Rivers Edge Elementary School PTA

EAGLES IN THE LAB – SCIENCE FAIR

Thursday, April 7th, 2016

Deadline for Submissions: March -25th 2016

This information is provided in keeping with our goal of emphasizing the process of doing a science project rather than the product. *While awards are given, the emphasis of the Science Fair is to provide students with a fun, meaningful science experience.* All the helpful information you find in this packet will serve as a guide for this and many other science projects you will do for years to come.

Science Fair Highlights

- All participating students will receive a recognition certificate.
- Students from Grades 3 to 5 will compete for awards.
- Students can work with a friend within a grade level.
- Siblings across grade levels can work together on a project.

Projects should be

- Fun and interesting to the student
- Age-appropriate
- Displayed neatly
- Understanding of the subject matter is most important.

As a parent, your role is to encourage your child's participation. There are many ways to do this without actually doing the project. Some suggestions are listed here:

• **HELP** your child develop a list of possible projects, based on their interests and abilities.
• **ARRANGE** for your child to get together with their partner, if they choose to work in pairs.
• **HELP** your child gather materials & construct a time frame; transport the project to school.
• **Make sure** that the project is **safe**; **provide** supervision when necessary
• Write out any text provided by younger students who are unable to do so themselves, ***without compromising the integrity of their work***.

This information packet has valuable information including:

- Details regarding submitting a project approval request (approval required before starting project)
- Checklist and key dates
- Project Categories and Project ideas
- How to prepare a project for the science fair?
- How to display your results?
- How will your project be evaluated?
- Reference websites with incredible project ideas.

As a Science Fair Committee, it is our role to make your experience as enjoyable as possible.

Science Fair Committee Chair:

Sindhu Gandavarapu (sciencefair@reespta.org)

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Science Fair Participation Request Form

- Deadline for submission: March 25th , 2016
- You may submit your project approval request form online here (http://goo.gl/forms/7t1b5sXHUO).
- If you are working with a partner, please submit your request only once.
- If you change to a new project or change plans, you must *email the Science Fair Committee*.

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CHECKLIST: COUNTDOWN TO THE SCIENCE FAIR

Use this form to keep your science fair project on schedule.

Check Off When Completed

_____ Choose a topic that you are interested in doing.

_____ Submit the Online Science Fair Participation Form by March 25th .

_____ Receive an email approval from the Science Fair Committee.

_____ Research your topic as necessary. Record your references.

_____ Write out your procedure.

_____ Gather your materials.

_____ Work on your project.

_____ Carefully collect and record data and observations as you progress.

_____ Take and develop photographs, if needed, as you work.

_____ Make or purchase display board.

_____ Begin work on your display board. Ensure that the Display conforms to the requirements.

_____ **Deliver your project to the school gym on Wednesday, April 6th 2:30pm-6:00pm. The Science Fair committee will be available to help you set up. Please note that projects will not be accepted prior to 2:30pm as we are not able to start setting up the gym until 2pm.**

_____ Science Fair judging begins at 8am on Thursday, April 7th.

_____ **Attend the PTA Science Fair celebration from 6:00pm to 7:30pm on Thursday, April 7th and** discuss your project with other students and parents!

_____ Pick up your project no later than 8:00 pm on Thursday, April 7th, to avoid damage Or loss.

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Note to Parents of Grade K-2 Students

You will quickly discover that this packet of information is geared more toward students in Grades 3-5. Expectations are that Grade K-2 projects will follow a similar but less elaborate process, with the emphasis on simplicity and fun. You will most likely be pleased when you look at the list of project suggestions and see how truly simple but enlightening some of the ideas are!

You can help your child by scanning the information presented here and leading them in the right direction. As they develop their ideas, help them turn those ideas into questions that they can then attempt to answer through their project. There are many suggestions in the packet and resources available for your child all along the way.

There is no set standard for K-2 displays. You can take your cues from the packet, but your child need only include those bits of information that are relevant to his/her project. Pictures, drawings, and photos can often replace volumes of text. There is no need to try to fit a simple project into a tedious display.

Remember that this is *not a competition* but an opportunity for students to begin to explore their world in a more formal way.

As you scan the information in this packet, please make note of:
- Deadlines
- Resources available for support all along the way
- Project ideas
- Display dimensions

Hopefully, this information will also help you to get a feel for the expectations of the upper level projects so that together we can begin to lay the foundation for students to think and communicate like a scientist, skills that can be applied to many other disciplines. You may also find it helpful to keep this material as a guideline for future projects.

Please keep the K-2 projects and displays simple, age-appropriate, and fun! Don't hesitate to contact a member of the Science Fair Committee if you have any questions.

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PROJECT CATEGORIES

The following descriptions of project categories are general in nature, and merely meant as a guideline. Use these ideas, project suggestions list, and your imagination to create a unique project! A project may seem to fall into one of 6 different categories. Choose the best fit and design your procedure and display accordingly.

EXPERIMENTS

- Using the Scientific Method to answer a question. e.g. "Does salt affect the floatation of an egg?"
- The scientific method is a way to ask and answer scientific questions by making observations and doing experiments.
- Ask a Question; do Background Research; construct a Hypothesis; test your Hypothesis ; analyze your Data ; draw a Conclusion; and communicate Your Results
- Display should typically list and display all the steps of the Scientific Method.
- The steps should be neatly labelled

COLLECTIONS (K-2 Grade Levels Only)

- Specimens. e.g. shells, leaves, rocks, etc.
- Try to ask a question that can be answered by describing properties, comparing, contrasting, or grouping your specimens. e.g. "How do you label and organize a rock collection?"
- Displays should be well organized by systematically compiling, classifying, and ordering the specimens.
- Descriptive terminology and comparisons (origin, characteristics of objects, etc.) will probably be important information to collect and display with your specimens

INVENTIONS

- Development of something new/novel
- Could be a creative way to solve a common problem
- State the problem or question that the invention is designed to solve or answer
- Does not have to be a marketable concept
- If possible, have a model for demonstration, if not, provide a detailed drawing/photograph
- There is no limit to this imaginative category!

OBSERVATIONS

- Try to ask a question that can be answered by using your senses and powers of observation to study a particular object or subject. e.g. "Does the color of your roof impact your house temperature?"
- Data collection and description will be important information for your display
- Describing properties of objects may be appropriate
- A diary or daily log may factor into your plan

MODELS

- A replica of a scientific theory, process or feature
- Be creative with the materials used in construction!
- Can be operational (example: volcano that uses baking soda and vinegar to erupt)
- Suggestion of points that can be included in your display: materials used, drawings, photos, and explanations of the parts of the model; historical perspective (ex: what, when, where were the most famous volcano eruptions?)

DEMONSTRATIONS of a scientific principle

- An explanation of how something works (like an electric motor) or why something happens the way it does (what causes rainbows).
- Be sure that you understand it thoroughly and can explain it to others.
- If possible, put together a working model (for example, a telegraph, a bell, or an electric motor).
- Suggestions to include in your display: Detail in simple terms the scientific principle being demonstrated; Identify key scientists who might have been involved in exploring this principle; bibliography of references used.

Rivers Edge Elementary School PTA

HOW TO PREPARE A SCIENCE PROJECT

These are guidelines only, and can be adapted to the project category selected. Projects from younger students will obviously follow an abbreviated version of that given here.

1. SELECT A TOPIC
Choose something you are interested in - baking, skateboards, nature, music, sports, etc. Consult the listings of project suggestions and web sites for additional idea. List questions that you think might be interesting to answer. Try to make your question as specific as possible. Examples might be:

- "How important is sugar as an ingredient in cookies?" (Experiment);
- "How yeast works" (Demonstration);
- "The Solar System" (Model);
- "What can I learn from the seashells I collected at Virginia Beach?" (Collection)

Choose a topic that you think you can answer. Before making a final choice, consider these questions:

- Will it be interesting and safe?
- Can I get the necessary equipment or materials to do it?
- Will I have enough time to complete it?

Determine which category your project best fits into: model, collection, observation, invention, demonstration, or experiment.

2. GATHER BACKGROUND INFORMATION
Find out more about what you want to investigate. Keep track of where you got your information since you will need that information for your display.

3. STATE THE PURPOSE
This is often written as a question. What do you want to find out? If you are performing an experiment, you will also state a hypothesis.

4. DEVELOP A PROCEDURE
Write out a step-by-step plan for your project. Envision how you are going to answer your question or test your hypothesis. What materials will you need? How will you measure your results? Consult the Safety Rules.

5. LIST AND GATHER MATERIALS
Be as specific as possible, in case someone else wants to try to repeat your experiment.
(e.g. 150 ml of Diet Coca-Cola).

6. CARRY OUT YOUR PROPOSAL
Once you have received an email confirmation, begin to follow your plan carefully. Use parental supervision where necessary for safety reasons.

7. RECORD OBSERVATIONS AND RESULTS
Keep careful records. This is the heart of your project. Record any data as you go. Make drawings, take measurements, record observations, and take photographs along the way.

8. DRAW CONCLUSIONS
Explain why your project turned out the way it did. If you made predictions, were they correct? What did you learn from your project? What problems did you encounter? If you are able, relate it to your everyday life. What would you do next?

9. LIST SOURCES OF INFORMATION

10. PREPARE YOUR DISPLAY

The information displayed will be determined by the type of project you have chosen. Keep it simple!
See Project Display section for details.

Remember there are no mistakes or failures, just opportunities for learning. It is okay if the experiment or the model doesn't work…….**that's science!**

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Project Suggestions That Can Be Adapted to Any Grade Level*

* Students in higher grades are encouraged to choose more complex projects or find ways to deepen their learning experience.

COLLECTIONS: **(K-2) only**
Rocks
Rocks from two beaches (or areas)
Different types of sand
Different types of soil
Fossils
Bones
Seashells
Leaves (indoor or outdoor plants)
Seeds
Bark rubbings
Insects
Feathers
Chemical elements (carbon, lead, iron, sulfur, etc.)
Solids, liquids, and gases

OBSERVATIONS:
Planets you can see
Winter constellations
Local weather
How to read a weather map
Clouds
All about horses (or dogs, frogs, fish, birds, etc.)
Local wildlife
Animal tracks
Raising finches (or rabbits, gerbils, etc.)
What makes a bird a bird
All about crickets (or bees, beetles, ants, etc.)
Earthworms
Spider webs
Watching an ant colony
How insects change
Living things in my yard
Trees near my home
Leaf prints
Parts of a flower
Roots of different plants
Teeth
Seashells
Fingerprints
Shadows
Crystals
Properties of solids, liquids, and gases
Objects that block and pass light (opaque/transparent)
Gravity
Shapes of magnetic fields
Parts of a flame (candle observation)

MODELS and DEMONSTRATIONS
Simple machines
Pulleys
Levers
Open and closed circuits
How a switch works
How fuses work
How a flashlight works
How light reflects and/or refracts
How a bicycle works
How a generator (or motor) works
Mixing colors
How magnets work
How an electromagnet works
Friction
How thermometers work
Does fire give off water?
Does fire use something in air?
Does air have weight?
Does air exert pressure?
Evaporation
How are sounds produced?
Why things float?
A boomerang can...
How things move on movie film?
Why the wind blows?
What makes hail?
What is ground water?
Inside our earth (model)
The earth's surface features (model)
Volcanoes (model)
Features of the sea floor (model)
Our solar system (model)
Galaxies and our milky way (model)
Optical illusions
How the ear works (model)
An insect (clay model, etc.)
How seeds travel
Do plants give off water?
Tree rings

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PROJECT IDEAS

SCIENTIFIC METHOD:

Do apples of various types have the same number of seeds?
What is the average number of seeds in an apple?
Do the sizes of the apples correspond to the number of seeds?
What effect will the acid in soda pop have on an old copper penny?
Which toy car rolls farthest?
Which materials dissolve in water?
Which paper towel absorbs the most water?
Which brand of popcorn pops the most? Pops the fastest?
Which brand of raisin cereal has the most raisins?
How much liquid is in an orange?
Will an ice cube melt faster when crushed up?
Which materials are magnetic and nonmagnetic?
Which magnet is strongest?
Will plants grow better in the sunlight or artificial light?
In what type of materials do plants grow best (sand, peat, clay, etc.)?
Do roots grow down? Can plants grow upside down?
What do plants need to grow?
Which materials conduct heat best?
How does the size/width of a rubber band affect its sound?
How do the sounds differ among glasses holding different amounts of water?
How does vinegar affect eggshells?
How does a shadow change throughout the day?
Measuring rainfall with a rain gauge
Depth of snow at ten different locations
Testing a sun dial with a clock
Do plants give off water?
Growing potatoes at different locations
How fast do kidney beans grow?
What conditions do pill bugs prefer (light or dark, moist or dry)?
Can an earthworm detect light and darkness?
How far does a mealworm (or snail) travel in one minute?
What is the best condition for the growth of mold?
Which bread molds most quickly?
Which color liquid do hummingbirds prefer?
What food does a hamster prefer?
Can people identify flavors of Kool-Aid when blindfolded?
What type of additives/ingredients in water makes cut flowers last longer?
What effect does the amount of salt have on the “floatablity” of an egg?
How is the taste of a cookie affected by the absence of one ingredient?
Which brand of diaper absorbs the most moisture?
Which type of battery will run a toy the longest?
Does the depth of planting a seed affect the growth of the plant?
Do snails or earthworms travel faster?
What effects does salt have on ice at different temperatures?
Which brand of paper toweling is the best overall?
Will a metal or wooden baseball bat hit a ball farther?
What percentage of the pumpkin seeds from a pumpkin will germinate?
What brand of bread stays fresh the longest?

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PROJECT IDEAS

DEMONSTRATIONS:

The periscope
Kaleidoscopes
How binoculars work
How a microscope works
How a telescope works
What makes a rainbow?
Different types of mirrors
Lenses and what they do
How a camera works
How Polaroid glasses work
What causes light to bend?
How photocells work
How a prism works
The pinhole camera
The Doppler Effect
What causes echoes
How a record player works
How an electric motor works
How a generator works Oil wells:
Batteries: How they work
The telegraph
What is a transformer?
What is a transistor?
Electronic components and their functions
How does a computer work?
Hydroelectric power
Series and parallel circuits
How a wing works
Looping roller coasters: How they work
Primitive clocks
Acids, bases and pH
Capillary action
What is density?
Weather forecasting
Cloud chamber
Osmosis
Harvesting the wind with windmills
How clouds form
Different types of earthquake faults
How a sundial works
How does the human heart work? (model)
The circulatory system
The ear
Tooth decay
Why a fish has fins
Bird wings: How they work
The submarine
Photosynthesis
The action of yeast in bread
How yogurt is made
How cheese is made
Paper recycling
Aluminum recycling
Glass recycling
How they work
How heat is transmitted
Newton's 3rd Law
Heat and air (convection mobile)
Make a rain gauge and take measurements
Make pH indicator from cabbage juice
Make a "lemon" battery
What makes a hot air balloon rise?
How airplanes fly
How rockets fly
How does a canal lock work
pH and how to measure it
How elements combine to make compounds
Radioactivity and Geiger counters
What is surface tension?
How a barometer works
Effects of air pressure
Phases of the moon (working model)

Check the reference section at the end of this packet for more ideas.

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PROJECT DISPLAY

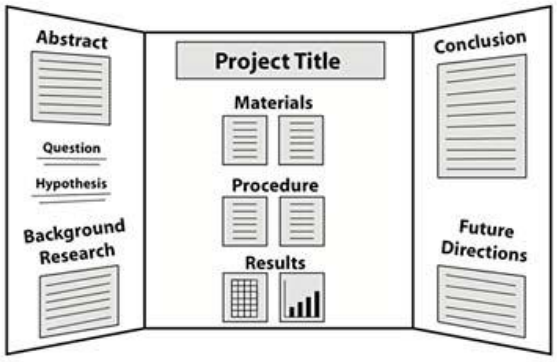
ALL SCIENCE FAIR PROJECTS MUST UTILIZE A DISPLAY BOARD. Student Name(s), Grade, and Teacher's name must be written on the back of the display board.

The display board: It should be a standard freestanding 3-sided, folding cardboard or foam board no larger than 32" tall by 48" wide. A single sheet of poster board alone tends to bend and sag.

Layout and Appearance:
Make your display look interesting and present all information clearly. Plan ahead to be sure that all the text and segments will fit. Text should be clear and the title large enough to read from a distance.

Sample Information to be included on your display board
The types of information to be displayed on your poster will vary depending on which category of project you have chosen. Examples of information that might be appropriate are:

- Title
- Purpose or question
- Hypothesis
- Materials
- Procedure
- Results
- Pictures, drawings, photos, graphs
- Observations
- Conclusions
- Research information
- References



Attachments to the board:
Appropriate materials can be attached to the display board (e.g.: bags of popped corn)

Additional items for exhibit:
Any additional item must fit in front of and within the boundaries of the standing display board.

Protect your science project

- Expensive or fragile items should not be displayed but should be simulated or photographed.
- Collections (minerals, shells, feathers, etc.) can be protected with a covering of plastic wrap.
- Design your display so that it is easy to transport to and from the fair.
- Carefully pack all materials when transporting.
- Have a photo taken of you and your project for your scrapbook. Years from now you'll be glad you did!

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SCIENCE PROJECT SAFETY RULES

1. Project Approval: All projects must be approved by the Science Fair Committee before you begin. You will receive a approval email after you submit the Science Fair Participation Form. If you change topics, you must get approval again for your new project. Please do not hesitate to email the Science Fair Committee if you have any questions.

2. Animals as subjects: If you are experimenting with humans or animals that have backbones, your experiment should cause no undue harm or stress to the subject. These projects should have written approval from the science fair committee before beginning the experiment.

3. Exhibiting Animals: No animals should be exhibited at the science fair. Models, stuffed animals, or photographs should be used instead.

4. Body Parts: No human body parts should be displayed. Exceptions are teeth, hair, and nails.

5. Blood/Bacteria: Students should avoid doing experiments involving bacteria cultures and blood.

6. Controlled substances: No controlled substances such as prescription drugs should be displayed.

7. Chemicals: No dangerous or combustible chemicals should be displayed at the fair. Rockets or engines must not contain fuel. All chemicals displayed should have the contents clearly marked on the container.

8. Flames: No open flames will be permitted. Exceptions may be granted during the evaluation process.

9. Safety: Student experimenters should wear safety goggles (eye protection) and follow standard safety practices when working with fire, hot liquids, or caustic chemicals. Parent approval and supervision may be required for these projects.

10. Electricity: It is recommended that all electrical experiments be designed using direct current circuits of 12 volts or less. All projects using household electricity must conform to standard wiring practices and safety. Open knife switches are not acceptable for circuits exceeding 12 volts. Wet cell batteries with open tops are not permitted.

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Project Evaluation

A committee of judges will evaluate each student's project. **During the <u>morning</u> of the science fair, each student participant will present their project to a panel of judges**. This will be a *friendly, informal interaction* where the students get to share their enthusiasm and learned information with an equally enthusiastic and supportive adult.

<u>Projects will be evaluated according to the following criteria:</u>

- Understanding of the topic
- Project Design
- The purpose is clearly stated
- The procedure is clearly outlined and designed to fit the purpose
- Projects in the experiments category make use of the scientific method
- Data presentation, interpretation
- Results, observations, and other data (graphs, charts, photos, etc.) are presented clearly
- Data supports the conclusions
- Adequate research/background information
- Display appearance
- Neat & well organized
- Project is clearly the work of the student

Science Fair Web Sites

1. http://www.ipl.org/youth/projectguide/
2. http://school.discoveryeducation.com/sciencefaircentral/Getting-Started/idea-finder.html
3. http://www.brainpop.com/science/seeall/
4. http://guest.portaportal.com/reessf
5. http://www.usc.edu/CSSF/Resources/Good_Project.html
6. http://www.all-science-fair-projects.com/
7. http://scienceclub.org/scifair.html
8. http://staffdev.henrico.k12.va.us/~dussaums/home/Welcome.html