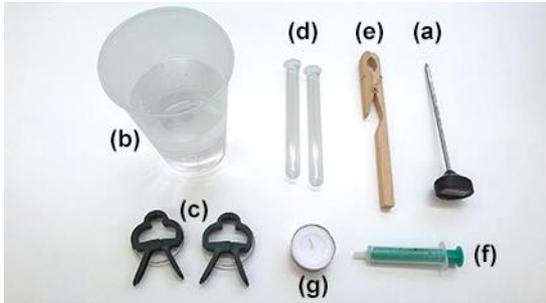


Heat 3: Heated water is mixed with water at room temperature

1 Apparatus and materials

Your materials



- 1 digital thermometer (a)
- 1 *lighter*
- 1 plastic cup 500 ml (b)
- 2 plant clips (c)
- 2 test tubes (d)
- 1 test tube clamp (e)
- 1 syringe 5 ml (f)
- 1 *stopwatch*
- 1 tea light (g)
- 250 ml cold water

1.1 Safety information

The materials may be used only as instructed by your teacher or as described in the experimentation instructions.

2 Preparing the experiment



1. Place a test tube vertically in each plant clip.



2. Fill the syringe with 3 ml of water.



3. Slowly dispense the water from the syringe into the first test tube. Dispense 3 ml of water into the second test tube.

3 Conducting the experiment

Conduct the experiment according to the instructions.

- Measure the temperature of the water in a test tube.



1. Press the ON button to turn on the digital thermometer.



2. Hold the digital thermometer in a test tube. Your partner reads the temperature and enters it in the table (next page).

- Heat the water in one test tube.



3. Remove the test tube containing the digital thermometer from the plant clip.



4. Your partner lights the tea light. Hold the test tube approx. 2 cm above the flame and heat the water until the display shows 35°C.



5. Your partner blows out the tea light and reads the temperature. (Wait until the temperature stops increasing.) He/she enters the temperature in the table (below).

- Mix the contents of the two test tubes.



1. Pour the heated water into the second test tube with the unheated water.



2. Use the digital thermometer to measure the temperature in the second test tube and enter it in the table.

3.1 Assignment 1

Enter all measured values in the table.

	Unheated water	Heated water	Mixed water
Temperature [°C] [degrees Celsius]			

3.2 Assignment 2

How do you explain the temperature of the mixed water?
Write down your guess.

3.3 Assignment 3

Read the following text.

A glass jar holds hot water. The same amount of cold water is added to it. The water mixture now has a different temperature. It is no longer as hot, but also no longer as cold as before when the hot and cold water were being mixed together. The temperature is somewhere in between. The basic law of heat transfer is in action here. The water with the higher temperature transfers heat to the water with the lower temperature. The mixed water has a uniform temperature after a while.

Example:

100 ml (100 milliliters) of water with a temperature of 20°C is added to 100 ml of water with a temperature of 60°C (60 degrees Celsius). The water now has a mixed temperature of 40°.

3.4 Assignment 4

True or false? Mark the correct answer with an X.

	True	False
A glass jar holds hot water. The same amount of cold water is added to it. The temperature changes.		
If you mix two liquids with different temperatures, the hotter liquid does not give off any heat.		
You mix a little hot water in a lot of cold water. The mixed temperature lies exactly in between.		
If you place a heated iron nail in a test tube with cold water, the iron nail does not give off heat.		