Student worksheet

Activity 2.1: Heat transfer by Conduction in solids, liquids and gases

Part 1: Solids

Introduction: Paperclips can be 'stuck' to a metal rod using Vaseline. When the rod is heated the Vaseline melts and the paperclips fall.

Equipment needed:

- Retort Stand
- Metal rod (ideally copper)
- Paper clips x 4
- Bunsen Burner
- Petroleum jelly (Vaseline)
- Watch/timer

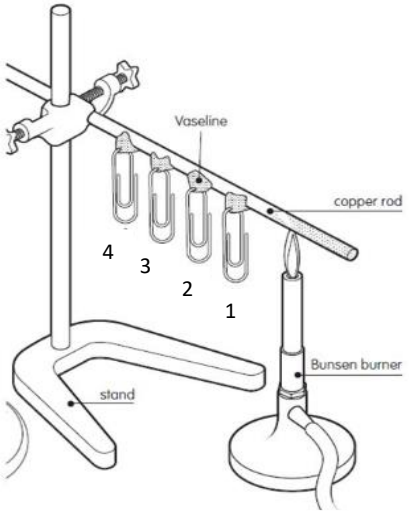

Figure 1.

Procedure:

1. Set up the apparatus as shown in figure 1
2. Watch what happens carefully
3. Record the time for each paperclip to fall in the table below.

Record your data:

Paperclip	1	2	3	4
Time in Seconds				

Conclusion:

What happens when the rod is heated at one end? What did you observe?

_____
_____
_____
_____

Fill in the blanks

This experiment shows that heat must have travelled along the rod from the hot end to the other end. This kind of heat transfer is called _____. Thermal conductors are materials that allow heat to pass through them_____. Metals are _____ conductors of heat and so are often used where we want quick movement of heat energy. Some materials are _____conductors of heat and are called thermal insulators. Wood and plastic are examples of _____.

Discussion Questions

1. Why does the handle of a metal saucepan usually covered with an insulating material?
2. Name three good thermal conductors.
3. Name three good thermal insulators.
4. Why are wooden spoons used for stirring food that is being cooked? (It is not just to stop you from scratching the non-stick)
5. Why does the canteen serve soup in polystyrene cups? (and it is not just because the cups are cheap)

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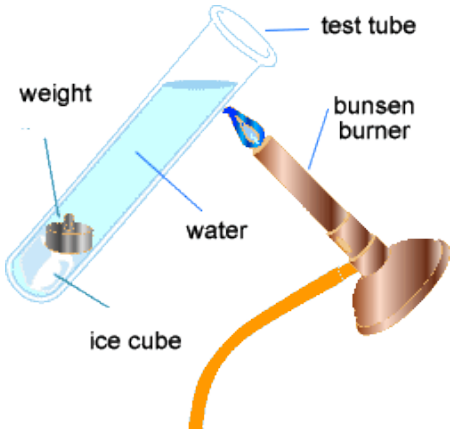
Part 2: Liquids

Introduction: Investigate why liquids are poor conductors of heat



Equipment needed:

- Retort stand
- Small rock or metal weight
- Water
- Ice cube
- Test tube
- Bunsen burner

Procedure:

1. Set up the apparatus as shown
2. Carry out the experiment as shown

Conclusion:

1. What did you observe? Does the ice cube melt when the water at the top of the test tube boils?

_____
_____
_____
_____

Discussion Questions:

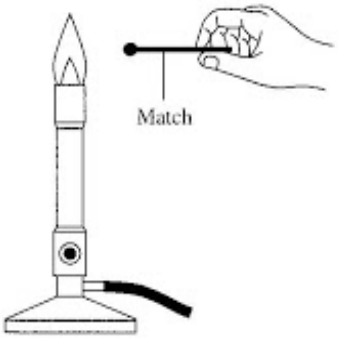
1. Why is there a weight on the ice?
2. What does this tell you about how good liquids are at conducting heat?

Part 3: Gases

Instructions: If a gas is a good conductor, the air between the flame and the match should conduct the heat and light the match – it does not. Why not?

Materials:

- Match
- Bunsen burner



Procedure:

- Carefully hold a safety match 1cm away from a Bunsen burner flame.
- DO NOT put the match in the flame.

Conclusion:

What did you observe?

_____
_____
_____
_____

Gases are_____ conductors of heat. This means that they are good

_____