

5th Grade Engineering Fair Deadlines

Step 1: Get Problem approved by Homeroom/Science teacher

Turn in **Ask** Page from this packet (pages 2-3)

Due **Wednesday, November 13th**

Step 2: **Imagine & Plan** (pages 4, 5, 6)

Due **Friday, November 22nd**

Step 3: *If you choose the covered wagon project, it will need to be **Created**

By Monday, November 25th

You will be able to test and re-test it at school on Nov. 25&26, and Dec. 2nd.

*If you choose your own project idea, you do not need to bring it to school. You will **create** and **test** it at home and record your results.

Step 4: **Test Results & Improve** (pages 7, 8, 9)

Due **Tuesday, December 3rd**

Step 5: Complete your 3-sided Display Board OR Digital Presentation (PowerPoint/ Google Slides).

Completed Display Boards OR Digital Presentations saved on Google Slides are due on Tuesday, December 10th.

*The physical creation that you have engineered will not be turned in with the presentation. Pictures are ideal for sharing your creation with your teacher, class, and judges.

*Judging takes place Monday, December 16th.

Ask

What is the problem that I want to solve?

Examples of problems we have solved (or ideas):

- *Design a boat that will carry ten passengers and float;
- *Design a container that will keep a liquid as hot as possible for an extended amount of time.
- *Design elements of a vehicle to keep passengers safe in a collision
- *Design a bridge to carry a certain amount of weight.

I can choose from two options:

Option 1: My own idea for a problem: _____

(I will develop my own criteria and constraints)

Criteria

(How will I know if it is successful?)

-
-
-

Constraints

(What resources are limited?)

- Time: created and tested by December 3rd
- Materials/Money:
- Other (if any):

Option 2: 5th Grade's problem: _____

Criteria

(How will I know if it is successful?)

-
-
-
-

Constraints

(What resources are limited?)

- Time: created by November 25th
- Materials/Money:
\$5 budget for device – use as many recycled materials as possible

Imagine

Research:

*What have others done to solve the problem? *Record at least 2 ideas you find, and also record the source (website).*

Fact/Idea

Source

Imagine

- *Brainstorm at least two ideas for solving the problem.*
- *If applicable, research how well certain materials or shapes work (maybe by testing them yourself).*

Record ideas or data here or on a separate page.

Plan

Combine the best parts of your ideas and data to make one plan. Draw or list the steps for exactly how this will be created. Be specific about details – label all materials, measure how much will be needed.

Create

Record the creation of your solution (sketches or photos are one way to do this).

Test

Think back to your original problem and criteria, and decide how you will measure the success of your solution (ex: How far it travels, how much water is collected, how much weight it holds).

*It is best to measure the variable quantitatively (using NUMBERS) rather than "it works/doesn't work."

Perform at least 3 trials of your solution, and record the results in chart form. Be sure to keep all conditions the same for the 3 trials. If you change a variable, be sure to conduct 3 more trials. One type of chart is provided, but you may create your own chart that fits your data best.

Variable I am measuring:	Trial 1	Trial 2	Trial 3

Improve

Reflect on how well your first solution met the criteria, and choose ONE variable to change.

Once you've changed that variable, perform at least 3 trials again, and record the results (again) in chart form. (You may create your own to fit your data best).

Do this as many times as needed to get the best results possible to meet your criteria.

*Even if your changes made your device less successful, include that data anyway, and explain how it helped you to arrive at your final product.

Variable I am measuring:	Trial 1	Trial 2	Trial 3

Variable I am measuring:	Trial 1	Trial 2	Trial 3

(Improve (continued))

Reflect on and summarize the process. Use the following questions to guide you:

What steps did you take to improve the solution?

How did you your test results change as you made improvements?

How well did your solution solve the problem, based on your original criteria?

What other ideas do you have for improvement, if you were to attempt this design again?

General Guidelines

*The templates and questions in this packet are designed to help you work through the Engineering Design Process. These will help you communicate the essential parts of your project to your teacher, and should be summarized into a presentable form for your display board or digital presentation (PowerPoint or Google Slides).

*A template for the layout of your display board is also included in this packet. Display boards can be purchased at school for \$3.

* If you choose to create a digital presentation instead, at least one slide should be included for each element shown on the board.

Transitions or animations (within or between slides) are not permitted.

*You can also access digital templates for the presentation, as well as an electronic copy of this packet in Google Classroom with Class Code: 8wr4vh8.

Glossary

Applicable – relevant or appropriate to your situation

Constraints – limits or restrictions on resources available (time, materials)

Criteria – requirements for being successful in solving a problem

Data – information gained from observing or testing an experiment; Good scientists record data to help them gain understanding and make conclusions.

Research – collecting information about a subject – can be gained from finding information shared by others, or by doing a test yourself

Results – outcome or effects of testing your creation (What happened?)

Solution – method for solving a problem; In this case, your solution can be what you have created to accomplish the challenge or goal.

Trial – conducting a controlled test or investigation a single time; Good scientists perform a test more than one time in order to make their results more reliable.

Variable – any factor that can be changed, controlled, or measured in an experiment;

Independent variables are those that you change in order to see their effects.

Dependent variables are those that you observe or measure (see how the independent variable affects it).

Controlled variables are those that you keep the same for all trials or tests.