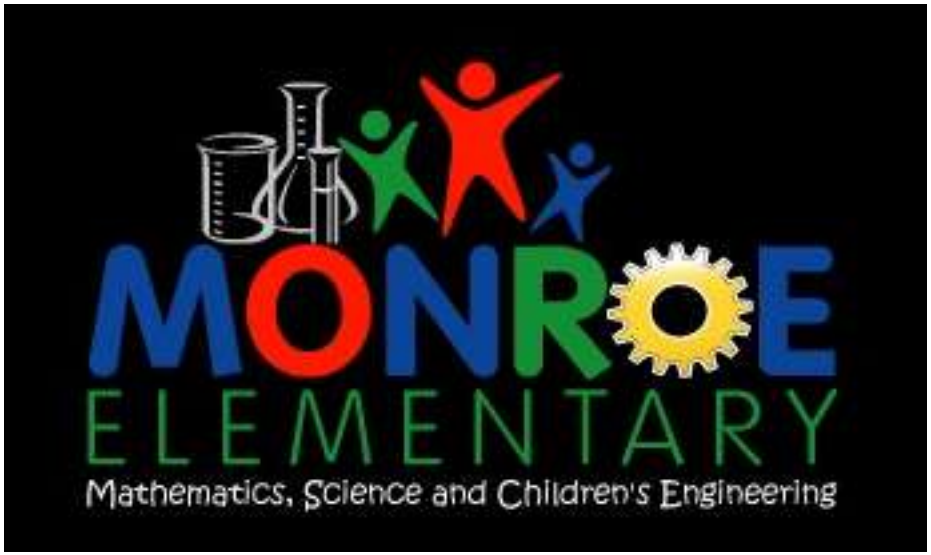
Monroe S.T.E.M. Fair



What is a S.T.E.M. Fair project?

- A S.T.E.M. Fair project can be anything related to Science, Technology, Engineering, or Mathematics.
- The project follows a process.
- The project must have measurable results.

Investigable Questions

Three types of investigable questions.

- Descriptive Questions
- Relational Questions
- Cause-Effect Questions

Descriptive Questions

Produce qualitative or quantitative description of an object, material, organism, or event.

Examples of possible question stems:

- What are the characteristics of _____?
- How many…? How often ..? How much…?
- What happens when _____? (natural context implied; change not imposed)
- What happens if _____? (when you change something).

Examples of descriptive questions:

- What kind of food do birds eat?
- Does brown sugar dissolve in water?
- What happens to leaves of maple trees when it snows?

Relational Questions

Identify associations between the characteristics of different phenomena. These can include:

- Identification & classification questions: identify phenomena and put them into meaningful groups
- Focused comparison questions: rank a group of materials based on a specific characteristic;
- Correlational questions: examine the extent that the presence of one variable is related to that of another variable (do not confirm cause-effect relationship).

Examples of possible question stems:

- How are _____ similar/different to _____?
- How can these _____be organized into groups?
- Which _____ (material/organism/etc.) is the most _____(absorbent/strongest/best conductor/etc.)?
- How is _____ related to _____?

Examples of relational questions:

- Is it easier to generate static electricity in a dry or humid room?
- Which material is more absorbent?
- How are these leaves similar and how are they different?
- How is the height of a plant related to the number of leaves? Do taller plants have more leaves?

Cause-Effect Questions

Determine whether one or more variables cause or affect one or more outcome variables.

Examples of possible question stems:

- Does ____ cause/affect _____?
- How does _____ affect_____?

Example of cause–effect questions:

- Does sunlight affect the growth of a plant?
- How does temperature affect the rate at which salt dissolves in water?

Science

Follows a scientific process:

Observations lead to questions

- Make observations at home or school.
- What questions might you have about your observations?

Good S.T.E.M. Fair Questions often start:

- How does _____ compare to _____?
- How does _____ affect _____?
- How does…?
- What…?

Science

Materials

- Include a list of materials needed - be specific

Procedure

- Describe what you will do to test the question.
- Describe how you will know if it is successful.
- Focus on one variable.

Science

Prediction

- Write what you think will happen.

Results

- Describe the criteria for success.
- Tell how will you measure the success. Show some data. Graph, table, picture, etc.

Science

Vocabulary

- List and define any new words learned related to the project.

Conclusion

- Write a few statements that answer your original question using your data to support the conclusion.

Science

I wonder…

- Experiments often lead to more questions.
- What other things are you wondering about as a result of your project or outcome.

Include photos or illustrations throughout your project.

Layout of the Science Board

Question	**Title**	Vocabulary
	Prediction	
Materials		Conclusion
	Results	
Procedure	(data that measured the success goes here)	I wonder…

Engineering

Ask

- Identify the problem
- How could you write that in question form?

Engineering

Imagine

- Brainstorm ways to solve the problem.
- Include sketches or drawings with labels with possible materials.

Engineering

Plan

- Most important part!
- Detailed illustration with labels of design solution.
- Include specific materials.

Engineering

Create & Test

- Use the plan to build the design.
- Include photos.
- Include the criteria you used to measure its success.

Engineering

Improve

- A new improved plan.
- Focus on the weaknesses of the design.
- Re-create it and test with new photos.

Engineering

I wonder…

- Include any new questions you have as a result of your design.

Layout for a Engineering Design Board

Ask	Title	Improve
Imagine	Plan Create & Test (Data that measured the success goes here)	I wonder…

MONROE S.T.E.M. Fair Showcase

Coaching will occur during the day. Coaches will ask you questions about your project.

- Why did you choose this choice as your topic?
- Who did you work with to complete this project?
- Did you encounter any problems? How did you solve them?
- What is the most interesting thing you learned by doing this project?
- How did you measure the success of your project?

Wednesday, February 3th, 2015

6:30pm-8:00pm

MONROE gym

Timeline

6:30pm-7:45pm Open viewing of all projects

7:45pm-8:00pm Clean-up

DISTRICT S.T.E.M. Fair

Saturday February 7th, 2015
Coon Rapids High School
Time: TBS
Register at www.anoka.k12.mn.us/stemfair

Example Timeline

8:00am-9:00am Students arrive to set-up projects
8:00am-9:00am Open viewing of all projects
9:00-11:15 Project Judging- only students and judges
11:15pm-11:45pm Tear down of projects
11:45-1:30 Awards ceremony in Auditorium

Coaches/Mentors

Sample questions coaches might ask:

- Why did you choose this choice as your topic?
- Who did you work with to complete this project?
- Did you encounter any problems? How did you solve them?
- What is the most interesting thing you learned by doing this project?
- How did you measure the success of your project?
- Tell me about your results. Were you surprised by the results?
- What new questions do you have now?

Look Ahead to 4th/5th Grade

- STEM Fair Projects are required. 4th grade you have option to work with a partner. 5th grade- they are all individual projects.
- Topics focus on a technology- the history, current technologies, and the engineering design process- future of that technology.