CF SCHOOL
Creating Foundations

Science Fair 2024

Guidelines and expectations

January and February – working on background research, designing, and conducting experiments.

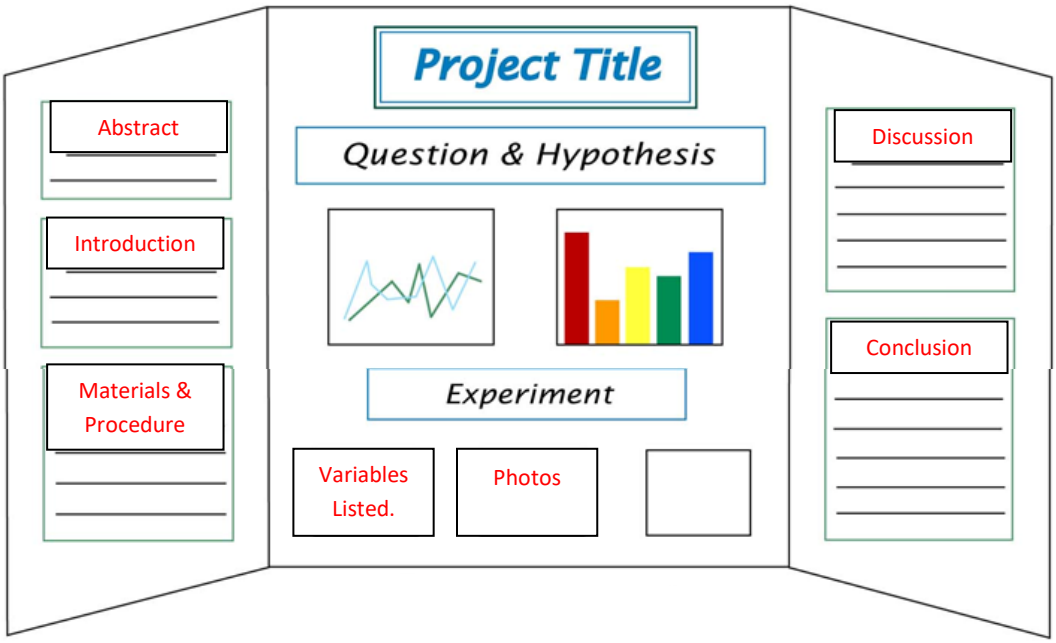
February 6-7 – analyzing results, creating graphs, discussing results, completing poster board, practicing your presentation.

Thursday, February 8– Science Fair 😊

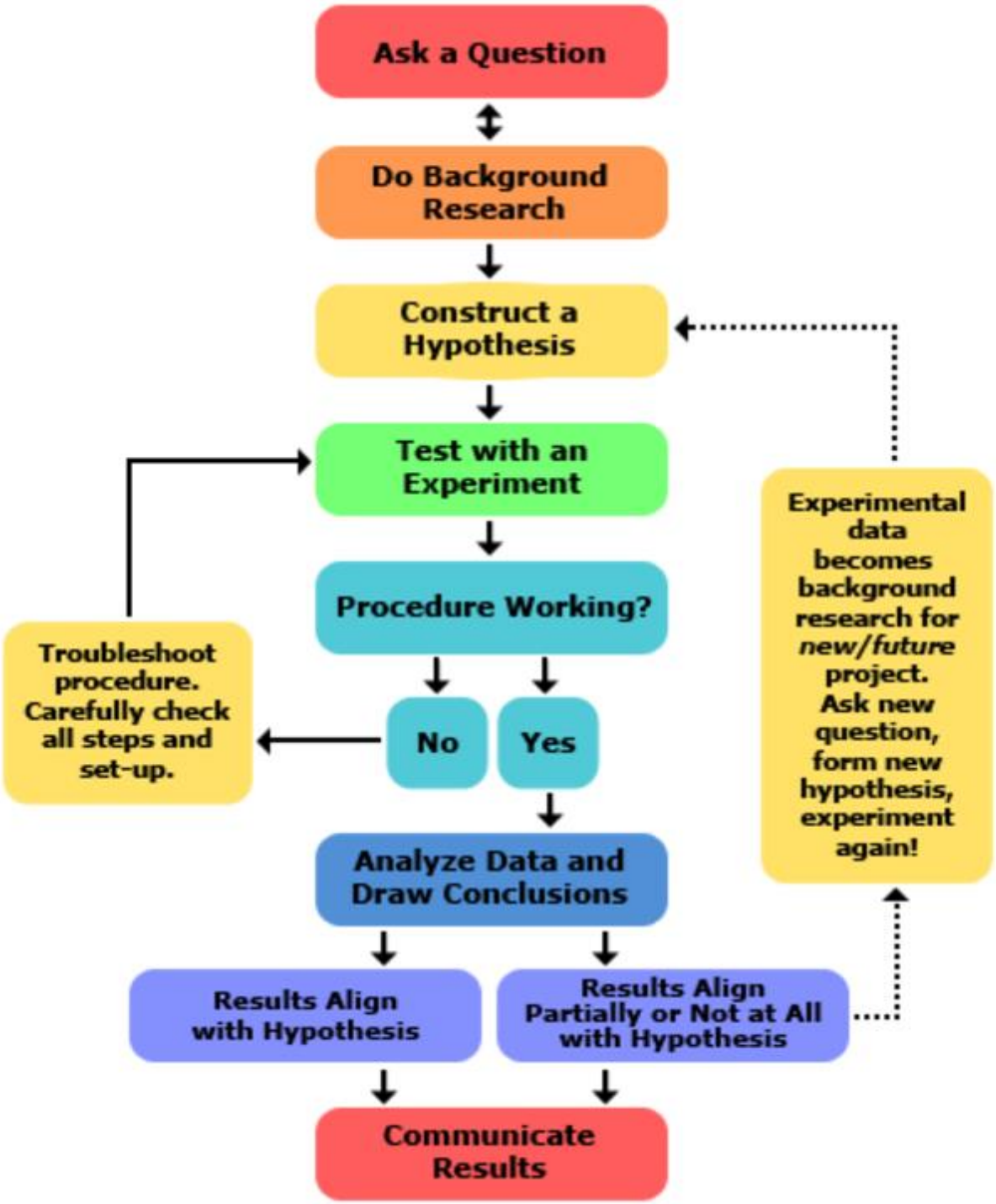
The science fair is a school-wide event taking place on Thursday, February 8, 2024. Leading up to the science fair all students will conduct an experiment and create a poster to present their results. The experiment must answer a question using the scientific method. Students will receive feedback on their final project and will have the opportunity to present their findings at the annual Cayman Islands Rotary Science fair held later this Spring.

Rules:

- Your task is to ask a question about something you are interested in and create an experiment to find the answer!
- Make sure to plan ahead and get started early if your experiment will take extra time (i.e., growing plants).
- You must use the scientific method to guide you in your research.
- All stages must be documented from start to finish.
- Final project must be displayed on a tri-fold poster board (see example below) and presented on February 8, 2024.



The Scientific Method



Step 1: Find a question.

- Must be in one of the following categories:
    - Life science – biology, botany, zoology.
    - Earth science – environment, weather, ecology.
    - Physics, chemistry, or computer science.
    - Food and health.
- Find a testable question – your question must be something that you can test by measuring a change. You need to show cause/effect.
- Propose a solution or invention to a problem – you must have a specific goal in mind and a way to measure its efficiency or effect.

Step 2: Do background research

- What things do you need to know?
- What has been done in this area so far?
- What methods or materials do you need to know more about?

***You must keep ALL sources. Save or bookmark all references.

Step 3: Develop a hypothesis.

- Based on your research, predict an answer to your question and provide an explanation for why you think you will get these results.
- A hypothesis is an educated guess about how things work. It is an attempt to answer your question with an explanation that can be tested. A good hypothesis allows you to then make a prediction:

  "If _____[I do this] _____, then _____[this]_____ will happen."

  State both your hypothesis and the resulting prediction you will be testing. Predictions must be easy to measure.

Step 4: Design an experiment to test hypothesis.

- You must determine what your experimental variable is, also known as your independent variable. Your dependent variable is what you are measuring, it depends on the independent variable you choose.
- All other variables must be controlled. You must include a control group that shows what normally happens.
    - Example: How does coloured light affect plant growth?
        - Independent variable = colour of light.
        - Dependent variable = height of the plant.
          **Height of plant (what I will measure) is going to depend on the colour of light that I use.
        - Controls – same soil, same seeds, same amount of water, planted at same time, kept in same pots, in same room, etc.
        - Control group – will receive normal light.
        - Experimental groups – red light, green light, blue light.
- You must have a full list of materials.
- You need a specific, detailed list of procedures so that anyone can repeat your experiment. If you do anything during your actual trial take note of it and add it to your procedure.

Step 5: Perform the experiment, collect data.

- Follow your procedure to conduct the experiment. Remember if you need extra materials or change any steps you must update accordingly.
- You must have a way of collecting data. Be it measuring changes in distance, growth rates, colour changes, etc. You need to regularly record your data throughout your experiment through pictures, notes, videos, etc. Be sure to write down regular observations throughout your experiment as well as measure the change of your dependent variable.
- If you are not getting any results, change your experimental procedure so that you do get results. Take note of any changes that you made.
- Repeat your experiment at least two more times to collect more data. Compare this to your previous trials. Remember to take note of anything that may be different in each trial, it could help explain different results later.

Step 6: Analyze your data

- Look at the data collected throughout the experiment, what did you find?
- How can you explain these results? Are there multiple explanations possible for these results? Is there further testing you could do to narrow down to one possible explanation?
- Was there anything strange in your results? Go back to your notes and observations, is there anything that happened that can explain your results?
    - You won't get in trouble if you made a mistake in your experiment, make sure you take note of it during the experiment and that you discuss it when you interpret your results.
- Error Analysis. There are often variables beyond your control that might have affected your results. It is important to identify these variables in your analysis so that someone looking at your data will know the possibility of inaccuracy. For example, you should note if your uncovered plants got less light energy because half the days were very cloudy.
- Limitations. In this part of your analysis, you caution against over-generalizing your results. For example, you may have proved the negative effects of less sunlight on a bean plant, but you cannot take your conclusion and apply it to any other type of plant. One of the limitations of your study is that you only tested one kind of plant.
- Was your initial hypothesis correct? Why or why not? How do you know?

Step 7: Present your results

- Find a way to show your data: tables, charts, graphs, and/or pictures.
- Discuss what your results are, the trends that you found, any strange findings, and the most interesting findings.
- How can you explain the results? Are there any other possible explanations? How can you be sure your explanation is correct?

Step 8: Conclusion:

- What is your conclusion? Did you prove or disprove your initial hypothesis?
- What could you do next to further verify your results or what applications could your results have?

Science Fair Project Deadlines:

Due date:	What is due?	Notes:
Monday, January 8	Project selection	
Thursday, January 11	Do background research to write your hypothesis	
Tuesday, January 16	Materials list and procedure submitted	
Monday, January 22	1 – started experiment at home **AND** brought results to school OR 2- materials brought to school to do project in class time.	

Presenting your project:

1.) Poster board

a.) Abstract (a brief summary of the whole project).
b.) Introduction (background research, question, hypothesis)
c.) Materials list
d.) Variables – independent, dependent, controls.
e.) Procedure (detailed procedure must be included, can be summarized for poster board).
f.) Results – presenting in graphs, charts, tables, pictures.
g.) Discussion – analysis of key results and explanations provided. Alternate explanations also provided and discussed.
h.) Conclusion – was your hypothesis correct? What further investigations can be done?
i.) Should look presentable: use different colours, appropriate fonts. Make people want to view your board!

2.) Presentation of project

a.) Can clearly state the hypothesis and provide an explanation for why you believed it?
b.) Explain the independent, dependent, and independent variables.
c.) Can describe the steps of the experiment and what results you obtained.
d.) Has interpreted the results of the experiment and found a way to clearly show these results to others.
e.) Relates the results back to the original hypothesis.
f.) Enthusiastic, prepared, knowledgeable and shows understanding of the material.