



Cub Scout Pack 295
Year 2 NOVA Program
Workbook

Scout Name: _____

Den: _____

Helpful Information

Requirements

For video or TV watching requirements, some examples include—but are not limited to—shows found on PBS ("NOVA"), Discovery Channel, Science Channel, National Geographic Channel, TED Talks (online videos), and the History Channel. You may choose to watch a live performance or movie at a planetarium or science museum instead of watching a media production. You may watch online productions with your counselor's approval and under your parent's supervision.

For article reading, books on many topics may be found at your local library. Examples of magazines include but are not limited to Odyssey, KIDS DISCOVER, National Geographic Kids, Highlights, and OWL or owlkids.com.

Scientific Method

The scientific method is a process for experimentation that is used to explore observations and answer questions. This method may be needed for some requirements throughout the NOVA program.

Steps of the Scientific Method

Ask a Question: The scientific method starts when you ask a question about something that you observe: How, What, When, Who, Which, Why, or Where?

Do Background Research: Rather than starting from scratch in putting together a plan for answering your question, you want to be a savvy scientist using library and Internet research to help you find the best way to do things and insure that you don't repeat mistakes from the past.

Construct a Hypothesis: A hypothesis is an educated guess about how things work. It is an attempt to answer your question with an explanation that can be tested. A good hypothesis allows you to then make a prediction:

"If ___[I do this] ___, then ___[this]___ will happen."

State both your hypothesis and the resulting prediction you will be testing.

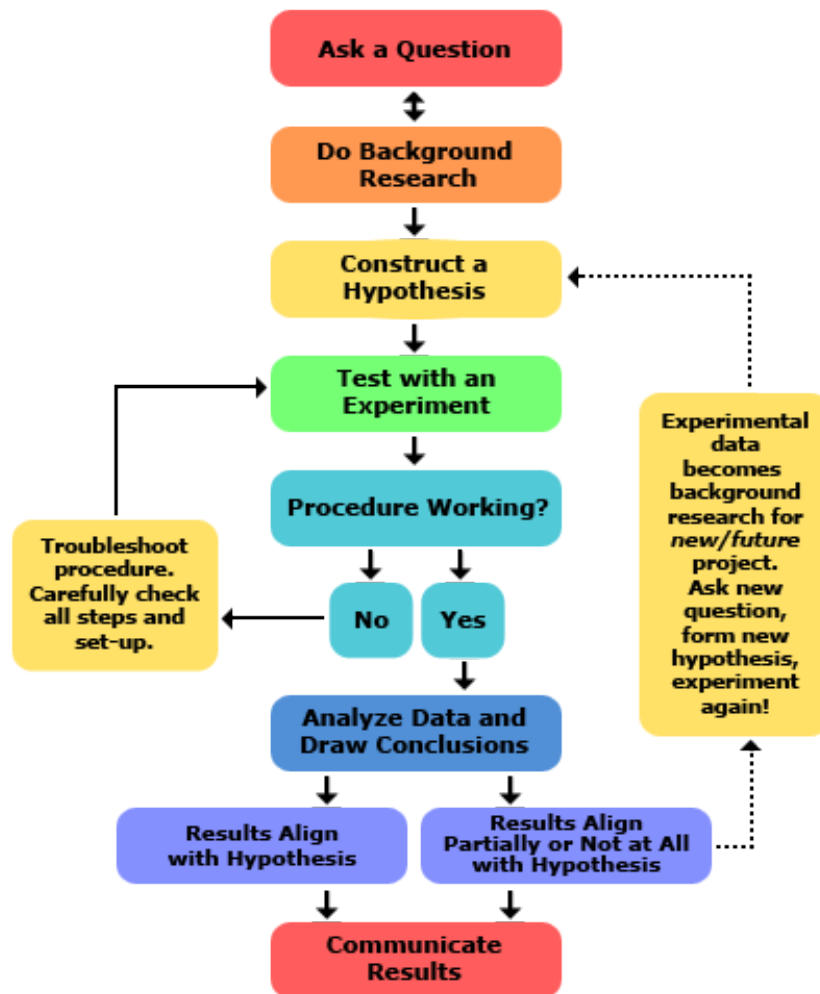
Predictions must be easy to measure.

Test Your Hypothesis by Doing an Experiment: Your experiment tests whether your prediction is accurate and thus your hypothesis is supported or not. It is important for your experiment to be a fair test. You conduct a fair test by making sure that you change only one factor at a time while keeping all other conditions the same.

You should also repeat your experiments several times to make sure that the first results weren't just an accident.

Analyze Your Data and Draw a Conclusion: Once your experiment is complete, you collect your measurements and analyze them to see if they support your hypothesis or not. Scientists often find that their predictions were not accurate and their hypothesis was not supported, and in such cases they will communicate the results of their experiment and then go back and construct a new hypothesis and prediction based on the information they learned during their experiment. This starts much of the process of the scientific method over again. Even if they find that their hypothesis was supported, they may want to test it again in a new way.

Communicate Your Results: To complete your science fair project you will communicate your results to others in a final report and/or a display board. Professional scientists do almost exactly the same thing by publishing their final report in a scientific journal or by presenting their results on a poster or during a talk at a scientific meeting. In a science fair, judges are interested in your findings regardless of whether or not they support your original hypothesis.



Source: http://www.sciencebuddies.org/science-fair-projects/project_scientific_method.shtml



Swing

This module is designed to help you explore how engineering and simple machines called levers affect your life each day.

Requirements being completed in Den Meetings: 2A, 3A, 4, 5

Requirement 1

Choose A or B or C and complete ALL the requirements.

- A. Watch an episode or episodes (about one hour total) of a show about motion or machines.
- B. Read (about one hour total) about motion or machines.
- C. Do a combination of reading and watching (about one hour total) about motion or machines.

1. Make a list of at least two questions or ideas from what you watched.
2. Discuss two of the questions or ideas with your counselor.

Title(s) Watched or Read: _____

Question 1: _____

Question 2: _____

Requirement 1 Completed:

Counselor's OK

Date

Requirement 3B

On your own, design, including a drawing, sketch, or model, ONE of the following:

- (1) A playground fixture that uses a lever
- (2) A game or sport that uses a lever
- (3) An invention that uses a lever

Be sure to show how the lever in your design will move something.

Requirement 3B Completed:

Counselor's OK

Date

Den Requirements Completed

Requirement 2A

Counselor's OK

Date

Requirement 3A

Counselor's OK

Date

Requirement 4

Counselor's OK

Date

Requirement 5

Counselor's OK

Date

Swing Complete

Counselor's OK

Date

1-2-3 Go!

This module is designed to help you explore how math affects your life each day affects your life each day.

Requirements being completed in Den Meetings: 2, 3, 4, 5



Requirement 1

Choose A or B or C and complete ALL the requirements.

- A. Watch an episode or episodes (about one hour total) of a show about involves math or physics.
- B. Read (about one hour total) about involves math or physics.
- C. Do a combination of reading and watching (about one hour total) about involves math or physics.

1. Make a list of at least two questions or ideas from what you watched.
2. Discuss two of the questions or ideas with your counselor.

Title(s) Watched or Read: _____

Question 1: _____

Question 2: _____

Requirement 1 Completed:

Counselor's OK

Date

Den Requirements Completed

Requirement 2

Counselor's OK

Date

Requirement 3

Counselor's OK

Date

Requirement 4

Counselor's OK

Date

Requirement 5

Counselor's OK

Date

1-2-3 GO! Complete

Counselor's OK

Date

Uncovering the Past

This module is designed to help you explore the wonders of archaeology.

Requirements being completed in Den Meetings: 2B, 3A, 3B, 4B, 5, 6



Requirement 1

Choose A or B or C and complete ALL the requirements.

- A. Watch an episode or episodes (about one hour total) of a show about anything related to archaeology.
- B. Read (about one hour total) about anything related to archaeology.
- C. Do a combination of reading and watching (about one hour total) about anything related to archaeology.

1. Make a list of at least two questions or ideas from what you watched.
2. Discuss two of the questions or ideas with your counselor.

Title(s) Watched or Read: _____

Question 1: _____

Question 2: _____

Requirement 1 Completed:

Counselor's OK

Date

Requirement 3C

Look around your house. Make a list of 10 artifacts from your home that serve as clues to the way you live. Discuss what you discovered with your counselor. (Artifacts could include anything found lying around the Scout's house. A dog crate could indicate the family has kept domesticated animals. A hammer could indicate they know how to use tools. Ask the Scouts to pretend they have never seen a particular item before, and what might they think it is.)

Artifact 1: _____

What this tells others: _____

Artifact 2: _____

What this tells others: _____

Artifact 3: _____

What this tells others: _____

Artifact 4: _____

What this tells others: _____

Artifact 5: _____

What this tells others: _____

Artifact 6: _____

What this tells others: _____

Artifact 7: _____

What this tells others: _____

Artifact 8: _____

What this tells others: _____

Artifact 9: _____

What this tells others: _____

Artifact 10: _____

What this tells others: _____

Requirement 3C Completed:

Counselor's OK

Date

Den Requirements Completed

Requirement 2B

Counselor's OK Date

Requirement 3A

Counselor's OK Date

Requirement 3B

Counselor's OK Date

Requirement 4B

Counselor's OK Date

Requirement 5

Counselor's OK Date

Requirement 6

Counselor's OK Date

Uncovering the Past Complete

Counselor's OK Date

Dr. Luis W. Alvarez Supernova Award Wolf and Bear Ranks



Requirements being completed in Den Meetings: 3, 4, 7, 8, 9

Requirement 1

Complete the adventure appropriate for your rank **AND** complete either option A or option B.

Wolf Cub Scouts: Code of the Wolf
Bear Cub Scouts: Make It Move

Option A: Do all of the following:

- (a) Keep track of the money you earn and spend for three weeks.
- (b) Geometry: Select a simple shape or figure. Observe the world around you for at least a week and keep a record of where you see this shape or figure and how it is used.
- (c) Visit a bank and have someone explain how interest works. Use the current interest rate and calculate how much interest different sums of money will earn.

Option B: Do all of the following:

- (a) Measure how you use your time by keeping a diary or log of what you do for a week. Then make a chart or graph to display how you spend your time.
- (b) Measure, mix, and prepare at least two recipes. Share your snacks with family, friends, or your den.
- (c) Study geometry in architecture by exploring your neighborhood or community. Look at different types of buildings-houses, places of worship, businesses, etc.-and create a presentation (a set of photographs, a collage of pictures from newspapers and magazines, a model) that you can share with your den or pack to show what you have seen and learned about shapes in architecture.

Requirement 1 Completed:

Counselor's OK

Date

Requirement 2

Complete the adventure appropriate for your rank **or** complete option A or B.

Wolf Cub Scouts: Call of the Wild

Bear Cub Scouts: Forensics

Option A: Do all of the following: (a) Go shopping with an adult and use a calculator to add up how much the items you buy will cost. See whether your total equals the total at check out. (b) Explain the meaning of these statistical words and tools: data, averaging, tally marks, bar graph, line graph, pie chart, and percentage. (c) Study a newspaper or online news source, with your parent's or guardian's permission, to find as many examples as you can of statistical information.

Option B: Do both of the following: (a) Explain to your den or your Mentor how a meteorologist or insurance company (or someone else) might use the mathematics of probability to predict what might happen in the future (i.e., the chance that it might rain, or the chance that someone might be in a car accident). (b) Predict the probability of a plastic bottle landing on its bottom, top, and side. Then flip it 100 times and keep track of which way it lands. Identify any possible sources of experimental error. Discuss the differences if the bottle is empty or full.

Requirement 2 Completed:

Counselor's OK

Date

Requirement 5

Speak with your teacher(s) at school (or your parents if you are home-schooled) OR one of your Cub Scout leaders about your interest in earning the Cub Scout Supernova award. Ask them why they think math and science are important in your education. Discuss what you learn with your mentor.

Teacher’s signature of completion

Date completed

Requirement 5 Completed:

Counselor's OK

Date

Requirement 6

Participate in a science project or experiment in your classroom or school OR do a special science project approved by your teacher. Discuss this activity with your mentor.

Description of project or experiment: _____

Teacher’s signature of completion

Date completed

Requirement 6 Completed:

Counselor's OK

Date

Den Meeting Requirements

Requirement 3 Completed:

Counselor's OK Date

Requirement 4 Completed:

Counselor's OK Date

Requirement 7 Completed:

Counselor's OK Date

Requirement 8 Completed:

Counselor's OK Date

Requirement 9 Completed:

Counselor's OK Date

All requirements have been met for the awarding of the Dr. Luis W. Alvarez
Supernova Award for Cub Scouts (Wolves and Bears).

Counselor's OK Date

Supernova – Webelos

Requirements being completed in Den Meetings: 3, 4, 7, 8, 9



Requirement 1

Complete three of the following: Adventures in Science, Engineer, option A, or option B.

Option A: Do all of the following: (a) Construct one of the following from wood, and one from another material: Book rack, Shelf, Bulletin board, Tie rack, Letter holder, Notepad holder, Toolbox, Towel rack, Recipe holder, Lamp stand, Kitchen knife rack, Kitchen utensil rack, Napkin holder, Garden tool rack, Lid holder, Mailbox, Birdhouse, Desk nameplate, Letter, bill, and pencil holder, Bread box, Key rack, Measuring cup rack, Measuring spoon rack (b) Keep an “insect zoo” with insects that you have collected. You might have crickets, ants, or grasshoppers. Study them for a while then release them. Share your experience with your den or your Mentor. (c) With adult supervision, show how to check the oil level and tire pressure on a car.

Option B: Do all of the following: (a) Take a field trip to a geological site, geological laboratory, or rock show. Discuss what you learned at an upcoming den meeting or with your mentor. (b) Construct a simple working electrical circuit using a flashlight battery, a switch, and a light. (c) Do five activities within your home or school that require the use of mathematics. Explain to your den or your Mentor how you use math every day.

Requirement 1 Completed:

Counselor's OK

Date

Requirement 2

Complete three of the following: Build It, First Responder, Into the Wild, Into the Woods, option A or option B.

Option A: Do two of the following:

- (a) Go on a geocaching adventure with your den or family. Show how you used a GPS unit or a smartphone with a GPS application to locate a geocache.
- (b) Describe both the benefits and the harm wildfires can cause in a forest ecosystem. Tell how you can prevent wildfire.
- (c) Set up an aquarium or terrarium. Keep it for at least a month.

Option B: Do both of the following:

- (a) With adult supervision, build and launch a model rocket. Describe how Newton's third law of motion explains how the rocket is propelled into the sky.
- (b) While on a campout or night hike, identify five constellations or satellites in the night sky.

Requirement 2 Completed:

Counselor's OK

Date

Requirement 5

Speak with your teacher(s) at school (or your parents if you are home-schooled) OR one of your Cub Scout leaders about your interest in earning the Webelos Scout Supernova award. Ask them why they think math and science are important in your education. Discuss what you learn with your mentor.

Teacher's signature of completion

Date completed

Requirement 5 Completed:

Counselor's OK

Date

Requirement 6

Participate in a science project or experiment in your classroom or school. Discuss this activity with your mentor.

Description of project or experiment: _____

Teacher's signature of completion

Date completed

Requirement 6 Completed:

Counselor's OK

Date

Den Meeting Requirements

Requirement 3 Completed:

Counselor's OK

Date

Requirement 4 Completed:

Counselor's OK

Date

Requirement 7 Completed:

Counselor's OK

Date

Requirement 8 Completed:

Counselor's OK

Date

Requirement 9 Completed:

Counselor's OK

Date

All requirements have been met for the awarding of the Dr. Charles H. Townes
Supernova Award for Webelos Scouts.

Counselor's OK

Date