

L.E.S. Science Fair

January 26 & 27, 2010

Application (last page) due December 11, 2009



Monday, January 25th 4th and 5th Grade Projects Due in the Classroom

All 4th and 5th Grade Students bring projects to your classroom for class presentations.

Tuesday, January 26 All K-3 Projects Due

Bring projects to your classroom to be shared during the day.
Transport projects to the gym after school at 2:30.
Public and family viewing in the gym 6:00-7:00 P.M.

Wednesday, January 27

Public Exhibition of projects all day in the gym.
Take projects home immediately after school and before 3:00.

Louisville 2010 SCIENCE FAIR OVERVIEW

Welcome to the Louisville Science Fair where you will have fun learning about science. The Science Fair is a great time for students to explore and discover new ideas and then share their knowledge and enthusiasm with others.

For more information and forms, this entire packet can be found on the LES homepage at: <http://schools.bvds.org/les/index.html> on the left side at the bottom under "Links". You may download the entire packet or the application only.

Materials and Safety

Please read the enclosed materials thoroughly as all projects will need to follow the attached Boulder Valley School District rules and safety guidelines. Remember ***no liquid or organisms*** are allowed at the Science Fair. Pictures of projects with these are acceptable.

Project Application Forms

Please complete the attached Project Application Form and return it to the office or teacher by Friday, December 11, 2009. The Science Fair Committee will review your project to be sure it meets all of the applicable school and district guidelines. If concerns with your project are noticed, you will be notified in a timely manner to alter or choose another project.

Science Fair Days

The Science Fair will be held on Tuesday and Wednesday, January 26 & 27, 2010 in the LES gym. Fourth and Fifth grade students will bring their required projects to the room on Monday January, 25. Kindergarten through third graders should bring your project to your classroom on Tuesday, January 26. The projects will be shared in class during the day. Immediately after school please transport your project to the LES gym and set it up on a table. Please clear the gym as soon as possible. Family and public viewing of the exhibitions will be in the evening from 6:00-7:00 p.m. Please leave your project in the gym so each class may visit the gym during the day on Wednesday, January 27. Immediately after school on Wednesday, please come to the gym to gather your project and clean your area. If you are absent, please have a friend collect it.

Classification of Projects

Grades K- 3: Projects can be done individually or with a partner. The project can either be a model/demonstration or an experiment. Students may do these projects with minimal assistance from parents or the students and parents can participate equally in the process and development of the display.

Grades 4 - 5: Projects can be done individually or with a partner. The project should contain an investigation that follows the Scientific Method/Model. This is a student-led project with minimal parental involvement and should meet all of the school and BVSD requirements included in this packet.

Project Ideas

For project ideas, you can reference the “Science Fair Projects Ideas” List. You can also try these web sites:

<http://www.science-ideas.com/elementary-projects.htm>

<http://school.discoveryeducation.com/sciencefaircentral>

<http://www.ipl.org/youth/projectguide>

<http://www.sciencebuddies.org>

<http://www.carolina.com> (for science supplies)

These web sites are provided for your information and do not constitute an endorsement or recommendation. As always, adults should determine appropriateness before using with children.

Display Reminder

For safety reasons, remember that no liquid or organisms of any kind, including water and plants may be displayed at the Science Fair. Liquids and plants may be used in experiments, but they may not be brought to school the day of the fair. We recommend that you take pictures or illustrate your experiments and include these on your display instead of having the actual liquid or organism at the Science Fair. See the attached BVSD Safety Display Guidelines for a detailed list of what is not allowed.

Science Fair Board

All Science Fair projects must be presented on a Science Fair Project Board. A variety of colored science fair boards are available at the LES Office for \$5.00 each. Local arts and crafts stores also carry Science Fair boards.

Project Display Examples:



SEVEN STEPS TO PREPARE A SCIENCE PROJECT

1. Select a Topic

See the attached “Ways to Find a Science Fair Project Idea” and the “Science Fair Project Ideas” list to help select a topic. You can also go to any of the Internet web sites listed on the 2nd page of this packet. Review the attached “Types of Science Fair Projects” handout to determine what type of project to perform on that topic, i.e. performing an experiment/survey or creating a model/giving a demonstration of how something works.

2. Gather Background Information and Submit Project Application

Gather information about your topic from books, magazines, the Internet, people and companies. Then complete a Science Fair Project Application Form and return it to your teacher or the front office.

3. If Performing an Experiment

Try to follow the Scientific Method. See the two attached information sheets on the Scientific Method. Try running a controlled experiment and record data which may be shown with graphs, charts and/or tables.

4. If Creating a Model or Preparing a Demonstration

Find a subject in nature/science that is interesting to you and create a model of it. Or, find a scientific rule or law and demonstrate how it works.

5. Construct an Exhibit or Display

Create a display on a Science Fair Project Board that is available at the LES office or at local stores. Make sure to write your name(s) on the board. It has to be neat, but it does not have to be typed. You may bring any items you used in your model/demonstration or experiment to help show what you did except liquids (including water) and any organisms (plants or animals). Make it fun, but be sure people can understand what you did.

6. Practice Presentation to Your Class

Practice explaining your project to someone (parent, friend, grandparent, etc.). Even though this is a non-competitive fair, you will be presenting the project to your class.

7. Come to the Fair and Have Fun!

Bring your project and display board to your class on the day of the Fair. Take the project to the gym immediately after school. Invite your family and neighbors to return to the viewing from 6:00-7:00 p.m. on Tuesday. After school on Wednesday, please gather your project as quickly as possible from the gym. Remember, no liquids or organisms may be displayed at the Science Fair.

TYPES OF SCIENCE FAIR PROJECTS

The following section describes four types of science fair projects you can choose from:

- Investigation
- Model or Collection
- Behavioral and Social Science
- Demonstration of a Scientific Principle

Investigation

Observe plants, animals, or people and report what you observe. You want to find out how your subjects behave or how they react to something you do to them. This type of project should follow the scientific method.

There are 3 types of investigations you can perform:

Comparative Surveys

These surveys are sometimes called natural experiments. Identify two or more groups or classes of subjects that are generally alike but which may show a difference in one or more important factors. Express the difference as a hypothesis.

EXAMPLE: "Boys' hearts beat faster than girls' hearts do."

Simple Experiment

In this investigation your purpose is to change something. You will be observing what happens as a result of changes.

EXAMPLES: Melt an ice cube; incubate an egg; inflate a balloon.

Controlled Experiment

This kind of investigation involves more complex experiments.

EXAMPLE: You might have a group of plants as an experimental subject and another group of the same type of plants as a control group. The independent variable in this experiment is the amount of chemical fertilizer added to the experimental plant group. The dependent variable is the difference observed in the growth of the plants.

Model or Collection

Construct a kit or model, or exhibit a collection. The purpose is to provide an answer to a question or hypothesis you are presenting. You must be able to explain your model or collection.

EXAMPLE: The purpose of a model of a solar home could be to determine the use of solar energy in lowering heating costs. Read; talk to experts; find answers.

Behavioral and Social Science

These projects usually involve surveys and/or human observation. When conducting a survey, refer for guidance to the District's policy and form found at JFJ/JFJ-R/JFJ-E "Student Submission to Surveys, Analysis, or Evaluations." See also COLO. REV. STAT. 22-1-123(5).

The following guidelines must be used:

- All survey questions must have prior approval of the school science fair committee and must be administered by the student.
- All survey questions must be approved prior to administering them to students.
- Students must notify interviewees of the purpose for the study.
- Students must conduct the surveys.
- There can be no deceptive use of the results.
- Prior permission must be obtained from parents to survey minors.
- Failure to meet these criteria will be grounds for exclusion from the school science fair.

EXAMPLE: "Do students prefer meat or vegetables for lunch?"

Demonstration of a Scientific Principle

Find a scientific rule or law that is interesting to you.

EXAMPLES: Demonstrate how a volcano erupts, or how the planets move around the sun.

WAYS TO FIND A SCIENCE FAIR PROJECT IDEA

1. Look at lists of **science categories** and pick one that you are interested in, and then narrow that down to a project.

EXAMPLE: Say you pick psychology, then narrow it to the differences between boys and girls, then to a topic like "Do boys remember boy-type pictures (footballs) better than girl-type pictures (flowers)?" (Two pages of categories are included on the attached "Science Fair Project Ideas" list.)

2. Use **your experiences**. Remember a time you noticed something and thought, "I wonder how that works?" or "I wonder what would happen if..." then turn that into a project.

EXAMPLES: Check the science section of the school **library**. Browse and look at book titles, then look inside the ones that look interesting to you. Also thumb through encyclopedias and magazines. Good magazines for ideas are: National Geographic, Discover, Omni, Popular Science, Popular Mechanics, Mother Earth News, High Technology, Prevention, and Garbage. Perhaps go to the Public Library.

3. Think about **current events**. Look at the newspaper.

EXAMPLES: People are hungry in Africa because of droughts. Some possible projects on this topic are growing plants without much rain, or what crops grow OK with little water? The ozone hole over Antarctica - how can we reduce ozone? A possible project is using non-aerosol ways to spray things. Or oil spills – how can we clean them up? A possible project is how to clean oil out of water.

4. Watch **commercials** on TV. Test their claims.

EXAMPLES: Does that anti-perspirant really stop wetness better than other ones? What are the real differences between Barbie and imitation Barbie dolls? Can kids tell the difference between cola drinks if they don't know which they are drinking?

SCIENCE FAIR PROJECT IDEAS

Behavioral Science

- Cell Phones and Driving: Does cell phone use affect driving ability in a video game simulation?
- Eyewitness Testimony: How reliable are eyewitness reports?
- Food: Do students prefer meat or vegetables for lunch?
- Learning: How does music influence learning and memory?
- Reflexes: How does reaction time in teenagers depend on the loudness of a sound?
- Seeing or Hearing: Do you do better at a task if you see the instructions or if you hear the instructions?

Biochemistry, Medicine, Health, and Microbiology

- Bacteria: Are antibacterial hand lotions effective in reducing bacteria populations?
- Bacteria: Are restroom door handles contaminated with bacteria?
- Bacteria: Does reusing water bottles increase their bacterial content?
- Bacteria: How clean are the tops of soda cans, and what is the most effective way to clean them?
- Blood Pressure: What effect does playing a video game have on a person's blood pressure?
- Body Temperature: How does eating hot or cold foods change a person's body temperature?
- Fingerprint Patterns: Do family members have similar fingerprints?
- Lung Capacity and Music: Do sixth-grade wind musicians have more lung capacity than those who are not musicians?

Botany and Zoology

- Chickens: Are the eggs of caged or free-range chickens stronger?
- Dogs: How well does a dog understand language?
- Fruit: How does ethylene affect ripening fruit?
- Plant Growth: Do different colors of light affect plant growth?
- Plant Growth: Do low-frequency sounds increase plant growth?
- Plant Growth: How do different sugars affect plant growth?
- Plant Growth: How does a magnetic field affect plant growth?
- Plant Growth: What effect do different fertilizers have on plant growth?

Earth and Space Science

- Earthquakes: Do earthquakes tend to occur at certain times of day?
- Sand: How wet should sand be to build a sandcastle?
- Soils: What effect does the type of soil have on water runoff and flooding?
- Weather: How accurate are Web-based weather forecasting services?

Engineering

- Aerodynamics: What is the most aerodynamic bike wheel?
- Boats: What's the best hull shape for a fast boat?
- Concrete: Does the addition of latex paint make concrete stronger?
- Concrete: What ingredients affect the strength of concrete?
- Noise: How can adding noise help reduce noise?
- Solar Cells: How does temperature affect the efficiency of a solar cell?
- Steel: Are there ways to insulate steel to keep it cool in extremely hot surroundings?
- Structures: How strong (and safe) is a playground jungle gym?
- Temperature: Can making ice more reflective slow its melting?
- Temperature: Which socks keep your feet the warmest?
- Vehicles: What factors affect the top speed of a radio-controlled car?

Environmental Sciences

- Fertilizer: Can recycled newspaper be used to fertilize plants?
- Grass: What effect do different salts have on lawn and prairie grass growth?
- Pollution: How do road de-icers affect roadside vegetation and water quality?
- Pollution: Is snow safe to eat?
- Salt: How does the concentration of salt in water affect seed germination?

Mathematics

- Music: Do different genres of music each exhibit a unique mathematical pattern?
- Statistics: How does the size of a statistical sample affect its accuracy?

Physical Science

- Chemistry: Which children's multivitamin tablet will disintegrate or dissolve the most in 30 minutes?
- Cleaning Agents: Which carpet cleaners work best?
- Corrosion: What factors affect corrosion in aluminum foil?
- Heat: Which materials work best as thermal insulators?
- Magnetism: How does temperature affect a magnet?
- Materials: Which scoopable cat litter has the most liquid absorbency?
- Sound: Does rosin affect the sound a violin produces?
- Wood: Which wood is the hardest?

LOUISVILLE SCIENCE FAIR OPERATING PRINCIPLES

Science Fair Goal

The goal of the Science Fair is to encourage interest in science, to feel accomplishment and pride in completing research projects, and most importantly to instill a genuine love of science and learning.

Science Fair Objectives

- Provide students with exciting opportunities to work on a science topic of their own choosing (which need not necessarily relate directly to the curriculum at a particular grade level.)
- Stimulate interest in science, math, and engineering.
- Develop inquiry and investigation skills.
- Increase knowledge and skills.
- To exhibit projects and share ideas with other students and community members.
- Be a fun event where ALL students are given public recognition for their hard work and effort.

Roles and Responsibilities

The goal of the Science Fair is not “winning.” In order to maximize your student’s experience, please follow these guidelines and responsibilities. The Science Fair should be a fun project that turns students on to science. Learn together, explore together and then let the child express the topic in his or her best way!

Student’s Role is to:

- Select a topic for the project and gain approval for the project.
- Complete an experiment, model, collection or demonstration of a scientific principle.
- Construct an exhibit.
- Use scientific terms in the display and explanation of the project to other students and community members.
- Follow BVSD Science Fair Safety Guidelines.

Parent’s Role is to:

- Be a good listener.
- Provide information on the topic as a resource person.
- Motivate the young scientist to do her best work.
- Furnish supplies and help locate needed equipment.
- Transport students to library or resource people.
- Provide space such as in the home for student to work on the project.
- Encourage the student who is the primary scientist completing the project.
- Ensure student safety and follow BVSD Safety Guidelines.

BVSD SAFETY DISPLAY GUIDELINES

Anything which could be hazardous to the public, the exhibitor or other exhibitors is **PROHIBITED**. An alternative solution to displaying the following items:
Take photographs of the substances that were used or use a digital camera and create large pictures with a computer printer for display on your board.

Organisms: No organisms may be displayed

For Example:

Vertebrates	No owl pellets No mice, live or dead No skeletons No fish, live or dead
Microbial Cultures	No fungi, live or dead No bread molds, bacteria, viruses, viroids, rickettsia, live or dead No parasites, human or other, live or dead
Invertebrates	No worms, live or dead No insects, live or dead
Plants	No plants

Chemicals: No chemicals may be displayed

For Example: No acids, dilute or strong
No bases, dilute or strong
No salt solutions
No insecticides
No repellents
No mercury

Flammable substances: No flammable substances may be displayed

For Example: No gases
No solid rocket fuel
No flammable liquids
No fumes

Electricity

- **Projects in the electricity category require the following:** Electrical connections using voltage over 12 volts must be soldered or fixed with approved connectors and all connecting wires must be properly insulated. Nails, tacks or un-insulated staples must not be used to fasten wire. All switches and metal parts must be located out of reach of observers and be designed with adequate overload protection. Bare wiring and exposed knife switches may be used on circuits of 12 volts or less only.
- **If the project requires an electrical outlet:** Only one 110 volt, 60 cycle, single phase AC connection will be provided for exhibits (if requested in advance).

THE SCIENTIFIC METHOD/MODEL

When doing an investigation, you will want to follow a research method used by scientists when they do experiments. Our suggested method takes into consideration a process that young children can use that relates directly to historical scientific method.

Use **bold headings** for each step on your board.

Required Method for 5th Graders

Step 1: Choose a problem

Choose a problem or question that you would like to explore. Ask a question about it.

- Choose something that interests you.
- Choose something that you don't know the answer to.
- Choose something that you can work with. (In other words, ask yourself, "Is this a realistic and doable science project in the time that I have and with the resources that I have?")

Example: I'm curious about the advertisement that says "Miraculous Plant Fertilizer" will make flowers bloom twice as fast as flowers without the fertilizer.

Step 2: Research

What aspect of your question or your problem could you research?

Consider looking at resources in books, on the internet, or asking specialists in the field.

- Write a **paragraph** on your research findings and display it on your project board.

Example: Using my resource, I looked on the world wide web and discovered that Nitrogen is a major ingredient in fertilizers. Then, I wrote my paragraph and displayed what I learned on my project board.

Step 3: Hypothesis:

Make an educated guess or hypothesis about what you think will happen based on the design of your experiment.

Example:

I created a hypothesis that the plants I gave Miraculous Plant Fertilizer would grow faster than plants that I just watered.

Step 4: Materials:

Develop a list of items used.

Example: Four similarly sized mum plants, a measuring device, fertilizer, water, a window sill.

Step 5: Procedure:

Tell what you will do to test your hypothesis

- List each thing you will do and number each step in order.
- Make sure that you will control your one **variable**. (*A variable in anything that can change or vary in an experiment. In a controlled experiment, everything should be the same every time you test, except the one variable that you are testing.*)

Example: The one and only variable that I am going to change is what I am watering the plant with. Two plants will receive water with fertilizer, and two plants will receive only water. Everything else will remain the same.

Here is an example of an experiment that is not controlled because it changes more than one variable (what you are watering with and the location.)

You water two plants with fertilizer and two plants with water. However, two of the plants are in the kitchen window sill, and two of the plants are in the back darker room of the house and do not get as much light as the kitchen plants.

This is not a controlled experiment because you changed both the watering and the location/light.

Step 6: Organize your data

- What happened? Answer that question and put the results in graphs, charts, and /or tables if possible.

Example: You might represent the growth of each of your plants in a chart or a graph. Then you will write a paragraph describing what happened and comparing the fertilized plants to the plants that received only water.

Step 7: Conclusion:

- Look at your data and decide what your data says about your hypothesis.
- State your conclusion.

Example: My hypothesis was correct because plants that received Miraculous Plant Fertilizer grew three centimeters taller than those that did not.

Step 8: Construct an exhibit or display—

- Create a display on a science fair project board (available in the LES office) or other recycled material.
- Make sure to write your name on the board.
- Your display should include: title, problem, research, hypothesis, list of materials, procedure, data and your conclusion titled in bold
- Display needs to be neat, (typed displays are great, but not required.)
- Photographs and other art work make your display appealing.

Step 9: Prepare for Presentation:

- Practice explaining your project to someone (parent, friend, grandparent, etc.)
- Make sure you understand everything you did and why.
- Explain why your project matters and how you might use it in everyday life, if possible.

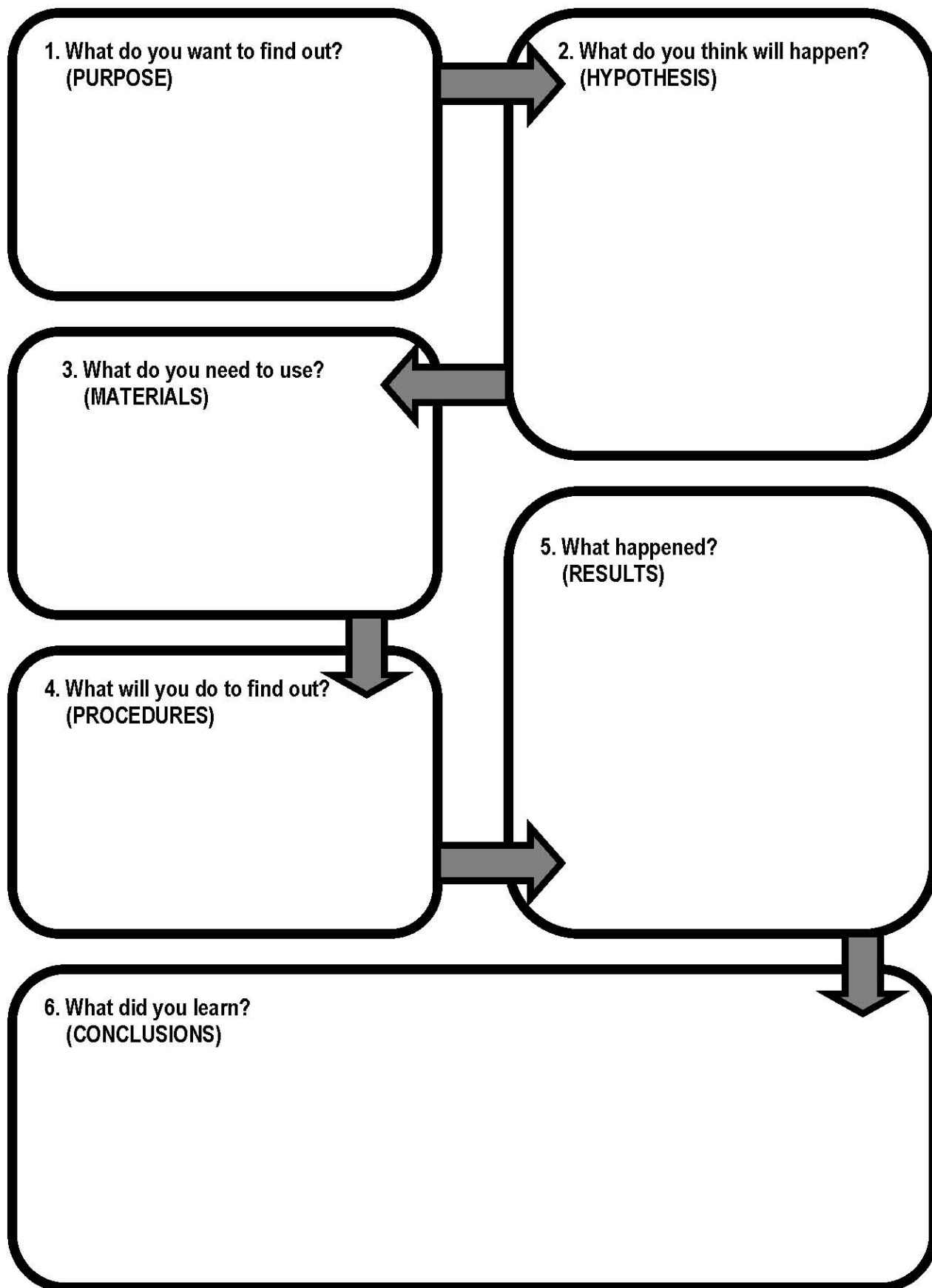
Step 10: Come to the fair and have fun.

Suggested Method for Kindergarten – 3 rd Graders	Suggested Method for 4 th Graders
<p>“My Question” Come up with a question that you want to answer based on your curiosity about a given subject, idea, or process.</p>	<p>Purpose A question or statement saying what you are trying to find out with your experiment.</p>
<p>“My Prediction” Make an educated guess or <i>hypothesis</i> about what you think will happen based on the design of your experiment. “What I think will happen is...”</p>	<p>Hypothesis Your prediction of the outcome of the experiment.</p>
<p>“What I Used “ Describe the materials you used to research your question, set up, and follow through with your experiment or exploration.</p>	<p>Materials A list of items used.</p>
<p>“What I Did” Write a clear description of what you did for your experiment or exploration. Write it with the intent that someone could follow your directions and do the same thing you did.</p>	<p>Procedure A description of “how” you experimented, observed, or carried out your project.</p>
<p>“What I Found Out” Explain in your own words what you learned by doing your project. Many projects may be done in groups, but each individual is responsible for producing their own report and/or description or display of the information collected with their exhibit. The report should be focused towards answering the specific question the project was designed around.</p>	<p>Data Gathering The process of collecting information and/or results.</p> <p>Result The review of the data for the experiment.</p> <p>Conclusion A summary of what your experiment shows, how your work can be used for more research, and any description of real-world applications.</p>

We would like to thank Fireside Elementary for sharing their Science Fair packet.

The Scientific Method/Model

A student record sheet for an experiment or science project



4th and 5th Graders: Make sure you research some aspect of your project.

2010 LES Science Fair Student Application
Due December 11, 2009
(Please return to the front office or your teacher.)

STUDENT NAME(S) _____

GRADE(S) _____ TEACHER(S) _____

PHONE NUMBER(S) _____

PARENTS: Please sign to indicate that you have read the entire LES Science Fair Packet including the BVSD Safety Display Guidelines, and that you will help your child follow the guidelines and oversee the safety of the project.

Parent Signature _____

STUDENT(S): Please give a detailed description of the project you plan to do.

PROJECT DESCRIPTION:

What topics interest me? _____

Which one would I like to investigate further? _____

What is a question I will ask myself about this topic?

How can I answer this question?

What materials will I need? _____

What will I call my project? _____

Any special display requirements (such as electrical outlet)?

_____ This project is approved by the Science Fair Committee or classroom teacher.