

# MASF Science Fair Categories And Sample Questions

MASF will now be accepting both Scientific AND Computer Sciences / Engineering projects for Division III. Each project must use one of the two following methodologies:

## Scientific Method

### **Question**

*Specific question based on an observation  
Having just one variable*

### **Hypothesis**

*What you think is the best answer to your  
Question – the outcome you expect*

### **Procedure (test)**

*Design your experiment, include each step  
Make sure to list materials and identify controls  
and the variable, make observations, and record  
data. Repeat several times (multiple trials)*

### **Results**

*Keep a log, graph, diagram etc.. of your work.*

### **Conclusion**

*Summarize your project, what happened?  
Did you get the answer you expected?*

## Engineering Process

### **Idea**

*Identify your goal (need your product/program will satisfy) and  
your target user*

### **Research**

*Should address all important facets of the project (science  
concepts, math formulas, existing products/programs)*

### **Method (design and test)**

*Based on research, establish design criteria, use this for  
preliminary designs that address the target user. Make sure to  
explore multiple approaches and be able to justify the chosen  
approach*

### **Results**

*Keep a log, graph, diagram etc.. of your work*

### **Analysis/Discussion/Conclusion**

*Does the product/program represent significant improvements  
over existing products/programs? Is it useful to target user?  
Does it fill a meaningful need?*

## Examples:

### **Scientific**

How does the quality of bearings  
affect the performance of a skateboard?  
(physics category)

How does humidity affect the strength of wood?  
(Material Science category)

### **Engineering Process**

Design a better skateboard bearing  
(Engineering / Computer Science Category)

Design a structure to support 100 lbs of load that spans 24"  
at any humidity. Using only popsicle sticks and glue.  
(Engineering / Computer Science Category)

In general, if you have a project that will test something using just one variable, then it will go into one of the Scientific method categories, if you are designing something, then it will go into the Computer Science / Engineering category.

**Computer Science and Engineering:** Computer Programming and analysis, Engineering design etc..

Some examples of projects for this category would be: Test how a computer counts letters, searches the internet, ~~turns a cd, or how to move a character on screen.~~ Write a program to alphabetize a list of words, do simple calculations, determine the strength of passwords, or create animation.

Design a robot to clean your room, a bridge that will span 2 feet with certain perimeters, a more efficient vacuum cleaner, a faster skateboard, a better calculator, a skyscraper that can withstand a certain amount of wind, etc..

Scientific Method, you must choose a testable question. This means you have only ONE variable (or thing that changes) in your experiment. If you pick a general question – it will more than likely be considered a Research project and will NOT be eligible to move on to the Mountain Area Science Fair.

**Zoology:** Pet Studies, Nutrition, Life Cycles of Insects, Food Chains etc.

**Research Questions**

What sounds do insects make?  
How do Mice learn?

**Testable Questions**

Does temperature affect the number of chirps a cricket sings in a minute?  
Does age affect how quickly mice learn to run through a maze?

**Electricity and Magnetism:** Solar power, Battery life, Lasers, Magnets, etc.

**Research Questions**

How does an electrical current work?  
How does a battery work?

**Testable Questions**

What materials best conduct electricity?  
What brand of battery last the longest?

**Chemistry:** Elements, Evaporation, Crystal Growth, Acid/Base Reactions, etc.

**Research Questions**

How do Crystals grow?  
How does water turn into gas?

**Testable Questions**

Which type of Crystal will grow the fastest?  
Does temperature affect evaporation?

**Physics:** Light, Mass, Liquids/Solids/Gases, Machines / Motion, Rocketry etc.

**Research Questions**

Why do things float?  
What make things a certain color?

**Testable Questions**

Which liquid has more buoyancy?  
Which color absorbs more heat?

**Earth / Environmental:** Fossils, Erosion, Weather, Crystals, Geology, Oceanography, etc.

**Research Questions**

What is a Crystal?  
What kind of soils are in Colorado?

**Testable Questions**

Which Crystal is the strongest?  
Which type of soil will erode the quickest?

**Human Body / Health:** Nutrition, Effects of Drugs, Learning, Exercise, Color Perception, etc

**Research Questions**

What are healthy foods?  
How does exercise make you stronger?

**Testable Questions**

Do eating sweets make you better at video games?  
Does body weight determine strength?

**Material Science:** Strength, Insulating Properties, Flexibility of Materials etc..

**Research Questions**

How does wool keep you warm?  
How does paper absorb water?

**Testable Questions**

What material insulated the 3 Little Pigs the best (straw, sticks, or brick)?  
Which paper towel is the strongest?

**Microbiology:** Molds, Yeast, Bacteria, Algae, etc. (all microorganisms must be sealed in hard plastic container)

**Research Questions**

What is that green stuff growing on my muffin?

**Testable Questions**

Do molds grow better in humid or dry conditions?  
Who has a cleaner mouth, a dog or a human?

**Aerodynamics / Fluid Mechanics:** Solid bodies moving through air or liquids.

**Research**

How does an airplane fly?  
Why are race cars fast?

**Testable Questions**

Which paper airplane design will go farthest?  
Which race car design will go the fastest?

**Botany:** Plant growth, Effects of pollution, climate changes, insects on plants. Etc..

**Research**

How do plants grow?

**Testable Questions**

How much water is necessary for a violet to thrive?

**Structures:** Bridge strength, Arches, Ship Designs, etc.

**Research Questions**

How are bridges built?  
When did man start using Arches?

**Testable Questions**

Which bridge design will hold the most weight?  
Does height affect the amount of load an arch will hold?