Name:_____ Date:_____

Scientific 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 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. **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.

Scientific Process Information Night!!

We will be having a guest speaker from SARSEF in attendance.

Wednesday, September 6th 6:00-7:00 pm
Sycamore MPR
**** EXTRA CREDIT FOR ATTENDING ****

Purchase your display boards there for $5.00

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! :)

** October 24, 2017 (Tuesday) - 100 points

4-5 grades:

Students must have completed the **Teacher Approval Form** to review with their classroom teacher.

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?"

** November 7, 2017 (Tuesday) - 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.

** November 28, 2017 (Tuesday) - 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 VARIABLE**S**: the variable**s** 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.

*It is strongly suggested that you complete your science project over the fall or winter break.

** December 5, 2017 (Tuesday) - 50 points

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!

** January 16, 2018 (Tuesday) - 150 points together

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!

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.**

** January 23, 2018 (Tuesday) - 100 points

Draw conclusions from the data

*****This is the part that most people forget.***

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 do to 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.

January 25, 2018 (Thursday) FAMILY SCIENCE NIGHT #2

"Putting it All Together" Bring your backboard, materials, supplies, and we will put projects together! **25 bonus points for attending. In the MPR from 6:00 to 7:00 pm. **Boards will be available for purchase $5.00.

** February 2, 2018 (Friday) - 200 points

Prepare a professional display at home!

Display boards will be made available in the **SYCAMORE OFFICE** after September 7th. You can purchase one for $5.00. Your backboard should include your **question**, **hypothesis**, **materials**, **procedure**, **research** (you must have research), **data**, **results** (you must include at least one graph), **conclusion**, and **bibliography** (a minimum of three reference sources).

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 February 8, 2018!

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 11th and 12th. 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!

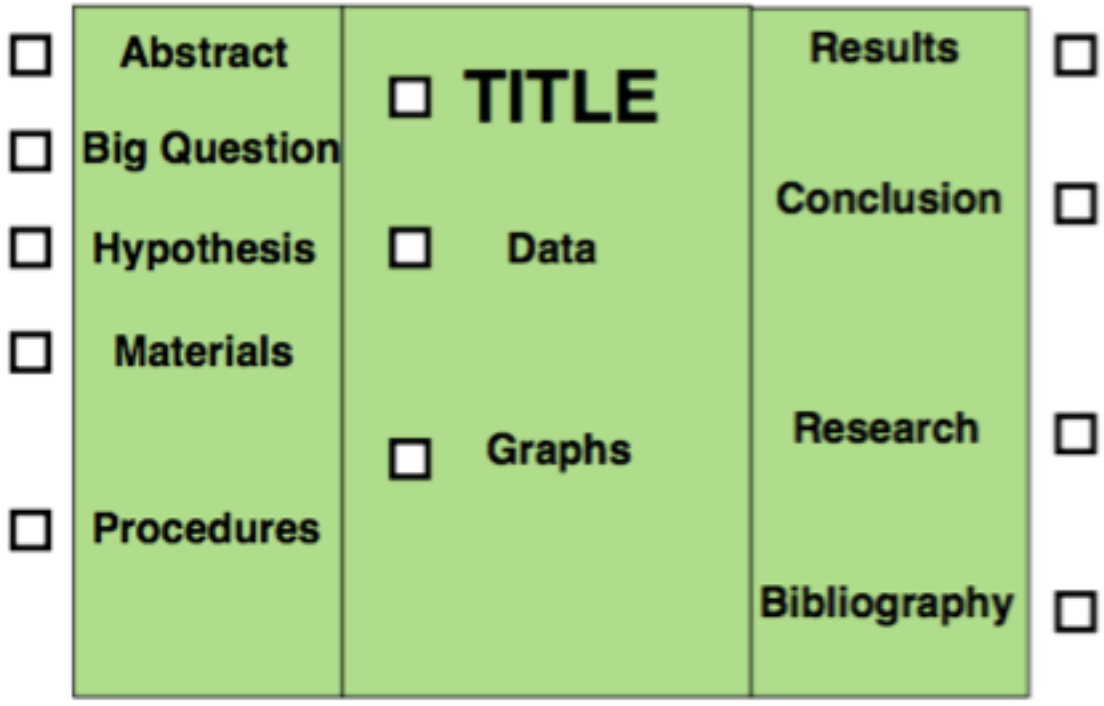
If you have any further questions please check www.SARSEF.org for additional information. There are helpful tools there to assist your child in their Scientific Exploration!

Science Display Board Checklist

Notes:

- Make sure your backboard is error free.
- Try to include pictures of your experiment.
- Make your backboard follow the scientific method order. The list below is in order you can vary the order if you would like, but a general logical order is needed.
- **4th grade** Your abstract cannot exceed 150 words. This is a summary of your project from beginning to end.
- **5th grade** Your abstract cannot exceed 250 words. This is a summary of your project from beginning to end.
- Label each part of your experiment on your backboard. For example, when you include your procedure on your backboard make sure to label that area "Procedure."
- When attaching your items to your background try to use doubled sided heavy duty tape, glue guns, rubber cement, etc. *Glue sticks tend not to work as well.*
- Projects in Grades K-8 must be no more than:
  - 30 in. deep (front and back)
  - 36 in. wide (side to side)
  - 42 in. high (only for table display)
  - *Electrical power is not provided for K-8 projects.*
  - **Visit www.sarsef.org for more information**

When creating your Science Fair Backboard, please use this checklist as a guide:



Helpful Websites you should check out:

www.sarsef.org

www.sciencenewsforkids.org

Parent signature required!

Please read the above information on the science timeline and sign below, indicating that you have discussed this with your child and agree to support them at home in this important learning process.

_____ _____

Student's Name **Teacher's Name**

_____

Parent's Signature

Please take this page off and return this portion. <u>Keep this timeline for your records.</u>

Questions/Comments: