

Mixing Hot and Cold Water

SEPUP Activity 61



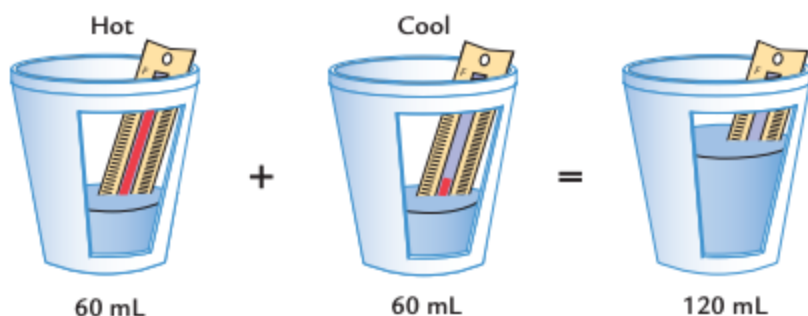
Scenario: Yasmin, her mom, and Uncle Raymond were at a restaurant having breakfast. Uncle Raymond complained that his coffee had cooled off. He asked the waiter for a “touch up” of hot coffee. The waiter filled Raymond’s half-full cup of cool coffee with steaming hot coffee. Raymond knew that Yasmin was studying energy. He looked over at his niece. “Now, Yasmin,” he asked, “Is my coffee too hot to drink?”



Inquiry: What happens to the energy when hot and cool water are mixed?

Procedure

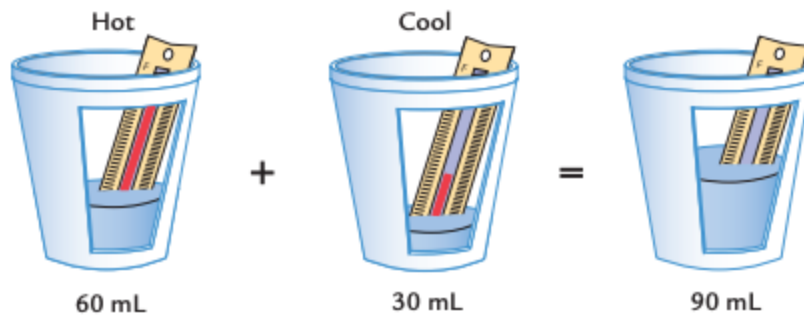
1. Make a prediction on what you think will happen if you mix each of the following.:
 - a. **Experiment 1:** 60 mL of hot water (60°C) with 60 mL of cool water (20°C)



think

Predict: What do you think will happen?

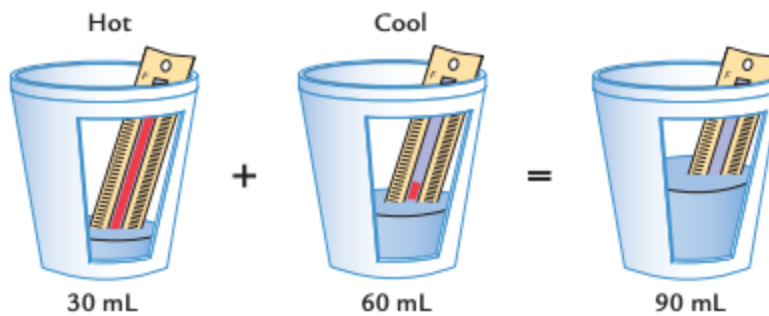
b. **Experiment 2:** 60 mL of hot water (60°C) with 30 mL of cool water (20°C)



think

Predict: What do you think will happen?

c. **Experiment 3:** 30 mL of hot water (60°C) with 60 mL of cool water (20°C)



think

Predict: What do you think will happen?

View this video of the experiment and record the starting and final temperature from the experiment in Table 1. Finally, calculate the change in temperature.

Video link - <https://safeshare.tv/x/ssRXnNzYImM#> .

Table 1: Mixing Water Data					
Experiment	Water	Volumn (mL)	Starting Temperature (°C)	Final Temperature °C)	Temperature Change (°C)
1	Hot	60 mL			
	Cool	60 mL			
2	Hot	60 mL			
	Cool	30 mL			
3	Hot	30 mL			
	Cool	60 mL			

Analysis

1. Were the results what you expected? Compare your predictions to the actual results.
2. When equal volumes of hot and cool water were mixed, how did the final temperature compare to the starting temperatures?
3. When you mixed unequal volumes of hot and cool water, how did the final temperature compare to the starting temperatures?

4. For all the experiments, explain what happened to the thermal energy in the water when the hot and cool water were mixed.

5. In any of the experiments, would it have been possible for the final temperature to be greater than the initial temperature?

6. Did any energy leave the cup-and-water **system**? Describe the evidence that supports your answer