

U60040 Heat

Work sheet



Experiment 7 Radiation of heat

Topics covered in the experiment

- Heat is given out by a hot body to its surroundings.
- The heat can be transported without any medium to carry it, in the form of heat radiation.
- The heat radiation is distributed in all directions and can be reflected and focused.
- A body irradiated by heat radiation gets heated.

Parts required:

From the Student Kit – Thermodynamics (U60040)

- 1 spirit lamp
- 1 mat
- 1 thermometer
- 1 concave mirror

From the Student Kit – Basic Set (U60011)

- 1 base plate
- 2 support plate
- 2 support rod, $l = 100$ mm
- 2 slotted double clamps
- 1 retaining clip, $d = 8$ mm

Setup

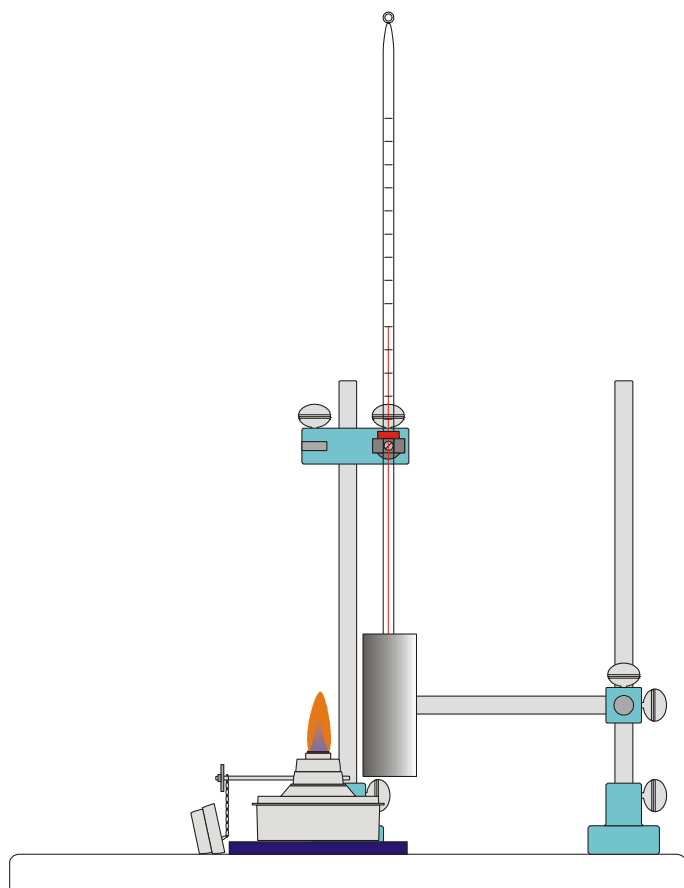


Figure 1

- 1) Mount the support base on the middle and in the right bore holes of the base plate (see Figure 1), by inserting the screws through the bore holes from below and screwing it to the support base from above.
- 2) Insert the support rod till the stop point into the support bases and stop it using the screws.
- 3) Fasten one double clamp to the left support rod that the free bore is facing right.
- 4) Fasten the retaining clip to the double clamp.
- 5) Insert the thermometer through the retaining clip, from top.
- 6) Place the spirit lamp on the mat, a little to the left of the support rod, so that the flame is about 5 cm from the thermometer.
- 7) Adjust the height of the thermometer so that its tip is at the same height as the flame.
- 8) Fasten the second double clamp to the right support rod that the free bore is facing forward.
- 9) Fasten the concave mirror vertically in the double clamp and orient it so that its center is at the same height as the tip of the thermometer, and it is about 1.5 cm from the tip of the thermometer.

Procedure

- 1) First remove the concave mirror together with the double clamp from the shorter support rod.
- 2) Read the room temperature from thermometer and note down the measured value in the measurement table.
- 3) Light the spirit lamp and adjust the flame height so that it is optimal.

- 4) Observe the thermometer and note down the temperature shown in the measurement table once the display does not show any further increase.
- 5) Again fix the concave mirror next to the tip of the thermometer and observe the thermometer.
- 6) Note down the temperature shown in the measurement table, once the display does not show any further changes.

Measurement table

| Room temperature | Temperature at the tip of the thermometer | |
|------------------|---|-------------------------|
| | without the concave mirror | with the concave mirror |
| | | |

Examine and explain the observations:

- a) Compare the temperature recorded when the spirit lamp is burning, with the room temperature.
- b) How can this difference be explained?
- c) Compare the temperature measured with the concave mirror placed near the tip of the thermometer, with the temperature recorded without the concave mirror.
- d) How can this difference be explained?
- e) In what form is the heat transmitted?

