

# GRAYS TUITION CENTRE – Online Tutoring

**WEEK: 4**

**Week Beginning: (11/01/2021)**

**Subject: SCIENCE**

**Year: 9**

## **Lesson Objective:**

- Recap Conduction and Convection
- Reducing and investigating unwanted energy transfers
- Efficiency

## **Keywords/ Concepts**

- Insulation, efficiency

## **Class Worksheets**

- Questions below

## **Homework**

- Questions below

## **Additional Notes**

- Attach all the classroom worksheets and homework worksheets to this lesson plan and email together.
- Assume the students don't have revision guides and workbooks. Attach all the pages you want them to have.

## Classwork

1. State the principle of the conservation of energy.
2. What is power? State the units it is measured in.
3. Name two mechanisms in which energy is transferred by heating.

## Homework

1. Give one way you could reduce the frictional forces in the hinge of an automatic door.
2. For a given material, how does its thermal conductivity affect the rate of energy transfer?
3. Why is the efficiency of an appliance always less than 100%?

More questions below.

1 The motor of an electric scooter moves the scooter 10 metres along a flat, horizontal course in 20 seconds. During this time the motor does 1000 J of work.

1.1 Write down the equation that links power, work done and time.  
Use this equation to calculate the power of the motor.

[3 marks]

1.2 The moving parts of the scooter are lubricated. The scooter then completes the course in 18 seconds. Explain, in terms of energy transfer, why the scooter completes the course in a faster time.

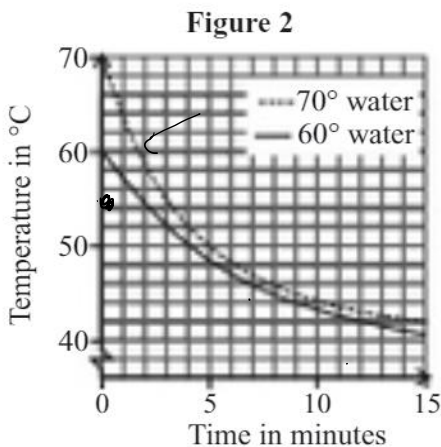
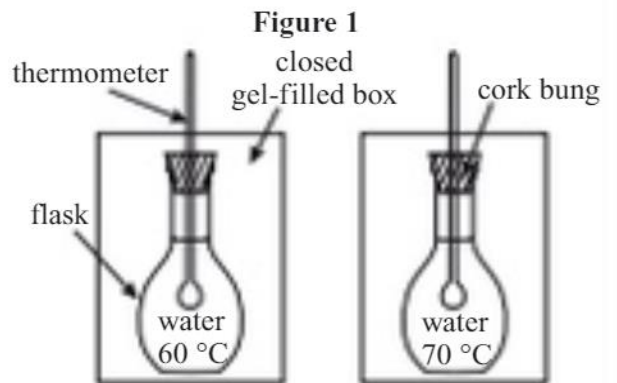
[2 marks]

1.3 The scooter's motor is replaced with a more powerful, but otherwise identical, motor. It moves along the same 10 m course. Describe how its performance will differ from before. Explain your answer.

[2 marks]

**PRACTICAL**

2 A student wants to test whether the temperature difference between the inside and outside of a flask affects the rate of energy transfer from the flask. She sets up the experiment shown in **Figure 1** and records the temperature of the water in each flask every minute.



2.1 Give two variables that the student must control.

[2 marks]

2.2 The student produces the graph in **Figure 2** of her results. Which temperature of water shows the greatest initial rate of energy transfer? Explain your answer using the graph.

[2 marks]

2.3 Calculate the rate of temperature change after 5 minutes for the 60 °C water. Give your answer in °C/minute.

[3 marks]