

Engineering Expo

Student's Name: _____

Each individual student will perform their own Engineering (Invention) Project at home. Students will then use that information to create a Google-Slide Presentation in class that will be shared.

Dear Students and Parents:

It is time to start work on Canyon Springs Engineering Expo. Enclosed is a schedule outlining the due dates and important information regarding your child's project. Ample time has been scheduled and work has been spread out so students can complete the work at a comfortable pace.

The primary objective of this project is to have students use the Engineering process and what they know about the Science Inquiry process to **create an invention that solves a problem and test it.**

This includes:

1. Identifying a problem
2. Brainstorming possible solutions
3. Asking questions & forming a hypothesis
4. Designing and building
5. Organizing data & Drawing conclusions

Your invention must be a solution to your problem and you must use the Science Inquiry Process to test your invention. We encourage you to pick problems that relate to you or your family and something that you are genuinely interested in solving.

This is a mandatory assignment and will be part of your 3rd quarter grade. All work must be done by the student; however, assistance may be provided by parents, etc. It is very difficult to work alone without the exchange of ideas, so we encourage you to brainstorm with your child on different problems and possible solutions.

I appreciate your support on this important project. As acknowledgement and part of your child's homework, please sign and date this letter by **Friday, January 12th.**

The Engineering Expo Google-Slide Presentation is due on **Wednesday, February 28th.**

Engineering Expo Agreement

Student's Name: _____
(Please Print)

I have reviewed the Engineering Expo information and calendar with my child, and we understand the requirements for a successful project.

Parent Signature

Date

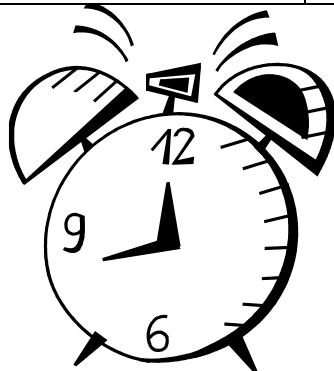
Student Signature

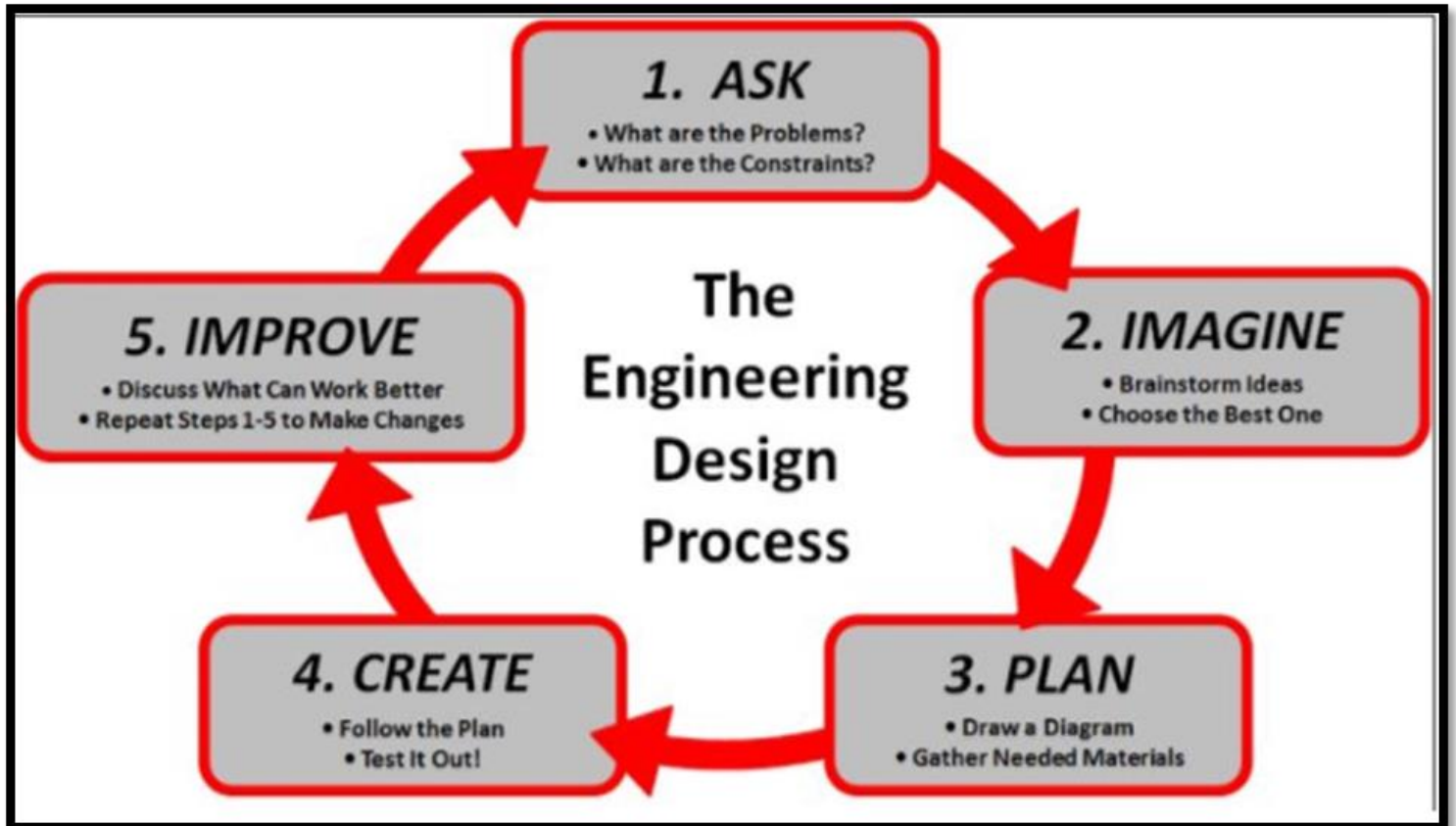
Date

Engineering Expo Timeline

Directions: The following is a chart of assignments and dates of when each is due.

Due Date	Completed Teacher Initials	Assignment
1/12/18		Parent Letter Signature (Page 2)
1/12/18		Identifying a problem (meet with teacher for approval in class) (Page 4)
1/16/18	Work day in class.	Engineering an invention to solve the problem. (Page 5)
1/22/18		Diagram of invention (Page 6)
Suggested date 1/29/18	No initials needed	Build your invention
2/06/18		Write a procedure to test your invention (Page 8)
Suggested date 2/12/18	No initials needed	Experiment should be complete
2/22 & 2/23	Work days in class	Work on Google Slides
2/26 & 2/27	Work days in class	Work on Google Slides
2/28/18	No initials needed	Google-Slide Presentation Due





Identifying a Problem

You will now brainstorm a problem you see in the world or in your daily life and determine how an invention could solve that problem.

Examples: It takes a long time to clean the cat litter box. It takes a long time for my nails to dry. I do not have time to feed my animal during the day. My sister keeps coming into my room. I do not wake up to my alarm.

1. _____

2. _____

3. _____

4. _____

Turning the Problem into a Question

Once you have met with Mrs. Raab and your "Problem" has been approved, turn your problem into a question.

Examples: How can I take less time to clean the cat litter box? How can I dry my nails faster? How can I feed my animal during the day if I am not home? How can I keep my sister out of my room? How can I make sure I wake up to my alarm?

Problem: Restate your "Problem":

Turn your "Problem" into a Question:

Engineering an Invention

You will brainstorm possible inventions (solutions) to help solve your problem. **NOTE: No invention affecting or having the possibility of affecting animals', insects' or humans' physical, mental, or emotional well-being will be approved.**

1. _____

2. _____

3. _____

4. _____

Diagraming your Invention

You will diagram (draw a picture) of the invention you have chosen to create. **Label parts on your diagram.**

Write the invention you have selected:

Write the materials you will need to create your invention:

Title: _____

Inquiry Process

THIS IS TO BE DONE AFTER YOUR INVENTION HAS BEEN BUILT

Once your invention (solution) has been engineered (created) you will test your invention by using the Science Inquiry Process (Scientific Method).

Please read the steps below so you are clear as to how to test your invention.

Steps of the Science Inquiry Process



STEP 1: Investigative Question

Ask a question which can be answered by experimentation. Questions should start with "how" or "why" and cannot be answered with yes or no.



STEP 2: Background Research

(Get information about your topic)

Write down information you already know about your topic.



STEP 3: Hypothesis

(Write what you think will happen)

In a hypothesis, students will predict the outcome and it should be based on the students' experiences and/or observations. It should be written in the following format:

IF (relationship of two variables)...THEN (prediction of what will happen).

A Hypothesis should include the following:

- If...Then format.
- NO "I think" in your hypothesis.
- Relationship between independent variable and dependent variable.
- Prediction of how the independent variable will affect the dependent variable.



STEP 4: Experiment

(Test it)

Materials:

- List every item that is needed to do the experiment.
- Be sure to include quantity and sizes.

Procedure:

- List a systematic sequence of exactly what is done.



STEP 5: Analyze Data/Conclusion

(Look at your test, write what you learned)

Analyze Data:

Write what happened in your experiment.

Conclusion: (Accept or Reject your Hypothesis)

STEP 6: Communicate your results

Display your results in your Google-Slide Presentation by using the Rubric on page 12.



Science Inquiry Process

THIS IS TO BE DONE AFTER YOUR INVENTION HAS BEEN BUILT

Investigative Question:

Hypothesis: (Use page 7 to help with the format of the Hypothesis. Write what you think will happen when you test your invention)

Materials: List all materials needed to test your invention (not the materials you needed to build your invention). Your Invention should be the 1st "Material" listed.

Procedure: Write out all steps to test your invention.

Step 1:

Science Inquiry Process

Once you have completed an experiment to test if your invention works, fill out the following information.

It is okay if your invention did not work the way you thought, however, you still need to complete the Analyzing Data and Conclusion part of your project.

Analyzing Data: Write down in paragraph form what happened when you tested your invention.

Conclusion: Write down in paragraph form whether you are accepting or rejecting your hypothesis and why.

Google Slide Guidelines

Use this page and the Rubric on page 12 when creating your slides.

Your project will be presented with many others, so it should be attractive and have eye appeal. Remember the "C's" for exhibiting:

- Color appeal
- Contrast
- Clear, concise statements
- Completeness



Your slides should **tell the story of your project**. Use simple statements and attractive visuals to help achieve this. Remember, your slides are ultimately how your invention will be graded. You need to make sure you spend time and effort in making a quality presentation.

The following components must be included and labeled, on your slides.

- Invention Title/Your name (**Slide 1**)
- Problem (**Slide 2**)
- Invention (**Slide 3**)
- Explanation of how your invention works (**Slide 4**)
- Diagram of your invention with all parts labeled (**PICTURES MUST BE INCLUDED**) (**Slides 5, 6, & 7**) (You may also put a video of you testing your invention)
- Analyzing Data - what happened when you tested your invention (solution) (**Slide 8**)
- Conclusion of testing your invention - accept/reject your hypothesis (**Slide 9**)
- Reflection "How can I make my invention even better" (**Slide 10**)

Google-Slide Information

Title: _____

Problem: (Not in Question form)

Solution:

Explanation of how the Invention works:

Analyzing Data: (What happened when you tested your invention?)

Conclusion: (Accept or reject your hypothesis and why.)

Reflection: (How can you make the invention better?)

**Google Slides are due: Wednesday, February 28th
NO EXCEPTIONS!!**

Google-Slide Rubric

	Meets or Exceeds Standard (5)	Approaches Standard (3)	Falls Far Below Standard (1)	Missing (0)
Title Slide (#1)	The title is related to the Invention (solution) and makes sense.	The title is somewhat related to the Invention (solution) and makes some sense.	The title is not clearly related to the Invention (solution) and does not make a lot of sense.	There is no title slide.
Problem Slide (#2)	The problem is clearly stated and it is clear what is trying to be solved.	The problem is somewhat clear and/or complete. Some difficulty in understanding.	The problem is unclear and/or incomplete. Difficult to understand.	There is no problem slide.
Invention Slide (#3)	The invention is clearly written.	The invention is somewhat clear.	The invention is unclear.	There is no invention slide.
Explanation Slide (#4)	There is a clear explanation of how the invention works.	There is a somewhat clear explanation of how the invention works	The explanation of how the invention works is somewhat unclear.	There is no explanation slide.
Diagram Slides (#'s 5, 6, 7)	There is a diagram of the complete invention with all of the materials labeled. All of the pictures are included.	There is a diagram of most of the invention with some of the materials labeled. There are some pictures.	There is a diagram of some of the invention with little materials labeled. There are few pictures.	There are no diagram slides.
Analyzing Data Slide (#8)	There is a clear explanation of what happened when experimenting with the invention.	There is a somewhat clear explanation of what happened when experimenting with the invention.	The explanation of what happened when experimenting with the invention is unclear.	There is no analyzing data slide.
Conclusion Slide (#9)	The conclusion is labeled; hypothesis has been restated and has been accepted or rejected.	The conclusion is labeled and somewhat clear, has been restated, and accepted or rejected.	The conclusion is labeled and not very clear, has not been restated, accepted, or rejected.	There is no conclusion slide.
Reflection Slide (#10)	The reflection is clear on how the invention can be made better.	The reflection is somewhat clear on how the invention can be made better.	The reflection is unclear as to how the invention can be made better.	There is no reflection slide.
ELA Requirements	All slides have correct spelling, punctuation, and grammar.	Most slides have correct spelling, punctuation, and grammar.	Some slides have correct spelling, punctuation, and grammar.	Few slides have correct spelling, punctuation, and grammar.
Organization & Format	All slides are in the correct order and labeled.	Most slides are in the correct order and labeled.	Some slides are in the correct order and labeled.	Few slides are in the correct order and labeled.