

Nixon Science Night

🔑 *Experiments* & 🔧 *Inventions*



This Science Night Guidebook belongs to

Project Title

Most of the text for this booklet came from
Margaret Fisher, Science Lab teacher at Fairmeadow School.
We are indebted to her for her guidance and the information she has
generously shared with Nixon School.



NIXON SCHOOL SCIENCE NIGHT

Congratulations on your decision to participate in the Nixon School Science Night!

Your Science Night project should be done at home. You will be able to demonstrate your creativity and scientific curiosity through your investigation, experiment or invention, testing, and display.

This book is a guide to help you plan your project. Read through it carefully and plan a schedule for yourself. It has information for both experimenters and inventors.



Look for this symbol for items that are primarily for EXPERIMENTS.



Look for this symbol for items that are primarily for INVENTIONS.

GET READY TO HAVE FUN AND LEARN A LOT!



EXPERIMENT

An **EXPERIMENT** is a test performed to determine the validity of a hypothesis, determine the effectiveness of something not tried before, or demonstrate a known truth.

You'll need to start your project with a **question or a problem**. It must be one that you can answer through an experiment or investigation. "What causes earthquakes?" is a scientific question, but not one you can answer through an experiment at home. A question like "How fast will a hockey puck move across different surfaces?" is one that you can answer yourself!



INVENTION

An **INVENTION** is a new or improved method, device, or process developed from study and experimentation.

You'll need to start your project with a **question or problem** that can be solved with a new invention or a design improvement. "How can a tractor be improved?" is a question that could lead to an invention, but not one you can easily answer through a project at home. A question like "How can I build a better CD holder?" is one that you can solve and build yourself!

YOUR QUESTION:

BECOME AN EXPERT!

Now is the time to learn everything you can about your topic or problem. Go to the library. Read books and encyclopedias. Talk to experts --scientists, engineers, designers, doctors, etc. Use the computer to search for information. Take lots of notes to help you remember what you learn.



BRAINSTORM IDEAS

Use the space below to write down any ideas that come to mind that might be solutions to your problem. Be creative, and don't limit yourself to complete or practical solutions. Include sketches of your ideas. Use more paper if necessary.



Next, you'll need to state your **hypothesis**. A hypothesis is what you think the answer to your question will be, and the reasons why you think so.

Through your experiment or when you build and test your invention, you will discover whether your hypothesis, your original guess, is correct or incorrect.

HYPOTHESIS:



By now you should have decided. Will you be conducting an **EXPERIMENT** or Designing an **INVENTION**?

-  **EXPERIMENT**
-  **INVENTION**



INVENTION

DESIGN and BUILD YOUR INVENTION

Once you have gathered enough background information, you are ready to begin to design and build your invention. After your research, you may want to now refine or modify your problem to include the following:

- What you will build, or
- what characteristics of a previous design you will modify, and
- what specifications you will test.

Draw your invention on separate paper. If you are changing the design of a real object, you could include a photograph of it. Label parts of your invention. Try to draw to scale.

Write directions for building your invention. Be simple and specific so that anyone could duplicate your model. Feel free to go back to the Materials page and add or change materials or amounts used in the construction of the model of your invention.

When your finish your design, build your model!

TESTING YOUR INVENTION

When you have built your model, you are ready to conduct tests to see if it works as planned. If appropriate, decide what characteristics you will test. For example, for a model airplane, you may want to test how far it will fly, or perhaps how fast, or how long it stays in the air. For a cereal bowl, you might measure how much it can contain, or whether it leaks. Consider where and how your tests will be conducted. You may want to conduct several test runs (called trials), so that you can compare results.

KEEP GOOD RECORDS!

During your experiment or invention, you write down your observations carefully. Take pictures or draw what you see as go along. Take precise measurements. You will show these on your final display. Some ways to show your records are:

- graphs
- tables
- photos
- charts
- drawings



USE THIS SECTION TO WRITE DOWN YOUR RECORDS AND OBSERVATIONS.

Describe in detail what you see, feel or smell. Be sure to keep track of the dates and times of everything you do and observe.

Your EXPERIMENT is over or your INVENTION is built and tested.
What happened?



RESULTS:

It's time to examine what your experiment or invention has shown. Was your hypothesis correct or incorrect? Why do you think things turned out the way they did? Would you do the experiment or invention differently next time?

Be very careful when drawing conclusions. If you have used only a small sample, such as five bean plants, can you expect the same results to occur in all bean plants? It might be best to write that your results indicate, rather than prove that your hypothesis is correct or incorrect.

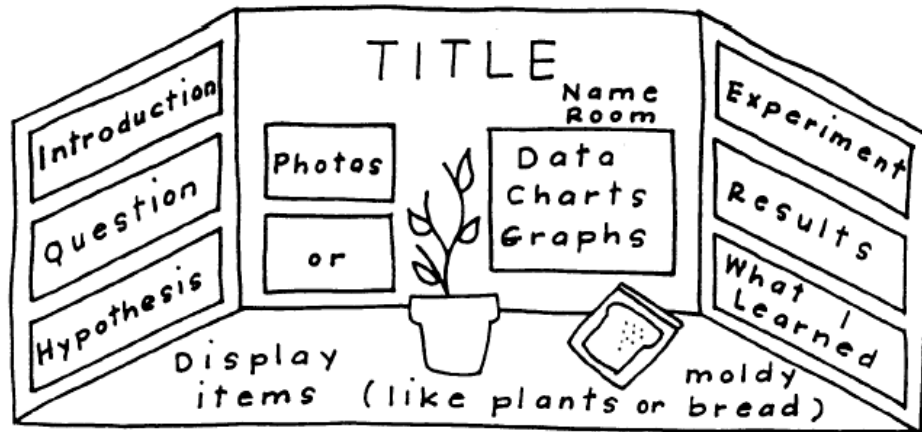
CONCLUSIONS (WHAT I LEARNED):

You now need to plan, prepare and construct your **PROJECT DISPLAY** so you can share your findings with the rest of Nixon! Your display should contain the following items:

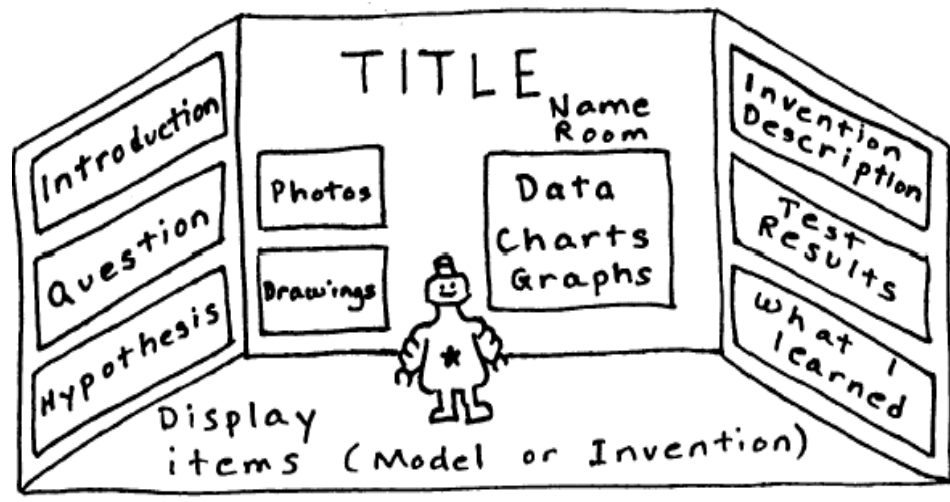
- A **TITLE** which describes your topic.
- The **QUESTION** that you set out to answer.
- Your **HYPOTHESIS**.
- A description of your **EXPERIMENT** or **INVENTION**.
- Your **RESULTS**.
- A statement telling **WHAT YOU LEARNED**.
- Any **VISUAL AIDS** that make your display easier to understand or more attractive, such as photos or drawings of the experiment or invention and tests. If possible, you should include parts of your actual experiment. If you've grown plants, for example, include them in your display. If you've investigated bread mold, display the bread (in plastic bags).
- All experiments must be **FREE-STANDING** and include your **NAME** and **ROOM NUMBER**.

YOUR DISPLAY MIGHT LOOK LIKE THIS:

 **EXPERIMENT**



 **INVENTION**



LIGHTS! CAMERA! ACTION!

Now that you have finished your entire project, people will want to know what you have discovered!

Bring your **FINISHED PROJECT** to the **THEATER** on **FRIDAY MORNING, (before school)** for set-up.

On **Friday evening**, your Science Night project will be on display in the Theater for your friends and family to see. Look for announcements as the date approaches.

You **must remove your project** on **Friday night** at the end of the Science Night to allow for use of the Theater on Saturday morning.



THANK YOU FOR YOUR PARTICIPATION!