Boiling Saltwater, Freezing Saltwater

Estimated Time: 30 minutes of experiment with several hours of checking water

SUMMARY

Water is an amazing substance that regularly boils and freezes at temperatures that humans can sit through. However, saltwater has different properties than freshwater so adding salt to water changes how it behaves. Can you predict what will happen?

WHAT YOU'LL LEARN

- Salt added to water will make water boil faster and freeze more slowly.

Materials Used	
• Measuring cup • Tablespoon • Three bowls • Pot and stove	• Freezer • Salt • Stopwatch • Paper and markers

Boiling Saltwater

1. Using your measuring cup, add one quart (4 cups) of water to each of your three bowls.
2. To the first bowl add two tablespoons of salt, one tablespoon of salt to the second bowl, and add nothing to the third bowl. Stir in the salt and then put the bowls to the side.
3. While the bowls reach room temperature, make your predictions about how the salt will affect the boiling time of the water. Will the salty water take longer to boil than the fresh water or less time?
4. Take the bowl of fresh water and pour it all into the pot. Turn on your stove and start the stopwatch. Once the water reaches a rolling boil, stop timing and record the result. Pour out the water and let the pot cool while you make a graph to record our data.
5. When the pot is cool, repeat step 4 with the bowl containing 1 tablespoon of salt. After recording the data for that bowl, repeat step 4 again with the bowl containing 2 tablespoons of salt.
6. Look at the graph you made using the data from all four experiments, what was the effect of adding salt to the water?

Freezing Saltwater

7. Repeat steps 1 and 2 again to create three new bowls.
8. Make some predictions about the freezing rate of these bowls. Will adding salt make the water freeze faster or slower? Make a graph to record the data.
9. Place all three bowls into the freezer and close the door. Start your stopwatch, checking the bowls every thirty minutes. When ice covers the top of a bowl (even if it isn't totally frozen) record that data. Make a graph of the time at which each bowl freezes over.
10. How did salt affect the freezing of water? Does adding salt make it take longer to freeze or a shorter amount?

TIPS

- The water is measured out all at once in steps 1 and 7 so that it can all reach room temperature. That's also why there is reflection time between pouring it into bowls and putting it in the pot, and why it's recommended you let the pot sit between runs.