WillCA **4th Grade Students** can:

Do a **SCIENCE** project: Ask a question and use the scientific method to find the answer!

Do a **CREATIVE STEM** project: Can you write a computer program? Or make a stop motion animation movie? Or make a Lego model of a machine? This is your chance to show everyone.

Do an **ENGINEERING** project: Have you got a great idea about a new invention? Or an idea about how to improve something? Use the engineering method to develop your idea!

Do an **ENGINEERING CHALLENGE**: Create a marble run out of cardboard or a device to protect an egg from a fall. Show us your designs!

SCHEDULE

WEEKS OF MAY 9-13 and MAY 16-20

1. Select your project. Check out THIS LINK for lots of resources!
2. Complete the Google Form your teacher sends you to record your project idea.
3. Conduct necessary research.
4. Create a plan.
5. Gather supplies.

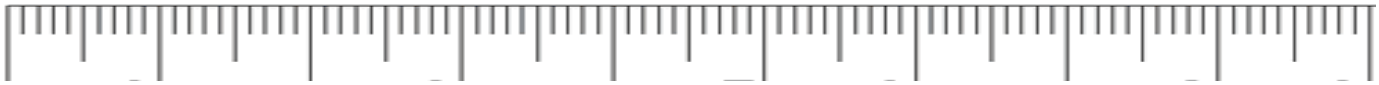
WEEKS OF MAY 23-27 and MAY 30 - JUNE 3

1. Conduct experiment and record results (Science), Design/Create/Test project and record results.
2. Compile your information and data into a presentation. This can be a group of pictures that you will talk about during class, a Powerpoint, a video, or a physical presentation board that you will show us during class. ***We will not be able to show live experiments or demonstrations during class. Please record those and we will show a video.
3. Upload your project to the PADLET.
4. **PROJECTS ARE DUE ON FRIDAY, JUNE 3RD**

WEEKS OF JUNE 6-10 and JUNE 13-17

Students will present projects during class!

SCIENCE PROJECTS



Get ready to research! **S**cience is a method to answer questions about our world and universe! By carefully controlling your experiments, your ideas can be disproven or verified.

The scientific method:

1. Form a **question.**
2. Research.
3. Make a **hypothesis.** (An idea you can test)
4. Design a **procedure.**
   a. Identify **one variable** (something that can be changed.)
   b. Identify a **control** (something that remains unchanged) for that variable.
5. **Measure** the results. (Run the experiment and gather data.)
6. Form a **conclusion**. Verify or disprove the **hypothesis** with the data.

Forming a Question

A successful project begins with a good question. The question should not be answered by a simple yes or no. For example, "*How does salt affect the freezing point of water?"* is a better question than "*Does salt affect the freezing point of water?"* Good scientific inquiry questions do not include taste, smell, and opinion-based responses. Good scientific inquiry questions have one **variable** and **measurable data**. If you can repeat the experiment several times, you will have more data to work with and your conclusion will be more accurate. Please note: your experiment cannot include dangerous materials.

Making a Hypothesis

A **hypothesis** is a prediction about what you think will happen. The **hypothesis** gives you a general guide as to what to expect from the experiment and does not need to be correct.

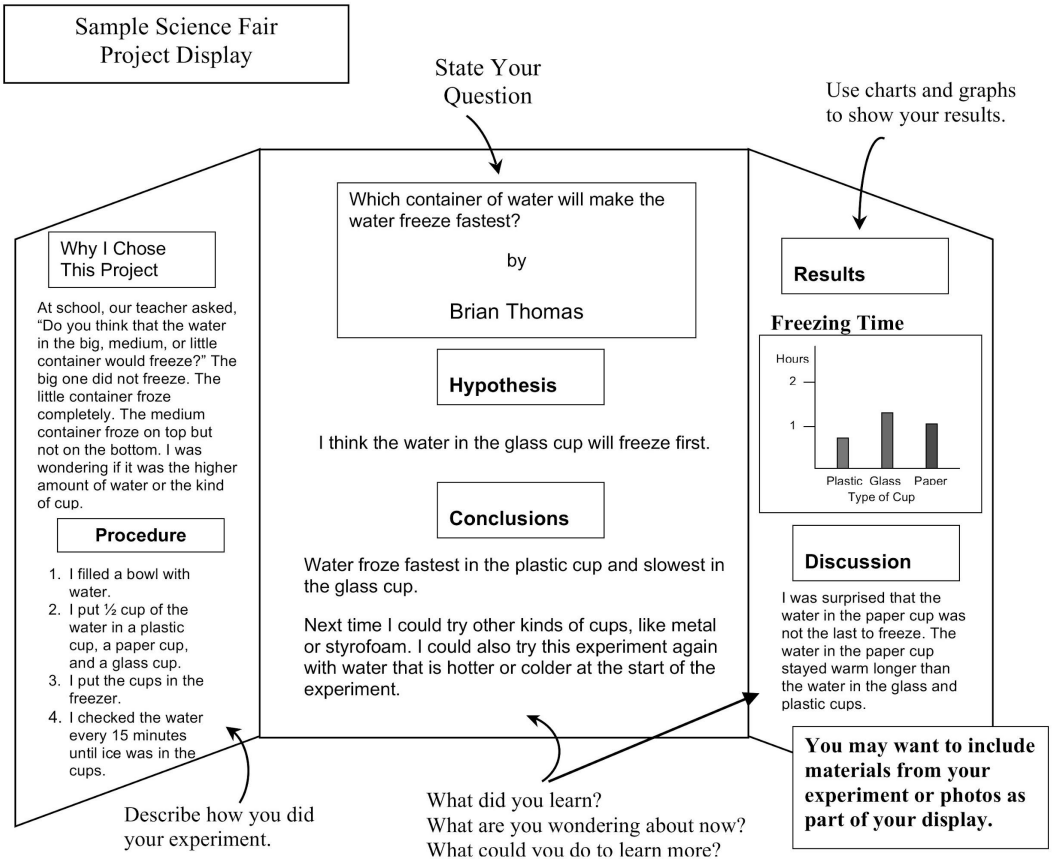
Designing the Procedure

A **procedure** is a step by step method of how you conduct your test. Your procedure needs to **measure** your **variable** (what you are changing) against your **control** (that which stays constant). It is the difference between the **variable** and the **control** that either verifies or disproves your **hypothesis**. For example, to answer "*Does salt affect the freezing point of water?"*, you would have two containers of water: a **control** and **test**. In the **control**, you would not add salt. In the **test** container, you would add salt. Then, you would put both containers at the same temperature and record if each froze. A successful procedure can be described and repeated by others.

Examining the Data and forming a conclusion

Your conclusion is what you have observed about your test, and is based upon measurements, not opinions. Your data should compare your **variable** against your **control**. For example, *The salty water did not freeze in the freezer, but the control did.* Try **graphing** your results.

Example Science Project Board



You do not have to make a trifold board like this. You can do a Powerpoint or share your results in a different way.

Please ask yourself the following questions to complete your science project…

My Question:
What is the question you hope to answer?

My Hypothesis:
A prediction about what I think will happen. *The hypothesis gives you a general guide as to what to expect from the experiment and does not need to be correct*.

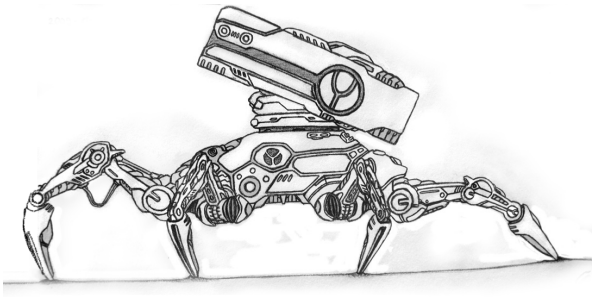
The procedure I will use:
(How I will test my Hypothesis?)

My variable:
(the one thing I will change)?

How I will measure my results:

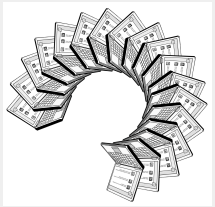
What materials I will use:

CREATIVE STEM



The **CREATIVE STEM** category is your chance to be creative with STEM.

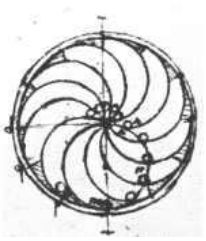
Computer Programs/Coding:

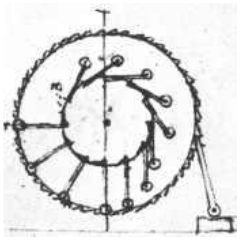


Show us a computer program that you have created and want to exhibit. This could be in any language or any platform. Try Scratch or Code.org or something with Minecraft.

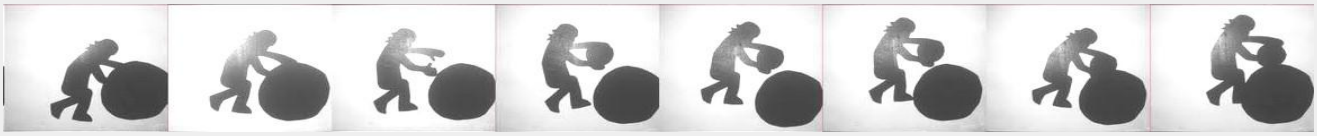
Technical illustration/Modeling: Scientists are artists. Artists are scientists.

Make a real or digital model to illustrate an idea or object. This could be a 3D model out of candy (or materials of your choosing), a simulation model, a Lego model (of your own design), or anything in between. Can you draw an illustration of the water cycle, or an animal cell? Show us!





Storytelling/Digital Media

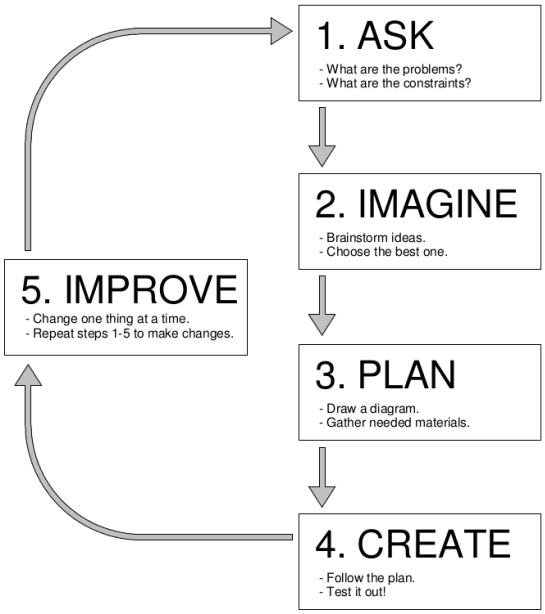


The possibilities here are endless! Convey a story with things such as computer illustration, stop motion animation, or puppet making.

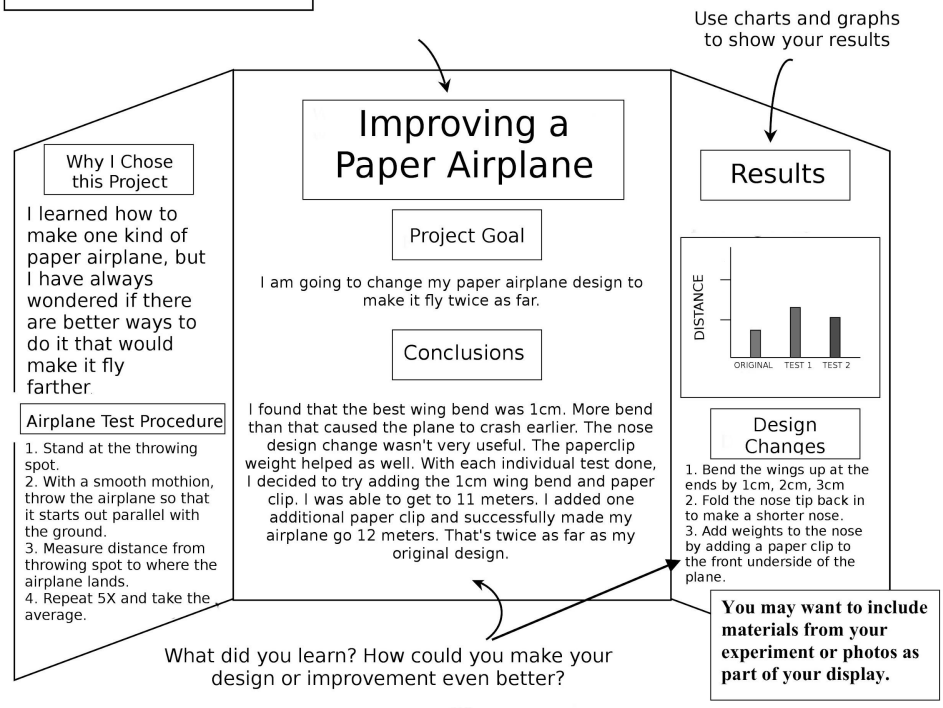
ENGINEERING

Engineers improve or create something for a particular purpose and their project needs to have a measurable result. Students can choose to do a **prototyping project,** where they invent something, or an **improvement project,** where they modify an existing product. If you are inventing something, you need to be able to measure your results to show that it fits its purpose. If you are improving something, you need to be able to measure how much it has improved. Students are asked to keep a design journal and projects should follow the process below.

The Engineering Design Process



Sample Engineering Project Board



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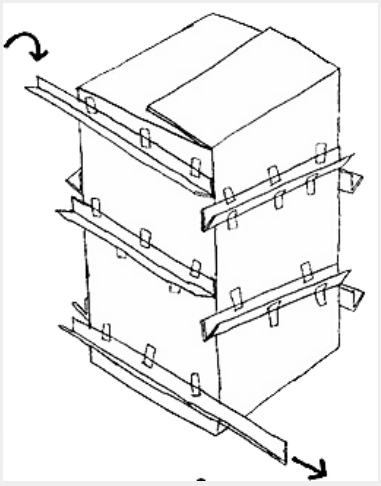
ENGINEERING / DESIGN CHALLENGE

Use the Engineering Design Process to solve a challenge!

Marble Run

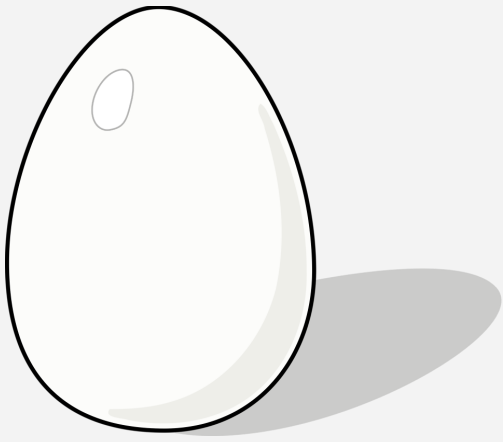


Do you think you could build a marble run using only tape and cardboard? Will the marble make it from top to bottom in 15 seconds or longer? How long of a run can you build? What design modifications might increase or decrease the marble's speed?

- **Objective:** Using just cardboard and tape to create a Marble Run. One section of your marble run must run uphill!
- **Requirements**: The marble must run for 15 seconds.
- **Materials**:
  - Cardboard
  - Tape
  - Marbles
  - Scissors (with adult supervision)
- **Directions:** Use the engineering design process to help you test and modify your design. Keep track of your process by writing, drawing, or taking pictures.

Go for the record! How long can your marble run?

EGG PROTECTOR



Can you build a device that can protect an egg from breaking when dropped from a height of 11 feet or higher? How strong can you make it? How small can you make it?

Objective: Design your egg protector so that the egg will survive an 11 foot drop.

Requirements: Your protector must use your own egg, not be battery powered, and fit in a 8 inch cube. Design your egg protector so we will be able to see whether your egg broke or not. It's OK if you need to open your device.