Ivy Creek Elementary School

Science Fair Handbook 2009-2010

Science Fair Application
Ivy Creek Elementary

Name _____

Teacher _____

Grade Level _____

Project Title:

_____

Scientific Question:

_____

_____ (Student's Name) has reviewed the information in this packet and would like to participate in the Ivy Creek Science Fair. We are aware that a science fair project is a big commitment that takes time to plan and conduct. We understand that the project needs to be set up before 8:15 a.m. on March 24, 2010 in the designated classroom.

_____

(Parent/Guardian Signature)

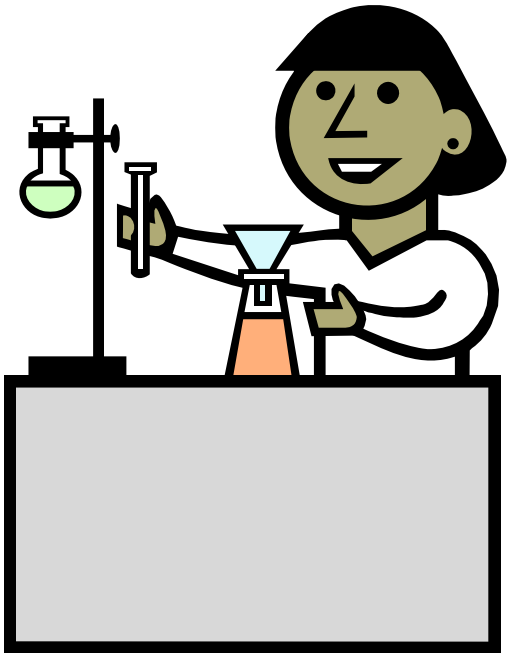
_____

(Student Signature)

Please return this form to your teacher at school.

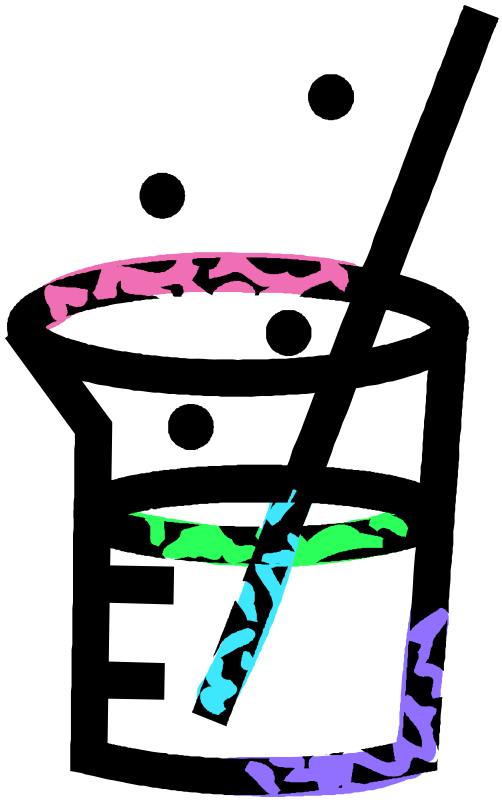
Ivy Creek Elementary School
Science Fair Handbook

Table of Contents



To the Student

Participating in a Science Fair is an exciting adventure! You will make new discoveries and teach yourself some new Science ideas. Science Fair investigations require time and space. Persevere with enthusiasm. Keep to a schedule, complete experiments, make conclusions, and retest results if necessary. Show Ivy Creek Elementary your knowledge and skills! Begin thinking about the possibilities you might explore through the Scientific Method. HAVE FUN WITH SCIENCE!



To the Parent

Please support your children's participation in the Science Fair. A positive, meaningful, and fun experience will create a feeling of pride for what they have accomplished. The project should be primarily the student's ideas and effort. However, there are many ways a parent can help:

- ◊ Read this booklet.
- ◊ Help your child choose an interesting, specific topic.
- ◊ Help your child select a project that he/she can do.
- ◊ Provide technical or safety assistance.
- ◊ Assist in collecting materials.
- ◊ Help your child get organized.
- ◊ Ask questions and provide encouragement.
- ◊ Check on progress.
- ◊ Listen to your child practice presenting his/her project.

Getting Started

Think: What am I interested in?

- ◊ Find a project that is interesting to you!
- ◊ Be specific. Narrow the topic.
- ◊ Be realistic.
- ◊ Refer to Science Fair books at your local library or visit online resources to get ideas about possible topics.

Choose: Choose a project of interest.

- ◊ The topic and experiment should be acceptable in the given time line.
- ◊ Put the topic in the form of a question.
- ◊ Make a schedule or checklist.
- ◊ Learn as much as you can from books, magazines, and online resources.

Record: Keep a notebook.

- ◊ Gather materials. They should be affordable.
- ◊ Experiment.
- ◊ Collect data.
- ◊ Make notes of resources you use.
- ◊ Keep a record of what you do, when you do things, and what is happening.
- ◊ Take pictures.

Purpose: Use the Scientific Method.

- ◊ This is a way to ask and answer questions by making observations and doing experiments.

Project Ideas

Energy

K-2

- Does the color of an object affect how much heat it absorbs from sunlight?
- Does the color of a liquid contribute to its ability to absorb heat?
- Which type of dry cell battery lasts the longest?
- Demonstrate how to use common fruits and vegetables as batteries.
- Does solar tea taste different than steeped tea?
- How does temperature of an object compare in the sun and in the shade? How could we use this to help keep our houses cool in the summer?

Energy

3-5

- Which light bulb is the best value for the money?
- How much more heat do incandescent bulbs produce than compact fluorescents?
- How effective are windshield sun screens at reducing the interior temperature of a closed automobile?
- Which metals are the best conductors of heat?
- Which materials retain solar heat the best after the sunlight is gone?
- Does a dry cell battery last longer if it used continuously or if it is turned on and off periodically?
- Demonstrate how to use common fruits and vegetables as batteries. How does the voltage and current output vary with the acidity of the fruit/vegetable?
- What is the most effective insulating material? Build a model that can keep ice for 24 hours.

K-5

Chemistry

- ◊ What types of objects sink? What objects float? What affects this?
- ◊ Does changing the temperature of water affect the speed of an object's solubility?
- ◊ What percentage of an apple's (or any fruit or vegetable) weight is water?
- ◊ What affects the speed of a chemical reaction?
- ◊ What will cause cabbage juice to change color?

Environment

- ◊ Which materials break down more quickly in soil?
- ◊ How clean is the air in different areas (around your car, in your backyard, etc…)?
- ◊ How does soil affect the pH of water?
- ◊ Do different diets affect earthworms and the soil they enrich?

Biology

- ◊ Are all colors of the light spectrum used to by plants to make food?
- ◊ How is yogurt made, and what are active cultures?

Weather

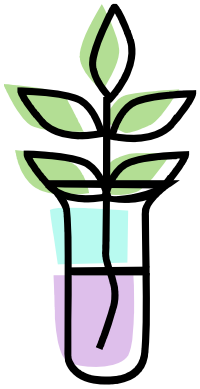
- ◊ How do clouds form?
- ◊ How can you measure the speed and power of wind?

Helpful Web Sites

http://www.sciencebuddies.org/mentoring/science-fairs.shtml
http://www.all-science-fair-projects.com
www.accessexcellence.org/RC/scifair.html
http://www.scifair.org
www.sciencebob.com
http://pbskids.org/zoom/activities/sci/
http://school.discoveryeducation.com/

http://sciencenewsforkids.org/

Scientific Method



Question: *Select or state a problem. Put the topic in the form of a question. Or, "state the purpose" of the project.*

The question should not require a simple "yes" or "no" answer.
Ask a question about something you observe: How, What, When, Who, Which, Why, or Where?
Choose something you can measure, preferably with a number.
Example: "How much current does a robot's arm use to lift a weight?"
Be specific. Instead of "In what conditions do plants grow best?" try "Do bean plants grow better in direct sunlight, indirect sunlight, or shade?"

Background Research: *Put together a plan for answering your question. Use the library and Internet research.*

Identify key words and main concepts. Talk to people with more experience than yourself: mentors, parents, and teachers. Design and describe a method for investigating the question.

Hypothesis: *Construct an educated guess* or a solution to the problem. It might be in the form of an "If…, then…" statement. This is a prediction. "If I do this, then that should happen."

Form a statement about the predicted results of your experiment. It is what you think will happen, based on the research you've done and your knowledge. A hypothesis doesn't include *why* you think you'll get certain results, just what you think the results will be. The more you know about your problem, the better equipped you will be to come up with a logical hypothesis. Your hypothesis should be clearly and simply stated, and it should be in statement form—not a question. Because it's understood that a hypothesis is an educated guess, you don't need to say that you are guessing. What happens if you find out your hypothesis is wrong after the experiment? Nothing!

Scientific Method (continued)

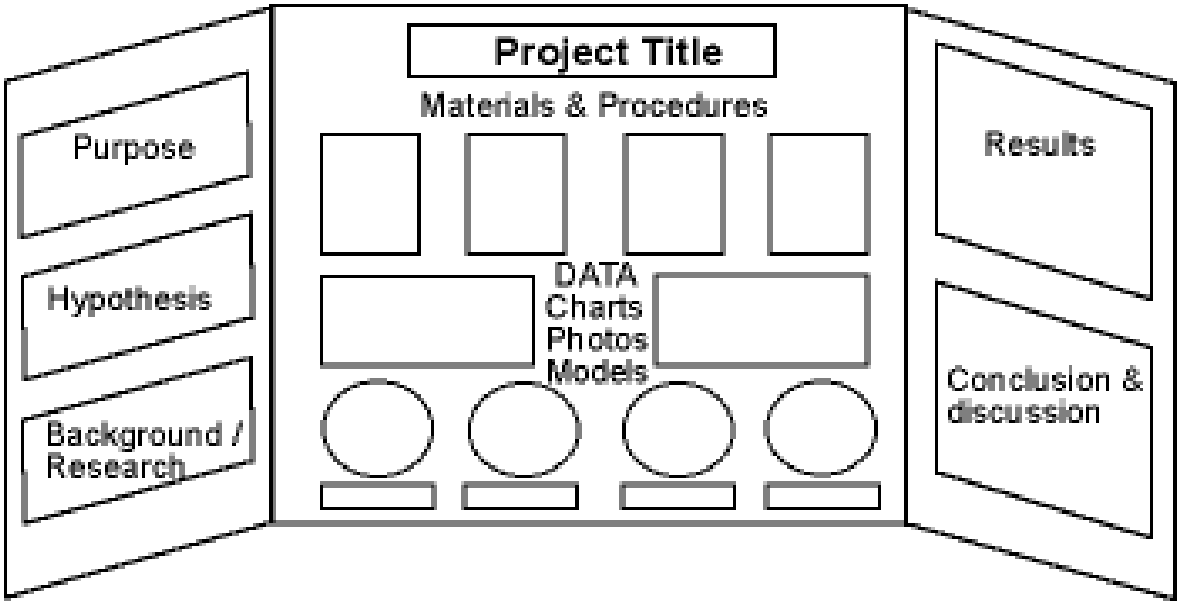
Experiment: *Test your hypothesis by conducting an experiment.*

Discover if your hypothesis is true or false. Keep detailed notes about everything you observe and do in a **journal**. Take **pictures or make sketches.** Repeat your experiment several times to make sure results are valid. It is important for your experiment to be a fair test. A "fair test" occurs when you change only one factor (variable) and keep all other conditions the same (constants). The experiment that you conduct will be to test your hypothesis. Your experiment will be designed around your hypothesis, and will either prove or disprove it. It will be important to conduct your experiment with your hypothesis in mind. However, it's imperative that you don't engineer your experiment to prove that your hypothesis is correct.

Analyze Results: *Analyze the information you have collected.*

Organize your notes. **Construct charts, tables, and/or graphs** with data.

Conclusion: *Communicate your results to others in a final report and display board.*



Experiment Planning Sheets

Title:

State the problem as a question.

_____

_____

Report:
Use books, encyclopedias, magazines, and electronic resources to find background information about the topic.

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Experiment Planning Sheets (#2 Continued)

Materials:
List the things used to do the experiment.

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Hypothesis:
Make an educated guess or a possible answer to the question.
"If…, then…" statement

_____
_____
_____
_____

Experiment Planning Sheets (#3 Continued)

Procedures:
List a step-by-step plan. How was your hypothesis tested?
What was your *variable* (what changed)?
What was your *constant* (what stayed the same)?

Results:
Tell what happened when your hypothesis was tested. Test at least 5 times to make sure results are valid. Keep results in a log book used only for this project. Graphs, charts, tables, photographs, or other visuals may be used to measure results.

Experiment Planning Sheets (#4 Continued)

Conclusion:
What did you prove or find out? Was your hypothesis correct? Compare your hypothesis to the actual results.

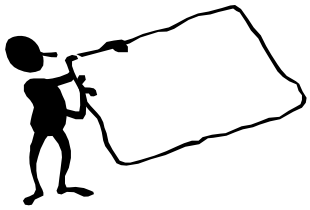
Bibliography:
List books, encyclopedias, and articles you used in the report.

Display Boards

The display board shows what you know, what you did, and what you learned.

- ◊ Sturdy cardboard, plywood, or foam board make great display boards.

- ◊ Size: 76 cm (30") deep – front to back
  122 cm (48") wide – side to side
  274 cm (108") high – floor to top

  Using a 48" x 36" presentation board works well.

- ◊ State your title in large writing at the top of your display board.

- ◊ Include major headings. Lettering for the headings should be read from 5 feet away.

- ◊ State your hypothesis, materials, procedures, results, and conclusions.

- ◊ Tell about your *research* findings. Make it interesting!

- ◊ Illustrate information with charts, graphs, tables, drawings, pictures, photographs, or a model.

- ◊ Be original.

- ◊ Use your best handwriting or type information.

- ◊ Report information on separate sheets of paper. These can be neatly glued or taped to the display board under appropriate headings.

- ◊ Use various colors to attract attention to different features.

The value of scientific investigation would be lost if it were not reported to others. At the Science Fair, you will report your project in the following way:

- ◊ Displaying an exhibit of your project and materials.
- ◊ Telling the judges and visitors about your project.

Judges will consider:

- ◊ The depth of knowledge and understanding demonstrated by you in the subject matter of your project.
- ◊ The use of the scientific method to conduct your project.

Your display should be interesting and eye catching. Use pictures and diagrams to illustrate your work on a poster display. Present your **title** prominently. Be sure to include the **purpose** of your project, your **hypothesis**, the **procedures** followed, your **results,** and **conclusions**. Take the time to develop an exhibit that is indicative of the effort you put into your research.

Samples, demonstrations, models, or experimental equipment should also be exhibited. These can be displayed in front of your presentation board. If you require an electrical outlet or intend to bring a live animal to the fair, please specify this.

Participants are welcome to use their own video equipment as part of their display. Equipment will not be provided by the school.

Presenting Your Project

Practice! Practice your presentation to your parents and friends. *Be confident!* Remember you know this project the best – more than any other person. Talk naturally from your own experiences. Do not read directly off your display board.

Do the following as you present the day of the Science Fair:

1. Dress for success!
2. Stand up and introduce yourself.
3. Look in the eye of the reviewer and have a conversation with him/her.
4. State the "catchy" title of your project.
5. Explain the purpose of your project. Why did you choose this topic? How did you get interested in this subject?
6. Tell about your research.
7. Explain the procedures. Allow your interest to show. Be animated.
8. Tell about your charts, tables, graphs, and/or pictures.
9. Discuss your conclusions.
10. Explain what you have learned or proven.
11. Thank the reviewer at the end for taking time to come to your Science Fair.

Experiment Schedule

	Assignment	Suggested Completion Date
1	Choose a topic. Name your project.	Jan. 15
2	Write your question, problem statement, or purpose.	Jan. 15
3	Research your topic.	Jan. 22
4	Write a hypothesis.	Jan. 29
5	Write procedures. Identify variable and constants.	Jan. 29
6	Collect materials.	Feb. 5
7	Conduct experiment. Collect data in a log book.	Feb. 19
8	Record results.	Feb. 26
9	Summarize results. Show data in charts, tables, graphs, and pictures.	Mar. 5
10	Draw conclusions. Compare results with your hypothesis.	Mar. 12
11	Write a report.	Mar. 12
12	Build a display.	Mar. 19
13	Prepare an oral presentation.	Mar. 19
14	Project Due	Mar. 24

Judging

Students will be scored in the following areas:

1. The Scientific Process
    a. Does the project promote analytical thinking?
    b. Does the project demonstrate scientific thinking?
    c. Is the student's growth and learning evident?
2. The Project Display Board
    a. Does the project contain all the appropriate sections?
    b. Is the Display board neat?
3. The Oral Presentation
    a. Can students communicate their findings?
    b. Is the student knowledgeable about their work?
4. The Journal/Experiment Planning Sheets
    a. Is their a journal with all of the student's original data?

Bring your completed Science Fair project to the **second floor of the new addition building** between **7:15 a.m. and 8:15 a.m.** on **Wednesday, March 24.** Judging will begin promptly at 8:30 a.m.

Room 3.224 (Grades 4-5)
Room 3.223 (Grades 2-3)
Room 3.222 (Grades K-1)

◊ Be prepared to explain and demonstrate your project to the judges during the following times:

Kindergarten	8:30 – 9:00
First Grade	9:00 – 9:30
Fourth Grade	9:30 – 10:00
Fifth Grade	10:00 – 10:30
Second Grade	10:30 – 11:00
Third Grade	11:00 – 11:30

THANK YOU for participating in the Ivy Creek Science Fair!

All projects must be picked up from school on <u>Friday, March 26</u>.

YOU DID IT!!