12th Annual
2016 Boones Ferry Primary Science Inquiry Fair

3rd - 5th Packet—Registration Due January 22

"The important thing is to not stop questioning." –Albert Einstein

Who: All Boones Ferry Primary students are encouraged to enter a project in our Science Inquiry Fair. We hope most 3rd-4th grade students will participate. ALL 5th graders will be involved as a grade level expectation. We will have the most amazing science fair in Boones Ferry history! We challenge our students to use either the scientific or engineering method to answer an inquiry question or solve a problem, or develop a meaningful research project

What: The fair is a display gallery of student scientific inquiry and research projects. **A project doesn't have to be complicated and can be lots of fun.** The process is about asking a question and finding an answer. It can be as simple as "How many licks are in a Tootsie Pop?" or "Which dish soap makes the biggest bubbles?" Results are then displayed at the fair.

Our fair is non-competitive. Students explain their projects to other students, family, and fair visitors when their class visits the fair and during part of the evening as they stand by their projects.

Why: Science fair is a way to experience science in a fun, hands-on way. We are surrounded by science. Science is asking questions and finding answers. Science makes things work and solves problems. Science education feeds curiosity and wonder and provides students with valuable concepts, life skills, and career options while developing an appreciation for the world. Participating builds self-esteem while being recognized with a certificate and medal!

Where: Projects are completed at home and displayed in the Fauna Gym
When: February 23-24 8:00 a.m. – 2:00 p.m. and February 24th 5:30-7:00 p.m.

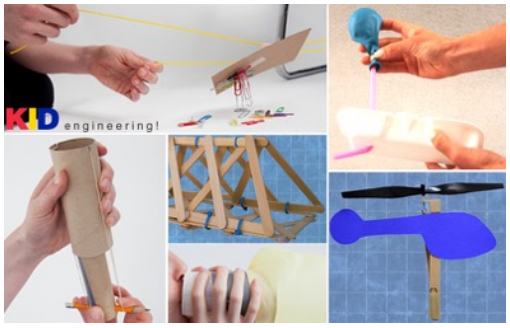
<u>District Science Fair</u>
All students are invited to attend the 15th annual CREST-Jane Goodall Science Symposium which will be held at West Linn High School on Friday, February 26, 2016. It is a great time to get new ideas for your next science fair project!

<u>Types of 3rd - 5th Grade Science Fair Projects:</u>

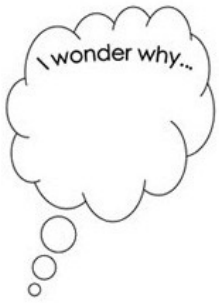
- **Experiment:** Conduct an experiment to find the answer to a question/ problem. Use the Scientific Method: ask a question, do some research, make a hypothesis (your best guess at how it will turn out), plan and conduct your experiment while recording and measuring data, and analyze your results. Examples: How much salt does it take to float an egg? Do all objects fall to the ground at the same speed?

- **Consumer Science or Observation Project**: Study animal or human behavior or the environment. Examples: What brand of raisin cereal has the most raisins? What color of bird seed do birds like better? Which is the warmest/coldest part of your home?

- **Inventions, Models and Designs:** Use science, math, and creativity to dream up and design an object or process to solve a real life problem. Write a computer program or use the engineering process to asking a question, brainstorm, plan, create, test, and make your design even better. Example: Can the design of a paper airplane make it fly further? Build a paper bridge that can hold the weight of a can of soup.



- **Inquiry Research Project:** Start with a question or problem and then do active research in any scientific field for the latest information. You will look for answers and solutions by reading, talking to experts, and gathering information from many sources. Examples: How do clouds form? How does a solar cell work? How does a light bulb operate? What can people do to help bees? 5th grade Genius Hour projects would fit this research inquiry category.



How to Register:
To enter the Boones Ferry Science Inquiry Fair, fill out the entry form at the end of this document and return it to the office by **Friday, January 22.** The entry form must have a parent/guardian signature. We may contact you to confirm or obtain any missing information.

Getting Started:
The Boones Ferry and Wilsonville libraries have many resources to support your inquiry project. Our school website provides many links to help generate ideas and support your project. Last but not least, simply start by exploring the world around you and asking yourself- *what do I want to learn more about?*

Displays for 3rd -5th Grade Projects:
Families and other students will be viewing displays. These displays should communicate the process of finding the answer to a student's question. There should be an area for each part of the project on the display.

- Tri-fold poster board—Sold at office for $3.00

Helpful websites: **Check out more links on our website: Student Learning Links/ Science Fair Resources**

-The Internet Science Fair Project Resource Guide: Good general information and lots of links to idea websites. **http://www.ipl.org/div/projectguide/**

--Science Buddies: Has a 40 question form that allows you to find an idea that matches your interest. Search by time required and grade level. Great site! www.sciencebuddies.org/

--Crystal Clear Science Fair Projects: Good ideas but a lot of their projects require you to buy stuff. www.crystal-clear-science-fair-projects.com

--Science Fair Central at Discovery Education. http://school.discoveryeducation.com/sciencefaircentral/

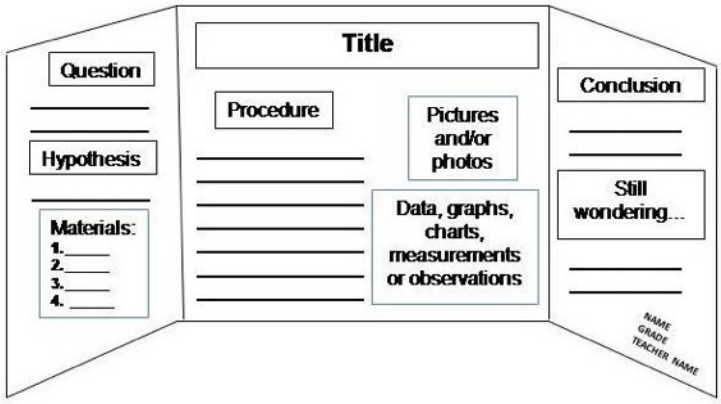
Questions? Contact Margaret Wattman-Turner, wattmanm@wlwv.k12.or.us, 503-673-7310

Entry expectations:

Your project display should:

- ✓ Demonstrate an understanding of the scientific experimental process or be an exploration of a scientific topic that you would like to share with others
- ✓ Show your own ideas and work
- ✓ Be neat and creative (handwritten okay, but be neat)
- ✓ Use correct spelling
- ✓ Use photos when possible. Provide models when appropriate.
- ✓ Use graph, tables, and charts to present data if possible.

Example of a Science Fair Board



Your display board should also include:

- ✓ A project title, generally your question
- ✓ Your name, grade, teacher and school
- ✓ Background information: What you learned through your initial research and how you decided what you wanted to learn more about
- ✓ Hypothesis: What you thought would happen
- ✓ Procedure: What you did
- ✓ Results: What happened
- ✓ Conclusions: What you learned, if your hypothesis was supported

Students presenting a research or other project need not necessarily follow this recommended format for the display board.

Projects **may not include**: **If it can spill, hurt, or cause an allergic reaction it is not allowed.**

- Science or math kits from stores
- Expensive or non-replaceable property (Is it too fragile to touch?)
- Live animals, reptiles, bugs or bacterial specimens (observations of live animals are permitted)
- Matches or flames, chemicals or flammable substances
- Electricity passing through an un-insulated wire. Electrical projects should be battery powered. No power will be available to the display tables.
- Uncontained messes or liquids, or anything that may cause stains
- Breakable items, peanuts, tree nuts, or latex
- Blood, gory products or illustrations

Suggestions for Parents:

- **Help your child get started** – a project idea may be something that your child is interested in, curious about, or a subject he/she is learning about in class. Look in books and on websites for experiment ideas that might expand into a project. Have your child think about the following sentence stems:
    - **I want to do _____. I want to find or show_____. I think that____ . I want to learn more about_____. What will happen if_____?**

  These thoughts help children learn about the world around them!
- **Complete Registration-** Work with your child to fill out and sign the entry form.
- **Encourage your child** – the science inquiry fair is meant to be a *fun* learning experience, engaging children in continuous questions about the world around them. It is non-competitive. Parents do not need a background in science, mathematics, or technology to be a support!
- **Monitor your child's progress** – changing ideas, missing items, over-looking steps, and not managing time effectively are common occurrences in any project. Help guide your child towards completing a finished project. This is an excellent opportunity to teach organization over time, a skill children need to develop.
- **Avoid doing your child's project for them** – handwritten signs and descriptions in their own words are great! However, support with typing or data input, depending on the age of your child, may be helpful.

Calendar:

Jan. 11-22.	**Turn in your registration form by January 22.** Gather information on your topic. Formulate your question and your hypothesis based on what you have learned.
Jan. 22-29	Design your study or experiment to find out the possible answers to your questions. Remember, if you are doing an experiment, you must try to control all of the variables that you can and note those variables you cannot control. Begin your study/experiment.
Feb. 1-14	Continue work on your study or experiment. Remember to allow time to repeat your experiment and engage in your study. You may want to begin working on how you will present your findings.
Feb. 15-21	Finish your experiment or study. Develop a way to display your work. Present your findings to friends and family. You should be able to answer most questions about your research.
Feb. 22	**Bring your project to school Monday, February 22 between 5:00-6:30 p.m.** Your project will be checked and set up at this time.
Feb. 23-24 Feb. 24	Viewing will be open to classes 8:00 a.m.-2:00 p.m. Families are welcome to attend. **Science Fair Night** is February 24, 5:30 p.m.-7:00 p.m. Students attend with their family and receive their medal. **Students must take their projects home immediately after the evening exhibit.**

The Scientific Process- Experimental Inquiry

The scientific process is a way to ask and answer scientific questions by making observations and doing experiments. These steps are not always linear, nor circular. At any point you may troubleshoot what isn't working, develop a new plan, do more research, get advice from others, ask new questions, form a new hypothesis and experiment again.

1. **Ask a Question: What are you curious about?**

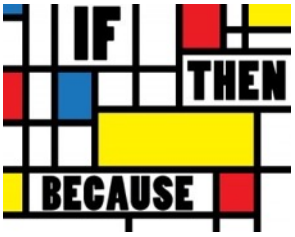
- Think about a topic you are interested in, such as how something works or how two things differ from each other.
- Choose a question that you can answer by doing an experiment. Use words like, "How does…", "Which ones…", "What will happen…", "Why is…"
- Be specific—there should be only one variable that changes

Example: Which will grow faster, seeds watered with tap water or rainwater?
In this experiment, the kind of water used will be the only thing that changes. The type of seed, soil type, amount of water and location will be the same.

2.Do Background Research: What do you already know? What can you find out from books, websites, and experts?

- Explain any knowledge you already have about your topic
- Provide details about how you came up with your question

Example: It rains a lot where we live, and the plants grow really well. There are a lot of green plants here, and they grow a lot. I wonder if there is something in rainwater that the plants need to grow that is not in tap water? I can research what is in tap water and what is in rainwater on the internet or by calling the water company and state water experts.



3.Construct a Hypothesis: What do you think will happen?

- Make a prediction based on your prior knowledge.
- "If _____*[I do this]* _____, then _____*[this]*_____ will happen."
- State your hypothesis in a way that you can easily measure.
- Your hypothesis should be constructed in a way to help you answer your original question.

Example: If I <u>water seeds with rainwater</u>, then <u>the seeds will sprout faster</u>. I think this because plants in our area grow really well with all the rain.

4. **Design your Experiment: What will your procedure be?**

- Make a list and gather **Materials** you will need.
- Plan the **Steps** you will use to collect data. Be specific so that someone else could duplicate your experiment based on your instructions.
- **Keep things constant** (not changing): Conduct a fair test. Only change one factor or variable at a time while keeping all other conditions the same.

i.e. if you want to test how different soils affect how tall plants get, make sure each plant has the same sunlight, water, amount of soil, only changing the type of soil in your experiment.

- **Plan to repeat your experiment**. i.e. instead of one plant for each type of soil, plant more than one so you can take the average. Repeating your experiments several times makes sure that your first results weren't just an accident.

Example:

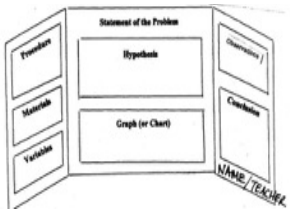
1. Get four plastic or Styrofoam cups.
2. Fill each one ¾ full with potting soil.
3. Put one lima bean halfway down into the soil in each cup.
4. Label cups, two for rainwater and two for tap water.
5. Set out a container to collect rainwater.
6. Set cups in a row on the windowsill.
7. When enough rainwater has collected, start watering the plants. Water the same amount at the same time each day.
8. If soil is still damp, only water every other day.
9. Record results.

5. **Test your Hypothesis --Collect and Organize your Data. Use charts or graphs to keep track.**
   - Write down what you observe happening.
   - If you are checking on something like growth or behavior, be sure to check at the same time every day.
   - **Example:**

	Rainwater Seeds	Tap Water Seeds
Day 1	(record results)	
Day 2		
Day 3		

6. **Form a Conclusion: Analyze and Interpret your Data**
   - Use science facts to help explain what you observed.
   - Describe your results and explain whether or not anything unexpected happened.
   - Did your experiment's results support your hypothesis? How or how not?
   - If you were to do the experiment again, what would you do differently?
   - Do you think you made any errors or mistakes that may have affected your results? If so, what were they?
   - How did your results affect your thinking about this topic?

Example: The seeds watered with the rainwater grew much faster than the ones watered with tap water! My hypothesis was supported. The rainwater seeds grew into plants that grew to be 14 inches tall. The tap water seeds barely came out of the soil. I think this happened because there may be something in tap water that isn't as good for the plants. Plus, the rainwater has nitrogen in it from the air, and plants need that to grow. If I did this again, I would make sure all of the plants are in the same amount of sun each day. The tap water seeds may have been in the sun less than the rainwater seeds. This experiment makes me want to water our indoor plants with rainwater because it would be better for them.



7. **Communicate and Share your Project Results with Others**

Science Inquiry Projects from Prior Years

Biology What color of birdseed do birds like best? Which cheese grows mold faster? What foods attract sugar ants? (Why do you find them where there is no sugar?) Is it easier to judge distance with two eyes or one?	**Physics** Does the size of the wheels on a Lego car affect the distance traveled? Will a bulb burn brighter with the batteries in a series or parallel? What kind of things do magnets attract? Does the age of batteries affect the sensitivity of smoke detectors?
Chemistry Which crystal grows faster salt or sugar? Will cola dissolve metal? Does the surrounding temperature affect a baking-soda vinegar reaction? How much salt does it take in water to float an egg?	**Environmental Sciences** Does a bath take less water than a shower? Does the type of materials put in compost affect its temperature? Does the location of rainfall change the pH of rainwater?
Consumer Science Which brand of raisin cereal has the most raisins? Which dish soap makes the most bubbles? Which laundry detergent works best? Which pancake syrup is the thickest?	**Earth Sciences** Do different amounts of water create different water pressure? Can different soil types absorb different amounts of water? Do meteorites going at a faster speed make bigger craters on impact?
Botany Can plants grow without soil? Do the roots of a plant have to grow downward? Do calamine lotion and hydrocortisone cream have any effect on poison ivy leaves? Does soil pH affect the growth of pinto beans?	**Behavioral Sciences** Do sound levels in school get loud enough to damage our ears? Does music affect short term memory? Does holding a mirror in front of a fish change what a fish does? Can things be identified by just their smell?
Engineering Does adding weight to the nose of a paper airplane make it fly straighter? Does the shape of a parachute affect how it falls?	

Steps in a Research Inquiry Project

1. **Question and Wonder**
   Choose a topic or area of interest, something you wonder about.

2. **Create an inquiry question**
   Your question should be broad enough to invite inquiry, yet not so broad that research will be overly challenging.

3. **Research** Dive into your research. **Read, Look and Listen**
   Use books, computers, films, observe and talk with experts.

5. **Analyze and Interpret—Aha!**
   Review your research and summarize your findings. Determine the answer to your initial question.

6. **Share**
   Share your findings at the Science Fair; i.e. Project board, Imovie, PowerPoint, oral presentation

7. **Plan Next Steps**
   As a result of your findings, what are you still wondering about? What will you do next?

Question and

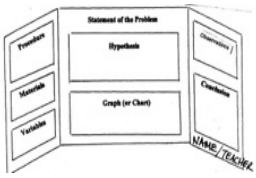
Create an inquiry question

Research: Read, Observe--Look

Gather Information, Learn

Analyze and Interpret

Share with



Still wondering, Plan next steps

2016 Boones Ferry
Science & Inquiry Fair Registration
3rd-5th Grade--Registration due January 22

Student Name(s) _____ Grade(s) and

Teacher(s)_____

1. **What is the question/problem you plan to investigate?** (Please be sure to phrase as a question; for example, “What happens if…?” or “How does *x* work?”)

_____

_____

_____

2. **What is your hypothesis?** In other words, what do you predict the answer to your question will be? It may be worded "If _____*[I do this]* _____, then _____*[this]*_____ will happen."

_____

_____

3. Describe the basic steps and plan for your experiment or research project?

_____

_____

Student signature: _____

***Note to Parents**
This project should be student-driven. The majority of planning, researching, designing and display preparation should be done by students. Child designed displays are encouraged!

Parents and other adults may help with: Planning and organizing, gathering materials, and assisting with display construction or typing.

Volunteers are needed for the Science Fair. I am able to help:
_____ Lead classroom groups during school hours Tuesday or Wednesday, Feb. 23-24
_____ Helping with set-up Monday, March 2, 5:00-6:30 pm
_____ Helping with tear-down Wed., February 24th after the family viewing (7:00 p.m.)

Parent Signature: _____

Home/Cell Phone:_____Email:_____