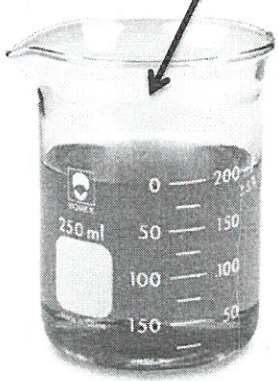


S9 Comparing Energy Consumption:  
More for Your Money

Investigate

	appliance	microwave	hot plate
	volume of water added to beaker	200.0 mL	200.0 mL
	mass of water added to beaker	189.5 g	191.3 g
	initial temp. of water	20.5 °C	20.5 °C
	time of heating	120 sec (2 min 0 sec)	1085 sec (18 min 5 sec)
	final temp. of water	92.0 °C	92.0 °C
	power rating of the appliance	1450 W	750 W

For the microwave test, the water had a final temperature of 92.0 °C after 2 minutes of heating. For the hot plate test, it took the hot plate 18 min and 5 sec to heat the water to 92.0 °C. Furthermore, the time recorded began when the hot plate was turned on.

6 a.  $E = P \cdot t$

$\uparrow$  energy (J or Watt-seconds)      $\uparrow$  power (W)      $\leftarrow$  time (s)

6 b. both appliances tested caused equal temp increases in equal amounts of water

the winner is:  
b/c it used the least amount of energy to reach the same final temp

8a. Calc. the expense of energy

$$\text{cost} = \text{energy} \cdot \text{price per unit of energy}$$
$$= \left( E \times \frac{1 \text{ kW}\cdot\text{h}}{3,600,000 \text{ W}\cdot\text{s}} \right) \quad (11\text{¢}/\text{kW}\cdot\text{h})$$

8b.