Foothill Family Science Programs 2018

Welcome to Foothill's Family Science Night's Information Packet. Enclosed you will find detailed information about due dates, display sizes, logistical information, as well as grade-appropriate suggestions on topics.

The 2017-18 Science Fair will be on March 16th, 2018. We will have a Science Day in addition to a Science Night. The Science Day is a day dedicated to science, where kids will be able to access to a variety of activities organized for them by PTA volunteers. This will culminate into the Science Night, in which the kids will be able to show their Science Projects. We will also have extra Science activities available on Science Night.

The Science Projects for the Science Fair can be individual, group, or class projects. We strongly encourage all kids to participate in any of the above mentioned forms. Participation at Science Day and at Science Night will be optional for all grades. This year we are again encouraging *inventions* in addition to *investigations*. (*Investigations* are the standard science fair experiment, following the scientific method.)

The goal of the Family Science Night in particular is to get your children to choose a simple question or problem about a topic he or she is interested in, and then either:

a.) design a simple experiment to try and answer a question, or
b.) design a solution to the problem.

The emphasis should be on *simple*; the project should be *child driven, child created, and fully understood by your child*. Ideally, the experiment or the solution should involve making observations, and recording results. The younger grades may do a display on a topic they are interested in, rather than an experiment.

Your child should understand what it is they were trying to do, and be able to explain it to others. Do not make an effort to couch the results in scientific language. *Your child and his or her peers should all understand the display.* The information in the display can be done by hand, or computer generated, depending on your child's age and inclinations. The complexity of the topic should be grade level appropriate. Let your child's interests and abilities, as well as his or her teacher, guide you on this.

There are many ways to choose a project. You could start by sitting down with your child and discussing what they have been doing in class for science. You could think back to some of the why and how questions they have asked recently. You could ask the teacher for ideas, or look through the handouts that are attached. Finally, there are hundreds of science fair project books out there, but please only use them as a starting point. Your own child's imagination is a better source of inspiration. ***Remember, that simple is best.***

If you have questions about your projects, please contact: science_fair@saratogafoothillpta.org

FOOTHILL FAMILY SCIENCE NIGHT

March 16, 2018
6:00–8:00pm

INFORMATION PACKET

Attached you will find:

1. A timeline for turning in project proposals
2. Suggestions on how to choose a project
3. A list of rules for the project displays
4. A grade level specific list of project suggestions
5. An example of a science fair experiment proposal
6. An example of a science fair invention proposal

Please plan your project early. Your teacher must okay your project before you start, both for safety and for appropriateness for your grade level.

Coordinators for this year's science fair are happy to help students in developing ideas for the projects. You can reach them at science_fair@saratogafoothillpta.org**.**

If you need a specific equipment or supply for a project, and you cannot find it, please contact us to see if it is possible to borrow it.

FOOTHILL FAMILY SCIENCE NIGHT TIMELINE
School Year 2017-2018
February 9h – The proposals are due for review

Teachers will review and return the proposals quickly, so that if there are problems with them, the student has time to revise their project before beginning the experiment.

GRADES K-3 **Students in these grades can do an experiment, create an invention, or make a model or diorama on a topic of their choice. Participation is voluntary and group projects are fine.**

A brief proposal of the topic and the participants list is due. We need this to allot space in the room, and to be sure there are no dangerous or inappropriate activities planned. You may use the form attached to this packet for your proposal. The proposal can be a few lines of text typed or hand-written.

GRADES 4 & 5 **Participation this year is entirely voluntary. Group projects with up to 4 people are fine.**

For an experiment, the project should include the question you are trying to answer, your hypothesis, and how you propose to set up your experiment to test your hypothesis. For an invention, your project should identify a problem, identify any background research you've already done, and suggest a solution. The proposal needs to be detailed enough to make it clear that you understand the procedure, and that it is reasonable to believe it can be accomplished given the time and materials available. This should be around one page long, typed or very neatly hand-written.

Please specify in the proposal if an electrical outlet is needed for the display

March 16th – THE BIG DAY IS HERE!

Bring your project to the MPR in the morning, between 8:00-9:00am. Be sure your name(s), grade level and teacher name are clearly displayed on the back of the display board. Volunteers will help you find the right spot for the project. You must tell the volunteers if you need an electrical outlet.

HOW TO CHOOSE YOUR SCIENCE FAIR PROJECT

1. Brainstorm on all the topics you are interested in. At this stage, do not eliminate anything as being impractical. Make a list.

2. Think about each topic on your list in turn. Are there any questions you have wondered about regarding any of these topics? (You can take an idea from the Science Docent lesson and expand it.) Is there a problem involving your topic that you think you could solve? Decide whether to do an investigation (answer a question) or an invention (solve a problem).

3. Start to narrow down your questions to things you could realistically answer given what you have at hand and what you know is possible. Avoid "why" questions.

4. For either an investigation or an invention:
   a. Keep it relatively **simple.**
   b. If you are working in a group, you all should be involved in the design, and execution of the project.
   c. Run your design by your teacher, a science docent, or your parent and listen to their suggestions. The final design is yours.
   d. If practical, collect data on your investigation or your invention at least two times to ensure that the results are reproducible and consistent.

5. For an *investigation*:
   a. You need to **make observations** and **record them.**
   b. You need to **measure** something.
   c. You need to **compare** at least two things. Most experiments need a **control,** which is the base result to which you compare your results.
   d. For example, if your question is "What is my cat's favorite food?" your control would be her usual food, and then you could try giving her three or four other foods to compare to her usual. You could measure time (how fast does she eat each food?), or quantity (if given the same amount of each kind, how much of each does she eat, by volume or weight?). You could set out all the kinds at once and see which she goes to first, or do a different one each day and see how much is left after an hour.

6. Your experiment could also take the form of an *invention* to solve a problem you are interested in. An example might be designing a way to keep a glass from breaking if you drop it, or a way to float your bowling ball in the swimming pool or something equally challenging.
   a. How can you be sure your invention works? **Collect data** to be sure**.**
   b. Does your invention work better than what is currently out there? Is it stronger? Is it lighter? Does it cost less? Is there a way to **compare** data from your design against a control?
   c. How can you **convince** your classmates that your invention works? Can you take pictures? Can you demonstrate it? Can you present your data in a table or a graph?

RULES FOR PROJECTS:

1. Displays should not take more table space than 30" wide by 14" deep. This is the amount of table space taken up by a standard size ***project board*** sold in all the office supply stores (labeled: 36" X 24" folded, 36" X 48" flat) when it is standing open. Get yours early, because they can run out.

2. There are a very limited number of electrical outlets available. You need to make advance arrangements and provide your own extension cords to use electricity.

3. Photos, graphs, charts and other visual displays always make a project more interesting.

4. Be sure the names of all the students who worked on the display are clearly shown. Participant name, grade, room and teacher must also be written in large characters on the upper part of the back of the project board for retrieving it when folded.

5. Be sure all written parts are clearly displayed, neat and legible.

6. Kids in the lower grades have the option of creating a display on a scientific topic they are interested in without completely following the scientific method. They should still include a summary and a discussion of what they learned.

7. If you did an *investigation*, be sure your investigation includes the following, and that it is clear on your display:

   i. Background information that led you to your question
   ii. The question you are trying to answer by your experiment
   iii. Your hypothesis – what you predict will happen when you do the experiment.
   iv. The materials and equipment you used
   v. Your method – exactly what you did. Details should include how much of any substance that you used, what you measured, etc.
   vi. Your results
   vii. A discussion of why you think you got the results that you did, and whether or not your hypothesis was correct.
   viii. A list of all of the references that you used in planning and doing your project.

8. If you created an *invention*, be sure your invention includes the following, and that it is clear on your display:

   i. The problem you are trying to solve with your invention
   ii. How other people have tried to solve this or a similar problem. How is yours different?
   iii. Your design — this can be a model or a prototype. If a model, explain why you think this will work if you really build it.
   iv. The materials and equipment you used,
   v. The data you collected to show that your design works (or that it doesn't). Highlight data if it shows your solution works better than what is currently used.
   vi. A discussion of why you think you got the results that you did, and whether or not your design can be improved.
   vii. A list of all of the references that you used in planning and doing your project.

K-1st GRADE SCIENCE PROJECT SUGGESTIONS

Participation is strictly voluntary. Students are encouraged to work in groups due to space considerations. **Students may do an experiment, or may make a model demonstrating something they have learned. Whatever the topic, it should be something they can understand.** It should be their project, at their level, and not something really cool that is way above their level of comprehension.

Possible topics are listed below. Do not feel constrained by this list. Go for whatever topic is interesting to your child.

1. Collect leaves and look at them closely. See what they all have in common and what is different.
2. How we grow and change – make tracings of hands or feet of people in your family and see how much they differ in size.
3. Can you invent a way for your baby brother or baby sister to reach the light switch by themselves?
4. Do you have an object at home that can be broken into parts? What do each of the parts do? Will the object work without each part? What tools did you use to get the object apart?
5. Explore whether some liquids expand more than others when they freeze.
6. Can you figure out why objects look different colors? Could you use different colors of cellophane and a flashlight to find out?
7. Here is a psychology experiment: Start with a short story on a card. Have one person read the story to someone else. Have that person tell another person the story, and so on . . . . How does the story change? Does it always get shorter? What details change?
8. Which magnet can pick up the most paperclips? Does size matter? Does shape? Does what the magnet is made out of matter?
9. Can you invent a way to reduce the amount of waste that you generate at home? How about at school?
10. Is there a shampoo you can use to keep your hair from tangling?
11. Does the temperature of your body go up when you exercise?
12. What makes something alive?
13. Does taco sauce clean pennies? If so, what part(s) of the taco sauce clean the pennies?
14. What keeps diapers from leaking? How much liquid can a diaper hold?
15. Can you invent a way to read a book at night without waking up your siblings?

2-3rd GRADE SCIENCE PROJECT SUGGESTIONS

Participation is strictly voluntary. Students are encouraged to work in groups due to space considerations. **Students may do an experiment, or may make a model demonstrating something they have learned. Whatever the topic, it should be something they can understand.** It should be their project, at their level, and not something really cool that is way above their level of comprehension.

Possible topics are listed below. Do not feel constrained by this list. Go for whatever topic is interesting to your child.

1. Make a collection of seeds from the neighborhood, and figure out what plant they came from, or how they most likely spread (wind, sticking to fur, being eaten, etc)
2. Fossils – make a footprint in wet sand, then pour Plaster of Paris into it to make a cast of your foot. Or cut up a plastic dinosaur and mix it into Plaster of Paris for your child. Let her then chip away the plaster like an archaeologist would do to recover the pieces.
3. Make a salt solution, then let the water evaporate and see if you get all of the salt back.
4. Collect up some baby teeth that you or your friends have lost. Soak them in coke, milk or juice and see what happens. Try coating them with a fluoride toothpaste first and then put them into the drinks and see what happens. If you don't have baby teeth available, you can do this with eggs, too; the calcium in the egg shell is a model for the calcium in the enamel of your teeth.
5. Set up a bird feeder. Use different kinds of bird seed, and see if different birds come, or if there are a lot more birds with one particular kind.
6. Do a similar thing with your pet – see what is their favorite food, or flavor of water. See if putting food coloring in their food or water affects whether or not they like it.
7. Make different types of paper airplanes and see which design flies the farthest (or which type of paper works best.)
8. Mix different liquids at home with baking soda and see which make it fizz the most.
9. See what brand of popcorn pops the best.
10. Experiment with ingredients to make the fluffiest, most delicious cake.
11. Gather a variety of balls. See which ball bounces highest. Experiment with different surfaces to see how the height of the bounce is effected.
12. Use thermometers and different sheets of construction paper to see how different colors react to heat. Place the thermometer under a piece of colored construction paper and leave in direct sun for 10 minutes. Record the temperature, and repeat with different colors. Record and assess your results.
13. Invent a way to make a noisy room quieter.

FOURTH GRADE SCIENCE PROJECT SUGGESTIONS

THIS SHOULD SERVE AS A SOURCE OF IDEAS, BUT SHOULD NOT BE LIMITING IN ANY WAY.

ANYTHING YOUR STUDENT IS INTERESTED IN CAN BE USED AS THE BASIS FOR A SCIENCE PROJECT.

YOU NEED TO THINK OF A QUESTION, PREDICT THE ANSWER, MEASURE SOMETHING QUANTITATIVELY (NOT JUST "MORE" OR "FASTER") AND PRESENT THE RESULTS.

THE EMPHASIS IS ON DESIGNING AN EXPERIMENT USING THE SCIENTIFIC METHOD.

IF YOU CHOOSE SOMETHING FROM A BOOK THAT DEMONSTRATES A SCIENTIFIC PRINCIPLE, YOU SHOULD FIGURE OUT HOW TO MAKE IT INTO AN ACTUAL EXPERIMENT. DO IT AT LEAST TWICE, ONCE HOW THE BOOK SAYS TO DO IT, AND THEN AGAIN WITH ONE VARIABLE CHANGED TO SEE HOW IT AFFECTS THE RESULT.

1. **Rocks and Minerals**
    - **a.** Try a variation on the crystals we made in class (borax snowflake). Predict how the changes will affect the final result.
    - **b.** Get small samples of various minerals that you don't care about keeping. Test what happens to them if soaked in vinegar, or water, or whatever.
    - **c.** Read about Moh's Hardness Scale, and test your minerals and other items at home to rank them on this scale.

2. **The Shape of the Land**
    - **a.** Make a model out of wet sand, or plaster, or perhaps clay, of a mountain or valley. Find some ways to see how water or wind can change the shape, either as gentle rain, flood, constant flow like a river, etc
    - **b.** Look around the landscape in Saratoga, or wherever you go for vacation. Find examples of erosion. See if you can figure out why certain areas erode and others don't (soil vs rock, vegetation cover, steepness of slope, whatever)
    - **c.** Build small structures from various materials such as brick, wood, stones, whatever and then subject them to an "earthquake". See which structures hold up best; see if you can predict which is best.

3. **Ecosystems and Food Chains**

a. Take four feet of string, and go to several different habitats around Saratoga and mark off one square foot. Explore that area, and catalog the creatures and plants that you find. See if you can predict what you find before you start.

b. Set up a mini-ecosystem at home with small creatures such as roly-polys, crickets, snails, etc. See if you can figure out everything they need to survive and thrive, and sustain it for at least several weeks. THIS WOULD NEED TO BE STARTED ASAP.

a. Observe the life cycle of some fairly rapidly cycling plant or animal (radishes, mealworms, brine shrimp, whatever strikes your fancy); see how temperature or amount of light, or how much water, affects the speed of the life cycle. You'll need to start this one very soon if you want it finished by early February.

b. Test whether an animal (your pet, insects you catch or buy, your little sister.) has a color preference, and thereby proving if they can see color. Add different colors of food coloring to the same type and amount of food, and see if the animal consistently chooses a particular color or colors to eat first (you should do this at least 4-5 times to be sure it is consistent; use the same food without any added color as the control.

c. Test whether a kind of insect/invertebrate (roly-polys, earwigs, snails, crickets or mealworms, for example) prefers light vs dark, by making one end of the habitat dark and one in the light (or do warm/cool, or two kinds of bedding, or whatever).

4. Electricity and Magnetism

a. Using iron filings, magnets and tracing paper, draw the force lines you see with different configurations with the magnet; after you have done the first one with a single bar magnet as the control, try to predict what the force lines will look like with different shaped magnets or combinations of magnets.

b. Use different materials to rub on balloons and try and generate static electricity; see if you can make the balloons repel or attract, and whether you can predict in advance which way the balloons will go with the different materials.

c. Use a coil of wire and a moving magnet to produce electricity. Try different kinds of wire and see which works best.

FIFTH GRADE SCIENCE PROJECT SUGGESTIONS

ANYTHING YOUR STUDENT IS INTERESTED IN CAN BE USED AS THE BASIS FOR A SCIENCE PROJECT.

YOU NEED TO THINK OF A QUESTION, PREDICT THE ANSWER, MEASURE SOMETHING QUANTITATIVELY (NOT JUST "MORE" OR "FASTER") AND PRESENT THE RESULTS.

THE EMPHASIS IS ON DESIGNING AN EXPERIMENT USING THE SCIENTIFIC METHOD.

IF YOU CHOOSE SOMETHING FROM A BOOK THAT DEMONSTRATES A SCIENTIFIC PRINCIPLE, YOU SHOULD FIGURE OUT HOW TO MAKE IT INTO AN ACTUAL EXPERIMENT. DO IT AT LEAST TWICE, ONCE HOW THE BOOK SAYS TO DO IT, AND THEN AGAIN WITH ONE VARIABLE CHANGED TO SEE HOW IT AFFECTS THE RESULT.

1. **Circulation and Respiration**
    a. Measure your heart rate and respiratory rate (breaths per minute) before and after particular exercises, or measure them for different family members and see how they vary with age, weight or whatever. Use your imagination!

2. **Digestion and Excretion**
    a. Measure how much you drink in a day, and/or how much urine you make in a day. Do it for several days and see if it stays the same. (ask your mom before doing this one)
    b. Using iodine as a marker for starch, see how long your saliva takes to eliminate the starch in different foods such as bread, potatoes, crackers, etc

3. **Animals and Life cycles**
    a. Observe the life cycle of some fairly rapidly cycling plant or animal (radishes, mealworms, brine shrimp, whatever strikes your fancy); see how temperature or amount of light, or how much water, affects the speed of the life cycle. You'll need to start this one very soon if you want it finished by early February.
    b. Test whether an animal (your pet, insects you catch or buy, your little sister.) has a color preference, and thereby proving if they can see color. Add different colors of food coloring to the same type and amount of food, and see if the animal consistently chooses a particular color or colors to eat first (you should do this at least 4-5 times to be sure it is consistent; use the same food without any added color as the control.
    c. Test whether a kind of insect/invertebrate (roly-polys, earwigs, snails, crickets or mealworms, for example) prefers light vs dark, by making one end of the habitat dark and one in the light (or do warm/cool, or two kinds of bedding, or whatever).

4. **Astronomy/space**
    a. It would be very hard to do an actual experiment involving this topic.
    b. You can do some gravity experiments, such as measuring how fast things fall or how hard they hit the ground, or altering the center of gravity for something.
    c. You could test whether it is light enough to read a book outside by moonlight during different phases of the moon (only works if it isn't cloudy; wait long enough for your eyes to adapt to the dark).

5. **Matter and Energy**
    a. Measure the density (specific gravity) of liquids at home using a weighted straw and seeing how far down it floats in the liquid. Perhaps check the density of a salt solution at progressively stronger concentrations
    b. Make a mixture of a bunch of stuff from home and then figure out a method to separate them back out. Write up the method before you try it as your "question".
    c. Use a cabbage juice indicator to check the acidity/pH of liquids at home. Predict before you start which ones will turn pink or blue (your "hypothesis").
    d. See which liquids at home react with baking soda. Figure out a way to measure how much gas the reaction makes. Predict which will react.
    e. See which metals rust/otherwise react with vinegar (nails, screws, coins, etc). See if they need air to react by submerging them in the vinegar vs. putting them on a paper towel soaked in vinegar. You could also use lemon juice, rubbing alcohol, etc.
    f. Measure how much the freezing or boiling point of water is affected by specific amounts of salt. See if the amount of salt added correlates with how much the temperature changes.

6. **Water cycle and use of resources**
    a. Pollute some water by mixing in nasty stuff, then try to purify it. Try filtration, evaporation/distillation, adding activated charcoal or alum, whatever you like. Predict in advance what will work.

7. **Air pressure, weather**
    a. Test different airplane designs to see which flies the best. There are many ways to measure lift. Use air pressure to propel something and measure how much pressure it takes or how much you can generate.
    b. Measure the temperature, air pressure (with a barometer), humidity, and/or amount of rainfall at your house and compare them to the weather report on the TV or newspaper; do this over several weeks.
    c. Use a rectangular tub of cold water with a Ziploc of ice at one end and a Ziploc of hot water at the other end. Your sink or bathtub would work if you promise to clean it out afterward, or any reasonable size plastic tub. Drip a small amount of food coloring at one end (or one color at each end) and watch the convection currents. Describe what happens to the color, and predict how long it will take for the water to be all one color. Do it several times. This is a model of deep ocean currents, and of many weather phenomena.

CRITERIA FOR EVALUATING SCIENCE FAIR PROPOSALS

4th and 5th GRADES:

1. Is the question to be answered clearly identified?
2. Is it clear what data are to be observed, and recorded, and that the students know how they are going to do this?
3. If applicable, is a control group identified? They may need guidance on what an appropriate control group would be, so feel free to suggest one.
4. Is the experiment that they suggest doable? Will it answer the question that they have posed? If it is too diffuse, suggest ways to narrow it down. A common error is trying to do too much, resulting in not achieving a specific answer, or answering a different question than you have posed initially.
5. Related to #4, are the materials available? Have they thought this through? Use your judgement on whether to raise these sorts of questions.
6. We would like to avoid simply duplicating something from a science fair book; if they have picked an idea from a book, we'd like them to then also do a variation on that project as the "experiment" vs the book's way as the "control".

K thru 3rd GRADES:

1. The main criteria are practicality, and whether you think the child understands what the proposed project is about. We would like to avoid parent-driven projects where the concepts are at a level well above the child's level of comprehension. When a project looks too complex, encourage them to do the same topic but on a simpler level; to not try and do too much; and to emphasize that the child should understand the question they are trying to answer and the process they are going through to answer it.

No matches, fire, glass, or live animals should be brought to the Science Fair. Avoid weapons, toxic substances or materials that are valuable or hazardous. Avoid any unsteady displays. Animals can be used in the experiment (e.g. "what it is my cat's favorite food?") but not in the display, you can show pictures instead.

K/3rd GRADE SCIENCE FAIR PROPOSAL FORM

Student Name(s) _____
_____
_____

Teacher(s)_____
Room (s) #_____ Grade(s)_____

Experiment/Invention name_____
_____

Do you need an electrical outlet? Yes or No (circle one). Do you need more space than the size of your display board? How much? _____

Brief description of the experiment or invention:
How we grow and change – make tracings of hands or feet of people in your family and see how much they differ in size._____
_____
_____
_____
Teacher signature_____

Your teacher needs to okay the project before you start, to be sure it is safe and appropriate for your grade level.

Remember: No matches, fire, glass, live animals, weapons or toxic substances. Avoid materials that are valuable, breakable, or hazardous. Avoid any unsteady displays.

4th/5th GRADE SCIENCE FAIR INVESTIGATION PROPOSAL FORM

Name(s):

Teacher:

Name of Experiment:

Question:

Hypothesis:

Proposed Experiment:

Do you need an electrical outlet? Yes or No (circle one)

Do you have any other special requirements? (explain)

Approval Signature:_____ (approval necessary)

IMPORTANT: Please refer to an example of a science project proposal at the end of the Science Fair Information Packet. Extra packets are available in the office.

EXAMPLE OF A 4th/5th GRADE
INVESTIGATION SCIENCE FAIR PROPOSAL

THIS IS THE LEVEL OF DETAIL WE ARE LOOKING FOR…

Name(s): Karen P
Teacher: Mrs.Waite-Lopez
Name of Experiment: Borax crystals gone wild

Question: What effect will adding different chemicals to a borax solution have on the crystals that form when the solution is cooled?

Hypothesis: Adding other chemicals that also form crystals will change the shape of the final crystals that form when the mixed solution is cooled. Adding chemicals that are colored will make the borax crystals colored.

Proposed Experiment:
My control will be to add five tablespoons of borax to two cups of boiling water and make it dissolve. I will suspend a j-shaped piece of pipe cleaner in the solution and allow it to cool to room temperature. Twenty-four hours later I will remove the pipe cleaner from the solution. These crystals will be my control.

I will then set up exactly the same conditions in other jars, except I will add 2 tablespoons of an additional substance to each one. I will try: sugar, table salt, baking soda, orange juice and Epsom salt. I will do each substance twice to verify whatever effect I see is reproducible.

I will then compare the crystals from each of the experimental jars with those formed under the control conditions, and see if my hypothesis was correct.

Please add the following to the end of your proposal:

Do you need an electrical outlet? Yes or No (circle one)

Teacher signature:_____ (Approval necessary).

4th/5th GRADE SCIENCE FAIR INVENTION PROPOSAL FORM

Name(s):

Teacher:

Name of Invention:

Problem your invention may solve:

How will you build your invention? Why do you think your invention will work?:

What will you measure to see if your invention works?:

Do you need an electrical outlet? Yes or No (circle one)

Do you have any other special requirements? (explain)

Approval Signature:_____ (approval necessary)

IMPORTANT: Please refer to an example of a science project proposal at the end of the Science Fair Information Packet. Extra packets are available in the office.

EXAMPLE OF A 4th/5th GRADE
INVENTION SCIENCE FAIR PROPOSAL

THIS IS THE LEVEL OF DETAIL WE ARE LOOKING FOR…

Name(s): Jim M
Teacher: Mrs. Miller
Name of Invention: Sandwich Saver

Problem your invention may solve: My family makes all of our lunches on Sunday. By Friday, my sandwich tastes stale. How can I make my sandwich taste better?

How will you build your invention? Why do you think your invention will work?: I will build a sandwich saver kit with separate containers for the bread and the other sandwich ingredients. I think my sandwich tastes stale because the ingredients leak into the bread and make it soggy on the inside, and the bread dries out in the air over the week. My sandwich saver will keep everything apart, will have a spreader to let me make my sandwich right before I eat it, and will keep the air away from the bread.

What will you measure to see if your invention works?
I will use the following hardness scale for the bread:
Hardness
1 soft
2 soft but a little hard on the surface
3 soft in the middle, but stiff on surface
4 stiff in the middle and crunchy on the surface
5 stale – hard all the way through
Taste
1 fresh, yeasty, sweet
2 less fresh, just a hint of yeast
3 not much bread taste, not sweet
4 dry and a little stale taste
5 completely stale taste – stinky

I will buy several loaves of the same yummy bread from my favorite bakery. I will make a sandwich on Sunday, and I will also put the ingredients for the same sandwich in my Sandwich Saver. On Friday, I will make another fresh sandwich. I will cut all three sandwiches into five pieces.
I will have five of my friends eat a piece from all three sandwiches and rate the sandwiches by hardness and taste.
Please add the following to the end of your proposal:
Do you need an electrical outlet? Yes or No (circle one)

Teacher signature:_____ (Approval necessary).