

Ideas for Science Fair Projects

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Science Project Tips for Parents

Why are Science Fair Projects Important?

1. Science Fair Projects provide opportunities for students to develop skills necessary to function productively as problem-solvers in a scientific and technological world.
2. The best way to learn about science is by "doing" science. "Doing" science and writing about what you observed and experienced enables students to construct their own understanding of the world around them.
3. It's FUN!

How Can Parents Best Help Their Children with Their Project?

1. Help them ask questions.
2. Provide them with hints.
3. Provide them with the materials necessary.
4. Encourage thinking through questions, alternatives, answers and data, without giving them the answers.
5. Help them to follow the teacher's guidelines or instructions.
6. Help them gather background information, through reading, to encourage good
7. questions, appropriate conclusions and the ability to speak knowledgeably about their
8. project.
9. Help select a project, based on your child's skills, age, knowledge and interests.
10. Get started right away, so it doesn't become overwhelming.
11. Don't copy a project from a website. But you may use a website to give some ideas
12. about a possible project. Some websites that can give interesting ideas are:
www.sciencebuddies.org www.sciencebuddies.org,
www.sciencebuddies.org www.sciencebuddies.org,

www.education.com/science-fair/middle-school/,
www.hometrainingtools.com/a/high-school-science-projects/, www.cool-science-projects.com/Middle-School-Science-Projects.html,
www.navigatingbyjoy.com/science/

14. Remember that it is ok if their hypothesis, or prediction of what will happen, is not correct. The important thing is that they measure their results, and do multiple trials. Science experiments do not always turn out the way you think they will. Do not change your hypothesis.
15. Have FUN working with your child!

Representative Questions that Could Lead to Ideas for Science Fair Projects

Physical Sciences

- How does internal air pressure affect a basketball's bounce?
- How does the height from which you drop a ball affect how high it bounces?
- How do vision and/or smell affect taste?
- Which diaper has the best absorption properties?
- Which paper towel is the strongest?
- How far will an object slide when propelled across surfaces with different textures?
- How does weight affect a toy car's car speed on a ramp?
- How can a ramp be designed to make a toy car roll farther?
- How does surface area of water in a container affect water evaporation?
- How does elevation affect the boiling point of water?
- How can water be separated into oxygen and hydrogen?
- How does salt affect the boiling point of water?
- When used as fuel, which type of wood gives off the most heat?

Earth Sciences

- How is erosion affected by ground cover?
- How does salinity affect plant growth?
- How do the Santa Fe water resources affect natural plant (e.g., duckweed) growth?
- How do commercial disinfectants affect microbial (yeast, e-coli, etc.) growth?

Biology and Life Sciences

- Which microwave popcorn pops the best?
- How does a fertilizer containing iron (essential plant nutrient) affect plant growth?
- How do varying soil types affect seed germination?
- How does music affect concentration?
- How do plants respond to the environment e.g., gravity, light intensity/direction, temperature, etc.?
- How do color/firmness indicate fruit ripeness?

- Do birds prefer eating bird seed from a feeder, from the ground, or from both? How can human peripheral vision be measured?
- How is right/left handedness related to right/left footedness?

Technology and Mathematics

- What is the distribution of values obtained from rolling two 6-sided dice?
- How do video games affect concentration?
- How does the spacing of a line of dominoes affect the time needed for the whole line to fall?
- How could a robot be constructed to locate a burning candle and extinguish it? Which of the five basic Platonic 3-dimensional shapes affords the best protection to a raw egg?
- How can a survey be used to verify a prediction?
- If a penny is flipped multiple times, how many times will it land on heads and how many times will it land on tails?
- How could a bunch of people in a line organize themselves from the tallest to the shortest if each can only compare herself to the person on her right and her left?
- How would you determine the value of pi?
- How would you find the fastest way from home to school?

Engineering

- Which design affords the strongest model bridge?
- Which design affords the longest paper airplane flight?
- Which model boat design allows the most cargo loading?
- How could one build a "launcher" device to launch a ball as far as possible and a "receiver" to catch it?
- What type of insulation holds in heat the best?
- How much force does it take to drive a nail through different types of wood?
- What is the best material to put in a sandbag to block water, such as during a flood?
- How does a change in the construction of a parachute affect flight?

Topics Not Recommended

Food spoilage/mold measuring	Candle burning
Tooth staining	Mentos and soda
Slime	Cleaning coins
Oobleck	Lemon batteries
Volcanos	Carnations in colored water
Lava lamps	Gummy Bears

Science Fair Themes

Themes could be developed from the representative questions list. Some advantages of the theme approach are efficiency and cost savings for individual teachers, inclusion of the whole class, room for student ingenuity, active student-teacher and student-student interactions, and the generation of large, hopefully meaningful, data sets. The following are presented as examples:

Biodiversity/Ecology - Each student surveys their neighborhood and identifies/counts types of plants or animals or birds or insects. Each student constructs a board for the fair and the class results are compiled for an overall view.

Aerodynamics - Each student builds several paper airplane designs and measures their performance based on a common classroom goal (e.g., distance traveled, time aloft, number of loops, etc.). As a class challenge, they could build a launch device for more accurate testing.

Pendulums - Each student explores the behavior of a pendulum by changing one property of their choice (bob weight, arm length, release angle, etc.) and measuring the effect on period.

Buoyancy - Students explore boat designs using the same size pieces of aluminum foil. Design approaches are documented and tested for how much weight (e.g., pennies) they can float.

Egg Drop – Using identical starting materials (i.e., toothpicks, glue, cotton puffs, etc.), students design containers to protect an egg from a 6-foot drop. Each student documents their design ideas and testing. Designs should be optimized for same amount/weight of packing material. **Plant Growth** - Each student explores the growth of wheat grass (or other plant) while changing one condition of their choice (e.g., amount of water, amount of light, amount of fertilizer, temperature, etc.)

Estimation - Each student predicts what price has increased the most in the last five years - a pound of hamburger, a small car, a basketball or a gallon of gas. The actual prices are researched and a chart and graph of the information are

constructed. A survey of 10 adult individuals asks for the same prediction. The results are graphed and the two data sets are compared.

Environmental Pollution - Each student could make or be given a simple setup to expose a standard size sticky surface to the air where she or he lives. Choose a fixed period of time, show them how to use a grid to help counting, and then compare particle totals for sites in different neighborhoods. Aside from residential areas, additional test sites both downtown and in the country could also be identified and monitored by volunteers. Two or three simultaneous tests at each site would give an idea of the range of results possible. Class results are tabulated on a map.

Some Website Resources

www.SFAFS.org

www.sciencebuddies.org (has a Topic Selection Wizard)

www.sciencemadesimple.com

www.education.com/science-fair/middle-school

www.cool-science-projects.com

Note: YouTube is NOT a recommended resource.