Winter science fair projects with ice, salt and a thermometer

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Seven science fair projects for a cold month, from 1st to 8th grade: melting ice, salt in ice water, and what warms fastest in the winter sun. Each is a real test.

A cold month is a good month for a science fair project. Ice is free, salt and sugar are in every kitchen, and a cheap thermometer turns a "does it melt?" demonstration into a real test with numbers. These seven projects each change one thing, measure one thing and repeat it three times, which is what judges look for. Every one has its own page in Peabody's science fair projects, with the materials, the steps, a results table to print and a line on what usually happens. Peabody is free through the end of 2026, with no ads.

Three that use a thermometer

Most ice projects measure time: how many minutes until the cube is gone. A thermometer lets a child measure something different, how cold or how warm, and that makes a project stand out.

1. Does more salt make ice water colder? (3rd to 8th grade). Four cups of ice water, with no salt, one, two and three tablespoons. After ten minutes, read each cup. Salt dissolved in water lowers the temperature at which it freezes, so salty ice water goes below 0 °C, and the cups with more salt usually read lower. It makes a good line graph: salt along the bottom, temperature up the side.
2. Which makes ice water colder: salt or sugar? (2nd to 6th grade). The same test with three cups: nothing, two tablespoons of sugar and two of salt. Anything that dissolves lowers the freezing point, but what matters is how many tiny pieces end up in the water, and spoon for spoon salt makes far more. A child who predicts "they'll be the same, they're both white" has a great hypothesis to test.
3. Which warms up most in the sun: soil, sand or water? (1st to 4th grade). Three cups of each on a sunny step for an hour, with the thermometer just under the top. Sunlight warms only the top of soil and sand, while in water the warmth spreads down through all of it, so the water's top usually warms least. It works on a bright winter day as well as a summer one.

Four that only need a timer

1. Does crushed ice melt faster than a whole cube? (1st to 4th grade). One cube whole, one in four pieces, one crushed. More of the crushed ice touches the air, so warmth gets in from every side.

2. What melts ice fastest: salt, sugar or sand? A question every family that salts a sidewalk has wondered about.
3. Which cup keeps an ice cube from melting longest? Foam, paper, glass and plastic, side by side. A project about insulation without the word.
4. Does salty water take longer to freeze? The freezer does the work overnight, so it suits a child who has a week.

Make it a fair test

Whichever project a child picks, three rules turn it from a demonstration into an experiment:

- Change one thing. Only the salt changes, or only the cup. The ice comes from the same tray, the cups are the same size, the room is the same.
- Measure it the same way every time. Hold the thermometer in each cup for the same 30 seconds, and rinse it between cups. Read the clock at the same moment.
- Do it three times. Ice is fussy. One cup can be odd; three tries show what really happens. From 4th grade, the results table on each project page has a column for the mean.

Peabody's guide on how to write a hypothesis has the "If I change…, then…, because…" frame for each of these.

Snow facts for the display board

A winter project's board can have a small "Did you know?" corner. These come from the National Snow and Ice Data Center:

- It can be too warm to snow, but it can never be too cold. Snow needs freezing air and enough water in the air. Peabody's answer for kids explains it.
- Snow looks white, but each ice crystal is actually see-through.
- Most snowflakes are less than half an inch across.
- Fresh snow makes the world quieter, because it soaks up sound.

Safety, briefly

None of these seven uses hot water or a stove. The ice-water projects are kitchen projects, but the salty and sugary water is for testing, not drinking: pour it away when the test is done. The sun project is outside, so the usual rule holds: never look at the Sun.

After the project

When the board is done, a snack that never melts is a good way to celebrate: Peabody's Kitchen has banana snowmen, ten minutes and no cooking. And for a quiet evening after a busy week, there are free stories to read together in the Peabody library.

Free at peabody.kids/blog/winter-science-fair-projects-ice-and-snow