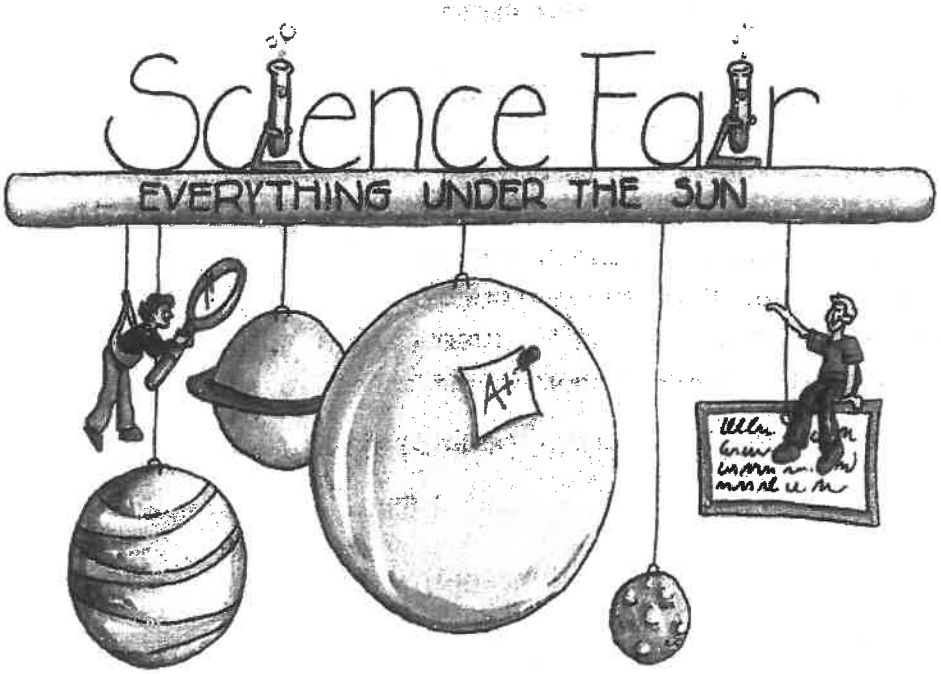
CAMPBELL STEM ELEMENTARY SCHOOL

SCIENCE FAIR

WEDNESDAY, MARCH 18, 2020

All students are encouraged to enter.

Get Started Today!!!



Get a packet from your teacher.

2020 Science Fair Timeline

1/27/20	Science Fair packets distributed to students
1/27 - 2/7/20	Choose a Science Fair topic
2/7 - 2/17/20	▪ Pose a question; research your topic ▪ Formulate a hypothesis ▪ Design your experiment; gather materials
2/17 - 3/9/20	▪ Conduct your experiment and record data ▪ Analyze your data; create graphs displaying data ▪ Create your Science Fair presentation display ▪ By the end of three weeks, you should have your procedure, results, observations, and conclusions in written form
3/9/20 - 3/16/20	Complete your display including all steps of the scientific method, photos or drawings of your experiment, graphs of your data, and a well-thought out conclusion about what your results mean. Include acknowledgements to the people and resources who helped you complete your project.
3/5/20	**Registration forms are due for the Science Fair!!** Give registration forms to your teacher. These help us set up the gym for the Science Fair!
3/17/20	Bring projects to school in the morning. Students will bring their projects to the gym when their class is called.
Wednesday, March 18, 2020	**Campbell Elementary Science Fair!!!** Judging All Day
3/19/20	Classroom Viewing; Students take projects home
3/27 - 29/20	Alaska Science and Engineering Fair. More information at: http://alaskasciencefair.org/

Choosing on a Science Fair Topic

Selecting a project topic can be difficult, be sure to pick a topic you like. Projects and displays should show the results of research and careful thought. Students may do an experiment, create a demonstration, show a collection, etc. Students should think about what they enjoy, what area of science interests them, and whether they have the resources and help to conduct the investigation.

Most importantly, choose a topic that you will enjoy and that will interest you!!!

Here are a few ideas to help students and parents start the process:

Experiments

Students pose a problem, design an experiment to investigate the problem, record and report the results, and make conclusions based on the results (i.e., they follow the scientific method). The final project is a display of the investigative process, any successes or failures, and the implications of the data.

Examples of experimental questions:

- Do crystals form differently in different solutions/environments?
- Which paper towel absorbs the most water?
- Do plants transpire more water in the winter or summer?
- How does the color of an object affect how warm it gets?
- Do preservatives stop bread mold from growing?
- How does changing the fulcrum affect a lever?
- What materials conduct electricity the best?

Demonstrations

These projects demonstrate a science principle or fact, or display some kind of scientific apparatus or instrument. Students may want to demonstrate how something works, a science phenomenon, or how something is created in a lab. Written materials should label all parts and describe in-depth the topic being demonstrated. Check with your teacher to see if demonstrations are acceptable.

Examples:

- A model of the features of the earth's surface.
- A model of a pinhole camera.
- Show how a flashlight works.
- Show what causes light to bend.

Note: There may be restrictions regarding the eligibility of models and demonstrations for awards at the Alaska Science and Engineering Fair. See their website for rules and restrictions. (http://alaskasciencefair.org/)

What is a Science Experiment?

Follow these steps in this order. Judges will be considering these steps when scoring your project.

1. Choose a **PROBLEM** to solve.
2. State your problem as a **SCIENTIFIC QUESTION**.
3. **RESEARCH** your problem.
4. Form a **HYPOTHESIS**.
5. **PLAN** your project.
6. Set up a **TIME SCHEDULE**.
7. Make a list of all the **MATERIALS** you will need.
8. **COLLECT** all your materials.
9. **CONDUCT** your experiment several times (minimum of 3 times).
10. **RECORD** the data (tables/drawings/photos).
11. **ORGANIZE** the data in an orderly format (graphs/charts).
12. **DRAW CONCLUSIONS** from the data (*Why did I get these results?)*
13. Prepare your **REPORT**, graphs, drawings, and diagrams.
14. Create your **SCIENCE FAIR DISPLAY** (include acknowledgements, bibliography).

What <u>is not</u> a Science Experiment?

- A collection of related or unrelated objects.
- A list of things.
- A report not supported by data or experiment.
- A model, illustration, or piece of equipment unrelated to an experiment.

Science Fair Category Descriptors

Life Science (Biological Sciences)
The study of living organisms. There are two main fields: botany deals with plants; and zoology deals with animals. Paleontology and ecology are also included in Life Science.

Physical Science
The study of the nature of the universe, structures, and properties of non-living matter; from tiny atoms to vast galaxies. Physical Science includes astronomy, chemistry, and physics.

Earth Science
The study of the composition, structure, and history of the earth, including earthquakes, volcanoes, and erosion (geology); and the study of meteorites, and minerals (mineralogy).

Social Science
The behavioral science of individuals, groups, and institutions that make up human society, focusing on human relationships and interactions. The main branches of Social Sciences include: anthropology, economics, political science, and sociology. Projects based on surveys concerning likes and dislikes fall into this category.

Important Reminder
When making a decision about which category your project falls under, be sure to pay close attention to your question. What question are you attempting to answer? For example, if your question is: "*Who would more often choose to run races during PE class, first grade boys or first grade girls?*" your category would be Social Science. If you were to ask "*Who has the fastest heart rate after running a 50-yard dash, first grade boys or first grade girls?*' your category would be Life Science. If you were to ask: "*Would a first grade boy run 50 yards faster in rubber-soled PE shoes or leather-bottom street shoes?*' your category would be Physical Science. All three projects have something to do with first graders, but the answer to each question falls within a different category of science.

Project Type Descriptions

Models

A model is usually used to show a scientific idea that is either too big to see (the solar system) or too small to see (a water molecule). A model should have a scale so that the person looking at it can understand how big or small it really is. For example, a model of the solar system might have a scale of one inch = 100,000 miles. In addition to a scale, there should be a written explanation about why this piece of science is important.

Collections

A collection is an organized group of things such as rocks, shells, sand, skulls, or insects. The collection should have each specimen identified with its common name and its scientific name, if it has one. You should give examples of the specimen characteristics. There should be an explanation of what the specimen have in common and why you chose to collect them.

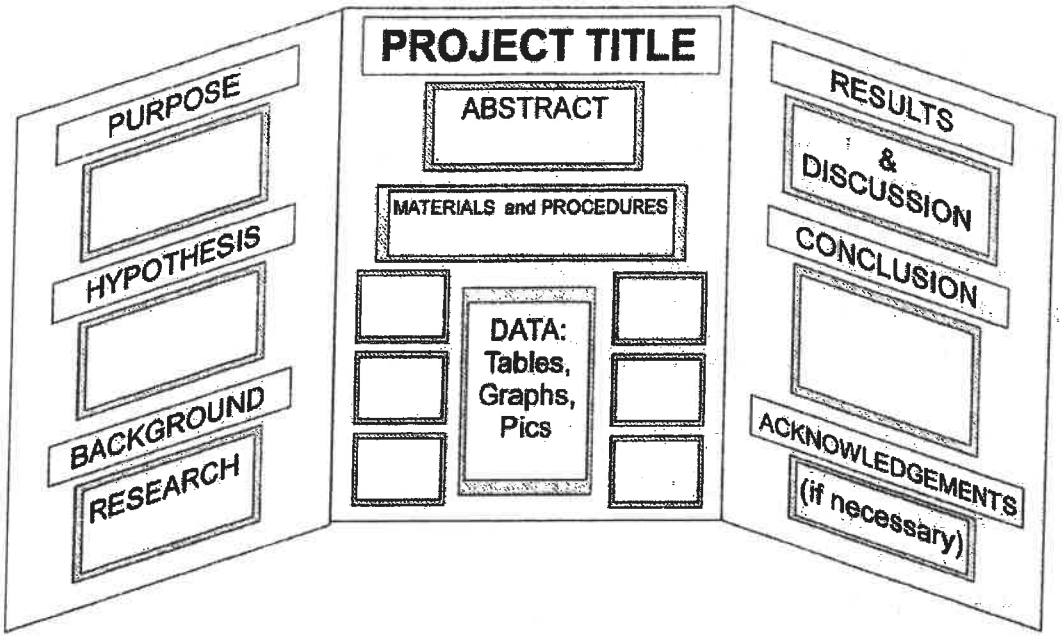
Demonstrations

A demonstration of scientific principle shows how the principle works. The outcome or what will happen is already known before the demonstration is done. An example would be to show the acid-base reactions in common acids and bases like lemon juice and baking soda. What will happen is already known or can be easily found with some research. **What is most important** is to explain what acids and bases are and why they react the way they do.

Experiment

An experiment uses the scientific method. You start with an "I wonder" question. This is a question you don't know the answer to or cannot easily find the answer with some research. You then develop the question into one you can test. You come up with a hypothesis then set up the procedure you will follow. You will follow the procedure a number of times. Three is a good number of repetitions. As you are following your procedures you should record your data. Then, using the data, see what conclusions you can make based on that data. Remember, it is okay if your hypothesis is incorrect!

Sample Layout of the Display Board



A. Name, grade, and teacher (On the back of the board)

B. Title

C. Topic/Question (also called Purpose): Try to explain the purpose of your project in one to three sentences

D. Hypothesis: What do you think will happen?

E. Materials: List of items and resources used in the investigation

F. Procedure: Write a step-by-step procedure of what you did during your experimentation

G. Results: This displays what you learned. Results can be displayed in graphs, charts, tables, picture, etc.

H. Conclusion: Look over your results, then write what you think the data shows; My data shows that . . . . *Was your hypothesis correct? What would you do differently next time? What new questions to you have?*

I. References

Ideas and Resources for Science Fair

Sample Topic Ideas

Air pressure	Digestion	Microscopes: how they work
Black light	Falling water	Optical Illusions
Bones	Five Senses	Paper
Breathing	Flowers of Alaska	Pulleys and levers
Breeds of some animals	Glass and light	Sand
Bridges	Light refraction	Shadows
Bubbles	Methods of measuring	Sea shells

PROJECTS

Examples of questions

- How do the moon phases affect plant germination?
- What materials can be charged by using static electricity?
- Do all colors of paper fade at the same rate?
- Do different types of soil hold different amounts of water?
- What keeps things colder – plastic wrap or aluminum foil?
- At what temperature does condensation start?
- Do bigger wheels roll faster?
- Can dogs smell things humans can't?
- How do engines work?
- How do you build a rocket?
- What different kinds of rocks are there?
- What material will melt ice the fastest?
- What factors affect how high a tennis ball will bounce?

Local Resources

- Public libraries
- Alaska Dept. of Fish & Game
- U.S. Fish & Wildlife
- U.S. Coast Guard
- Center for the Environment
- Chugach State Park
- National Oceanographic Center
- Utility companies
- Hospitals and laboratories
- Poison Control Center
- Blood bank

Internet Resources

http://www.sciencebuddies.org
This site offers guidance to your student in selecting a topic and posing a question for experimentation.

Other Sites:

http://www.scienceforalaska.com
http://www.sciencemadesimple.com
http://www.alaskasciencefair.org

SCIENCE FAIR PROJECT REQUIREMENTS

I. **Display Board**

The display is a visible account of your work. The display should include the following:

a. Name, grade, and teacher (**on the back of the display board**)
b. Title
c. Topic/Question (also called "Purpose")
d. Hypothesis
e. Materials List
f. Procedure
g. Results (data and/or observations)
h. Conclusions
i. References

In designing and constructing your exhibit, please consider the following:

- Exhibit should be under 30" x 48" x 108" (depth, height, width)
- Exhibit should be freestanding
- Use drawings, charts, photographs, or graphs
- Report or data notebook may sit in front of the backboard

II. **Interview/Presentation** (this will be age appropriate)

a. Shows enthusiasm and interest
b. Gives a thorough explanation of project
c. Demonstrates understanding of project and results
d. Shows what was learned by doing the project

DISPLAY MAY NOT CONTAIN THE FOLLOWING

- Live animals, live plants or dried plants;
- Food materials;
- Soil, solutions, chemicals, household products or water, dry ice or other sublimating solids (Display of clean, empty containers is acceptable);
- Drugs or drug look-alikes;
- Microorganisms, algae, mold, bacteria, or protozoans;
- Preserved animal parts (teeth, fingernails, feathers, hair and bones may be okay if preserved and sealed in plastic);
- Exposed electrical apparatus or open batteries (wiring must be insulated);
- Flammable gases or open flames;
- Un-shielded fans, light bulbs, belts, pulleys, chains or moving parts with tension or pinch points;
- Sharp items such as needles, scissors, or glass tubing, syringes, pipettes;
- Glass;
- Items containing latex

Please note: If your experiment includes any of the above mentioned items, please consider including **drawings** or **photographs** of experimental procedures and results.

If you have questions or concerns, please contact Mrs. Gates or Mrs. Frost.

Total Score: /25

Campbell STEM Elementary

Science Fair Judging Rubric - Science Experiment

Project Title: _____ **Project #:** ___

Student Name(s): _____

Grade: _____ **Teacher:** _____

5 points = Superior
4 points = Above Avg.
3 points = Average
2 points = Below Avg.
1 point = Needs work

Orally - Shares understanding of the scientific method.

5	Explains in detail the five main parts of the scientific method without reading word for word from the display board.
4	Discusses three or four parts of the scientific method.
3	Explains several parts of the scientific method but is unclear about the role of each one.
2	Does not seem to understand the scientific method and cannot explain it to the judges.
1	No scientific method present

Understanding of scientific method demonstrated through the display board.

5	Clearly and neatly labels and displays the scientific method on the display board.
4	Displays the scientific method on the board but may be missing a label or two.
3	Has a few steps to the scientific method but it may be unclear.
2	Lacks the steps to the scientific method, no labels.
1	No scientific method present.

Speaks knowledgeably about the project

5	Shares many details about the project with the judges. Evidence is clear that the student did the work.
4	Shows clear understanding of the project.
3	Knows what the project is, but gives little explanation.
2	Tries to answer questions from the judges.
1	Student does not know the information about the project.

Data presented using well organized tables, graphs, diagrams, and charts.

5	Display board is well organized, colorful, and neatly displays data. Written information is proofread, and easy to read (or typed).
4	Tables, graphs, and charts accurately and neatly display data.
3	Tables, graphs and charts accurately display data.
2	Some tables, graphs, and charts are included on the display board. Information is unorganized.
1	Display board only has a few pictures; it lacks tables, graphs, and charts.

Shows enthusiasm and interest in the project.

5	Shows genuine enthusiasm and interest in project; student choice of topic is evident.
4	Shows enthusiasm and interest in the topic.
3	Seems interested in project but lacks enthusiasm.
2	Seems interested in project and shows a bit of enthusiasm; parents may have chosen topic.
1	Does not seem to care about project; doesn't show much enthusiasm in project; parents may have chosen topic.

Comments:

Total Score: /25 Campbell STEM Elementary

Science Fair Judging Rubric - Demonstration, Model, or Collection

Project Title: _____ **Project #:** ____

Student Name(s): _____

Grade: _____ **Teacher:** _____

5 points = Superior
4 points = Above Avg.
3 points = Average
2 points = Below Avg.
1 point = Needs work

Orally – Shares importance of project as it relates to a science concept, engineering problem.

5	Explains in detail how the project demonstrates an engineering problem/solution, scientific concept, or relevance of a collection to further scientific knowledge.
4	Discusses connection to science or engineering concept, but does not make a connection to the importance, or omits some of the details.
3	Explains project but incomplete or vague connection to science or engineering concepts.
2	Explains project, but no connection to science or engineering concepts.
1	Cannot explain project or science/engineering concepts.

Project represents a scientific concept, engineering design, or scientific collection.

5	Thoroughly represents a scientific concept, engineering design, or importance of a collection to scientific understanding. Labels, descriptions and explanations are included.
4	Model/collection present, but missing a few labels/descriptions. Incomplete explanation of scientific concept, engineering design, or significance of collection.
3	Model/collection present with some labels and descriptions, but connection to scientific concept, or engineering problem is vague.
2	Model present, but few labels/descriptions. No or inaccurate connection to science/engineering concept.
1	Model present, but no labels/descriptions. No connection to science engineering concepts.

Speaks knowledgeably about the project

5	Shares many details about the project with the judges. Evidence is clear that the student did the work.
4	Shows clear understanding of the project.
3	Knows what the project is, but gives little explanation.
2	Tries to answer questions from the judges.
1	Student does not know the information about the project.

Data presented using well organized tables, graphs, diagrams, and charts.

5	Display board is well organized, colorful, and neatly displays data. Written information is proofread, and easy to read (or typed).
4	Tables, graphs, and charts accurately and neatly display data.
3	Tables, graphs and charts accurately display data.
2	Some tables, graphs, and charts are included on the display board. Information is unorganized.
1	Display board only has a few pictures; it lacks tables, graphs, and charts.

Shows enthusiasm and interest in the project.

5	Shows genuine enthusiasm and interest in project; student choice of topic is evident.
4	Shows enthusiasm and interest in the topic.
3	Seems interested in project but lacks enthusiasm.
2	Seems interested in project and shows a bit of enthusiasm; parents may have chosen topic.
1	Does not seem to care about project; doesn't show much enthusiasm in project; parents may have chosen topic.

Comments:

Please fill this out and return it to your teacher by Monday, March 4, 2019

Science Experiment Form

(For K – 3rd grade students – optional organizational tool)

QUESTION OR PURPOSE 	*What do I want to find out?*
HYPOTHESIS 	*What do I think will happen?*
PROCEDURE	*How will I find out?* (Step by Step) 1. 2. 3. 4.
RESULTS	*What actually happened?*
CONCLUSIONS	*What did I learn?*

Scientific Method Outline

(For 4th – 6th grade students – optional organizational tool)

STATE THE QUESTIONS OR PURPOSE	*What do I want to find out?*
WRITE THE HYPOTHESIS	*What do I think will happen?*
DESIGN THE EXPERIMENT **Procedure**	*How can I test what I think will happen?*
MATERIALS NEEDED	
RECORD AND ANALYZE THE DATA	*What happened?*
DRAW CONCLUSIONS	
BIBLIOGRAPHY OR REFERENCES	

Campbell STEM Science Fair 2020
Registration Form
Due: Monday, March 5, 2020

Name: _____

Grade: _____ Teacher: _____

Project Question: _____

_____

Project Category (Circle One)

A. Life Science (Biology) – animals or plants (**NO live animals or plants**)

B. Physical Science (Chemistry, Physics, or Engineering) – electricity, magnetism, heat, light, sound, chemical reactions, simple machines, energy, aerodynamics, color

C. Earth Science (Astronomy, Geology, Meteorology) – rocks, earth science, weather, stars, planets, space science

D. Social Science (Human Behavior) – group preferences, reactions, behaviors

E. Engineering/Invention – innovative designs to solve a human problem

Check the category that applies to your project:

_____ Model _____ Collection

_____ Demonstration _____ Experiment

Does your project require any electrical outlet? YES NO
(If you need electricity you must bring an extension cord with your project)

Your project board should be able to stand up by itself (without leaning against something)