

Bradley International School

December 2017

Dear Family,

Thank you for your support throughout the beginning of the school year. As we enter December, we enter the mind of the creative scientist. On **Wednesday, January 10**, every third, fourth and fifth grader will be expected to display a **science report and model OR a science fair project**. The science fair and science report is an optional project for students in ECE, kindergarten, first and second grade. The attached packet provides all the necessary details.

The following web sites are an excellent place for your child to deepen his/her understanding of the scientific process and science fair project (it has tips for parents too!).

SICK SCIENCE on YouTube

<http://www.sciencehound.com/>
www.sciencebuddies.org
www.all-science-fair-projects.com

Science Report Topics

<https://www.brainpop.com/science/seeall/>

Please note that all students who need support with their projects can speak with their teacher to set up a time to meet before school, after school or during lunch.

The judging for the fair will take place between 9:00 a.m. - 3:30 p.m. and family night will be from 6:00-7:30 p.m. on January 10th. Project boards can be dropped off in the classrooms on January 10th. Make sure to put your name on the project.

Again, thank you for your support of our science program. If you have any questions, please contact me by phone (720-424-9444) or by email Margaret_cypress@dpsk12.org.

Choosing the Perfect Problem

Selecting an appropriate problem to investigate for the science fair is critical to your success. All of the science fair projects are expected to follow the scientific process where the results between two or more variables are compared and can be measured and graphed. Be sure to get your idea approved by your teacher before you begin your experiment. If you are struggling with selecting an idea, some examples of possible questions that would work for the science fair are listed below. Most importantly, select a problem that you are interested in. It will make the science fair more fun.

Science Fair Project Ideas

1. What effects do different soils have on holding water?
2. How do different types of insulation affect temperature change?
3. Which toothpaste cleans with the fewest number of brushings?
4. Which glue holds the most weight?
5. Which cleanser cleans tiles with fewer scrubs?
6. Do the activities of microscopic life change with temperature?
7. Which paper towel is the strongest?
8. Which size Frisbee travels the farthest?
9. Which brand of sandwich bags is the strongest?
10. Which brand of plastic wrap is the strongest?
11. Which kind of architectural structures (bridges) can support the most weight?
12. Which paper airplane design flies the farthest?
13. What material makes the highest flying kite?
14. Which kind of boat can support the most weight?
15. What affect does light have on seed germination?
16. Under what conditions does mold grow faster?
17. How do different colors of light affect plant growth?
18. How does temperature affect plant growth?

*******Special note to parents*******

While this science fair project is the responsibility of your child, your assistance in discussing and planning the process your child will go through is critical to his/her success. Please use the included task analysis to evaluate your child's work and motivate him/her to reach higher levels of quality (word processing looks nice, but is not required if handwriting is neat). So please guide your child, but don't do it all yourself. In the end it is still your child's project, and he/she will have to present it to peers and field questions about the scientific principle learned. **Thank you for your support.**



Let's take a closer look at each step.....

Step 1: Stating your inquiry question

Try to keep your question as short and specific as possible. There are two models you might follow.

Model 1:

How does _____ affect _____?

Example: How does water temperature affect plant growth?

How does the amount of glue affect the strength of glue?

Model 2:

Which _____ is _____?

Which _____ does _____ the best?

Example: Which brand of gum keeps its flavor the longest?

Which type of glue is the strongest?

******Make sure your question really asks what you are testing.******

Step 2: Stating your hypothesis

State your hypothesis or "guess" as to what you think the answer to your question will be. Your hypothesis does not have to be correct, but it should be a good guess based on prior knowledge or things you have seen.

Example: If I put coke, water, sugar-water, and salt-water on grass seeds, then the water would make the grass grow faster because it has no sugar or salt to dry up the plants seed.

Step 3: Designing an experiment

After a hypothesis has been formed, an experiment needs to be done to support your hypothesis or solve the inquiry.

You must keep careful records of everything you do. These records need to be detailed and nicely written so another person could read your notes and do the experiment without any trouble.

Write out step by step what you did and include the materials that you use. It might be easier to write down the steps after you have done them. Numbering the steps as you go is a good strategy.

There is one important part of your project that you must include in order to have a valid test. That is your "**independent variable**". An independent variable is the one part of your experiment that is different and changed during the test. **All other parts of the test must be kept the same.**

Example: In our grass seed experiment the independent variable was the fluid that was fed to the grass seed. That was the only change that was allowed. Each cup of seeds had the same amount of soil, same amount of grass seeds, all were placed in the same amount of sunlight, and all were feed with the same amount of liquid. The independent variable (coke, water, sugar-water, and salt-water) was the only thing that changed. If more than one thing is changed in an experiment, you cannot be sure what exactly is affecting the results.

Step 4: Observations and writing results

Throughout your experiment you will have many observations to make. These observations usually fall into three categories.

#1 Measurement: Here you would measure things like temperature, weight, distance, speed or time.

#2 Counting: You might count the number of worms found in a certain type of soil or the number of animals living in a small pond.

#3 Using your senses: You would record things you see, hear, taste, smell, or feel, as they relate to your experiment.

- Write a paragraph summarizing the results in words.
- Write a second paragraph including the trends or patterns in your results.
- Write a third paragraph that describes the science knowledge that supports your results

You should use a chart or graph to show your observations. In addition, you may want to display photos that you took during the different stages of your experiment.

Step 5: Drawing Conclusions

After you have conducted your experiment and recorded your observations, you are ready to write your conclusion. A conclusion is the end product of the whole process called the scientific method.

What decision did you come to? Was your hypothesis correct? Did you find an answer? What might you do differently in further studies? What else might you want to find out?

Step 6: Exhibiting your Science Fair Project

The display board is very important because it is the first thing that people see. (Boards can be purchased at Michaels, Hobby Lobby, Office Max and Office Depot etc.). Poster boards will be provided by the school as an alternative to the project board. The display board should be eye catching and attractive. You want to quickly capture the attention of the audience so they will stop and take a closer look at your science fair project.

Everything about the display board should be neat and attractive!

Inquiry Question	Project Title	Observations
Hypothesis	Materials and then Procedure	Conclusion
Variables	Chart or Graph	Name/ Teacher

Science Fair Project

Please use this as a guide through your experiment and then transfer the information to your science fair board.

Inquiry question: Write the problem in the form of a question. Remember the question mark.

Hypothesis: Write a statement of what you predict will happen in the "If...then" format.

If _____

then _____

because _____

Independent variable: _____

Materials: List and quantify.

Procedure: Number the steps so procedure can be replicated easily.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

Repeat experiment three times in order to compare results.

Make a graph of your results. This can be done by hand or computer.

Data/Observation: Describe in paragraph form what happened during the experiment. Be detailed.

Conclusion:

1. Write your hypothesis in past tense using "when....then" format.

When_____

then_____

_____.

2. Was your hypothesis supported or not?

3. Describe any scientific principles learned.

4. Reflection: Next Inquiry- another related experiment you could try or how you could make this experiment better?

Science Fair Task Analysis

Name: _____

Statement on Inquiry: (2 pts.) _____
Is it written in the form of a question?

Hypothesis: (3 pts.) _____
Written in a good sentence with a good reason.

Procedure:

Materials: (3 pts.) _____
Listed:

Experiment: (5 pts.) _____
Complete list of procedure listed. Repeat three times.

Independent Variable: (2 pts.) _____
Fully explained

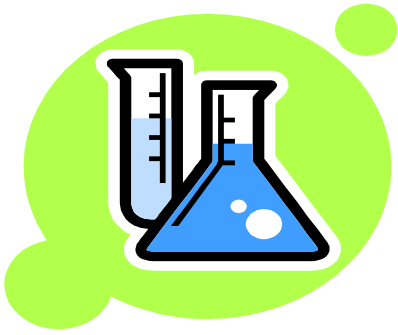
Results: (10 pts.) _____
_____ Clear description of experiment results in paragraph form.

Chart or Graph: (5 pts.) _____
Effectively displays data from experiment.

Conclusion: (5 pts.) _____
Rewrite your hypothesis;
Tell if your hypothesis was supported;
Tell what you have learned;
Reflection.

Display Board: (15 pts.) _____

Total (50 pts.) _____ x 2 = _____ %



EXAMPLE SCIENCE FAIR PROJECT

Inquiry question: Write the problem in the form of a question. Remember the question mark.

How will the number of paper clips on the nose of a paper airplane affect the distance that it can fly?

Hypothesis: Write a statement of what you predict will happen in the "If...then" format.

If ***I put five paper clips on the nose of a paper airplane***
then ***the airplane will fly farther than with none, one, two, or three paper clips on the plane's nose***
because ***heavier things fly farther than lighter things. I can throw a baseball farther than I can throw a ping pong ball.***

Independent variable: ***The number of paper clips on the nose of the plane.***

Materials: List and quantify.

<i>Computer paper</i>	<i>paper clips</i>	<i>chart</i>
<i>Pen</i>	_____	_____
_____	_____	_____

Procedure: Number the steps so procedure can be replicated easily.

1. ***Construct identical planes to use in the experiment.***

2. **Attach the appropriate number of paper clips for each trial.**
3. **Throw planes.**
4. **Measure the distance and record data after each throw.**
5. **Average the results to record in the "conclusion" section of display.**

Repeat experiment three times in order to compare results.

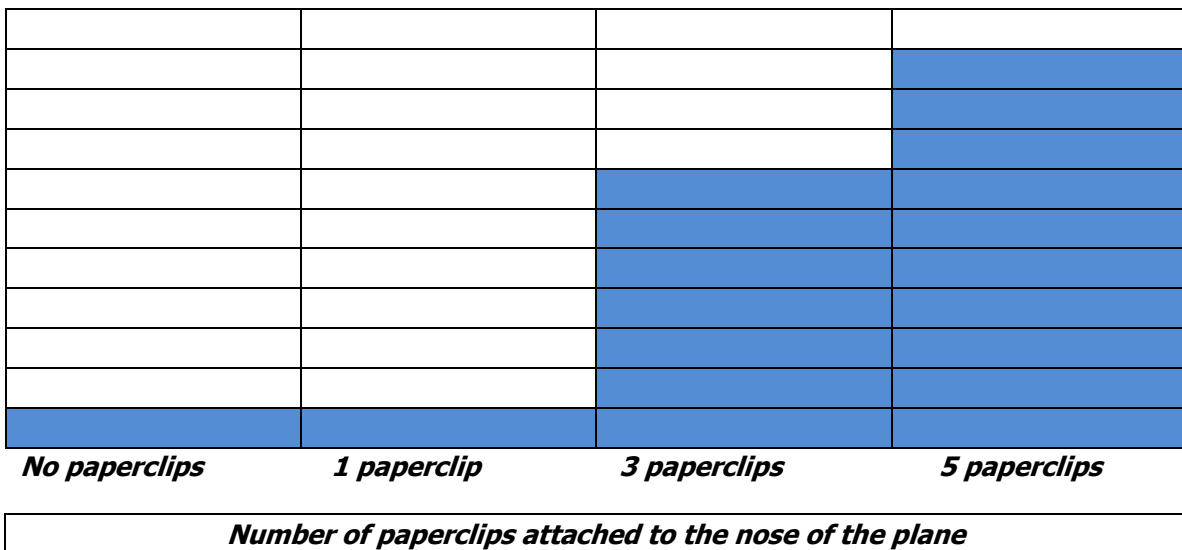
Make a graph of your results. This can be done by hand or computer.

Make a graph or chart of your results. This can be done by hand or computer.

Flight Results (Chart format)

	<i>Test 1</i>	<i>Test 2</i>	<i>Test 3</i>	<i>Average</i>
<i>No paper clips</i>	<i>0m</i>	<i>1m</i>	<i>0m</i>	<i>.3m</i>
<i>1 paper clip</i>	<i>0m</i>	<i>0m</i>	<i>1m</i>	<i>.3m</i>
<i>3 paper clips</i>	<i>8m</i>	<i>7m</i>	<i>5m</i>	<i>6.6m</i>
<i>5 paper clips</i>	<i>9m</i>	<i>11m</i>	<i>8m</i>	<i>9.3m</i>

Flight Results (Graph Format)



Distance of flight measured in meters

Data/Observation: Describe in paragraph form what happened during the experiment. Be detailed.

The plane did not fly very far with no or one paper clip attached to the nose of the plane. It flew the farthest when it had five paper clips attached to the nose. I believe that the plane flew farther with the paper clips because the paper clips added weight which helped to guide it longer. For example if I threw a ball, which has weight, it would go farther than if I threw a feather, which is a much lighter weight.

Physics can come in handy when designing the craft, as various forces can easily affect the distance and length of the flight. The current Guinness Book of World Record for the furthest paper aircraft flight is 69.14 meters. This record was accomplished on February 26, 2012 in North Highlands, California by John M. Collins and Joe Ayoob. In order to achieve a flight of this length, one must learn about various designs and how they work with the different forces affecting flight.

Conclusion:

Write your hypothesis in past tense using "when....then" format.

When ***I put more paper clips on the end of my airplane***

Then ***the plane flew a farther distance.***

Was your hypothesis supported or not? ***The results showed that my hypothesis was supported.***

Describe any scientific principles learned.

Reflection: Next Inquiry- another related experiment you could try or how you could make this experiment better?

Grade 3 Lesson 5 Writing to Inform: Article

4-point Writing Sample

- 1 The introduction makes the topic and purpose of the essay clear.
- 2 The paragraph includes many carefully chosen details. The writer begins by describing an early telephone.
- 3 Linking words connect ideas.
- 4 The paragraph includes many carefully chosen details. The information is given in time order.
- 5 The first sentence states the topic of the paragraph. The paragraph includes many carefully chosen details. The information is given in time order.
- 6 Precise words clearly convey ideas.
- 7 This paragraph is a concluding statement that sums up the information in the essay.

Telephones Through Time

1 What would you do without a telephone? You can use a phone to chat with your friends or make plans. You can ask your parents to pick you up. You can get important information. People have been using telephones since the 1890s. But telephones have changed a lot since then!

2 If you saw one of the first telephones, you might not even know what it was. It was on a tall stick. In fact, it was called a candlestick telephone. The mouthpiece was at the top of the stick. The earpiece was separate. It was connected to the stick with a cord. There were no numbers to punch or dial because people had to call the operator to make a call. The operator had a switchboard. When a person rang the operator, the operator would connect wires on the switchboard. Then she would ring the person being called.

4 In the 1920s, rotary phones were invented. Then people could make their own calls. They didn't need an operator. A rotary phone had a round dial with a hole for each number. A person put a finger into the holes to dial a number. Another way this phone was better was that the mouthpiece and earpiece were not separate. In the 1960s, phones got push buttons for numbers instead of dials. Then calling someone was even easier.

5 Cell phones were invented in the 1990s. They were much bigger than cell phones today. They didn't work as well, either. There weren't many cell towers, so there were lots of places where you couldn't make calls. The smartphones of today don't even compare to the first cell phones! They are tiny. Plus you can connect to the Internet, send text messages, and take pictures with a smartphone.

7 As you can see, telephones have changed greatly since Alexander Graham Bell invented the first one. But people still use their telephones to stay in touch.

Grade 4 Lesson 2 Writing to Inform: Article

4-point Writing Sample

1 This paragraph provides a “hook” by describing a scene that helps readers picture the clearly stated topic.

2 Headings help organize the information.

3 The paragraph’s first sentence states the main idea of the section, and all of the facts and details in the remaining sentences support that main idea.

4 This definition helps readers understand the word *embalm*.

5 The paragraph’s first sentence states the main idea of the section, and all of the facts and details in the remaining sentences support that main idea.

6 The writer uses the word *transport* because it is a more precise word than *move*.

7 These words and phrases link the events in the section by showing the passage of time between them.

The Important Role of Spices

1 “Pass the salt, please,” your dad says at dinner. You hand him the salt shaker. However, salt wasn’t always so easy to get. In fact, for thousands of years, spices like salt were rare and expensive. Because of that, spices have played an important role in history throughout the world.

2 Uses of Spices

3 Spices have been used in different ways at different times. They have always been used to flavor foods, but there have been other uses. The ancient Egyptians used cinnamon to embalm, or preserve, bodies. The workers who built the pyramids ate onions and garlic because Egyptians believed these herbs gave them strength. In ancient Greece, athletes received crowns made of spices like bay leaves and myrtle. In ancient Rome, soldiers were paid in salt. To show his grief, a Roman emperor once burned a year’s supply of cinnamon, a valuable spice.

2 Spices and Trade

5 Spices have affected trade and business. Rome built the *Via Salaria*, or Salt Road, to transport salt. This new road was used to transport other goods, too. In ancient times, most spices came from Asia over land routes called the Silk Road. After Rome set up a trade center in Alexandria, Egypt, all spices had to pass through this center to get to Europe. In the 14th century, spices had to pass through the port of Venice, Italy. Traders paid huge taxes on the spices they moved through Venice. Explorers in the 15th century looked for new trade routes to Asia.

8 The paragraph's first sentence states the main idea of the section, and all of the facts and details in the remaining sentences support that main idea.

9 The conclusion restates the three main ideas, leaves readers something to think about, and connects the end of the article to the beginning.

2

Power from Spices

8 Some nations have used spices to gain power. In fact, the nation that controlled the spice trade became powerful and wealthy. First Rome used its trade center in Alexandria to control the spice trade with Asia. Rome also built villages along the Mediterranean coast to control salt production. Then Venice controlled the spice trade. Portugal became the spice boss after Vasco da Gama found a new route to India. When Holland gained control of the cinnamon and peppercorn trades, it worked hard to protect that control.

9 Throughout history, spices have been used in many ways, from flavoring foods to preserving bodies. Because spices were rare and expensive, they were important trade goods that affected nations' trade and business. Also, the nation that controlled the spice trade became richer and more powerful than other nations. Today spices do not play the important role they once did. However, they still do a great job of flavoring our foods. Pass the salt!

Grade 5 Lesson 2 Writing to Inform: Article

4-point Writing Sample

- 1 Paragraph introduces the topic.
- 2 Headings help organize the text.
- 3 Definitions of terms are provided.
- 4 Domain-specific vocabulary is used throughout the text to develop ideas.
- 5 Words and phrases are used to link ideas.
- 6 A quotation helps explain a concept.

Water and Wind Power

1 Water and wind are sources of energy for producing electricity. Hydroelectric power plants use falling river water to produce electricity. Wind turbines capture wind to produce it. Both ways of generating electricity have benefits, and both have drawbacks. Let's take a look at these energy sources.

2 Water Power

Hydroelectric energy begins with a dam across a river. The dam holds water in a reservoir. A reservoir is a lake created by the dam. Some of the reservoir water enters a sloping pipe, called a penstock. The water rushes down the penstock into the propeller blades of a turbine. Then the rushing water turns the turbine, causing a shaft to spin. The shaft is a rotating bar that connects the turbine to a generator. The generator produces electricity. Then power lines carry the electricity to homes and businesses.

2 Wind Power

Wind turbines are used to produce electricity with wind power. Blowing winds turn the blades of huge turbines. The rotating blades cause a shaft to spin. The generator connected to the shaft changes the energy of blowing wind into electrical energy. That energy then travels through cables and wires.

2 Benefits

Both hydroelectric power and wind power have some benefits over other energy sources, such as coal or nuclear energy. For example, water is a renewable resource. It cannot be used up because water is recycled when it rains or snows. Like water, wind is a renewable energy source. Air is always moving. Both hydroelectric power and wind power are clean energy sources. "Clean energy doesn't produce pollution or greenhouse gases that can contribute to climate change."

Another benefit of wind power is that it does not require the use of water. That means water is available for other uses. Also, homeowners can buy personal wind turbines. Personal wind turbines can greatly lower a homeowner's electricity costs.

² Drawbacks

⁷ A major drawback of hydroelectric energy is its effect on plants and animals. When rivers are dammed, animals may lose their migration routes. Too, the oxygen levels of water below a dam might be lowered. These lower levels are not good for the plants and animals in the river. Another problem is the loss of land. Reservoirs cover over land that could have been used for farming.

A major drawback of wind power is the amount of space taken up by wind farms. Wind farms are large areas with many wind turbines grouped together. Open rural areas are good spots for them. But these areas could be used for farming.

In addition, wind turbines can harm animals. Birds and bats have flown into them and lost their lives. Wind turbines are also noisy. People who live near them complain about the noise. Many people think they are ugly, too. In addition, the costs of constructing turbines and power lines to carry the electricity are very high.

⁸ Like all energy sources, hydroelectric power and wind power offer benefits and drawbacks. Yet, both are helping to power our communities today. They are sure to be an important part of our energy future.

⁷ Facts and details are used to develop the topic.

⁸ This paragraph is a concluding statement that relates to the information provided.

LESSON 2 Rubric for Informational Writing

SCORE	4	3	2	1
Ideas/ Purpose	Clearly indicated purpose: to inform and/or explain; clearly stated topic	Purpose indicated: to inform and/or explain; stated topic	Purpose vague; topic not clearly stated	Purpose and topic unclear or not evident
Elaboration/ Evidence	Topic strongly developed with many carefully chosen details	Topic developed with details, but these may be insufficient	Not all details develop topic	Details unclear or limited
Organization	Interesting introduction, satisfying conclusion; related information grouped logically	Recognizable introduction and conclusion; most information in paragraphs grouped logically	Missing either introduction or conclusion; related information not always grouped	No introduction or conclusion; unrelated information with no discernible grouping
Language/ Vocabulary	Precise, domain-specific words that tell about topic; good use of transitions to link ideas	Domain-specific words that tell about topic; needs additional precise words and better use of transitions	Mostly correct but ordinary words; needs words that are more precise; uses few transitions	Uses limited, dull, or unclear words; uses no transitions
Conventions	Strong command of most standard writing conventions; only a few minor errors	Reasonable command of most standard writing conventions; some errors that detract from writing	Some command of standard writing conventions, but many errors that detract from writing	Limited command of any standard writing conventions; numerous, serious errors

Model	Model is completely finished, well thought out and is easily understood.	Model is well thought out and implemented correctly. Missing a component.	Model shows evidence of research in planning but is not finished.	Model shows no research in planning.
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NOTE Evaluate students' informational writing using this rubric.