

1.1 Melting point and freezing point of solids



How can you determine the melting point and freezing point of solids?



We are familiar with these examples: If you take solid margarine out of the fridge and leave it in the hot kitchen for a while, it melts into a liquid. If you put cooking oil in the fridge, you can recognize the formation of solids. This shows us that substances can take on a liquid or solid state of matter, depending on the temperature.

The melting point of a pure substance has a constant value and can be used to detect a certain substance. Mixtures melt in a temperature range. In this experiment, you will learn how to determine the melting/freezing points of different matter.



Set up:

- test tube
- test tube stand
- clothespin
- plastic cup
- thermometer
- ice
- table salt
- tea light
- solder
- teaspoon

1. Make a cooling bath of ice, salt, and water (3:2:1 ratio) in a plastic cup.
2. Measure the temperature of the cooling bath first.
3. Fill a test tube with 3 ml of water and place it in the cooling bath.
4. Record the temperature in the test tube every 15 seconds for 5 minutes and create a temperature/time diagram (see page 2).



Observing and documenting:



1. How can you determine the freezing point of water and other pure liquids by means of the diagram?
2. What influence do substances (such as table salt) dissolved in water have on the freezing point?
3. To find out, measure the temperature in your cooling bath.

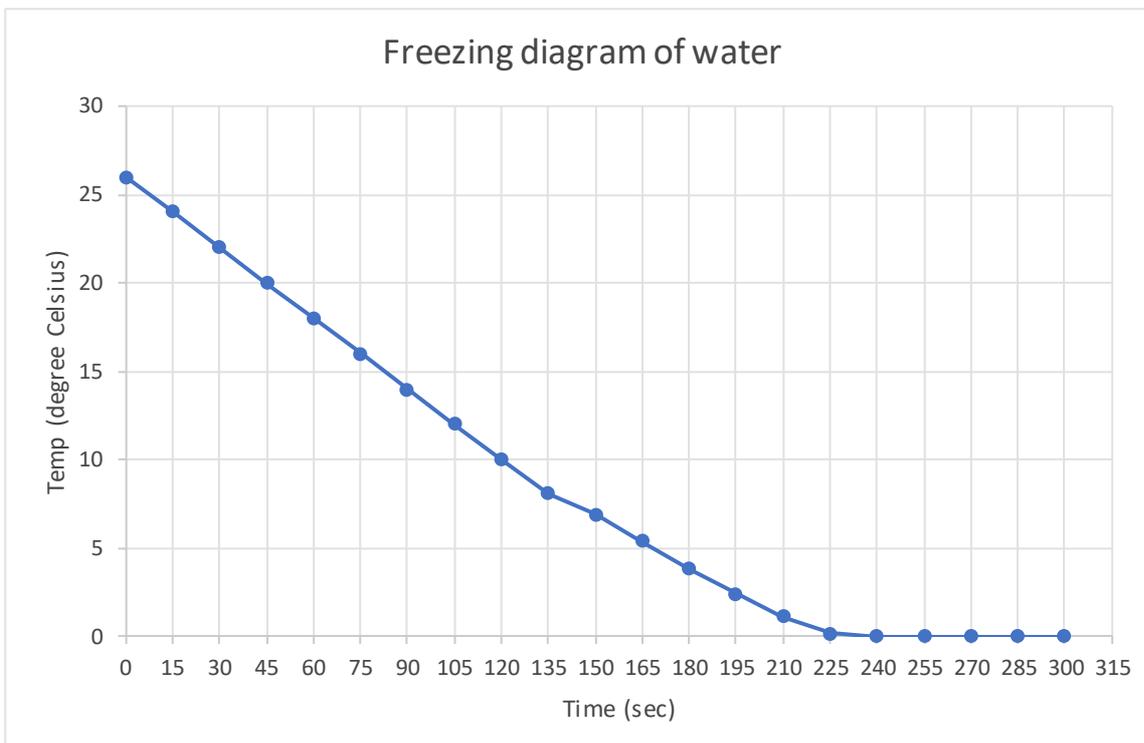


1. In your opinion, what is the relationship between the freezing point and the melting point? Design an experiment to check the relationship between the melting point and the freezing point.
2. Design an experiment to determine the melting point of solder. What can you deduce about the composition of solder from the melting point?



Technical application and vocational orientation:

Time (sec)	Temperature (°C)	Time (sec)	Temperature (°C)
0		165	
15		180	
30		195	
45		210	
60		225	
75		240	
90		255	
105		270	
120		285	
135		300	
150			



The illustrated curve serves only as a guide. Create your own curve with the results from your experiment.