4th and 5th grade - 2nd trimester STEM project

STEM stands for Science, Technology, Engineering and Mathematics. **All 4th and 5th grade students must complete either a science OR engineering project.**

Included here is everything you need to get ready for this project. Our Winter Break is a great time to get yourself started on your projects, or to begin to plan and think about your project. Here are some important dates and things to remember:

- Packet and project details given before Winter break. Examples of both scientific method and engineering based projects will be covered in class.
- **Tuesday, January 10th:** All applications due online. Students must receive approval of their project before starting work. Project applications will be done online this year and can be accessed through the Google Classroom for each class. The application pages are included in this packet to fill out and use to prepare for the online application. But the online application is the one that counts. (It's also a little shorter than the paper version)
    - Any student who has not submitted an online application by Friday, January 13th will be assigned a project topic.
- **Tuesday, January 31st** : Mid project update sheet due
- **Monday, February 27:** All projects due. Students bring project materials to class for presentations.

- There are many useful websites with project ideas. A few to try are:

  http://www.all-science-fair-projects.com/
  https://www.sciencebuddies.org/science-fair-projects/science-projects
  https://www.education.com/science-fair/

Choosing a Project

Students can submit a science fair project OR an engineering project. There are differences in the process and purpose for each kind of project. Use the sites listed, and the information below to help you choose which type of project you would like to do.

How is a science project different from an engineering project?

Science Projects

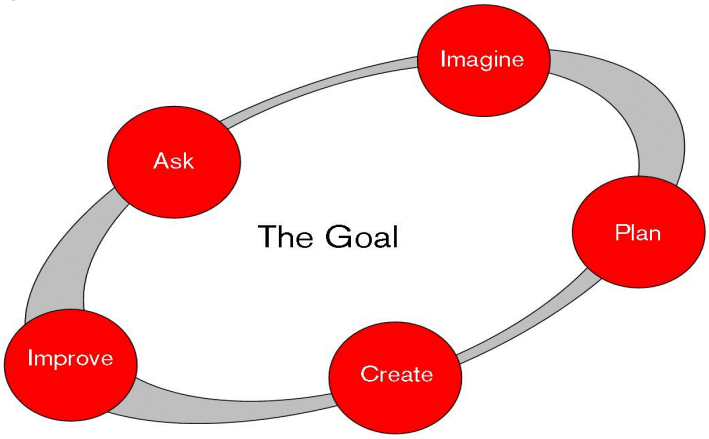
A science project starts with a question that a student can answer with research and testing. Once the question has been established, the student needs to determine what experiment(s) or research needs to be done to answer the question. When designing the experiment, students need to make sure that there is only one variable that they are testing. Use the "Scientific Process", which is simplified in a list below:

1. **Ask a Question**
   Be curious, but choose a limited subject that you want to know more about. Identify a testable problem and move on to step 2!
2. **Perform Background Research**
   Learn as much as you can about your subject. Check both print and online resources.
3. **Predict**
   What do you think will happen? Record your thoughts.
4. **Design Your Experiment**
   Make sure your experiment is "controlled" – meaning only one thing changes (variable) at a time so you can measure exactly what happens. Record observations and data once you start your experiment.
5. **Experiment & Analyze Results**
   Once you have your data from your experiment, we suggest graphing the results – not only can you use this on your project board, but you can also visualize what happened more easily!
6. **Conclude**
   Tell us what happened. Is it what you thought? Why or why not?
7. **Report & Exhibit**
   Make your presentation board informative and detailed, but memorable as well. Be prepared to explain why you chose your project, how you went about planning it, and what you learned.

Engineering Projects

An engineering project takes a problem that exists and works to improve or solve it. This could be an environmental issue, a design challenge, a problem with something failing/breaking, improving the design of something to make it more efficient or effective, and much more! Engineers are people who use science, math, and their creativity to design or improve technologies using the engineering process.

Engineering Design Process



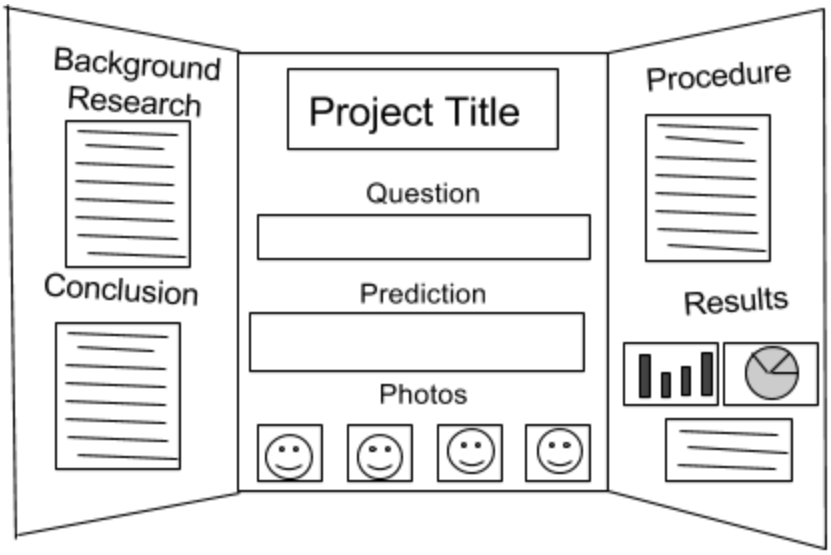
"Engineers use a problem solving process to design and improve technologies, or anything made by humans to solve a problem." ---Engineering is Elementary

A good way to plan out your Engineering Project is to follow the list below:

1. **Ask**
   What is the problem? How can I make this better? What have others done? What are the constraints? Create a prototype to improve items we already have.
2. **Imagine**
   What could be some solutions? Brainstorm ideas. Choose the best one.
3. **Plan**
   Draw a diagram. Make a list of materials you will need. Consider the cost and requirements of your materials.
4. **Create**
   Follow your plan and create it. Test it out!
5. **Improve**
   Make your design even better, revise it. Test it out!
6. **Report & Exhibit**
   Make your presentation board informative and detailed, but memorable as well. Be prepared to explain why you chose your project, how you went about planning it, and what you learned.

Science Project Display Example

Title - Short, catchy and lets people know what your project is about
Question - What are you curious about? One sentence that includes what you are testing.
Hypothesis - What do you think your results will be after completing your investigation and testing?
Background Information - This section includes the research and information that people need to know about the parts of your investigation.
Procedure - These are the steps that you used in sequential order. They are numbered and include enough detail that someone else could follow them and complete your investigation.
Results - Collect the data and prepare charts, diagrams, journals, photographs, or tables that will help people understand your results.
Conclusion - What did you determine or learn from completing this investigation? What would you do next time?

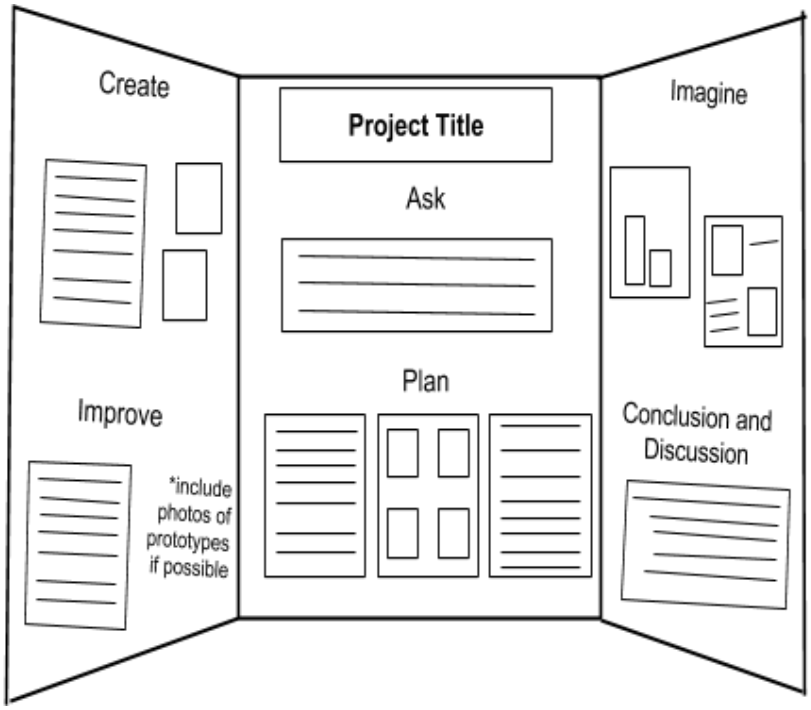


Be prepared to answer questions about your project from interviewers, teachers, and/or judges, such as the following:

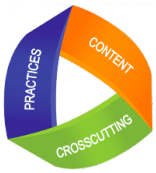
How did you decide to do this investigation? How did you decide on your problem/purpose/prediction? Explain your hypothesis and procedure to me. How many times did you repeat your experiment? What did you test? (control and variables) What did you already know about your subject? What did you learn from your project? Explain your data/table/chart to me. What did you conclude about your project? What have you learned from this process? What would you do next time to improve it?

Engineering Project Display Example

Title - Short, catchy and lets people know what your project is about
Ask - What is the problem? How can I make this better? What have others done? What are the constraints? Create a prototype to improve items we already have.
Imagine - What could be some solutions? Brainstorm ideas. Choose the best one.
Plan - Draw a diagram. Make a list of materials you will need. Consider the cost and requirements of your materials.
Create - Follow your plan and create it. Test it out!
Improve - Make your design even better, revise it. Test it out!
Conclusion and Discussion - What did you determine or learn from completing this investigation? What would you do next time to improve it?
Report & Exhibit - Make your presentation board informative and detailed, but memorable as well. Be prepared to explain why you chose your project, how you went about planning it, and what you learned.



Be prepared to answer questions about your project from interviewers, teachers, and/or judges, such as the following:
How did you decide to do this investigation? Explain your hypothesis and procedure to me. How many times did you redesign your prototype? What did you already know about your subject? What did you learn from your project? Explain your data/table/chart to me. What did you conclude about your project? What have you learned from this process? What would you do next time to improve it?



STEM Fair Science Project Application 2022 - 2023

Name_____ **Teacher**_____ **Grade**_____
Is this a group project? ___ yes ___ no If yes, who are your partners? _____
Project Title:

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Ask a Question: Be curious, but choose a limited subject that you want to know more about. Identify a testable problem.

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Hypothesis: What do you think will happen?

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Design Your Experiment: Make sure your experiment is "controlled" – meaning only one thing changes (variable) at a time so you can measure exactly what happens.

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Parent Signature _____

Teacher Approval: yes_____ no_____
Teacher Comments:
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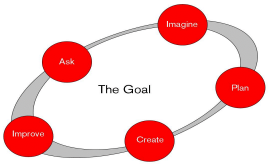

STEM Fair Engineering Project Application 2022-23

Name_____ **Teacher**_____ **Grade**_____
Is this a group project? ___ yes ___ no If yes, who are your partners? _____
Project Title:

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Ask - What is the problem? How can I make this better? What have others done?

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Imagine - What could be some solutions?

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Plan - Draw a diagram. Make a list of materials you will need. Consider the cost and requirements of your materials.

Parent Signature _____

Teacher Approval: yes_____ no_____
Teacher Comments:
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No live animals of any kind may be used in your project