Name:_____ Date:_____

Engineering Process Timeline

USE A JOURNAL TO RECORD ALL OF THE FOLLOWING STEPS. YOUR JOURNAL MUST BE TURNED IN ON THE BELOW DUE DATES FOR A SCORE. ORIGINAL, HANDWRITTEN JOURNALS (date each entry) ARE REQUIRED WITH EACH PROJECT!

Students and teachers will discuss and learn about the science process in depth in class, but it is each student's responsibility to complete a science project at home. Keeping a thorough journal is a vital part of a successful science project. Please encourage your child to start keeping a journal now. Include entries for everything! From the brainstorming of ideas, shopping lists, and trials for their project. **All information that goes into your journal (excluding your graphs) need to be handwritten. You cannot type information and glue it inside your journal.** Journals can be kept in a composition notebook or spiral notebook.

For great science information please visit the SARSEF website (**http://www.sarsef.org**). It is loaded with information that will help your child with their project, and includes websites to look for ideas, but remember *originality is part of the grade*. Pick a project that interests you! If you do, you will have fun completing this project. Science is amazing and should be fun.

Virtual Scientific Process Information Night!!

Will be posted for watching.

When selecting an experiment, be sure to choose something that you find interesting! Make it a project that you have a common interest in... Lastly, make it your own. If you find a project online or in a book, see if there is a way to make it different for you! :)

4-5 grades:

Students must have completed the **Teacher Approval Form** to review with their classroom teacher.
This is on Schoology. https://docs.google.com/document/d/1qRvrkzEIHBqIjW-t0CR89iE_YFJsGDCXOjNIVxCLThg/edit

K-3 grades:

The **Big Question**;
After you brainstorm some ideas on topics that interest you, you need to come up with a question that you can use to conduct an experiment. Think of a very original idea - an idea maybe no one else will have! Judges grade you on your ideas, the more original the better. You need to be able to chart the changes of your experiment because you will be asked to chart your data and results in a graph form. A big question should be something that you are interested in finding out the results of. The big question needs to be a question; not a statement or fact of something - those have already been proven. It also can not be a demonstration, as that is not "testing" a question.

Give yourself enough time to solve your question through testing. A good scientist tests their hypothesis at least three (3) times before deciding on their final results.

For example, "How can I help save California landscape during a landslide?"

**Due Tuesday November 17, 2020- 100 points

Form a hypothesis/problem and complete research:

Problem

All Engineering Projects begin with a problem. This problem should be specific and focused. What is the purpose of your project? How will you solve your problem? Explain how you will solve the problem.

Research

Brainstorm possible solutions/research the topic of your project. Consider what others have done to solve this problem and include prior research. Generate new ideas for solutions. This information will provide necessary background information. Research must be at least three well written paragraphs from three different sites. References must be identified and noted.

Keep the bibliography information from your places visited. You will need to write down the website or the book/magazine name so you can create your bibliography and put it on your display board later.

** Due Tuesday December 1, 2020- 100 points

Design an experiment and write out materials

Design an experiment (procedure)
One of the steps of the engineering process is to identify the criteria and constraints. Identify the conditions that must be met to solve the problem. Identify anything that might limit a solution, such as cost, availability of materials, safety. Be specific.

Materials
You need to write out all the materials that you are going to need/use during your experiment. Write out a list of materials in your journal. Writing them out, and thinking about completing your project, will help you make a list of what materials you need. If you realize later you need more materials or to change the materials, make changes in your journals at a later time. You will need to keep track of ALL the materials you use because it will need to be included on your display board.

For example, nine plants (three for each test), soil, three pots, ruler, water, measuring cup, three lights, yellow, red, and green light bulbs, journal, and my chart.

** Due Tuesday January, 12, 2021- 150 points together

Designs
Select a design. Choose two or three of the best ideas from your list. Make a detailed sketch of each design. Label each sketch with dimensions and include materials needed to build a model. Select one design to construct. Justify your choice by listing reasons you selected this design.

Build a Model or Prototype (50 points)!
Write a detailed procedure for building the model or prototype. Someone else should be able to duplicate the experiment from these steps. List the materials actually used to construct the model. This should be in a list. Follow the procedure you wrote to build the model/ prototype.

Evidence of Engineering Project (50 points)
Provide proof that you have performed your experiment. Provide photographs with written explanations and observations of each step. Pictures should only be of the experiment. NO faces.

** Due Tuesday January 19, 2021 - 100 points

Test Model/ Prototype and Evaluate (100 points)
Write a hypothesis about your design's performance during testing. Use an "If… then" format. For example, "If the redesigned model has increased in size (Change in the independent variable), then it will fall at a faster speed, (change the dependent variable). Decide on one variable that you will use to test your model. Record the results on a chart/data table. List the strengths and weaknesses of your design. Discuss what changes, or compromises, in your design (if any) had to be made due to constraints. Decide if your design solved the problem identified in Step 1.

Redefine the Design (50 points)
Based on the results of your test, make improvements on your design. Identify the changes that you would make and give reasons for the changes.

** Due Tuesday January 26, 2021- 100 points

Final Board Display

Boards will be done virtually this year. The submission for the Google Slides board will available on Schoology.

** Due Friday February 5, 2021 - 200 points

*<u>*Don't forget, all 4th and 5th graders must have an abstract. 4th graders need to have 150 words or less, and 5th graders must have 250 words or less. **These are written summaries of the work that was completed.*</u>

<u>Sycamore Science Showcase Judging February 5, 2021!</u>

TWENTY Sycamore students will go on to Vail Pride Day and will be invited to Southern Arizona Regional Science Fair (SARSEF). This is an amazing experience! Projects will be on display for the Parent Teacher Conferences on February 7th and 8th. If you would like to take your child's project home with them when you come to see them on the conference days, please feel free to do so. ***If your child is selected as a SARSEF competitor, please leave their project for me to hold on to until our meeting. :) Thank you for your help with this in advance.*

Remember, this is supposed to be fun! Enjoy yourself!

Thank you,

The Sycamore Teachers!

If you have any further questions please check www.SARSEF.org for additional information. There are helpful tools there to assist your child in their Scientific Exploration!

Helpful Websites you should check out:

www.sarsef.org

www.sciencenewsforkids.org