

## GED 2002 Teachers' Handbook of Lesson Plans

Area/Skill - Science	Cognitive Skill Level - Analysis/Evaluation	Correlation to Framework - 03.01/03.04/03.07	Lesson Number - 30
<p><b>Activity Title - Water and Ice</b></p> <p><b>Goal/Objective</b></p> <p>To understand what happens to solids and liquids when they change from one form to another.</p> <p><b>Lesson Outline</b></p> <p><b>Introduction</b></p> <p>Begin the class discussion by asking students whether frozen water takes up more space than liquid water and why or why not. Discuss that in science, this type of a statement is termed a “problem statement.” From a problem statement comes a hypothesis or an answer to the question. Discuss that today’s lesson will require that the students conduct a scientific experiment to support or disprove their hypotheses and answer the problem statement.</p> <p><b>Activity</b></p> <p>Have students write their individual hypothesis on an index card. Then provide each student with the <b>Handout—Ice and Water</b> and a table to record their observations and inferences for both parts of the experiment. When they have finished their experiment, have them share their observations with the class. Remind the students that they must answer the question that was asked in the original problem statement : Does frozen water take up more space than liquid water?</p> <p><b>Debriefing/Evaluation Activity</b></p> <p>Have students discuss why their hypothesis was either supported or disproved by the experiment. Some students may have hypothesized that the water would shrink as it froze as do most liquids. However if they completed their research correctly they should have come up with the correct explanation that the ice expands. Make sure that students’ conclusions contain a discussion of the fact that there was less water in the glass after the ice melted and that the froze water in the bottle had a peak in the middle showing that it had expanded.</p>		<p><b>Materials/Texts/Realia/Handouts</b></p> <ul style="list-style-type: none"> <li>• <b>Handout - Ice and Water</b></li> <li>• Materials for the experiment—ice cubes, clear plastic glasses, small glass bottle with a large mouth, small square of aluminum foil</li> <li>• Chart paper/board and markers</li> <li>• Paper and pencils.</li> </ul>	
		<p><b>Extension Activity</b></p> <p>As a follow-up activity, have students make salt water by adding four tablespoons of salt to three liters of water. Freeze some of the salt water to make ice cubes and use the ice cubes and the rest of the salt water to conduct the experiment. Determine any differences in the result.</p>	
<p><b>Real-Life Connection</b></p> <p>People must often guess or hypothesize an answer to a question and then provide proof as to whether or not their hypothesis was correct. This occurs not only in the world of science, but also in one’s daily life. Have students think of scenarios where they needed to make an “educated guess” as to the outcome of something. How did they prove that their guess was correct?</p>		<p><b>ESE/ESOL Accommodations</b></p> <p>Record the directions so that students can listen to them being read while they are conducting their experiment.</p> <p>Allow students to orally report or tape record their findings.</p> <p>Have students work in small groups where research can be read orally and documentation can be completed as a group.</p>	

## GED 2002 Teachers' Handbook of Lesson Plans - Script

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### Activity Title - Water and Ice

#### Introduction

*Ask:* Does frozen water take up more space than liquid water? Why or why not? *Say:* Today, we are going to conduct a scientific experiment to support or disprove our hypotheses. Remember, a hypotheses is an educated guess regarding a problem statement. Write your educated guess on an index card so that you can refer to it at the end of the experiment. The problem statement is the questions that I just asked.

#### Main Activity

*Say:* Today's lesson will require that you conduct a scientific experiment to support or disprove your hypotheses and answer the problem statement.

Provide each student with the **Handout—Ice and Water** and a table to record their observations and inferences for both parts of the experiment.

*Say:* Using the handout and the materials needed, conduct your experiment. Remember to record all of your results so that you can share your observations with the class. Remember that you must answer the question that was asked in the original problem statement : Does frozen water take up more space than liquid water?

#### Closure/Conclusion

After the students have completed their experiment and documentation, *ask:* Was your hypothesis supported or disproved by the experiment?

*Say:* Some of you may have hypothesized that water shrinks as it freezes, as do most liquids. However if you completed your research correctly you should have come up with the correct explanation - ice expands.

Make sure that all of the students' conclusions contain a discussion of the fact that there was less water in the glass after the ice melted and that the frozen water in the bottle had a peak in the middle showing that it had expanded.

#### Follow-Up Lessons/Activities

Have students make salt water by adding four tablespoons of salt to three liters of water. Freeze some of the salt water to make ice cubes and use the ice cubes and the rest of the salt water to conduct the experiment in the handout. Have the students compare and contrast any similarities or differences in the results.

**GED 2002 Teachers' Handbook of Lesson Plans  
Science Lesson 30 Handout**

**Water and Ice**

**Problem Statement:** Does frozen water take up more space than liquid water?

**Hypothesis:**

**Experiment**

**Materials:** ice cubes, clear plastic glass, small glass bottle with a large mouth, small square of aluminum.

**Procedure:**

1. Fill the glass with water until it overflows.
2. Add one ice cube to the glass.
3. Carefully clean up the spilled water and leave the glass undisturbed until the ice melts.
4. On your data sheet, describe what happened and provide a possible explanation for your conclusion.
5. Fill the glass bottle with water and cover it with the aluminum foil.
6. Put the bottle in the freezer and leave it until the water is frozen solid.
7. On your data sheet, describe what happened and give a possible explanation for your conclusion.

**Data Sheet**

<b>Question</b>	<b>Conclusion/Rationale</b>
<b>What happened when the ice cube melted in the glass of water? Why?</b>	
<b>What happened when the water in the bottle froze? Why?</b>	