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**Citrus County**

**Science & Engineering Fair**

**Secondary Division**

**Citrus County Regional Science & Engineering Fair (RSEF) Rules**

Be advised that in accordance with the Intel International Science & Engineering Fair (ISEF) rules, there are some rules of the State Science & Engineering Fair (SSEF) of Florida that are more stringent than the official Intel ISEF Rules and Guidelines. These additional requirements will take precedence over the International Rules. There are also some Citrus County Rules specific to the Citrus RSEF that take precedence over ISEF & SSEF rules. Be sure to read all the rules prior to starting this process.

**Citrus County Regional Science & Engineering Fair (RSEF) Display & Process**

The science fair process follows the scientific method. During this process each student should document the procedures they do in their log book. A 3-hole punch folder may be best for elementary students. A template to use is at the back of this packet. The log book is required to be part of the display

**The Display**

Your exhibit should be an attractive, well organized display of all your hard work. It should look neat and professional.

The title listed on the display should be the same as the title on your abstract.

Below is a suggested arrangement of your display. (except for the abstract - it is required to be displayed on the lower left side of the board)

Only the board, your science fair paperwork and log book can be on display at the RSEF. Be sure to write your name and school on the back of board and inside cover of log book.

Measurements are the maximum allowed – ( can be smaller)

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**Title**

Data

Table

Or Chart

Graph

Pictures

Problem

Hypothesis

Abstract

*(Required*

*Placement)*

[------------48 inches------------]

Procedure

Materials

Conclusion

**SELECTING A TOPIC**

To find a topic:

* Look at your science textbook, magazines, newspapers
* Talk to your teacher, family members, or friends
* Visit professional people and museums
* Visit science websites

Select a topic that interests you. Selecting something new may make your experiment more intriguing.

Select a topic that you know little about, but it should be one that you want to investigate further.

 Select a topic that would have results that can be measured.

GOOD TOPICS

* *What is the effect of tap water vs. bottled water on the growth of plants?* This is a good topic because it requires experimentation that you can do yourself. You must use the scientific method in completing this project.
* *What is the best way to keep cut flowers fresh the longest?* This topic suggests the use of an experimental method. Asking a question is a good approach toward developing your topic.

POOR TOPICS

* *How volcanoes erupt?* This topic will not allow experimentation. Making a model is a demonstration, not an experiment.
* *Microscopes.* This topic is too general. Telling how one works is not experimentation.
* *Which popcorn pops better?* This topic is a comparison, not an experiment.

**RESEARCH – Find information about your topic…**

You should have at least three sources cited for your research. You can find information about your topic online, in books, magazines, videos or even from an expert in your area of study. Once you find these sources you will read, view or interview them. Then you will need to write a brief summary of the information you collected. Be sure to record the title of the article or book, the author and page numbers and the year it was published. If you interviewed someone, be sure to record their name, title and the date and time of interview. This is how you cite your sources for your bibliography.

You will find “Research” pages in for your log book in this packet. You can record your information and bibliographies on these pages.

**PURPOSE A QUESTION/PROBLEM – From your research you pose a question or try to solve a problem.**

This can be stated as:

*“I wonder what would happen if…?*

*“What is the effect of \_\_\_\_\_\_\_\_\_\_\_\_ on \_\_\_\_\_\_\_\_\_\_\_\_?*

This **one sentence** should explain why you are doing the experiment.

If your purpose is well worded, you will have little difficulty writing a title for you project.

**HYPOTHESIS**

The hypothesis states what you think might happen based on the general understanding of your topic. The hypothesis determines what you will be testing in the experiment.

Here is an example:

Purpose: *I wonder what would happen to plants when exposed to different intensities of light.*

Hypothesis: *If I expose plants to different intensities of light then the one that gets the strongest amount of light will grow the best.*

**EXPERIMENT/PROCEDURE**

You create an original design to test your hypothesis. Be sure to document everything in your log-book.

1. MATERIALS

List all materials used in your experiment. Include what, how much, and what kind of materials you used. Keep in mind that quantities are very important. Remember to use metric units.

Good Materials List Poor Materials List

250 ml graduated beaker Measuring cup

750 ml water at 20oC water

20x20 cm square cake pan container

Celsius thermometer thermometer

Clock with second hand

2. VARIABLES, CONSTANTS AND THE CONTROL

Independent Variable – The one “thing” you change, on purpose, in an experiment. If you are testing light intensity and how it effects plant growth. The independent variable would be the intensity of the light.

Dependent Variable – What changed because of the “thing” you changed? It is usually the factor that you are measuring in the experiment. Using the light example above, it would be the height of each plant in the different intensities of light.

Constants – Factors that are held the same throughout the experiment, such as using the same amount of water, container size, plants and soil. The only factor that should change in an experiment is the independent variable.

Control – A trail in the experiment which is done without changing the original factors. In the experiment above, you could be using that just uses natural light. If the experiment doesn’t have a control, it should be noted in the procedure. You should have an understanding of what a control is and why it was or was not appropriate for your project.

3. STEP-BY-STEP DIRECTIONS

Directions should be sequenced, numbered and clear so that anyone could set up your experiment and get similar results as you (like a recipe). Remember to use metric units for measurements.

Examples of Good Directions

1. Gather and prepare all your materials
2. Put on safety goggles
3. Add 3 ml of magnesium sulfate into a test tube
4. Observe the contents for 5 minutes
5. Record observations every minute during this time

Examples of Poor Directions

1. Put magnesium sulfate in test tube
2. Observe the contents
3. Use safety equipment

**Observations/Data**

Data refers to information gathered during your experiment. This would be represented by your metric measurements taken or observations made during the experiment. Data should be recorded in your log book in the form of tables and/or charts.

**Graphs** are used to illustrate the data. Each graph should have a Title. The independent variable is graphed on the X axis (horizontal) and the dependent variable is graphed on the Y axis (vertical). Each axis should be labeled and use appropriate units of measurement.

TYPES OF GRAPHS

**Bar Graph** – used to display data that does not occur in a pattern or over time.

**Line Graph** – used to display data that occurs in a continuous manner.

**Remember:**

* Give your graph a title
* Label each axis
* A scale must be present

  *Title*

 

**D**

**R**

**Y**

**M** **I** **X**

*Label*

*Label*

**D**ependent or

**R**esponding Variable on the

**Y**-Axis

**M**anipulated or **I**ndependent Variable on **X**-axis

**CONCLUSION**

Your conclusion should include the following:

* Statement of support OR non-support of your hypothesis
* Written summary of your data
* Descriptions of any problems or unusual events that occurred during your investigation
* Describe what you would do differently next time
* Additional experiments that could continue form your experiment
* Who (or what industry) could benefit from the findings of your investigation

**Abstract**

After finishing research and experimentation, students are required to write a (maximum) 250 word, one-page abstract to be displayed on the lower left-hand corner of the project board.

This needs to be typed on the official FL SSEF Abstract form:

The Abstract should include the following: (It is a summary of the process)

 a) Purpose of the experiment

 b) Procedure

 c) Data

 d) Conclusions

 e) Practical Application of findings (how can it be useful)

The abstract may NOT INCLUDE the following:

 a) Acknowledgements (including naming the research institution and/or mentor with which you were working)

 b) Self-Promotions and external endorsements

 c) Work or procedures done by the mentor