

# Laboratory work about ice and salt

[Environment](#), [Water](#)



Another source of error is that possibly the ice and salt did not get to a low enough temperature, but again I would think this would alter the results giving a higher temperature instead of a lower one. Something that would give too low a temperature is if the thermometer bulb was directly on the test tube, and the temperature decreased because of the ice/salt mixture instead of the alcohol/water mixture. This is what probably happened in my experiment. Another thing that would cause the temperature to be too low is contamination in the alcohol, contributing more solute to the solution than expected. Using table salt and road salt, how would you design an experiment to determine which of these affected the boiling point of water the most? Which substance do you expect will affect it the most and why?

Procedure: Weight out 1 g of salt and put it in ml of water in a test tube. Put a thermometer in and put the test tube over a Bunsen burner, recording the temperature till it boils. Assuming equal masses (1 g each) of salt, the table salt should affect it more because sodium is smaller than calcium and there would be more moles of table salt in g than there would be of road salt.

Conclusion: Freezing point depression occurs when a solute is dissolved in a solvent. The solute makes the freezing point of the solvent decrease. How much the freezing point decreases depends on the molar mass of the solute. The higher the molar mass, the more the freezing point will decrease. The solute molecules interfere with the solvent freezing, and so the solution will have to get colder to freeze than the pure substance would. There was a large percent error in this experiment. There were a number of things the test tube and got too cold from the ice/salt mixture on the outside of the test tube.

Some other sources of error are measuring the alcohol or the water incorrectly. The graduated cylinder is not very accurate when measuring small amounts such as 2 ml. Some of the alcohol could have evaporated during the experiment since it is so volatile. There could have been some contamination in the alcohol, such as other solutes, that would contribute to the decrease in freezing point. I used 91% sports alcohol instead of 70%, and this may be a cause of error as well. The formula holds only for relatively small amounts of solute, and maybe the 91% was too much.

This experiment did not turn out as well as I had hoped. Perhaps if there were a way to keep the thermometer off of the test tube itself so that it doesn't get so cold, that would be a better procedure. Perhaps if you could cork the test tube (if it were a large enough one to fit a cork in it) with a hole for the thermometer, then the cork would hold the thermometer in the solution instead of having it touch the sides of the test tube. No matter the numerical results of the experiment, I did learn a lot more about freezing point depression than I had known previously. That aspect of the experiment was successful.