

HEAT WATER ABOVE ITS BOILING POINT

A. Question: *Can water be boiled beyond its boiling point?*

B. Materials Needed:

1. A small beaker (100ml) & thermometer
2. A burner and stand
3. Table salt

C: Procedure:

1. Let students work in pairs. Distribute the above materials to each pair of students.
2. Heat about 20ml water, place the thermometer in the beaker and record the temperature every half minute (one student stirs with the thermometer and reads off the temperature while the other records it).
3. As soon as the water boils, let students add different amounts of salt to the water (2, 4, and 6g of salt could be given to three groups of student pairs).
4. Continue heating, stirring, observing the temperature, and recording it very half minute until the water boils again.

D: Anticipated Results:

The students should see that the addition of salt to the boiling water drops its temperature and boiling ceases.

E: Thought Questions for Class Discussion:

1. What happened to the boiling when the salt was added?
2. What happened to the temperature after the salt was added?
3. What is the normal boiling point of water?
4. Which of the three groups had the highest boiling point?

F: Explanation:

As soon as the salt is added to the boiling water, the temperature drops and the water stops boiling. This is because the salt has a lower temperature and dissolving it in water dissolves some of the heat. With the salt in the water, the water molecules adhere not only to each other-- but also to the salt ions, which makes it harder to transfer the water into the gaseous state. This is why the water has to have a higher temperature to boil. The more salt, the higher the boiling temperature of the solution. However, the temperature of the water vapor stays at 100° C (this can be checked by lifting the thermometer above the liquid).

This demonstration shows that impure water (water that contains minerals and salts) has a higher boiling point than pure (distilled) water.