

Name: _____ Date: _____

Scientific Process Timeline



Students and teachers will discuss and learn about the scientific 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. **The journals will be submitted through Schoology in grades 4 and 5. Individual journals for K-3 will need to be typed or photographed for submission opportunities.** 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, "Does the color of light affect the growth of plants?"

**** Due Tuesday November 17, 2020- 100 points**

Form a hypothesis/problem and complete research:

Hypothesis



Using your big question, you are going to take an educated guess at what you think is going to happen in your experiment. It's okay if you aren't sure, that is why we conduct the experiment. Think about all the things you've seen around you, use your common knowledge to really think about what the outcome of your testing could be. Your statement should start with "I think..." and should include "because..." and a reason you think this way.

For example, "I think yellow light will be best because that is the color of the sun."

Research

You need to have at least three different resources for finding information. **Wikipedia is NOT a good resource for finding information.** Your resources could be a website, books on the topic, or magazines you have found. You need to **write** out all the information that you find that is connected to your topic in your journal. If you find something that is multiple pages long, pull out the important details that support your topic and write those in your journal. Every time you do any type of research, log it into your journal. Even if you don't find any important information, at least log that you tried to find details and what search words you used.

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

**** Due Tuesday December 1, 2020- 100 points**

Design an experiment, control your variables and write out materials

Design an experiment (procedure)

You are going to “set-up” the experiment, without actually setting it up. You need to write out all the details that you are going to do in order to test your hypothesis. You have to explain how you are going to prove or disprove your hypothesis step by step. Setting it up precisely this time will help you actually get ready to test and to think about all the problems you could encounter while testing.

For example, I will use three different colors of light; green, yellow, and red. I will use three plants that are the same size and type. I will set them under the light for an exact time each day and track the results. I will put them under a light for 20 minutes every day at 4:00 PM. Daily, I will also measure the height of the plant. I will write the height of the plants in a chart inside my journal every day.

Control all of the variables

You are only testing one variable for your project. The variable you are testing is the ONLY thing that is changing. All the other variables need to stay the same. Think about what you are testing and determine how you are going to keep all the other factors the same so it doesn't ruin your results.

** Controlled **VARIABLES**: the variables that stay the same.

** Changing **VARIABLE** is the **one** variable that changes based on the experiment.

For example, I will have three plants all the same type and size, in the same kind of soil, all watered exactly the same. I will keep them in the same place in my house, the same temperature, and the same type of lamp that is showing the light. I will use the same ruler to measure each of the plants. The ONLY difference will be the color of light. **The changing variable is the color of light.**

*****There can be NO experiments that involve the following for safety reasons: human or vertebrate testing, mold or bacteria.***** Thank you for your understanding.

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.

Journal Check 1:

This will be a check to see where you are at in your experiment. If your experiment has been started, this is a check to see what you have done, and if you have any corrections that are needed. If you already started, by now, you should be able to take measurements of data for the question you asked. Your experiment doesn't have to be finished yet, there is still time to collect data.

Take measurements in time, size, weight, appearance, temperature, speed, or any other measurable data. This data will be used to prepare appropriate graphs for your display. Make sure your journal entries are readable and organized. Make sure to date EACH entry you make. Record everything!

**** Due Tuesday, December 8, 2020- 150 points**

Journal Check 2 (50 points) and graph your results (100 points)!

Journal Check 2:

This will be a check to see if your experiment was being worked on over break. By now, you should be able to take measurements of data for the question you asked. Your experiment doesn't have to be finished yet, there are still a few more days to collect data.

Take measurements in time, size, weight, appearance, temperature, speed, or any other measurable data. This data will be used to prepare appropriate graphs for your display. Make sure your journal entries are readable and organized. Make sure to date EACH entry you make. Record everything!

****Due January 12, 2021 - 100 points**

Graph your results.

It may take several experiments (we recommend a minimum of three trials), or you may have to grow something over time. Results must also be displayed as a graph(s) on the backboard. Collect your data and begin putting that information into a graph (line or bar graph) to show your results. Your graph can be handwritten at this time in your journal or you can type it on the computer - you may still be charting data and need to make changes to your graph before putting it on your display board.

Additionally, you will need to write out your results in paragraph form to explain the information that is used in your graph.

Draw conclusions from the data

Now that you have your results, it is time to see if what you have collected proves or disproves your original hypothesis. Explain your results. **Also, this is where you need to reflect on this process. Ask yourself what you could do to improve your experiment?**

Be sure to share at least two changes you could make to the project to improve the experiment or the process. This must be well written in your journal. Your conclusion needs to say what your results are and if your hypothesis was proved correct or disproved. Tell what changes you would make if you were to repeat your experiment. Include graph(s) in your results of your data. Your graphs can be made on the computer or created by hand (in your neatest, best handwriting).

For example: The plant under the yellow light did not grow the tallest. Looking at my results, all the plants grew the same amount in the first week. In the second week, the plant under the red light grew the most. The plant that grew the tallest under the different light was the plant in the red light. My hypothesis was not correct, because the plant under the yellow light did not grow the most. If I were to do this experiment again, I would keep the red light, and change the other colors to see if red was the best color choice. I could also change the plants I used and keep the same colors to see if it was the plant type that liked the color red.

**** Due January 19, 2021- 100 points**

Final Board Display

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

****Due Friday February 5, 2021- 200 points**

***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.**

Sycamore Science Showcase Judging !

TEN Sycamore students will go on to Vail Pride Day and will be invited to Southern Arizona Regional Science Fair (SARSEF).

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