It’s time to start thinking about the STEM Fair!

1. The STEM Fair will be held on February 27, 2020 from 6:00 to 7:30 pm. Projects for the STEM Fair should be completed outside of the school day. Projects that were completed as part of an in-school project will not be considered for judging. All projects will be due on the 27th and should be brought to school during the school day to allow set-up prior to the fair. During the school day on the 27th, students in grades 3-5 only will be judged on their presentation and the information on their project board. Each presentation will be 2 minutes, regardless of whether it is a group or individual project. All students must present their own project in order to be judged. Electronic projects may be submitted using Google Slides.

2. Students may complete their project in a group or individually. Groups may consist of two or three children. Group projects that include both primary and intermediate students will not present to or be judged by the judges.

3. The STEM Fair is like a Science Fair, but with a wider selection of topics. The projects can include science, math, engineering, and/or technology components. Students can solve a real-world problem or can conduct an experiment. The project may use the scientific process or the engineering design process, depending on the type of project students choose to complete.

<table>
<thead>
<tr>
<th>Engineering Project</th>
<th>Scientific Process</th>
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<tbody>
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<td>• Based on a real world problem for the student. For example, a student may want to figure out a way to make a favorite cookie recipe healthier, explore the best soil for growing vegetables, build a bridge that would support a pet guinea pig, or design a way to safely store Christmas ornaments. Projects may have more than one solution and may include one or more of the areas of STEM.</td>
<td>• Students will conduct an investigation on a science topic: biology, environmental science, chemistry, physics, etc.</td>
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<td>• Students will ask questions, imagine, plan, create, improve, and experiment based on the problem they choose to investigate.</td>
<td>• Students will complete the steps in the Scientific Method: Research, purpose, hypothesis, procedure, log, data displays, results summary, conclusion</td>
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6. It will take several steps to complete a STEM fair project: topic selection, research, making a plan, setting up and conducting the investigation or design plan, collecting and evaluating data, making changes based on the results, deciding how to display the data in charts and graphs, and preparing an exhibit of the project.
7. This is a valuable learning experience that will be interesting and fun! Look around your environment and think of a problem that interests you, or find a topic you want to learn more about. We will accept project registrations until Friday, January 31st.
STEM Fair Project Form

Please return this form to your teacher by Friday, January 31, 2020.

<table>
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<tr>
<th>Student Name(s)</th>
<th>Teacher</th>
<th>Grade</th>
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<tr>
<td>(Please list all members of the group on one form. If one name is listed, we will assume that child is working on a project alone.)</td>
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The topic or question for the project will be:

________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________

Will you need electricity on the evening of the fair? _____________

Will you need a computer available to present your project the evening of the fair?_______

I would like to order a trifold project display board from MES for $5.00. (Please send in $5.00 or a check made out to MES in an envelope labeled with the student’s name and “STEM Board”. Attach the envelope to this project form.) The boards will be delivered to your child’s classroom upon receipt of the $5.00.

I give my child permission to participate in the 2020 STEM Fair.

Parent/Guardian Signature___________________________________________

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Parent volunteers are needed to help clean up when the fair is over! If you can help, complete the information below.

Parent Name: _____________________________________________________

Phone Number: ______________ Email address: ________________________

Thanks so much for your help!
This form and set of guidelines will also be available on the MES website.
**Scientific Process Guidelines**

**Select a Topic:** Think about science you notice in the world around you and choose one concept you would like to investigate. Conduct an experiment on this concept. For example, which type of salt de-ices a sidewalk better?

**Make A Project Plan:** Think about all you need to do to complete the project and develop a timeline to complete the project.

**Research:** Do some research about your topic. It will help you make your hypothesis and give you a base of knowledge to use when investigating your concept. Paraphrase all of the important information you find about your topic and list resources you use.

**Purpose:** The purpose describes what you would like to find out or accomplish. Take your initial question and turn it into a statement.

**Hypothesis:** The hypothesis is an educated statement of what you think will happen and why you think that, based on your research.

**Procedure:** This is a detailed set of steps that you will follow to complete your investigation.

   a. List all the materials you will use/need for the experiment.
   b. Think about variables. Independent variables are what you are changing on purpose to see what occurs. Dependent variables are the result of your investigation. This is what you measure. For example, a scientist may want to change the amount of water a plant gets (independent variable) to see how it affects plant growth (dependent variable).
   c. Decide what you are going to do and write step-by-step directions of how you will conduct the investigation.

**Log:** Find a way to record all information and what you learn or discover in a log book. Date each entry. This information will help you as you journey through the steps of your investigation. Be sure to take pictures along the way as this will help you with your display on the project board.

**Data Displays:** Your project board should have data displays. Charts and graphs are examples of ways to display your data and results.

**Results Summary:** This is a paragraph that makes observations about your data and explains what it shows. (ex. There were 5 more flowers on Tuesday than Monday.)

**Conclusion:** Use your data and investigation to reflect and make a conclusion. Was your hypothesis correct? Were there any problems that may have affected your results? Describe any materials or equipment you made. What would you change the next time to make it better? How could this information be used in real life?
**Project Board:** Your board should be no larger than 48 inches wide. It should include the title, purpose, research, hypothesis, procedure, data, pictures, results summary, conclusion, and a list of research citations. You will be judged on this, as well as your 2-minute presentation, in front of the judges.

**Presentation:** This is when you will get to share your project board with the judges. Each presentation, whether group or individual, will be 2 minutes. Practice your presentation so that you will be able to talk about all the steps of your project and answer any questions.

Have fun!
Engineering Project Guidelines

If your project will solve a problem, follow these guidelines to complete your project. Students in grades 3-5 only will be judged on your presentation and project board.

The engineering process is cyclic in nature. Engineers may start at any step and move around from step to step in order to achieve their goal. Your project board will provide a summary of your journey through the engineering process. Visit http://www.eie.org/content/engineering-design-process to see a visual of this cyclical process.

Ask

Identify the Problem - What real life problem would you like to address? Ex. How can I make a box that will protect Christmas ornaments? Conduct research on the topic to help you make educated decisions about your design.

Identify Criteria and Constraints – What are the limitations of the design? Ex. The box must fit through the attic ladder door so it must not be bigger than 2 1/2 feet by 3 ft. It must be made of a material that will hold up to temperature variations in the attic.

Imagine

Brainstorm Possible Solutions – Brainstorm and draw ways the problem could be solved. Draw them neatly; using rulers to draw straight lines and to make parts proportional. Parts and measurements should be labeled clearly.

Explore Possibilities - Record pros and cons of each design idea next to the drawings.

Plan

Select an Approach – Choose one of the solutions and write a paragraph about why you chose this design over the others. Use your prior research and constraints listed above to support your decision.

Write a Set of Directions - Write a set of steps you will follow to build your solution. Include a materials list.

Create

Build a Model - Build a full-size or scale model based on your drawing and use the materials you specified.
Improve

**Refine the Design** – Test the design and evaluate its success. Display this data in a chart or graph. Based on the results, identify or make changes to the design to make it better. Explain why you made these changes.

**The Display and Presentation**

**Project Board** - Your project board should be no larger than 48 inches wide. It should include the title, purpose, research, plan drawings, a detailed summary explaining the steps taken to completion, data displays of test results, pictures, results summary, conclusion, and a list of research citations. You will be judged on this, as well as your presentation.

**Presentation (Grades 3-5 only)** - This is when you will get to share your project board with the judges. Each presentation, no matter whether it is a group or individual, will have two minutes to present. Practice your presentation so that you will be able to talk about all of the steps of your project and be able to answer questions.

Have fun!