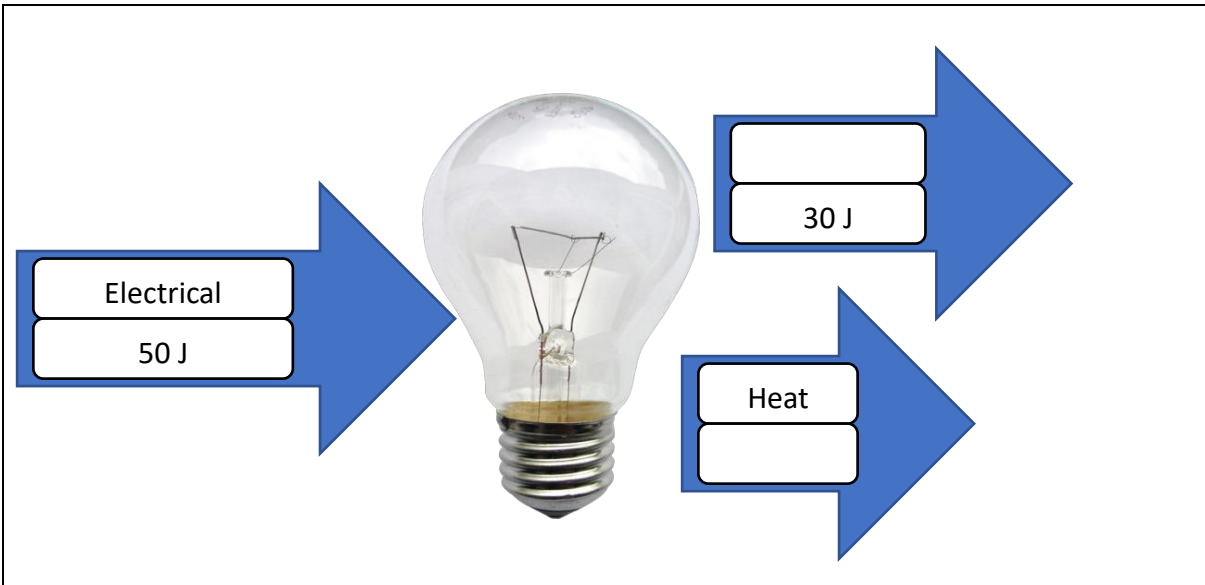
(b)



**Question 7:**

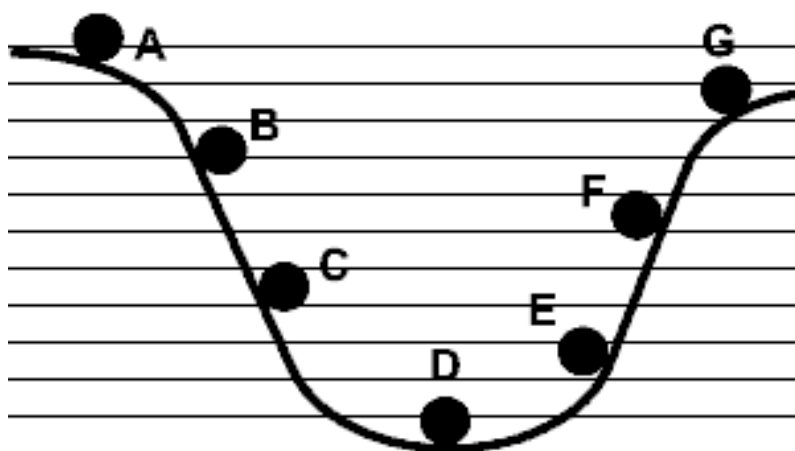
For each example of an energy transfer, fill in the missing boxes with the **energy type** and the **amount** of energy it takes up.





**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?

\_\_\_\_\_.

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

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

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

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

**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:**

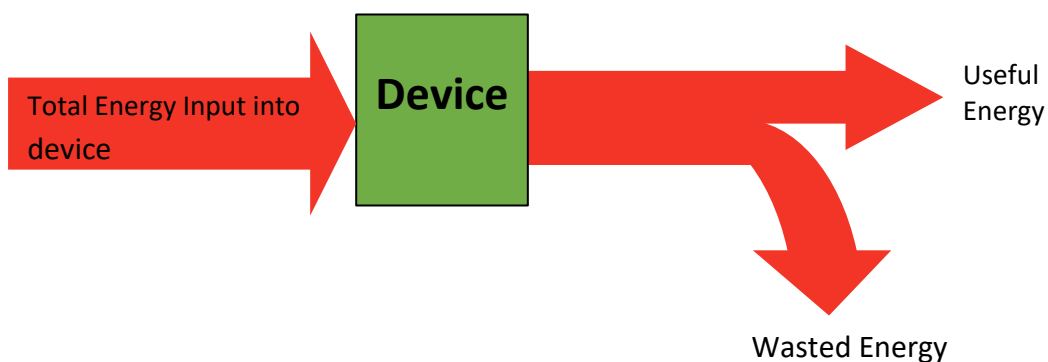
A Sankey diagram represents the energy transfer through a device.

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.



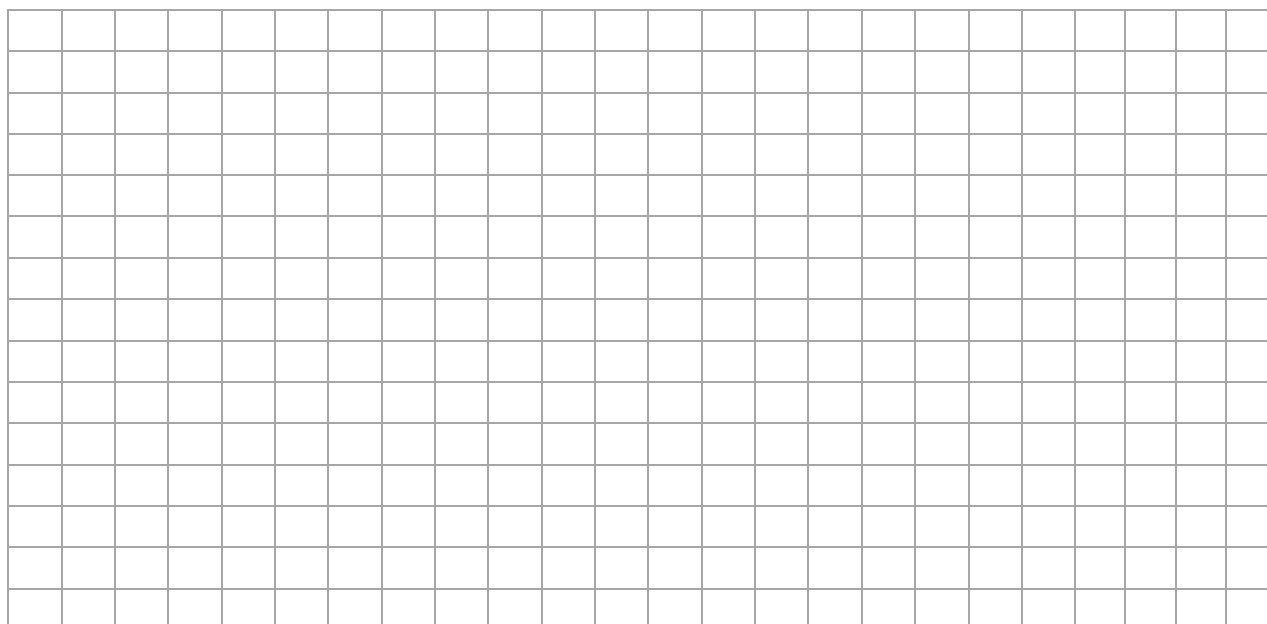
**Draw your own** Sankey diagram for a 60 J filament bulb given that:

Total input energy = 60 J

Useful (light) energy = 10 J

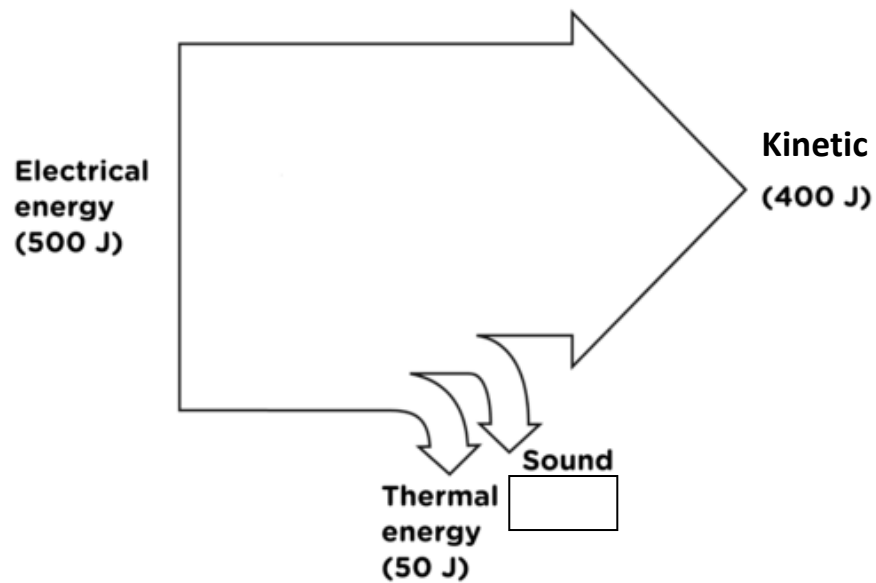
Dissipated (heat) energy = 50 J

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:

a. What is the **useful form/ forms of energy** produced by this device?

\_\_\_\_\_.

b. What is the amount of **useful energy** produced? Include the Unit.

\_\_\_\_\_.

c. What is the **dissipated (wasted) form/ forms of energy** produced by this device? \_\_\_\_\_.

d. Calculate the amount of **sound energy** produced by this device.

\_\_\_\_\_.

e. What is the total amount of **dissipated (wasted) energy** produced by this device? \_\_\_\_\_.

f. What is the **input** energy for this device? \_\_\_\_\_.

g. Think of a device that this Sankey diagram may represent?

\_\_\_\_\_.

h. Is this device efficient or inefficient? Explain your answer.

\_\_\_\_\_.