

## IV. Getting the right temperature

Key Question: How do I mix water to adjust temperature?



**Student name:**

**Class:**

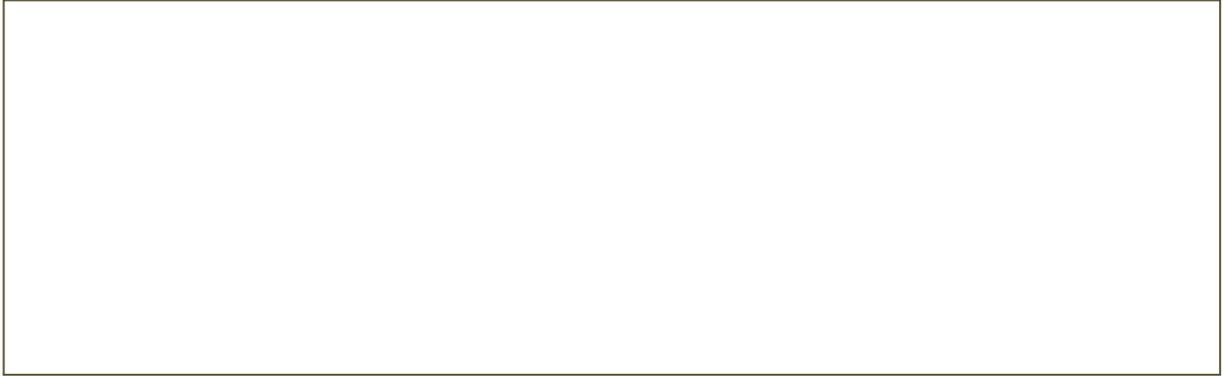
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## Activity 1 – A too hot bath

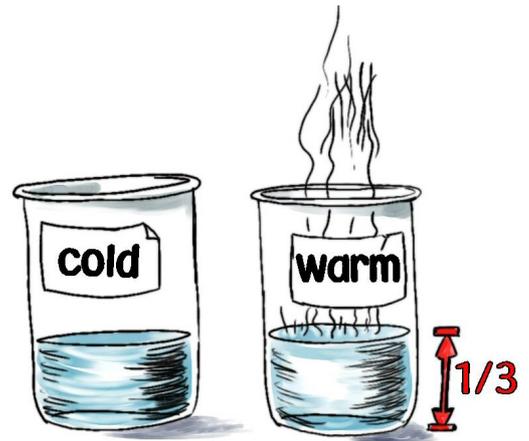
Imagine you would like to have a warm bath and you start to pour warm water into your bathtub. When you are ready to get into your bath you feel that the water in the bathtub is too hot.

1. What could you do to adjust the water to the temperature you like?



## Activity 2 – Temperature of mixing water

- You need two beakers of the same size.
- Fill a one beaker about 1/3 full with cold water and a second beaker about 1/3 with warm water.
- Put the temperature sensor in the beaker with the cold water and measure the temperature. When recording temperature, wait until the temperature read by the sensor stops changing.



Cold water temperature is \_\_\_\_\_ °C.

- Repeat the measurement for the beaker with warm water.

Warm water temperature is \_\_\_\_\_ °C.

- Make a prediction. What do you think the temperature will be when you mix the two beakers of water?

I think the temperature will be \_\_\_\_\_ °C.

- 2.** How did you come up with this prediction?

- Now pour the cold water into the beaker with warm water. Measure the temperature of the mixture. You can mix the water with the metal tip of the sensor.

The resulting temperature of the mixture is \_\_\_\_\_ °C.

3. Is the temperature close to what you expected? Explain.

- Now repeat this experiment at least three times more. Write all results in the table below.

TRIAL	TEMPERATURE OF COLD WATER (°C)	TEMPERATURE OF WARM WATER (°C)	PREDICTED TEMPERATURE OF THE MIXTURE (°C)	MEASURED TEMPERATURE OF THE MIXTURE (°C)
1				
2				
3				
4				

4. Look at the table. Compare the final measured temperature with the initial temperature of cold and warm water. Do you see a pattern? Explain.

5. What seems to be true about the final temperature in all cases you have measured?

### Activity 3 – Accurate measurement of mixing water

In this investigation you will mix specific volumes of warm and cold water and measure the resulting temperature of the mixture.

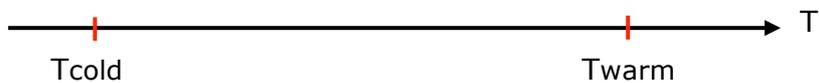
- Fill one beaker with 50 mL cold water. Put 50 mL of warm water in the second beaker.
- Measure the temperature of the cold water and warm water in the same way as in the previous investigation. Write the results in the table below.
- Pour the cold water into the warm water and measure the actual temperature of the mixture. It will take a few seconds for the sensor to adjust to the temperature of the water. Write the results in the table.
- Repeat the experiment but now use 50 mL of cold and 100 mL of warm water. Write the measure results in the data table.
- Repeat the experiment again but now use 100 mL of cold and 50 mL of warm water. Write the measure results in the data table.
- For each measurement calculate an increase in the temperature of the cold water and a decrease in the temperature for the warm water. Write the results in the table.

WATER VOLUME (mL)		WATER TEMPERATURE (°C)			INCREASE OF WATER TEMPERATURE (°C)	DECREASE OF WATER TEMPERATURE (°C)
COLD	WARM	COLD	WARM	MIXTURE	COLD	WARM
50	50					
50	100					
100	50					

6. Look at the table. Compare the final measured temperature with initial temperature of cold and warm water. Do you see a pattern? Describe in your own words.

## Questions

- A.** What do you think will happen when you mix 70 mL of cold water and 30 mL of warm water? Indicate on the prediction bar below which temperature do you expect?



- B.** How did you decide on your prediction?

- C.** Check your hypothesis by doing the experiment. How close was your prediction?