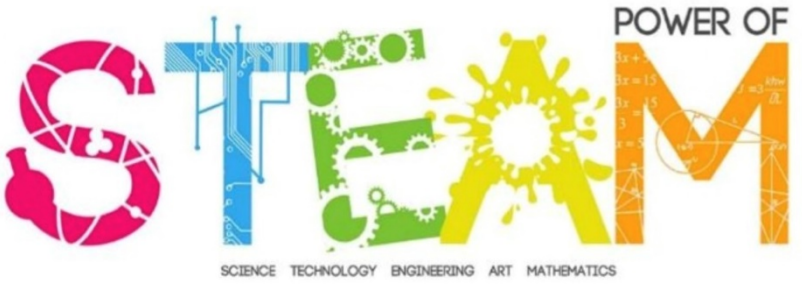

Science Project Guidelines for STEAM Night 2024

Our 7th STEAM Night at MATES will be held on campus on February 29th, 2024. Students may bring their science projects before or after school to the MPR at drop off on February 29th. All projects must be taken home at the end of STEAM Night. You may reach out to Erin Tracy, STEAM Night Chair, via email at Eryn1722@aol.com with any questions.

Below are the requirements for the Science project submissions in three categories - Scientific Inquiry, Rube Goldberg, or Invention, with an additional three categories to choose from for K-2 students this year – presentation of a Collection, a Model or a Demonstration. K-2 students may choose to submit a Science Project from any one of the 6 categories listed here.

Please complete an application form for all students that would like to submit projects. This will be due back to school on February 9th, 2024.

All projects must be able to stand alone without a student to run the experiment.

Collection (K-2 only)

For this category, you will create a collection of items and then sort and compare them in insightful ways. This can be done by categorizing and classifying the items. Items must be labeled and put into categories of similar characteristics. For example, use the five senses, or use color, shape, texture, or size to sort items. Write up your observations and give a short description of the category rules (names) and how the objects were classified (or sorted) into the groups. Note any items that posed a problem in your classification system.

Here are some suggestions to help guide you -

- **Collect information by counting objects, taking part in surveys, and measuring**
- **Categorize and classify objects: flowers, shells, rocks, shoes, Lego pieces etc.**
- **Gather information using student's five senses**
- **Describe observations, I see… I hear… I can smell…**
- **Know what body part is used to gather specific sensory information**
- **Identify, with help, the shape, texture, hardness. etc. of an object**
- **Ask questions about the information student gathered (data)**
- **Compare data using measurement terms – bigger, smaller, thicker, thinner, heavier, lighter**
- **Draw a picture of the student's data using one-to-one correspondence**

Some examples:

- **Leaf rubbings to categorize and classify shapes of leaves**
- **Collect items with different textures to touch**

- **Categorize and sort: Shells, rocks, stamps, doll shoes, leaves, flowers, grasses, wood, plastic types, marbles, vegetables, Lego pieces, Minecraft pieces, anything your student scientist is interested in.**
- **Display the collection in a well-organized, creative, artistic way, with labels, and a written sentence about what student found most interesting about project. This sentence will be read out aloud during presentation of the project on STEAM Night.**

Model (K-2 only)

A model shows how something works. It doesn't test anything.

- **Make a stationary or working model with moveable parts to show how something is made and its parts. Label all the parts of the model, with definitions of the parts and what they do. Give an explanation of what the model represents. Since a model is either smaller or larger than the actual object, it is a good idea to have a scale to explain the real size.**

Some examples: Volcano, solar system, Moon, heart, solar powered car, engine, airplane, wing and lift, insect and its parts, skeleton of a dinosaur, flower and its parts, hydro-electric power dam, erosion control, weather map, computer, etc…

More examples of models from Science Buddies:

https://www.sciencebuddies.org/search?v=pi&d=2&x=diff2,0,0&s=models

Demonstration (K-2 only)

Demonstration is the act or process of showing a scientific concept or truth. It may answer a simple question with a 'yes' or 'no' without changing a variable, such as "Can I grow sugar crystals?" Students may perform the demonstration for others during presentation of the project on STEAM Night.

Some examples of demonstration include:

1. Student exhales through a straw into a solution of tap water and aquarium pH indicator. The changing color demonstrates that increasing the amount of dissolved carbon dioxide causes water to become more acidic.

2. A simple demonstration explains why ABS makes modern cars safer to drive.

3. What does it take to become truly invisible? This disappearing trick separates fact from fiction. A Pyrex bowl submerged in vegetable oil completely disappears from view but try it with water or a different type of glass and it won't work. (Application: Times article on Invisibility Cloak)

More examples of demonstrations from:

https://www.pinterest.com/popawrod/science-project-models/

Scientific Inquiry

Scientific Inquiry is the basic experimentation category where a question is asked, a hypothesis is created, an investigation is performed, and a conclusion is reached. The Scientific Method is a fundamental part of this category. It is a sequence of operation for any Scientific Inquiry. The steps are:

- **Ask a testable question.**
- **Research the topic.**
- **Make a hypothesis about the outcome based on that research and your own knowledge.**
- **Design the investigation.**
- **Conduct the investigation.**
- **Collect data.**
- **Make sense of the data and draw a conclusion.**

Rules for Scientific Inquiry:

1. **You may work in groups of 2-5 or you may work on your own.**
2. **You must create a display that clearly outlines your scientific inquiry and the steps of the scientific method.**
3. **Your display should include visual images, models, and a description of each step you took in this process.**

Rube Goldberg

Have you ever wanted to build your own simple machine? A Rube Goldberg machine is a contraption, invention, device or apparatus that is engineered to perform a task including a chain reaction. The expression is named after American cartoonist and inventor Rube Goldberg. Most inventions try to make difficult tasks easier. Rube Goldberg discovered ways to make simple tasks amazingly difficult. One of his inventions used dozens of arms, wheels, gears, handles, cups, and rods that were moved by balls, canary cages, pails, boots, bathtubs, paddles, and animals, just to squeeze oranges for orange juice. The funny thing about his inventions is that he never built them; he only designed them. For more information on Rube Goldberg, visit https://www.rubegoldberg.com/

Rules for Rube Goldberg:

1. **You may work in small groups of 2-5 or you can work on your own.**
2. **A Rube Goldberg Machine is designed so that a single action STARTS the machine, such as pressing a button, letting go of a marble, cutting a string, removing a barrier, etc. No other additional human actions are required once your machine has started.**
3. **A machine must include 5-10 steps**
4. **A minimum of 3 simple machines must be present. Choose from a wheel and axle, a pulley, an inclined plane, a wedge, a lever, and a screw.**

Invention

Almost everything we work with, use, or wear is engineered. Someone had to think of how to design that object to solve a particular problem. An invention is a new device or an improvement on an existing machine or product that solves a problem or need.

Rules for Invention:

1. **You may work in small groups of 2-5 or you can work on your own.**

2. **A ‘mock-up’, prototype, or construction of the invention must be displayed.**

3. **This must be a new invention or an improvement on a current product.**