

## Science Investigation

For this project you will be planning a science investigation of your choice. The most important part of your investigation is to develop a question that you can answer by collecting data. During our electricity unit we will ask questions like:

*Which material: plastic, aluminum, brass or wood is a better conductor?*

*Which material: Styrofoam, metal, or cotton makes the best insulator?*

Once you develop a question, you will need to develop a way to test it and collect data. I put an example of an investigation in your packet. If you are unsure how to write your investigation at any point you can ask for help.

You will share your project in front of the class and earn a grade based on the requirements of the attached rubric. The project will also be displayed at the **Art and Science Night 6:30-8:00 on Friday, March 22<sup>nd</sup>**. It's your choice how you want to display it. Either a poster board or one of the project display boards with the 3-fold would work well. I have large construction paper available from school to use if needed.

**Question Due: Friday, February 15<sup>th</sup>**

I will check on your progress at various times to ensure you are working on the various steps. Remember, we won't have a March review packet or book report to free up some time for the project.

**Final Due Date: Friday, March 15<sup>th</sup>**

Please let me know if you have any questions,

*Mrs. Roubicek*

[roubiceks@svsd410.org](mailto:roubiceks@svsd410.org)

## Science Project

Your question is due Friday, February 15<sup>th</sup>! If you need help make sure you see Mrs. Roubicek.

Question: \_\_\_\_\_

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Website Resources: <http://www.all-science-fair-projects.com/>  
<http://www.sciencefair-projects.org/>  
<http://sciencebuddies.org/>  
<http://chemistry.about.com/od/sciencefairprojects/a/sciproelem.htm>

Sample Questions:

1. Which material melts an ice cube faster? (Use 2 or 3 and compare)
2. Which material keeps a cup of hot chocolate hot for the longest? (Compare a few)
3. What is more important when growing a plant: water or sunlight?
4. Do objects float better in fresh water or salt water?
5. What material rusts faster in water? (Compare 2-3 different than example in packet)

**These are only samples... to earn a "4" on your project, you will need to find a challenging and unique question!**

# Science Project Checklist



## Scientific Process

- \_\_\_\_\_ My project includes all parts of the scientific process (question, prediction, materials, procedure, data, conclusion).
- \_\_\_\_\_ My problem is clearly stated and in the form of a question.
- \_\_\_\_\_ My procedure is well-written and easy to follow.
- \_\_\_\_\_ My conclusion clearly answers the problem using the results of my data.

## Effort

- \_\_\_\_\_ My topic is creative and unique.
- \_\_\_\_\_ My method is creative and accurate.
- \_\_\_\_\_ My experiment shows a great deal of time and effort

## Oral Presentation

- \_\_\_\_\_ I will present my project clearly and understandably.
- \_\_\_\_\_ I show my classmates and teacher that I understand the topic and all parts of the scientific process through my presentation.

## Display Board

- \_\_\_\_\_ My display is neat and contains all parts of the scientific process with correct spelling.
- \_\_\_\_\_ My display includes graphs, charts, and photos as needed.
- \_\_\_\_\_ My display shows all data accurately.

# Science Fair Evaluation Guide

Project Title:

Project Number:

## SCIENTIFIC THOUGHT, APPROACH, THOROUGHNESS (x10)

Scientific method is not evident. Problem not in question form and does not reflect project. Hypothesis does not answer the question. No evidence of research. Procedure is simplistic and difficult to follow. Procedure not followed. Project not completed. Data lacking or expressed poorly. Conclusion does not answer the problem stated.

Scientific procedure illustrated throughout most of the project. Problem in question form, wording awkward, and presents a fairly good picture of project. Hypothesis answers question with no clear reason given. Some understanding of background information. Most people could follow procedures with minimum of errors. Data displayed but not enough provided to fully understand results. Conclusion answers question, but lacks support from results.

Scientific method clearly illustrated throughout project. Problem stated clearly in form of a question and answered clearly and concisely with reason in the hypothesis. Clear understanding of background information. Procedure is well-written and easy to follow. Data expressed clearly. Conclusion clearly answers the problem question using results.

1

2

3

4

5

Incomplete

Fair

Excellent

## ORIGINALITY/INGENUITY/EFFORT (x2)

Topic shows no creativity. Topic chosen for ease rather than interest. No creativity or scientific thought in finding the solution. Experiment not difficult and probably took little time to complete.

Topic fairly creative and shows some thought. Method fairly scientific and somewhat creative. Experiment moderately difficult and shows some time and effort.

Topic is creative and unique. Shows evidence of thought. Method creative as well as accurate. Effort to make testing fair and scientific is evident. Experiment shows a great deal of time and effort.

1

2

3

4

5

Incomplete

Fair

Excellent

## ORAL PRESENTATION (x6)

Unable to explain project with clarity. Little or no knowledge of background information and cannot explain what is known. Poor understanding of how experiment was conducted or cannot communicate that understanding. Results and conclusions do not match or are not understandable.

Student is a little nervous, but able to explain project fairly well. Solid understanding of subject. Some difficulty explaining background information. Solid understanding of experimentation process. Expresses results and conclusions fine, but conclusions too broad.

Student is confident, speaks loudly, clearly, and understandably. Clearly understands the topic and communicates this knowledge in a concise manner. Clearly and concisely expresses knowledge of how the experiment was conducted, as well as the results and conclusions.

1

2

3

4

5

Incomplete

Fair

Excellent

## DISPLAY (x2)

Display is sloppy and unappealing. Several pieces of information missing. Shows little effort. Information improperly placed with numerous misspellings. Results not displayed or if so are difficult to read and incorrectly labeled.

Display reasonable neat and appealing. Most information present. Shows a fair amount of work. Information in correct place, but a few words misspelled. Results adequately represented in graphs or charts, labeled correctly, and fairly easy to read.

Display board neat, attractive and contains all the needed materials. Shows evidence of quality workmanship with all words spelled correctly. Graphs, charts, and photos accurately display the reflected results.

1

2

3

4

5

Incomplete

Fair

Excellent

# ~ SAMPLE PROJECT ~

Plan a new investigation to answer the scientific question.

In your plan, be sure to include:

- Prediction of the investigation results
- Materials needed to do the investigation
- Procedure that includes:
  - one variable kept the same (controlled) CV water amount
  - one variable changed (manipulated) AV materials tested
  - one measured (responding) variable MV amount of rust
  - logical steps to do the investigation (does it make sense?)

**Question:** By using water, what gets rusty first? Penny, paper, or nail?

**Prediction:** I predict the nail will get rusty first because it is made of iron and there is no coating.

**Materials:**

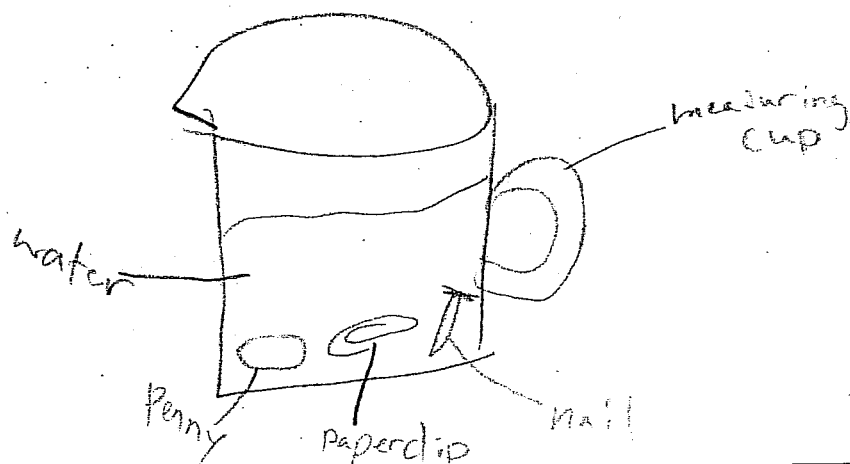
Penny — copper

Paperclip — stainless steel

Nail — iron

1/2 cup of water

measuring cup



Procedure: 1. Pour  $\frac{1}{2}$  cup of water into the measuring cup.

2. Place the three objects into the water.

3. Watch it closely for any change.

Data:

| # of Days | Penny | Paperclip | Nail |
|-----------|-------|-----------|------|
| 1         | X     | X         | X    |
| 2         | X     | X         | O    |
| 4         | X     | O         | O    |

Key  
O = there is rust  
X = no rust

## Conclusion

Write a conclusion for the investigation.

In your conclusion, be sure to:

- Answer the investigative question or describe whether the prediction was correct.
- Include **supporting** data from the data table.
- Explain how this data **supports** your conclusion.

Can you find these in your conclusion?

|             |  |
|-------------|--|
| Pred./Quest |  |
| High Data   |  |
| Low Data    |  |
| Explain     |  |

My Prediction was right (right or wrong)

The data shows that the nail got rusty first within a day.

That data also shows that after 4 days the paperclip got a little rust on it, but the penny didn't at all.

So, based on this data, I can conclude that the nail gets rusty first

because it is made of iron and there is no coating.



# Sample Display Board

**My Experiment**

In my experiment, I compared the density (or weight) of 4 liquids. After combining the 4 liquids, I checked them after one hour and they had separated. This is because each liquid was lighter than the liquid below it. This means that the liquids with the molecules that are further apart are lighter than the liquids with the molecules that are packed closer together.

**Question**

How does density affect liquids???

Which liquid is most dense: water, vegetable oil, maple syrup, or rubbing alcohol?

**MY PREDICTION:** Maple syrup, then vegetable oil, then rubbing alcohol, then water.

**Materials**

- ✓ A tall glass
- ✓ Pure maple syrup
- ✓ Water
- ✓ Cooking Oil
- ✓ Rubbing Alcohol
- ✓ Food Coloring

**Procedure**

1. Set the glass on a table or counter.
2. Pour 1 cup of maple syrup into the glass.
3. Pour 1 cup of water into the glass.
4. Pour 1 cup of cooking oil into the glass.
5. Add a drop of food coloring to the rubbing alcohol and pour into the glass.
6. Check liquids after one hour and after one day.

**Conclusion**

My prediction was part right. The order of density of the liquids I tested was:

1. Maple Syrup
2. Water
3. Cooking Oil
4. Rubbing Alcohol

Based on the data, I can conclude that Maple Syrup is the most dense liquid and the molecules that are closest together.

**What is density?**

This experiment of density explores how closely packed molecules are in a liquid. Because all liquids are made out of molecules, it is possible to determine how tightly packed these molecules are. This is known as density. The more tightly packed the molecules of an object, liquid or gas are, the more dense they are.

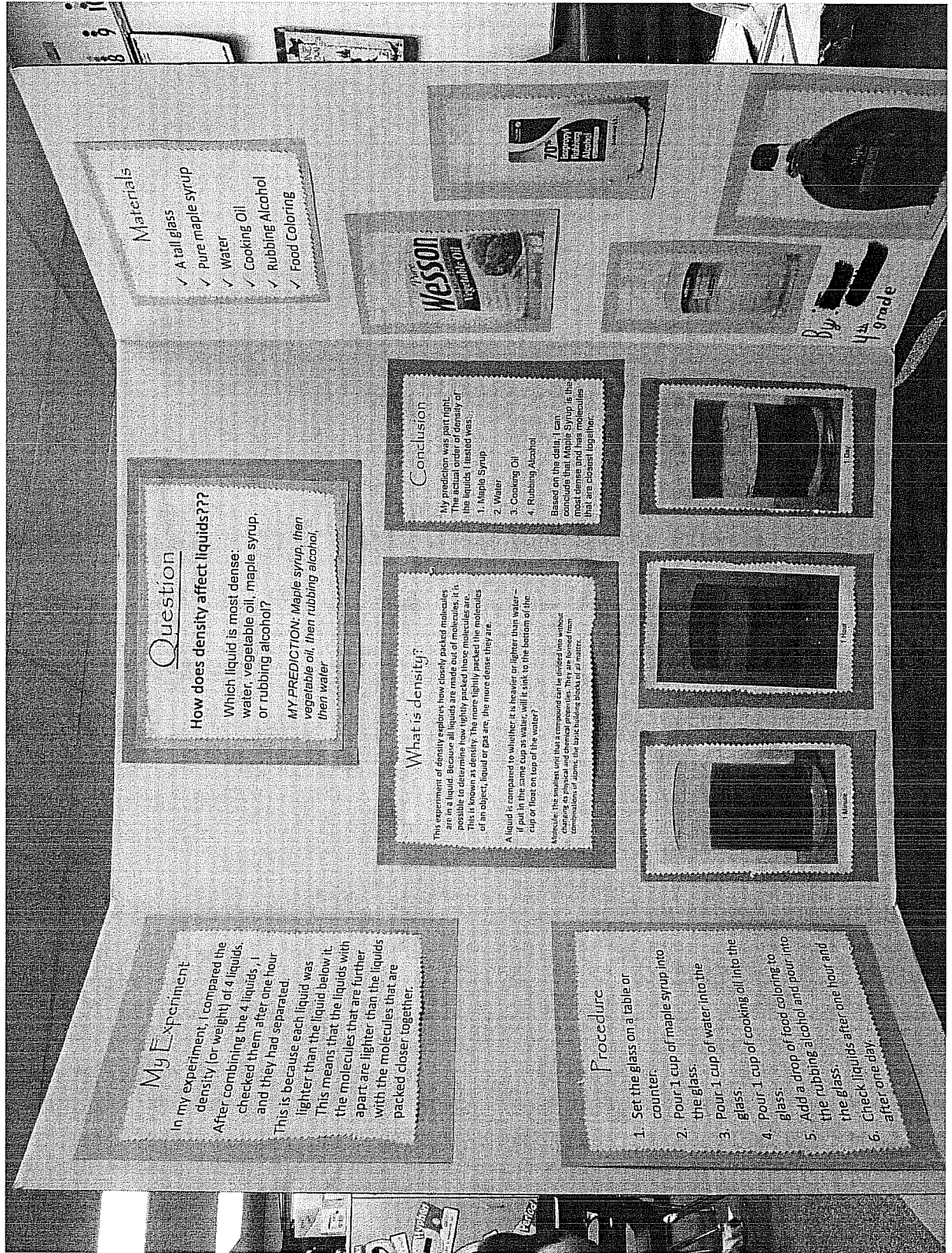
A liquid is compared to whether it is heavier or lighter than water— if put in the same cup as water, will it sink to the bottom of the cup or float on top of the water?

**Materials:** The smallest unit that a compound can be divided into without changing its chemical properties. They are formed from combinations of atoms, the basic building blocks of matter.

**1 Hour**

**1 Day**

**By: 4th Grade**



My

Project →

Plan a new investigation to answer the scientific question.

In your plan, be sure to include:

- Prediction of the investigation results
- Materials needed to do the investigation
- Procedure that includes:
  - one variable kept the same (controlled) **CV** \_\_\_\_\_
  - one variable changed (manipulated) **ΔV** \_\_\_\_\_
  - one measured (responding) variable **MV** \_\_\_\_\_
  - logical steps to do the investigation (does it make sense?)

|                    |
|--------------------|
| <b>Question:</b>   |
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| <b>Prediction:</b> |
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| <b>Materials:</b>  |
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**Procedure:**

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**Data:**

## Conclusion

Write a conclusion for the investigation.

In your conclusion, be sure to:

- Answer the investigative question or describe whether the prediction was correct.
- Include **supporting** data from the data table.
- Explain how this data **supports** your conclusion.

|                                        |  |
|----------------------------------------|--|
| Can you find these in your conclusion? |  |
| Pred./Quest                            |  |
| High Data                              |  |
| Low Data                               |  |
| Explain                                |  |

|                                             |
|---------------------------------------------|
| My Prediction was _____ (right or wrong)    |
|                                             |
| The data shows that                         |
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| That data also shows that                   |
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| So, based on this data, I can conclude that |
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| because                                     |
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