Science fair projects for 6th graders with two variables

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Science fair projects that fit 6th grade, each with its independent and dependent variable named, the controls listed, and a mean and graph for every level.

A 6th grade science fair project has two variables: the independent variable, the one thing you change on purpose, and the dependent variable, the one thing you measure to see what happened. Everything else stays the same, and those are the controls. Thirty-five of the forty projects on Peabody fit 6th grade, and each one names its two variables and at least two controls before you start. Get those three things right and the rest of the project (three tries, a mean, a graph, an honest conclusion) follows.

I built the science fair pages on Peabody around a variables card: what you change, what you measure, and what you keep the same. It sits on the hypothesis sheet for every project, filled in from the project's own data. Here's what a 6th grade fair expects, twelve projects with their variables, and how to run one.

What a 6th grade fair expects

Sixth grade fairs often start using the words independent and dependent variable. Those are simply the formal names for the thing you change and the thing you measure, and a 6th grader should be able to say both in one sentence: "I changed the number of drops of soap, and I measured how many seconds the oil and water took to split."

The rest of the 6th grade checklist:

- Name every control, and say what would go wrong without it. "If I shook one jar harder, I wouldn't know whether it was the soap or the shaking."
- Three tries at every level, with units in the table header.
- A mean for every level. Add the tries and divide by three.
- A bar graph for separate kinds, a line graph for a number that grows.
- A conclusion that says right, partly right or not, and points at the numbers.

Sixth grade is a good time to pick a question where the answer isn't obvious. If the hypothesis turns out wrong, that's a result worth reporting: say so straight out, show the numbers, and name the next test. A grown-up's role at 6th grade is to check and ask questions.

Twelve projects and their two variables

These fit 6th grade. "You change" is the independent variable; "you measure" is the dependent one, with its unit. All thirty-five are on the 6th grade page.

- Project: How much does a rubber band stretch with each extra weight? · Grades: 5th–8th · Testing: 1 day · Cost: free · You change ? you measure: pennies in the cup ? stretch (cm)
- Project: Does a longer string swing slower? · Grades: 4th–8th · Testing: 1 day · Cost: free · You change ? you measure: string length ? swings in 15 seconds
- Project: Does a steeper ramp make a toy car go farther? · Grades: 2nd–6th · Testing: 1 day · Cost: free · You change ? you measure: ramp height ? distance rolled (cm)
- Project: Does sugar dissolve faster in warm water? · Grades: 2nd–6th · Testing: 1 day · Cost: free · You change ? you measure: water temperature ? time to dissolve (seconds)
- Project: What melts ice fastest: salt, sugar or sand? · Grades: 2nd–6th · Testing: 1 day · Cost: free · You change ? you measure: what's sprinkled on ? time to melt (minutes)
- Project: Where does a puddle dry fastest: sun, shade or wind? · Grades: 2nd–6th · Testing: 2 days · Cost: free · You change ? you measure: where the cup sits ? water level drop (mm)
- Project: How much salt does it take to float an egg? · Grades: 3rd–7th · Testing: 1 day · Cost: free · You change ? you measure: tablespoons of salt ? egg height (cm)
- Project: Does dish soap stop oil and water from separating? · Grades: 3rd–8th · Testing: 1 day · Cost: free · You change ? you measure: drops of soap ? time to separate (seconds)
- Project: Does a higher start make a marble roll faster? · Grades: 3rd–8th · Testing: 1 day · Cost: free · You change ? you measure: start height ? speed (cm per second)
- Project: Which colour of paper warms up most in the sun? · Grades: 3rd–8th · Testing: 1 day · Cost: about $3 · You change ? you measure: paper colour ? warming (degrees)
- Project: Does planting a seed deeper make it slower to come up? · Grades: 3rd–8th · Testing: 14 days · Cost: about $1 · You change ? you measure: planting depth ? days to come up
- Project: Do the heaviest liquids always sink to the bottom? · Grades: 4th–8th · Testing: 1 day · Cost: about $2 · You change ? you measure: which liquid ? grams per quarter cup

Four of the twelve stop at 6th grade and one at 7th, so this is the last year or two for them. The rubber band starts at 5th grade and suits a 6th grader who likes a straight-line graph.

And a second variable, when you're ready

Every Peabody project also has a "Going further" line: a second thing to change once the first test is done. That's what 7th grade fairs start to expect, but a 6th grader with time can try it. For the oil and water, keep 10 drops of soap and shake 10, 20 and 40 times. For the marble run, tilt every slide more steeply and run all three heights again. Two lines on one graph, and a conclusion that compares them.

How to run it

1. Fill in the variables card first. On the hypothesis sheet: what you change, what you measure, and at least two things you keep the same. Every Peabody project lists at least two controls; the check in the code won't publish one with fewer.
2. Write the hypothesis. "If I change ___, then ___ will ___, because ___." The because is your child's reason.
3. Run three tries at every level and write each number in the results table the moment it's measured.
4. Work out the means and draw the graph. Independent variable along the bottom, dependent variable up the side with its unit.
5. Write the conclusion on the conclusion sheet: right, partly right or not; which numbers; what next.
6. Lay out the board. The board plan is a 36 × 48 inch tri-fold with Question, Hypothesis, Materials, Steps, Results and Conclusion in reading order.

The safety check lives in code

Every project on Peabody passes a check in code before it can be shown: nothing off the fair's safe-list, no flames, no chemicals beyond the kitchen, no animals, no cultures and no people as the thing tested. A grown-up does any step with a sharp knife or hot water. Your school's sheet wins.

Try tonight

Pour a quarter cup of water and a quarter cup of cooking oil into a clear jar with a lid, add one drop of food colouring, screw the lid on tight and shake it 20 times. Set it down, start a timer, and stop it when a clear line shows between the oil and the water (if none shows after 10 minutes, write 600 seconds). Three tries, then 5, 10 and 20 drops of dish soap, three tries each. Independent variable: drops of soap. Dependent: seconds. Controls: the same jar, the same amounts, 20 shakes. That's Does dish soap stop oil and water from separating?. To choose a different one, Pick my project asks four questions and hands over one.

Questions grown-ups ask

What's the difference between the independent and the dependent variable?

The independent variable is what your child changes on purpose (the drops of soap). The dependent variable is what they measure, because it depends on the change (the seconds). If they can fill in "If I change ___, then ___ will…", the first blank is the independent and the second is the dependent.

How many controls does a 6th grade project need?

As many as it takes to make the test fair, and at least two. Every Peabody project lists its controls; the oil and water lists three (the same jar, the same amounts, shaking it the same 20 times). Your child should be able to say why each one matters.

What if the hypothesis is wrong?

That's a good result, and judges at this level listen for it. "I thought more soap would always keep them mixed longer, and the numbers show ___" is a strong conclusion either way, as long as it uses the numbers.

Peabody (peabody.kids) is free through the end of 2026, with no ads and no sign-up, and nothing a child taps on the science fair pages is sent anywhere. The library has stories for middle grade readers when the board is done.

Free at peabody.kids/blog/science-fair-projects-for-6th-graders