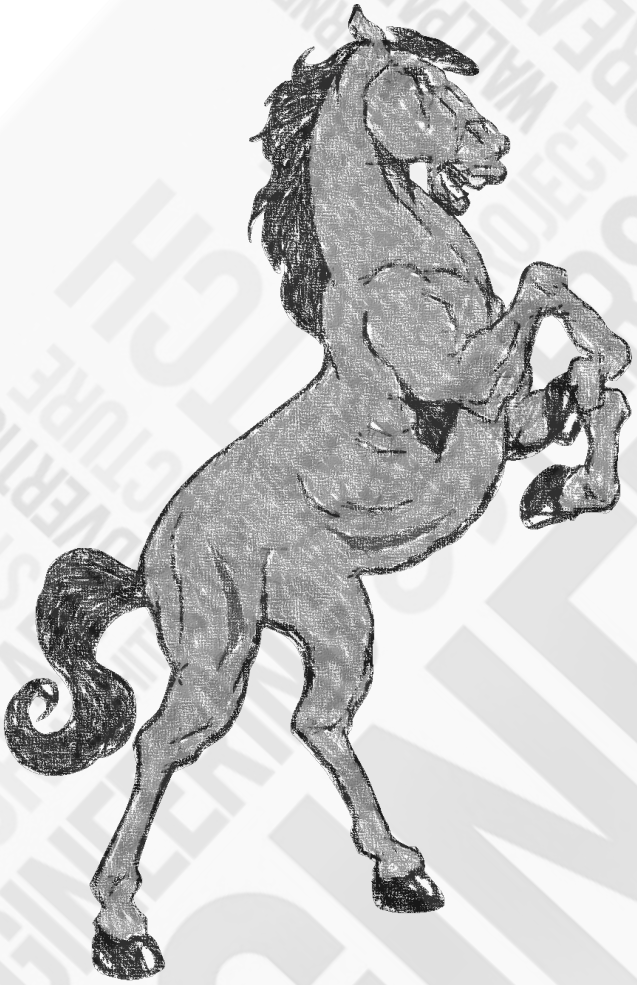
Name: _____

Good Hope Elementary School



Included in this packet:

- Information about the upcoming Engineering Fair
- Directions on what you'll need to do
- A scoring rubric telling you how your project will be graded
- Your Engineering Fair Proposal

Engineering Design Packet

Good Hope Elementary Engineering Fair

What is the Engineering Fair?

An Engineering Fair is a competition of student *science/engineering projects* held each year at your school, in your district, in your county, and in the state of California. It is the invention category of the science fair, where students will design and invention, build a prototype, and test it.

What is Engineering Design?

Engineering is the designing, building, and testing of a made-at-home product. The invention has to be useful and apply to real-world situations.

What is the Engineering Design Process?

The engineering Process is a series of steps that need to be taken when creating a new invention in order to benefit the user.

Step 1: Define a need. Identify what you want to construct and explain its purpose. *I want to design and build __. The goal of this project is to __.*

Step 2: Research three or more sources on your topic. Write a paragraph for each summarizing what you've learned about your topic.

Step 3: Create design requirements. You need to identify shape, size, weight, physical features, performance, cost, time, etc. How do you plan to test your invention?

Step 4: Preliminary and final designs

Beginning designs: Draw the beginning designs of the prototype you will build with labeled parts.

Final Designs: Make changes to your beginning designs as you improve your design. You need to show progress with each design.

List of Materials: Make a detailed list of the exact materials you need for your prototype.

Step-by-step procedure: Write a step-by-step procedure you will follow to build the prototype. Write it in the order you want to follow. Be very descriptive in your writing.

Step 5: Build, Test, Record Results, and Analyze Data

Build your prototype: Build a prototype according to your design requirements, list of supplies, and step-by-step procedure. Later, you will need to write about the experience of building your prototype.

Testing and data recording: After you're finished building, test your prototype to see if it can do what it was designed to do. Write down detailed observations and record data that you are trying to measure. Test the prototype two or three times for accuracy.

Analyze the data: See if the results match the design requirements. If not, redesigning is necessary.

Step 6: Make adjustments to the prototype. Show adjustments in your drawings. Keep accurate notes of any changes you make, as this is a very important piece of the Engineering Design Process. Continue to retest the prototype and analyze the data until the results match the design requirements.

Step 7: Write a conclusion. The conclusions needs to show the value of the project and how it can be applied to everyday life. Summarize your learning by answering some of these questions.

- *How do the results validate what was expected to happen?*
- *What did you learn from building the prototype?*
- *In what way(s) was the prototype important?*
- *Could you improve the prototype any more?*
- *How does the prototype help people understand the real world better?*
- *What new insights did you discover?*
- *How can this information be applied to real life?*
- *What knowledge was gained by designing and building the prototype*

In short, your Engineering Project has three parts.

1. Start with writing a **PROPOSAL**: This is the _____ form attached to the back of this packet. This identifies *Start with writing a **PROPOSAL**: This is the form attached to the back of this packet. This identifies the problem this project will address, the process you will follow and the solution you hope to reach. The proposal **MUST BE APPROVED** by your teacher before you can move forward on your project. Your proposal is due on _____.*

2. *Next, get started on completing the seven steps listed above. You have to have a **NOTEBOOK/ DAILY JOURNAL: You will start this once your proposal is approved.** The purpose of the journal is to record your thoughts, ideas, questions, and experiences throughout your experiment. Much of what we know about Albert Einstein (One of the world's most famous scientists in history) came from reading his journals. You may use a spiral notebook or the one provided for you in this packet. Attach your journal to your science project display board on the day your project is due.*

3. *Finally, start building your **DISPLAY:** Your display board should show your understanding and application of the Engineering Design Process. It should also be eye-catching, attractive, neat, and accurate. When adding photos, please DO NOT include faces of people in the pictures.*

Your teacher will use the rubric below to assign you a grade for your science project. The project itself will receive a grade, as will the presentation. The three most important things that will be judged are completeness, quality of your journal, and whether or not your conclusion/results addressed your problem.

Engineering Design Process Rubric Student Name: _____

The Design

Criteria	Scale Score (circle one)	Multiplier	Points
Completeness of Engineering Design Process Was the Engineering Design Process followed? Was research completed and is data present? Are beginning and final designs drawn and labeled?	5 4 3 2 1	x 2	= _____
Journal Quality Is the journal legible? Does it include daily observations and summarize what was learned?	5 4 3 2 1	x 3	= _____
Prototype Is the prototype built according to the design requirements? Was sufficient data gathered during testing? Was redesigning and retesting completed?	5 4 3 2 1	x 2	= _____
Visually appealing Is the project neat and legible? Does it contain photos/illustrations or a certain flair that makes it "pop" ?	5 4 3 2 1	x 1	= _____
Results/Conclusion addresses the questions Results show a well, thought out, reasonable conclusion showing a useful world connection. Were at least 4 of the concluding questions addressed?	5 4 3 2 1	x 2	= _____

Project total = _____/ 50
Presentation total = + _____/30

The Presentation/Interview

Criteria	Points possible	Points Given
Knowledge of project: (shows basic knowledge, elaborates)	10	
Eye contact: (continuously made eye contact)	5	
Poise: (is able to explain how the engineering method was used)	5	
Elocution: (clear voice/audience can hear presentation)	5	
Enthusiasm: (shows interest, enthusiasm, passion)	5	

Project total = _____/80

Overall grade = _____