F. E Peacock Middle School
Presents

The 2012 Middle School
Science Fair

Saturday, February 4, 2012
9:00 AM – 12:00 PM
F. E. Peacock Middle School Gym

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A NOTE TO STUDENTS

So you want to be in the Science Fair? Great idea! But what are you going to get out of it? What **is** the point of science fairs anyway? Well, you will learn how to think scientifically, how to reason logically, how to make observations, how to perform experiments and draw conclusions, how to make an intelligent guess in advance as to what those conclusions might be, and how to determine whether the guess was supported, rejected, or left unanswered. Try to think of this project as an educational and fun experience rather than work to be done for a grade. All F.E. Peacock Middle School science students will be required to prepare a Science Fair project that will be presented in class. Outstanding projects from each grade will be selected by the science teachers to represent their grade level at the Science Fair on Saturday, February 4, 2012.

This manual was prepared especially for you. It will be your guide from the moment you choose a topic to the point at which you present your findings to visitors at the fair. You will find a selection of potential topics -- arranged by grade level -- from which to choose. You will also find a number of resources (books, periodicals, etc.) for preparing your project or choosing a topic or area to investigate. If you have additional questions, please do not hesitate to contact your classroom teacher, the librarian at school, the Itasca Library, or other public libraries in our area. What follows is a list of important questions for you to consider as you think about selecting a project for the science fair.

THINGS TO CONSIDER

1. Does the topic **interest** you?
2. Do you have the **ability** to do the experiment?
3. Do you have the **time** to do the experiment?
4. Can you find enough **information** on the topic?
5. What **materials** will you need for the experiment?
6. Can you financially **afford** the experiment? (Try to avoid spending a great amount of money to perform the experiment)
7. What kind of **presentation** is best for the experiment?

SELECTING A TOPIC

Choosing a topic for the science fair will probably be the most difficult part of the entire process. You will probably find that making a decision is a time-consuming and mind-boggling experience because there are so many options available to you.

For example, your topic can fall in one of the three major areas of science: life science, earth and space science, and physical science. Your project must be an experiment and use the scientific method to test your hypothesis.

SCIENCE FAIR RULES

Approval/Acceptance Procedure
Permission Forms to participate in the Science Fair on Saturday, February 4, 2012 must be turned in to the student's grade level science teacher by January 20, 2012.

Environmental Concerns
Projects must not be harmful to the environment.

Animal Research
Projects must not be harmful to animals, e.g., shock or starvation experiments.

Safety Concerns
Students must adhere to strict safety procedures.

Size of Project
Entire project & display must fit on a 2' x 4' tabletop.

Setup/Removal of Project
Projects should be set up from 8:00 a.m. to 8:30 a.m. Students must remove their projects and clean areas used by 12:00 or directly after judging has been completed, which ever comes first.

Judging
Judging will take place between 8:30 a.m. and 11:00 a.m. A freestanding display is required for students to explain their exhibits. Students must stand next to their projects while they are being judged. Please watch for the judging times for your grade level.

Awards
Qualified individuals will judge all projects based on set criteria. Students will be competing for 1st, 2nd, 3rd place, or participation ribbons from one of three categories (grades 6, 7, 8). Every entrant will receive a ribbon indicating the grading of the project. In addition, an overall winner from each of the above three categories will receive a "Golden Test Tube" award based on the consensus of the judges. In the event of a tie, the judges' decision will be final.

Student Pickup
Parents must pick up children promptly after awards are distributed.

SCHOOL RULES WILL BE IN EFFECT

CONDUCTING AN EXPERIMENT FROM START TO FINISH

WHAT IS THE SCIENTIFIC METHOD?

Scientists look at problems the same way that you do. They call it scientific method. When something puzzles them, they use scientific method to try to solve the problem.

Here, in a nutshell, is how they do an experiment:

1. Their first step is to identify a problem through observation. They narrow their choices from many potential topics to a specific one they can explore.
2. Their next step is to do some background research in their chosen area to understand their selected field.
3. The third step scientists take -- and a very key one -- is to ask a specific question focused on what they will investigate and the variables they will observe. They state their problem as a question that can be tested.
4. They then form a hypothesis (make a guess or prediction) about what is causing the problem and how it might be solved.
5. They experiment or test their hypothesis to see if it solves the problem. As they experiment, they gather information and record observations. If one guess is not correct, they make another. They check and re-check their experiments to see what happens, and then they form a conclusion or state an answer to their problem. Finding an answer to one question brings up a new question, and they repeat the experiment all over again.
6. Record and organize the data, then analyze the data in the form of a graph or data table that displays the results of the data.
7. State the results of the data and state whether the hypothesis was correct or incorrect in the conclusion, a brief summary of the experiment.

HOW TO PERFORM AN EXPERIMENT IN DETAIL

CHOOSE YOUR TOPIC
Pick a topic that is interesting to you.

ASK THE BEST QUESTIONS
The best science investigation question:
- can be answered by selecting one from a few possible answers.
- has a topic that you can find adequate information about.
- is about something that is easily observed and measured.
- leads to an investigation you can perform with available materials and equipment.

RESEARCH YOUR TOPIC
- Search the school and public libraries first. Be sure to check with the librarian about your topic. He or she may be able to guide you to more information.
- Use indexes, encyclopedias and almanacs.
- If you need more information, you can go to the university library for primary journal articles and abstract journals.
- Fill out reference cards while searching on the Internet.

MAKE YOUR HYPOTHESIS
Even though many forms of scientific method are used, all science investigations are based on hypotheses that are tested in order to answer questions about the world.

TEST YOUR HYPOTHESIS
Experimental Studies
Use **scientific method** to design and set up a controlled experiment to test a hypothesis.

Scientific Method:
- Ask a question
- Review what is known
- Form a hypothesis
- Design an experiment to test the hypothesis
- Observe the experiment and organize the results
- Share the results with others
- Analyze the results and draw conclusions

PROJECT PROPOSAL

Experiment design:

- Include a description of exactly what needs to be done to complete your investigation. Close attention must be paid to every detail in writing up these exact procedures. Make sure the experiment can be repeated.
- How did you test the hypothesis?

PRESENTING YOUR RESULTS

The data you obtain from your experiment is the most important information. What does your data tell you?

Your data can be recorded using:

- **Tables** – to record raw data
- **Bar graphs** – to compare totals
- **Line graphs** – to show how two factors change in relation to one another
- **Pie charts** – to show percentages of many observations

MAKING YOUR OWN CONCLUSIONS

- The main conclusion of any science investigation is a statement that either supports or rejects the hypothesis of the project.
- Did you answer the question?

PREPARING YOUR DISPLAY

- **Introduction** – topic question to be explored, hypothesis and experiment
- **Methods and Materials** – the essential steps that were completed and equipment and other supplies that were used
- **Results** – Data from the experiment is summarized
- **Conclusions and Discussion** – an explanation of why you accept or reject the hypothesis and a list of possible flaws
- **Reference List** – sources that you read which may have influenced your investigation

PUTTING IT ALL TOGETHER

Neatly and attractively display your research and results on a display board.

JUDGING PROCEDURE

Judging will take place from 8:30 a.m. to 11:00 on Saturday, February 4, 2012 at Peacock Middle School. ALL STUDENTS WILL BE REQUIRED TO STAND BY THEIR PROJECTS WHILE THEY ARE BEING JUDGED. **The decision of the judges will be final.** Please refer to the JUDGING CRITERIA form for clarification of how the projects will be judged.

Every entrant will receive a ribbon and rating sheet indicating the grading of the project. These will be awarded to participants after the judging is completed.

Three overall winners (one each for grade levels 6-8) will be chosen by the judges. They will each receive a "Golden Test Tube" award.

F. E. Peacock Middle School
SCIENCE FAIR

Judging Criteria

STUDENT'S NAME: _____

PARTNER'S NAME: _____

GRADE LEVEL: _____

CATEGORY: _____

PROJECT TITLE: _____

	Possible	Earned	Comments
Problem Clearly Stated: List purpose or question (i.e. state hypothesis).	**20**		
Knowledge Gained: Assessment of student's understanding of the project	**20**		
Scientific Approach: Process used for testing project (i.e. , procedures listed).	**20**		
Validity of Conclusion: Conclusions are reasonable.	**20**		
Visual Presentation: (i.e., appearance of project) Should be neat and attractive.	**20**		
TOTALS	**100**		

PLEASE CIRCLE

First Place	**90-100**
Second Place	**80- 89**
Third Place	**70- 79**
Participant	**Below 70**

100+ SCIENCE FAIR PROJECT IDEAS

- Food preference in gerbils
- Does adding salt to water change the temperature at which it boils?
- The effect of temperature on how long a soap bubble lasts
- The effect of different light intensities on the growth of sunflower plants
- The effect of light on the growth of bread mold
- Which bird feed do birds like best?
- A comparison of calories in five different kinds of peanuts
- The effect of acid rain on the growth of Wisconsin fast plants
- The effect of acid rain on the germination of apple seeds
- Using black walnut juice and marigolds to prevent weeds in your garden
- The effect of sugar water on the survival of cut flower stems
- The effect of salt on the growth of bean plants
- Hummingbird color preferences at feeders
- Bird feed consumption at different colored bird feeders
- Bacterial growth in apple juice and apple cider
- Does auxin affect seed germination?
- Can magnesium affect seed germination?
- Will acid rain affect the cell structure of spirogyra algae?
- The effect of surface area on fuel burn time
- Does the life of a light bulb depend on its wattage?
- Sudsy soaps
- The effect of wire coils on the strength of an electromagnet
- Packaging eggs and shock resistance
- The effect of friction on velocity
- The effect of temperature on golf ball performance
- The effect of temperature on the rate of water absorption in cut carnations
- The antibiotic effects of bread mold on bacteria
- The effect of the color of light on the growth of sunflowers
- How changes in gravitropic responses affect plants
- A study of the abundance of prey available to arachnids through the use of artificial webs
- The feeding habits of winter birds
- The germination of gamma grass, Tripsacum Dactyloides
- Hydroponics: growth for the future
- A comparison of the heat conduction abilities of different metals
- Iron in your food
- Prejudices in children: When do they start?
- The effects of a classroom seating arrangement on student performance
- The golden ration and its effect on heart rate
- The effects of a small magnetic field on the movement and behavior of laboratory mice
- The effect of paper airplane design on flight distance and flight time
- A comparison of the water content of different kinds of fruit
- The amount of fat in fast foods and store bought hamburgers
- The effects of car exhaust fumes on the growth of plants
- An investigation of bacteria and fingernails
- The effects of the amount of water on the number of stomata in peas
- Acid rain: how it affects plant growth
- Using lichens to measure lead pollution along the Missouri River

- The effects of wing shape on lift
- An investigation of the mysteries of Fibonacci
- Does light affect population growth rate in euglena?
- The effects of radiation on pea seeds
- The effects of humidity on the behavior of isopods
- Are soap bubbles good for anything but a bath?
- Learning styles and memory retention
- The effects of car exhaust on seed germination
- Why do rocks sink and supertankers float?
- The effects of ultrasonic waves on the growth of peas
- A study of bridge construction
- Which brand of gum is the most viscous?
- The effect of design on efficiency of a propeller
- The effects of heavy metals on the growth on Wisconsin fast plants
- The effects of ultraviolet light on the photosynthetic rate of soybeans
- The fermentation of yeast: optimal temperature and pH
- The effects of water flow on a water wheel
- Day or night: When do amaryllis plants grow more?
- The effects of stress on the germination of corn seedlings
- The effect of rotation on fruit fly development
- Comparing the tensile strength of different metals
- A study of a goldfish's ability to learn a maze
- The effects of microwave radiation on seed germination
- The effects of caffeine on the respiratory rate of cockroaches
- How does watching fish affect people's blood pressure?
- The effects of distractions on memory and learning
- The effects of music on the ability to memorize nonsense syllables
- The design and construction of a rigid sail model for all vessels
- An analysis of the nutrient content of breakfast cereals
- The use of pitfall traps to determine insect diversity
- The effects of fluorescent light on the learning abilities of white mice
- An analysis of the relationship between music and plant growth response
- An investigation into the effects of irradiation in the seed stage on the growth and development of marigolds
- Osage oranges: determination of a natural cricket repellent
- The effects of nicotine on the cell shape and survival of euglena
- The amount of vitamin C present in ordinary foods
- The effects of electric currents on germinating seeds
- Comparing the effects of antibacterial soap on bacterial growth
- The antibacterial effect of common sauces
- Particulates in the air
- Is the purity of bottled water consistent with the claims that distributors make?
- A study of the effects of the plant hormone, auxin, on the growth of bean plants
- The effects of eye dominance on task performance
- The effect of age on successful mating in fruit flies
- Multiple intelligence in the career world
- The fungi around us
- The effects of acidity on metals
- Which form of insulation is the most effective?
- How terraces help stop soil erosion

- Determination of vitamin C in aging fruit
- The effects of vitamin C on the visible characteristics of the wild-type fruit fly
- Gender-based memory
- An investigation of the lung capacity of smokers and nonsmokers

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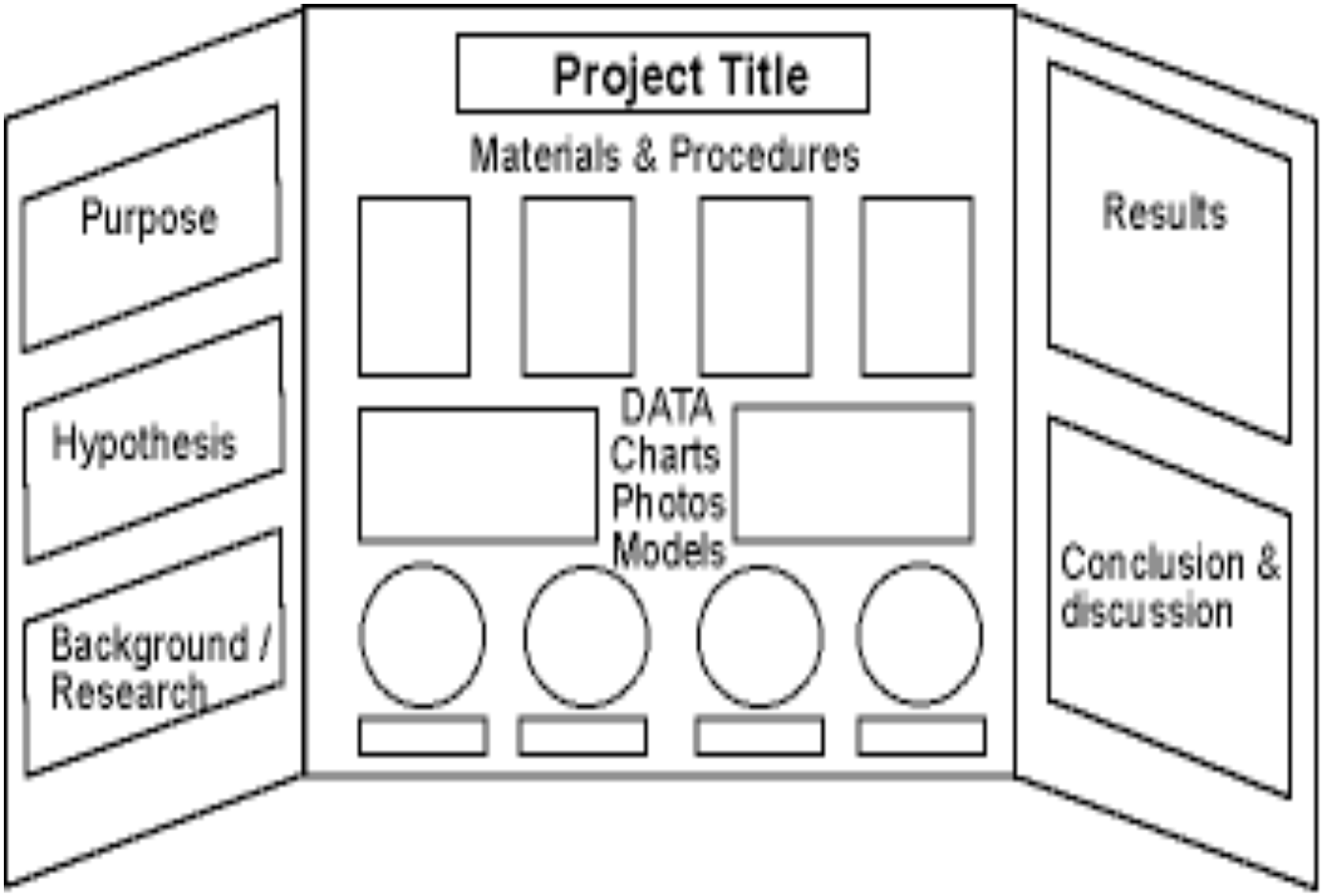
Science Fair Visual Presentation



Your title should be the largest text (by far) on the display. It should be bold and attention getting. Nothing should be handwritten.

Lay out your project information on your science fair project display board in a **logical and easy to read manner**. Most people like to read information from **left to right** and from **top to bottom**. If you think about your project like a story, your beginning would be your Question/Purpose and the end would be the Conclusion.

The **center** of your science fair project display board should contain all the relevant information about the actual **Experiment** – descriptions of the materials you used, pictures of your experiment at the start, middle and end, a description of how the experiment was conducted, and any Excel graphs and tables you made.

When creating the pages for your display board, make sure that the text is readable at a glance – try not to use overly fancy graphics or fonts with your text so that it is easy to read (no WordArt except for the title). Be sure to label each of the areas and remember-neatness counts!

F. E. Peacock Middle School
2012 SCIENCE FAIR
2/4/2011
GRADES 6-8
PERMISSION FORM

STUDENT NAME: _____ DUE DATE: January 20, 2012

PARTNER (if applicable): _____

GRADE LEVEL: _____

PROJECT TITLE:_____

PROBLEM TO SOLVE:

_____

_____

METHOD TO BE USED TO SOLVE PROBLEM:

_____

_____

_____

CHECK ITEMS LISTED BELOW THAT YOU WILL REQUIRE:

1. Electrical outlet _____
2. Extension cord _____
3. Water _____
4. Other (please be specific)_____
   _____

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I give my child, _____, permission to work on this science fair project. By signing this form, I accept the obligation to purchase the materials necessary for the completion of the project.

PARENT SIGNATURE: _____

TEACHER SIGNATURE: _____
(Teacher signature is required for final approval and acceptance of science projects. Students will be notified immediately if approval is denied.)