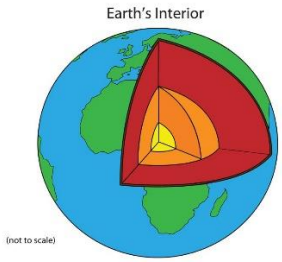
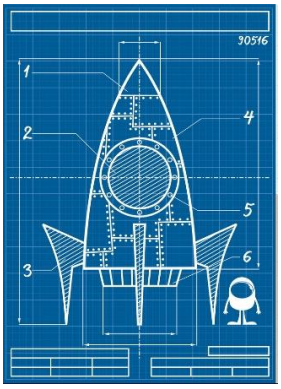
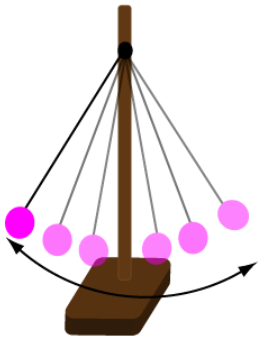
2022 Meadows Science Fair Guidelines

What will you discover?

Astronomy  *The study of the solar system, stars, planets, and the universe*	Biology  *The study of living things (including botany, zoology, and microbiology)*	Computer Science  *The study and design of computer technology: hardware and software*
Earth Science  *The study of our Earth, including geology, meteorology, oceanography, paleontology, and ecology*	Engineering  *Design and/or construction of devices, structures, or machines*	Physical Sciences  *The study of matter, chemicals, forms of energy, and laws of motion*

Registration Deadline: March 30th, 2022
Registration Link: https://forms.gle/yiM7aVxS5UKrymQt8

Projects Due: Wednesday April 27th, 2022

Step 1: Choose a Topic
Choose a topic for your science fair project from a science category that you are interested in. You can choose a topic in any of these science categories:

- Astronomy
- Biology
- Computer Science and Technology
- Earth Science
- Engineering
- Physical Sciences

Step 2: Ask a Question
A science fair project is all about finding out the answer to your question. Thus, your question becomes your problem to solve. You may want to brainstorm and create a list of a few questions that you would like to investigate more.

Here are some websites that can help you find ideas about for your project.
https://www.sciencebuddies.org/
https://www.sciencefair-projects.org/
https://www.outreach-foundation.org/parents-students/

- *Important*: Make sure your question is something safe to research and/or experiment about on your own. *DO NOT* start a project if the experiment is not safe, the materials are too difficult to find or too expensive, it involves live animals, or if it will take more time than you have. Make sure you review the Science Fair Rules (page 5) before you choose a project!

Once you have a question that you want to answer, please register for the science fair (Link on page 1). As you perform your research, your topic might change and that's OK! That's part of what makes science so fun!

Step 3: Conduct Research
To help you answer your question, collect and read as much information as you can about your topic. Books, magazines, the Internet, people, etc. can all be good informational resources. Your goal is to begin to answer your question based on the information you collect. Be sure to include what you learn on your display board (see below). Your project must include a **bibliography** of your research with a minimum of two sources, so remember to write down where you find important information.

Step 4: Perform a Hands-on Science Activity
Scientists learn by doing! Think about an activity that you can do to learn more about the topic you chose. There are lots of different types of activities that you can choose. Which one you choose will depend a lot on the topic that you chose to study. Some examples of activities are:

- **Conduct an Experiment**
  Scientists design experiments to answer questions in science. If you perform an experiment, you'll begin by developing a hypothesis. A **hypothesis** is your best guess at what the correct answer to your question might be. Then you'll design an experiment to test that hypothesis, and

collect some **data** (any type of measurement) to support or not support your hypothesis.

For example, one hypothesis might be "Heavier things fall faster." If this were my hypothesis, I would do an experiment where I dropped things with different weights. My data would be the weight of each object and the time it took to fall. I could use the data to check if my hypothesis is correct.

If you conduct an experiment, your project poster should state your hypothesis, your experimental design, and the results of the experiment.

- **Build a Model or Machine**
  Many scientists learn by building things. Engineers learn about how to build large bridges by building small scale versions. If you're studying astronomy you could build a model of a star or a planet.

  If you build something, your project poster should state what the model is, and explain all the different components of the model/machine. Include details about why you chose the materials, colors, sizes, etc. that you did.

- **Perform a Demonstration**
  You may want to demonstrate the science that you've learned during the project. You could do a chemical reaction (with an adult's help!), or you could write a computer program.

  If you elect to do a demonstration, your project poster should say what will happen (the purpose or goal), show the demonstration (in pictures for example), and then explain why demonstration worked.

- **Characterize Specimens**
  One of the easiest ways to learn about science is to simply observe the objects around us. You can choose to collect specimens and characterize or classify those objects based on a property that you chose to investigate. A **specimen** is an individual example of something. For example, I might choose to do a project on ways to write. I could collect pens, pencils, markers, and crayons as specimens.

  If you choose to display specimens, your project poster should include what connects all the specimens into one group. (In the example above, they are objects to write or draw with.) Then you should describe the features of each specimen that makes each unique from the others, and what properties lead to these differences. Keep in mind, you can collect actual specimens or you can collect pictures of specimens.

Step 5: Evaluate and Present Your Data

Here you consider all the information you gathered in your research and your activity together. The data you obtain from your research and activity should be organized into tables, graphs or charts. Tables are good for recording raw data. Bar graphs visually compare totals. Line graphs show how two factors change

in relation to each other. Pie charts are used to show different percentages.

Step 6: Draw a Conclusion

The conclusion of your project is the answer to the question you asked at the beginning. Were you able to answer it easily? Or does the answer depend on a lot of different things? When you are thinking about your conclusion, try to complete the sentence: "I learned….".

Other things you may include in your conclusion are: surprising things you learned; difficulties you encountered in your experiment; how you might change things if you continued your experiment in the future; and other questions that came to mind while conducting your research or experiment.

Step 7: Display Findings

You've learned so much! Now it's your turn to be the expert and help us all learn about your topic. Your project information will need to be presented on a tri-fold display board no larger than 36" x 48". Display boards can be picked up afterschool on Thursday April 14th and Friday April 15th. Your board should be presented in an organized manner, with all information neatly written or typed, and should include all of the following:

- Student's Name(s), Grade and Teacher's Name
- Title of Project
- Question
- Data, including
    - Research summary
    - Description of hands-on activity
    - Graphs or pictures that show results
- Conclusions
- Bibliography of resources used, at least 2

Step 8: Present Project

Prepare and practice a summary of your science project. It should be no longer than 3 minutes. You should be able to state your question, explain your research, describe your activity, and state your conclusions. The science fair judges will listen or view your presentation. Make sure to let them know what you learned.

Project posters are due to the office by 8 am on Wednesday April 27, 2022.

Please note that family and friends will not be invited to attend project presentations during judging. Families and friends are invited to attend a Science Fair Awards Ceremony on the evening of April 28, 2022. Student posters will be on display during the Awards Ceremony.

Meadows Science Fair Rules

1. Participants must be Meadows Elementary School students grades TK-6.
2. Participants may submit individual projects - OR - they may work with one partner from the same grade level as a team.
3. NO prior year science projects may be used or revised.
4. NO dangerous or flammable chemicals may be used.
5. NO open flames are permitted as part of an exhibit.
6. NO exposed electrical contacts will be allowed.
7. NO live animals are allowed in any experiment.
8. Projects and exhibits must be the student's own work. A grade-appropriate topic should be selected. Family members are encouraged to guide their student through the project, and should assist in aspects of an experiment where safety is an issue (i.e. using a stove, etc.). Please make sure the student is the primary investigator!