

Salt (for cooking)

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Acknowledgements

This resource was originally amended and adapted by the University of Reading to support outreach work delivered as part of the Chemistry for All project.

To find out more about the project, and get more resources to help widen participation, visit our Outreach resources hub: rsc.li/3CJX7M3.

Demonstration taken from Explorable.com Lifting Ice Cube Experiment. Available from: <https://explorable.com/lifting-ice-cube-experiment> (accessed 10 October 2022).

Activity 1 has been adapted from Heston Blumenthal's RSC Kitchen Chemistry book.

Learning objectives

By the end of this session, you will be able to:

- Explain some effects of using salt in cooking.
- Describe health concerns associated with salt in the diet.

Career link

Associate principal scientist

Watch the video on **slide 11** of the PowerPoint (also available from rsc.li/3YmUIFS) about Robert's job as an associate principal scientist. He builds computer models to predict the effect of different chemicals on the taste and texture of sweet foods.

Demonstration: the effect of salt on ice/water equilibrium

Equipment

- Glass of ice-cold water
- Ice cubes
- String
- Salt

Method

1. Drop an ice cube into the ice-cold water.
2. Touch the string to the top of the ice cube.
3. Sprinkle salt over the ice cube and string and then leave until the plenary session.

To answer

Describe and explain what happened to the string and ice cube by the end of the session.

Activity 1: how is the boiling point of water affected by salt?

Equipment

- Clamp stand
- Clamp
- Boiling tube
- Bunsen burner
- Heatproof mat
- Thermometer
- Salt
- Weigh boat
- Spatula
- Glass rod
- Anti-bumping granules
- Balance
- 10 ml measuring cylinder

Safety and hazards

Wear safety glasses.

Hot equipment can cause burns. Allow the equipment to cool before handling.

To do

1. Prepare your solution as instructed by your teacher.
2. Set up the equipment, ensuring that there is a large gap between the Bunsen burner and the boiling tube. See **slide 15** of the PowerPoint for help.
3. Clamp the boiling tube to the clamp stand and light the Bunsen burner. During heating there should be a blue flame.
4. Gently stir the solution as it warms until all the salt has dissolved. Record the boiling point in the table below. Note: this is not the temperature at which the liquid starts bubbling, but the highest temperature that the solution reaches.

Solution made	Mass of salt added (g)	Boiling point (°C)
A	0	
B	1.8	
C	3.6	

5. Record and compare your results with two pairs who tested the other solutions.

To answer

(a) Does the addition of salt change the boiling temperature of water? Explain your answer using your results.

(b) How does the amount of salt added to your solution compare with the amount of salt you would use in cooking?

Activity 2: colour changes

Equipment

- Tripod and gauze
- 3 × 250 ml beakers
- Bunsen burner
- Heatproof mat
- Thermometer
- Spoons
- 100 ml measuring cylinder
- Stopwatch
- Balance and weigh boat
- White tile
- Vegetables (peas, green beans, green cabbage)
- Cooking solution D: 100 ml tap water and 18 g salt
- Cooking solution E: 100 ml tap water and 2 g bicarbonate of soda
- Cooking solution F: 90 ml tap water and 10 ml white vinegar

Safety and hazards

Wear safety glasses.

Hot equipment can cause burns. Allow the equipment to cool before handling.

To do

1. Set up the equipment. See **slide 18** of the PowerPoint for help.
2. Make the three cooking solutions using the amounts in the equipment list and label the beakers D, E and F.
3. Measure out 5 g of your allocated vegetable.
4. Set up the first solution to boil. Once the liquid is bubbling, add the 5 g of your vegetable and boil for five minutes. Take care and be aware that the boiling water may splash you. Wear heatproof gloves to handle the hot beaker.
5. Allow the beaker to cool. Once it has cooled sufficiently, use the spoon to remove some of the vegetable from the beaker and place it on a white tile.
6. Repeat steps 3–5 using the other solutions.

To answer

- (a) Compare your results for the green vegetable you cooked in different solutions. What effect have the solutions had on the vegetable?

- (b) What effect did the solutions have on the other vegetables, boiled by the other pairs?

Career link

Flavourist and innovation director

Watch the video on **slide 20** of the PowerPoint (also available from rsc.li/40V9mkh) about flavourist and innovation director, Claire. She uses her chemistry knowledge to develop flavours and technologies to make new food and beverage products.