

Representative Questions that Could Lead to Ideas for Science Fair Projects (9/30/18)

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?
- How does the physics (e.g. rolling objects, falling objects, etc.) in a video game (e.g. Minecraft) compare to real world physics?
- 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?

How can blood type be determined from saliva?

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?

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?

How has the price increased in the past five years for – a pound of hamburger, a small car, a soccer ball, and a gallon of gas?

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 one measure the length of the West Coast from Mexico to Canada?

How could two strangers exchange a secret over mail?

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

Tooth staining

Slime

Oobleck

Volcanos

Lava lamps

Candle burning

Mentos and soda

Cleaning coins

Lemon batteries

Carnations in colored water

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: You Tube is NOT a recommended resource.