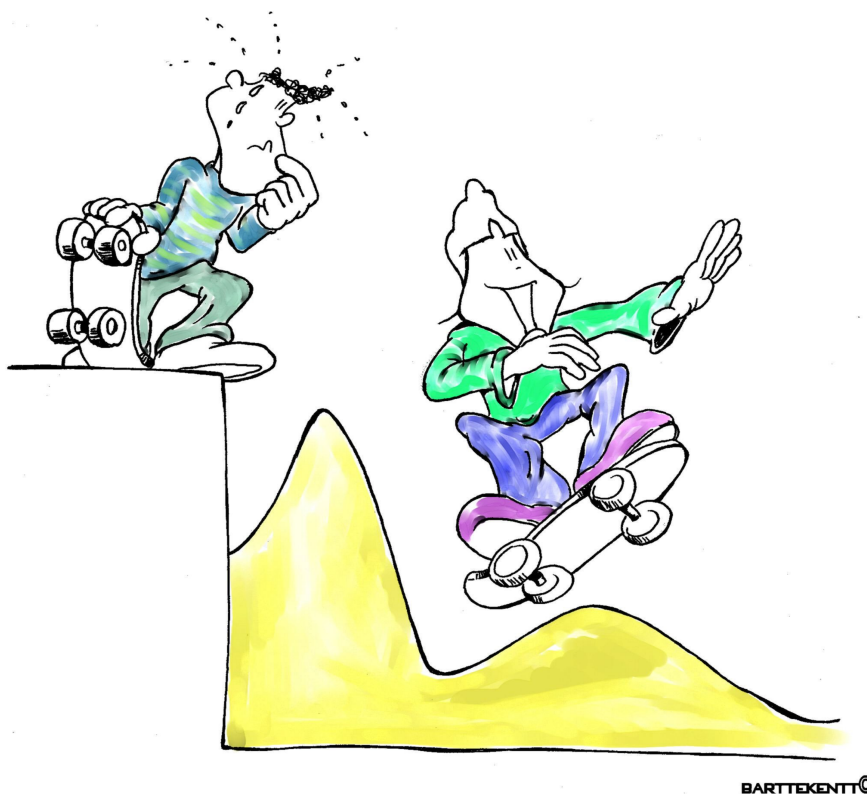


II. Graphing temperature

Key Question: How does the temperature change over time?



Student name:

Class:

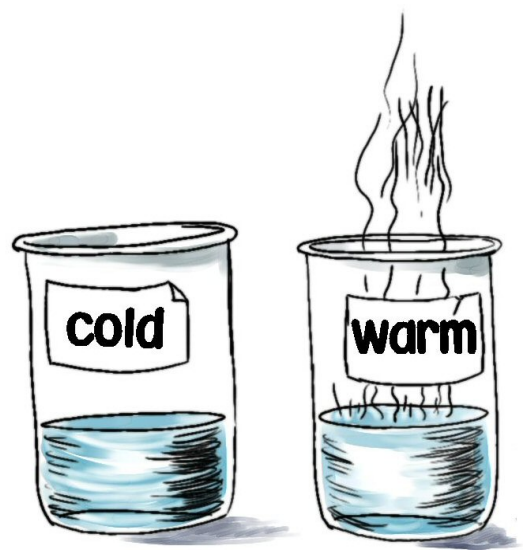


<http://www.cma-science.nl>

Activity 1 – Graphing temperature

In this activity you will make a temperature graph yourself. You need one beaker with warm water and one beaker with cold water.

- On the computer screen you see the temperature diagram. Along the horizontal axis you see the time in seconds and along the vertical axis you see the temperature in $^{\circ}\text{C}$.
- Look at the red cross on the vertical axis of the graph.
- Place the temperature sensor in the beaker with warm water.

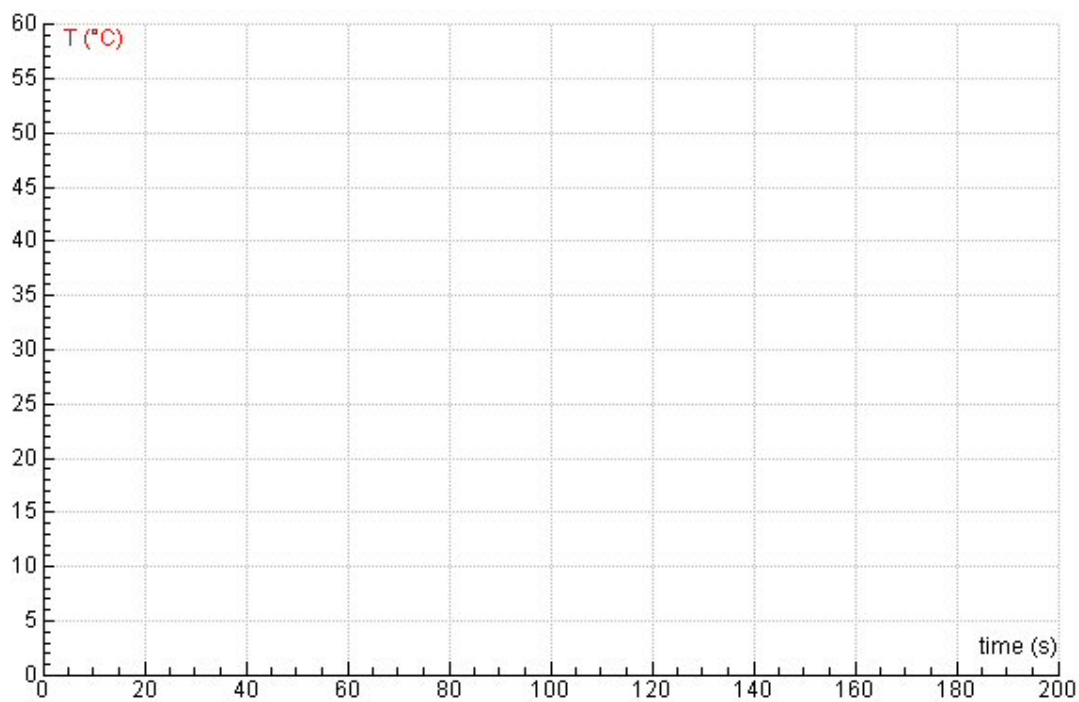


1. What happens to the cross when the temperature goes up?

2. Place the temperature sensor in the beaker with cold water. What happens to the cross when the temperature goes down?

- Take the metal part of the temperature sensor in your hand and start the measurement. Watch how the temperature of the sensor changes on the graph on the screen.
- After a little while, when the temperature stops changing, put the sensor into a beaker with the warm water. Again watch how the temperature of the sensor changes.
- After a little while, when the temperature stops changing, put the sensor into a beaker with the cold water. Again watch the temperature.

3. Draw the temperature graph in the diagram below.



4. In the graph label the moment when you had the sensor in your hand, the moment you put the sensor into the warm water and the moment when you put the sensor into the cold water.
5. Write a story about your temperature measurement.

Activity 2 – Temperature game

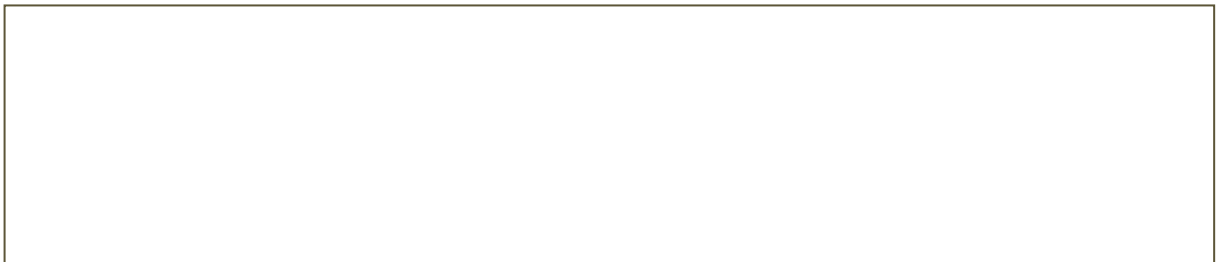
Now you are going to play a game. Hidden from your view, your classmate will dip the temperature sensor slowly in and out of beakers with the cold and warm water. Your job will be to look at the temperature graph and guess in which container the temperature sensor was placed.

Remember to keep water far from the computer!

- When your classmate is ready to begin the game, start the measurement.
 - You classmate puts the sensor slowly in the one beaker then in another beaker. He may change beakers a few times. You may **not** look at what he is doing! You look only at the temperature graph!
6. At which time moments was the temperature sensor dipped in the cold water? How do you know?

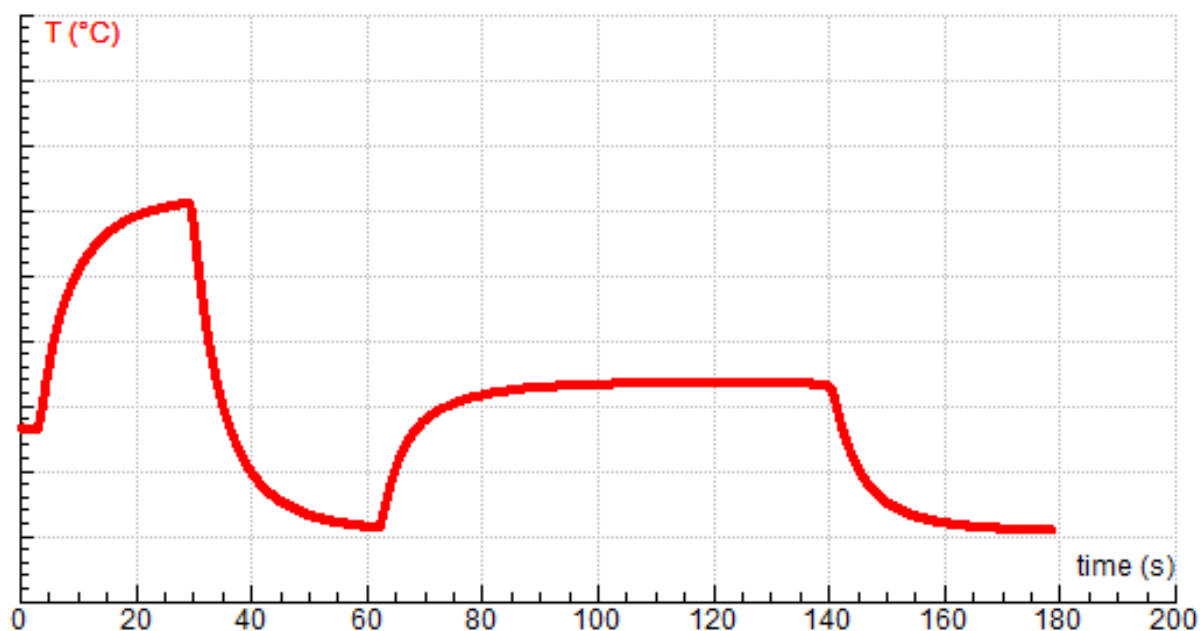


7. At which time moments was the temperature sensor dipped in the hot water? How do you know?



Activity 3 – How good can you control the temperature?

Now you are going to make the temperature graph, which matches as well as possible the graph below. You may use beakers with cold, warm and hot water.

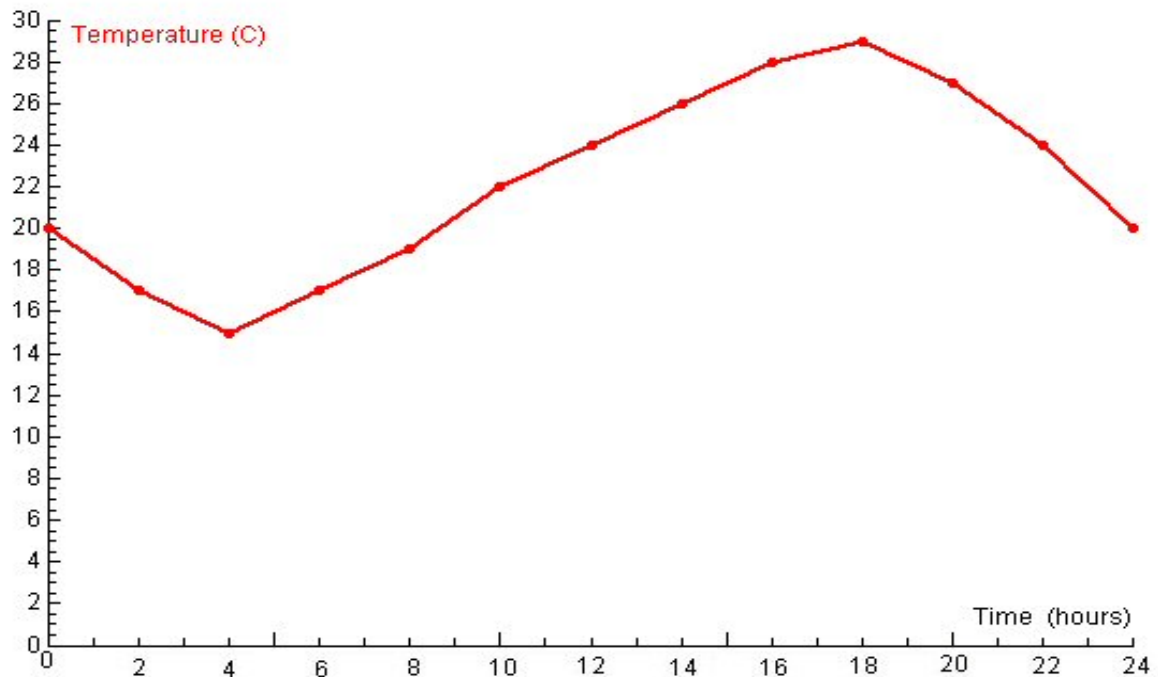


8. First look at the graph and write down how do you think this graph was made?

- Start the new measurement and by dipping the sensor in cold, warm or hot water try to match the given graph.

Activity 4 – Reading temperature graph

Scientists often use graphs to show trends and relationships in data. For example, daily change in temperature can be shown on a temperature graph like one below.



On this graph, along the horizontal axis you see the time in hours and along the vertical axis you see the temperature in $^{\circ}\text{C}$. The measurement starts at midnight.

9. What was the highest temperature?

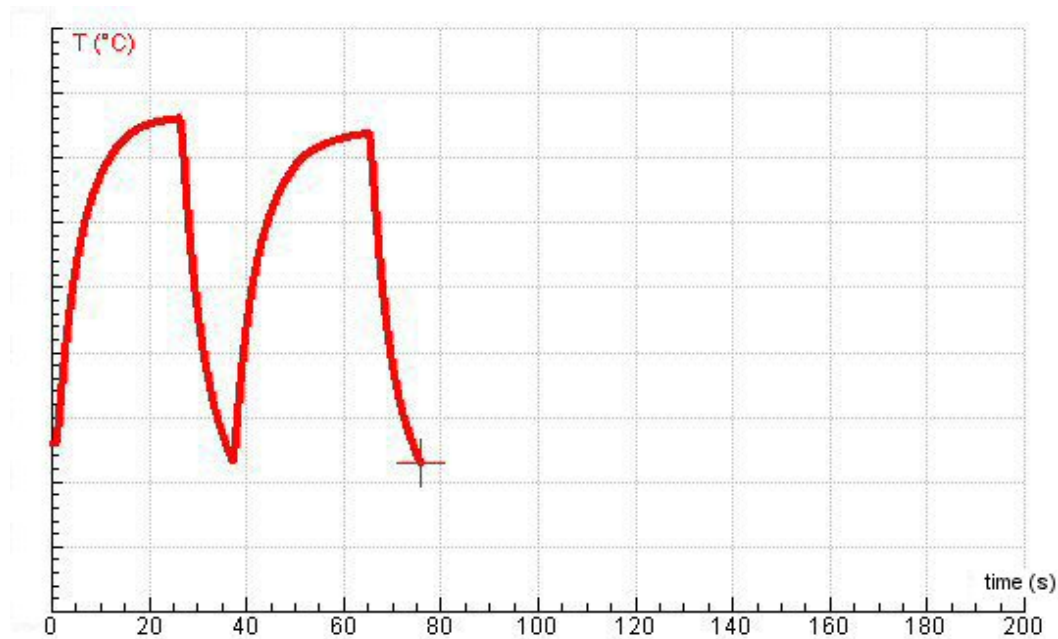
10. What was the lowest temperature?

11. What do you think this was a summer or winter day?

12. Write a short story how the temperature was changing.

Questions

- A.** By dipping the temperature sensor in warm and cold water make the "letter M" - graph, similar to one shown below.



- B.** Write down the steps needed to create the letter M.

- C.** In the similar way create the letter W. Write down the steps needed to create the letter W.

