Salt on Ice

Use research and a fair test to investigate a winter question.

FSL.3A.1 "Ask questions and conduct research to generate a hypothesis, determine independent/dependent variables, and appropriate controls for scientific investigations and experiments."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the research finding that suggests salt may change melting, circle the three salt amounts, and number two conditions kept the same to help you identify how the test is designed.

How Much Salt Is Enough?

1. After a winter storm, the courtyard steps outside a school stayed icy while nearby paths cleared. A student wondered whether adding more salt always makes ice melt faster. Before planning a test, she checked a university chemistry resource and a local water agency report. The chemistry resource explained that dissolved salt lowers water's freezing point, but it did not claim that every extra gram of salt produces the same change. The water agency warned that excess road salt can enter streams. These findings turned a casual observation into a testable question: How does the amount of salt added affect the water released from ice in ten minutes?

2. She placed identical ice cubes in three identical funnels above separate measuring cups. Each cube received either zero, one, or two grams of table salt. The funnels held the cubes while meltwater dripped into the cups. She predicted that cubes receiving more salt would release more liquid water during the ten-minute test. She set all three stations in the same room, started them at the same time, and kept the cubes the same mass. A no-salt station let her compare salted cubes with ice that melted without added salt. She planned to repeat the test with fresh cubes on three days.

3. The student would record the milliliters collected in each cup after ten minutes, not simply judge which cube looked smaller. A room thermometer would help her check whether changing air temperature might affect the results. If the two-gram cups collected more water than the one-gram cups in repeated trials, the measurements would support her prediction under these conditions. They would not prove that adding unlimited salt always helps. If the amounts were similar, she would reconsider her prediction and examine whether salt failed to reach the ice evenly. Either way, the measurements could guide a follow-up question about effective salt use.

2 ANSWER WITH EVIDENCE

Use the passage

1. Which source gives a reason to test whether salt changes melting, and what did that source report?

2. Write the student's prediction as an if-then hypothesis about the salt amounts and the meltwater collected.

3. What factor does the student change, and what result does she measure?

4. Which station is the comparison group? Name two conditions kept the same, and explain why one matters.

3 YOUR TURN

Your own words

Design a different investigation about a change you could make at school or home, without using ice or salt. State a testable question, a trustworthy source and what you would look up, an if-then hypothesis, the factor you would change, the result you would measure, a comparison group, and two conditions you would keep the same.

ANSWER KEY

Salt on Ice

HIGH SCHOOL · FSL.3A.1

PART 1 · READ AND MARK

Underline the research finding that suggests salt may change melting, circle the three salt amounts, and number two conditions kept the same to help you identify how the test is designed. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Which source gives a reason to test whether salt changes melting, and what did that source report?	**The university chemistry resource reported that dissolved salt lowers water's freezing point.**
2	Write the student's prediction as an if-then hypothesis about the salt amounts and the meltwater collected.	**If more salt is added to an ice cube, then more meltwater will be collected after ten minutes.**
3	What factor does the student change, and what result does she measure?	**She changes the amount of salt added and measures the milliliters of meltwater collected after ten minutes.**
4	Which station is the comparison group? Name two conditions kept the same, and explain why one matters.	**The no-salt station is the comparison group. Cube mass and time in the funnels are kept the same. Equal time matters because a cube left longer could release more water for that reason alone.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Question: Does water temperature change how long a sugar cube takes to dissolve? Research: I would consult a university chemistry textbook to check how temperature affects the rate at which sugar dissolves. Hypothesis: If the water is warmer, then an identical sugar cube will dissolve in less time. I would change water temperature and measure the seconds until no solid cube remains. My comparison group would use room-temperature water. I would keep water volume and sugar cube mass the same, and I would not stir either cup.

Accept equivalent hypotheses and any two conditions the passage says were kept the same. For the open task, accept a comparison group that provides a clear reference for the proposed change.