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Estimate the Sun's temperature without leaving the school

Worksheet 1: Heat transfer and absorption

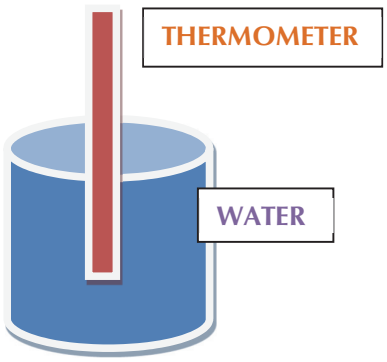

Image courtesy of the author

If heat flows into an object, the object's temperature rises and the temperature change (ΔT) depends on the thermal energy supplied in Joules (Q), the nature of the given material, and its mass in kilograms (m). This can be expressed in the equation $Q = mc\Delta T$, where c is a quantity characteristic of the material called its specific heat.

1. Fill a bottle with water and measure its initial temperature using a thermometer.
2. Position the water-filled bottle in direct sunlight.
3. Record the water temperature increase after 5, 10, and 20 minutes of Sun exposure. Complete the table with the results.

Time (min)	Temperature (°C)
5	
10	
20	

4. What do you observe about the value of the temperature as the time increases?

_____
_____
_____
_____

5. Calculate the heat that is needed for the rise in temperature after 15 minutes using the equation $Q = mc\Delta T$ and calculate the heat transfer rate.