

STEM/Nova Program for Cub Scouts

STEM—Science, Technology, Engineering and Mathematics

STEM is part of an initiative the Boy Scouts of America has taken on to encourage the natural curiosity of youth members and their sense of wonder about these fields through existing programs. From archery to welding, Scouts can't help but enjoy the wide range of STEM-related activities. To support this initiative, the BSA developed the Nova Awards program so that youth members have fun and receive recognition for their efforts.

What Are the Nova Awards?

The Boy Scouts of America developed the Nova Awards program to excite and expand a sense of wonder in our Scouts. By working with an adult counselor or mentor, the various modules allow them to explore the basic principles of STEM and discover how fun and fascinating STEM can be. The Supernova awards are offered for those who enjoy a super challenge. For more information about STEM and the Nova Awards program, visit www.scouting.org/stem. Discover how the Nova Awards program helps youth be "Prepared. For Life."

Cub Scout Nova Awards:



Science Everywhere - This module is designed to help you explore how science affects your life each day.

Down and Dirty - This module is designed to help you explore how earth science affects your life each day.

Nova WILD! - This module is designed to help you learn about wildlife and the natural world around you.

Out of This World - This module is designed to help you discover the wonders of space exploration.



Tech Talk - This module is designed to help you explore how technology affects your life each day.



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



1-2-3 Go! - This module is designed to help you explore how math affects your life each day.

Supernova Awards



Cub Scout Supernova Award

To earn the Cub Scout Supernova award, you must be a Bear or Wolf Cub Scout who is active with a den. With your parent's and unit leader's help, you must select a council-approved mentor who is a registered Scouter. You may NOT choose your parent or your unit leader (unless the mentor is working with more than one youth).

Tigers are not eligible to earn the Cub Scout Supernova award. Although it is not a requirement, it is recommended that you earn at least two of the four Nova awards for Cub Scouts before earning the Dr. Luis W. Alvarez Supernova Award.

Webelos Scout Supernova Award



To earn the Webelos Scout Supernova award, you must be a Webelos Scout who is active with a den. With your parent's and unit leader's help, you must select a council-approved mentor who is a registered Scouter. You may NOT choose your parent or your unit leader (unless the mentor is working with more than one youth).

If you earned the Cub Scout Supernova award, you must repeat similar requirements while you are a Webelos Scout. Although it is not a requirement, it is recommended that you earn at least two of the four Nova awards for Cub Scouts before earning the Dr. Charles H. Townes Supernova Award.

STEM Cub Scout Adventures Map

Rank	STEM/Total	%
Wolf	12/19	63
Bear	12/19	63
Webelos/AOL	15/27	56
Total Adventures	39/65	60 % of all Adventures are STEM

	Adventure	Rank	Science Everywhere	Down and Dirty	Nova WILD!	Out of This World	Tech Talk	Swing!	1-2-3 Go!	Supernova Awards
1.	Adventures in Coins	Wolf	✓							
2.	Air of the Wolf	Wolf				✓				✓
3.	Call of the Wild	Wolf								✓
4.	Code of the Wolf	Wolf							✓	✓
5.	Collections and Hobbies	Wolf	✓	✓		✓				
6.	Digging in the Past	Wolf	✓	✓	✓					
7.	Finding Your Way	Wolf					✓			
8.	Germes Alive!	Wolf	✓			✓				
9.	Grow Something	Wolf	✓	✓	✓					
10.	Motor Away	Wolf				✓	✓	✓		
11.	Paws of Skill	Wolf						✓		
12.	Spirit of the Water	Wolf			✓					
13.	A Bear Goes Fishing	Bear	✓		✓			✓		
14.	A Bear Picnic Basket	Bear			✓					
15.	A World of Sound	Bear					✓			
16.	Baloo the Builder	Bear						✓		
17.	Bear Picnic	Bear	✓							
18.	Critter Care	Bear	✓	✓	✓					
19.	Forensics	Bear								✓
20.	Make It Move	Bear					✓			✓
21.	Marble Madness	Bear								✓

	Adventure	Rank	Science Everywhere	Down and Dirty	Nova WILD!	Out of This World	Tech Talk	Swing!	1-2-3 Go!	Supernova Awards
22.	Robotics	Bear			✓				✓	
23.	Super Science	Bear		✓						✓
24.	Super Science	Bear			✓					
25.	Adventures in Science	Webelos ¹		✓		✓		✓		
26.	Build It	Webelos					✓			✓
27.	Building a Better World	Webelos								✓
28.	Camper	Webelos	✓							
29.	Castaway	Webelos								✓
30.	Earth Rocks!	Webelos	✓	✓						
31.	Engineering	Webelos				✓		✓		
32.	First Responder	Webelos								✓
33.	Fix It	Webelos					✓			
34.	Game Design	Webelos				✓			✓	
35.	Into the Wild	Webelos			✓					✓
36.	Into the Woods	Webelos			✓					✓
37.	Maestro!	Webelos	✓							
38.	Movie Making	Webelos					✓			
39.	Sportsman	Webelos						✓		

Sources:

<http://www.scouting.org/Home/CubScouts/Parents/Awards/CubScoutAcademicsandSportsProgram.aspx>

<http://www.scouting.org/stem/Awards/CubScout.aspx>

<http://www.scouting.org/stem/Awards/Webelos.aspx>

¹ Webelos/Arrow of Light



Down and Dirty

Cub Scout Nova Award Workbook



This workbook can help you but you still need to read the Cub Scout Nova Awards Guidebook.

The work space provided for each requirement should be used by the Scout to make notes for discussing the item with his counselor, not for providing the full and complete answers. Each Scout must do each requirement.

No one may add or subtract from the official requirements found in the Cub Scout Nova Awards Guidebook (Pub. 34032).

The requirements were issued in 2015 • This workbook was updated in August 2016.

Scout's Name: _____

Unit: **Cub Pack 147 Oxford, MA**

Counselor's Name: **Mary Ann Perveiler**

Counselor's Phone No.: _____

This module is designed to help you explore how earth science affects your life

☐ 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 Earth, the weather, geology, volcanoes, or oceanography.

What was watched?	Date	Start Time	Duration

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.

Then do the following:

☐ 1. Make a list of at least two questions or ideas from what you watched.

1.	
2.	

- ☐ 2. Discuss two of the questions or ideas with your counselor.

1.

2.

- ☐ B. Read (about one hour total) about Earth, the weather, geology, volcanoes, or oceanography.

What was read?	Date	Start Time	Duration

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.

Then do the following:

- ☐ 1. Make a list of at least two questions or ideas from what you read.

1.

2.

- ☐ 2. Discuss two of the questions or ideas with your counselor.

1.	
2.	

- ☐ C Do a combination of reading and watching (about one hour total) about Earth, the weather, geology, volcanoes, or oceanography.

What was watched or read?	Date	Start Time	Duration

Then do the following:

- ☐ 1. Make a list of at least two questions or ideas from what you read and watched.

1.	
2.	

- ☐ 2. Discuss two of the questions or ideas with your counselor.

1.	
2.	

- ☐ 2. Complete ONE adventure from the following list. (Choose one that you have not already earned.) Discuss with your counselor what kind of science, technology, engineering, or math was used in the adventure.

Wolf Cub Scouts

Bear Cub Scouts

Webelos Scouts

Collections and Hobbies

Critter Care

Adventures in Science

Digging in the Past

Super Science

Earth Rocks!

Grow Something

[illegible]

- ☐ 3. Investigate: Choose A or B or C or D and complete ALL the requirements


- ☐ A. Volcanoes erupt

- ☐ 1. How are volcanoes formed?

- ☐ 2. What is the difference between lava and magma?

- ☐ 3. How does a volcano both build and destroy land?

- ☐ 4. Build or draw a volcano model. If you build a working model, make sure you follow all safety precautions including wearing protective glasses for your volcano's eruption. If you draw a volcano, be sure to draw a cross section and explain the characteristics of different types of volcanoes.



- ☐ 5. Share your model and what you have learned with your counselor.

- ☐ B. Rock on.

- ☐ 1. What minerals are common in your state? How they are used.

Mineral	Used

- ☐ Make a collection of three to five common minerals and explain

	Mineral	Explanation
1.		
2.		
3.		
4.		
5.		

- ☐ 2. Are these minerals found in sedimentary, igneous, or metamorphic rocks?

	Mineral	Type of rock
1.		
2.		
3.		
4.		
5.		

- ☐ 3. Explain or demonstrate the difference in formation of the three major types of rocks.

Sedimentary	
Igneous	
Metamorphic	

- ☐ Which types of rocks are common in your area?

- ☐ 4. Share your collection and what you have learned with your counselor.

- ☐ C. Weather changes our world

- ☐ 1. Make three weather instruments out of materials around your home. (Examples include a rain gauge, weather vane, barometer, anemometer, and weather journal.)

1.	
2.	
3.	

- ☐ Use these and another method that is readily available (i.e., thermometer, eyes, older person's joints, etc.) for a total of four methods to monitor and predict the weather for one week. Keep a log of your findings.

(A sample page for recording the predictions and results may be found at the end of this workbook.)

- ☐ Which instrument provided the most accurate information?

- ☐ 2. Keep a weather journal for a week. Include your predictions and the predictions of a local meteorologist.
(A sample Journal page for recording the predictions and results may be found at the end of this workbook.)
Do your predictions match those of the local meteorologist?

Do your predictions match the weather that occurred?


How can the predictions become more accurate?

- ☐ 3. Discuss your work with your counselor.

- ☐ D. Animal habitats: Choose TWO of the following animal habitats and complete the activity and questions. At least one habitat should be close to your home (within 50 miles). Visit at least one of the habitats. Once you have completed the activity and questions, discuss the habitats and the activities with your counselor:

- ☐
1. Prairie

- ☐ Draw or model a food web with at least five consumers and two producers that live in the prairie habitat.



- ☐ What is the difference between consumers and producers? Predators and prey?

[illegible]

☐

What would happen if one of the animals in the food web disappeared?

☐

2. Temperate forest

☐

Research the two main categories of trees in the temperate forest (coniferous and deciduous).

☐

Why are their leaves different?

☐

How are their seeds different?

☐

Put a twig from a coniferous tree (cone-bearing tree with needles) in a cup of water and tightly fasten a clear plastic bag around the needles. Put a twig from a deciduous tree (leafy tree that loses its leaves in the fall) in a cup of water and tightly fasten a clear plastic bag around the leaves. Observe what happens and draw pictures of your observations.

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☐

Think of an explanation for what occurred and discuss your explanation with your counselor

□

3. Aquatic ecosystem

□

With a parent's permission and guidance, visit an aquatic habitat near your home. Examples include a stream, river, lake, pond, ocean, and wetland (a marsh or swamp).

☐

Draw or photograph the area.



What are the most common types of plants growing there?

☐

What animals did you see?

☐

Did you see, hear, or smell any evidence of other animals? (Your evidence might include things like bird calls, splashes of fish or frogs jumping, tracks, feathers, or bones.)

☐

How do aquatic ecosystems affect your life?

☐

How have humans affected the ecosystem? (Look for signs of humans such as trash and bridges or walkways.)

☐

How do you think humans have affected the ecosystem in ways you cannot see? (Think about fertilizer and pesticides washing off your lawn and flowing into a stream.)

☐

How would this affect creatures that live in the water?)

What can you do to improve the quality of the ecosystem?

□

4. Temperate or subtropical rain forest

□

Describe the three main levels of the rain forest (canopy, understory, and forest floor).

☐

Make a drawing or model showing examples of animals and plants that live at each level.

☐

Choose an animal or plant from each level and explain how it is adapted to its particular place in the rain forest.

☐

5. Desert

☐

Choose a desert animal or plant. _____

☐

Make a model of it, draw it, or describe it.

☐

Explain how it is particularly well adapted to survive in a place where there is very little water.

☐

How would the desert be different if this plant or animal were not there?

☐

6. Polar ice

☐

Research an animal that can be found in the polar ice habitat. _____

☐

Draw or make a model of the animal

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☐

and name three characteristics that make it well adapted for life in the very cold and snowy environment.

1.

2.

3.

☐

7. Tide pools

☐

Explain how a tide pool is formed and describe several animals that are found in tide pools.

☐

Make a model or draw a diagram of a tide pool at a high intertidal zone and a low intertidal zone.

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☐

Include animals found in tide pools and explain how they adapt to their constantly changing environment.

- ☐ 4. Visit. Choose A or B and complete ALL the requirements.

- ☐ A. Visit a place where earth science is being done, used, explained, or investigated, such as one of the following: cave, quarry or mine, geology museum or the gem or geology section of a museum, gem and mineral show, university geology department, TV or radio station meteorology department, weather station, volcano or volcano research station, or any other location where earth science is being done, used, explained, or investigated.

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- ☐ 1. During your visit, talk to someone in charge about how people at the site use or investigate a particular area of science. How could this investigation make the world better?

- ☐ 2. Discuss with your counselor the science being done, used, explained, or investigated at the place you visited.

- ☐ B. Explore a career associated with earth science.

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- ☐ Find out what subjects you would need to study as you get older.

- ☐ What kind of education would you need in the future to help explore Earth?

- ☐ What types of people other than geologists explore Earth?

- ☐ Discuss with your counselor what is needed to have a career in earth science.

Weather Prediction Methods (Requirement 3C1)

Date	Method Used	Prediction	Actual Weather
	Rain Gauge		
	Weather Vane		
	Barometer		
	Anemometer		
	Journal		
	Rain Gauge		
	Weather Vane		
	Barometer		
	Anemometer		
	Journal		
	Rain Gauge		
	Weather Vane		
	Barometer		
	Anemometer		
	Journal		
	Rain Gauge		
	Weather Vane		
	Barometer		
	Anemometer		
	Journal		
	Rain Gauge		
	Weather Vane		
	Barometer		
	Anemometer		
	Journal		
	Rain Gauge		
	Weather Vane		
	Barometer		
	Anemometer		
	Journal		
	Rain Gauge		
	Weather Vane		
	Barometer		
	Anemometer		
	Journal		

Choose FOUR of the methods listed and one other (such as thermometer, eyes, older person's joints, etc)

Sample Weather Journal (Requirement 3C2)

Date	Your Prediction	Meteorologist's Prediction	Actual Weather

Important excerpts from the [*Guide To Advancement - 2015*](#), No. 33088 (SKU-620573)

[1.0.0.0] — Introduction

The current edition of the *Guide to Advancement* is the official source for administering advancement in all Boy Scouts of America programs: Cub Scouting, Boy Scouting, Varsity Scouting, Venturing, and Sea Scouts. It replaces any previous BSA advancement manuals and previous editions of the *Guide to Advancement*.

[Page 2, and 5.0.1.4] — Policy on Unauthorized Changes to Advancement Program

No council, committee, district, unit, or individual has the authority to add to, or subtract from, advancement requirements. There are limited exceptions relating only to youth members with special needs. For details see section 10, “Advancement for Members With Special Needs”.

[Page 2] — The “Guide to Safe Scouting” Applies

Policies and procedures outlined in the *Guide to Safe Scouting*, No. 34416, apply to all BSA activities, including those related to advancement and Eagle Scout service projects.

[7.0.3.1] — The Buddy System and Certifying Completion

A youth member must not meet one-on-one with an adult. Sessions with counselors must take place where others can view the interaction, or the Scout must have a buddy: a friend, parent, guardian, brother, sister, or other relative—or better yet, another Scout working on the same badge—along with him attending the session. If merit badge counseling or instruction includes any Web-based interaction, it must be conducted in accordance with the BSA Social Media Guidelines (<http://www.scouting.org/Marketing/Resources/SocialMedia>). For example, always copy one or more authorized adults on email messages between counselors and Scouts.

When the Scout meets with the counselor, he should bring any required projects. If these cannot be transported, he should present evidence, such as photographs or adult verification. His unit leader, for example, might state that a satisfactory bridge or tower has been built for the Pioneering merit badge, or that meals were prepared for Cooking. If there are questions that requirements were met, a counselor may confirm with adults involved. Once satisfied, the counselor signs the blue card using the date upon which the Scout completed the requirements, or in the case of partials, initials the individual requirements passed.

Note that from time to time, it may be appropriate for a requirement that has been met for one badge to also count for another. See “Fulfilling More Than One Requirement With a Single Activity,” 4.2.3.6.

[7.0.3.2] — Group Instruction

It is acceptable—and sometimes desirable—for merit badges to be taught in group settings. This often occurs at camp and merit badge midways, fairs, clinics, or similar events. Interactive group discussions can support learning. The method can also be attractive to “guest experts” assisting registered and approved counselors. Slide shows, skits, demonstrations, panels, and various other techniques can also be employed, but as any teacher can attest, not everyone will learn all the material.

There must be attention to each individual’s projects and his fulfillment of *all* requirements. We must know that every Scout—actually and *personally*—completed them. If, for example, a requirement uses words like “show,” “demonstrate,” or “discuss,” then every Scout must do that. It is unacceptable to award badges on the basis of sitting in classrooms *watching* demonstrations, or remaining silent during discussions.

It is sometimes reported that Scouts who have received merit badges through group instructional settings have not fulfilled all the requirements. To offer a quality merit badge program, council and district advancement committees should ensure the following are in place for all group instructional events.

- A culture is established for merit badge group instructional events that partial completions are acceptable expected results.
- A guide or information sheet is distributed in advance of events that promotes the acceptability of partials, explains how merit badges can be finished after events, lists merit badge prerequisites, and provides other helpful information that will establish realistic expectations for the number of merit badges that can be earned at an event.
- Merit badge counselors are known to be registered and approved.
- Any guest experts or guest speakers, or others assisting who are not registered and approved as merit badge counselors, do not accept the responsibilities of, or behave as, merit badge counselors, either at a group instructional event or at any other time. Their service is temporary, not ongoing.
- Counselors agree to sign off only requirements that Scouts have actually and personally completed.
- Counselors agree not to assume prerequisites have been completed without some level of evidence that the work has been done. Pictures and letters from other merit badge counselors or unit leaders are the best form of prerequisite documentation when the actual work done cannot be brought to the camp or site of the merit badge event.
- There is a mechanism for unit leaders or others to report concerns to a council advancement committee on summer camp merit badge programs, group instructional events, and any other merit badge counseling issues—especially in instances where it is believed BSA procedures are not followed. See “Reporting Merit Badge Counseling Concerns,” 11.1.0.0.
- There must be attention to each individual’s projects and his fulfillment of all requirements. We must know that every Scout—actually and personally—completed them.

It is permissible for guest speakers, guest experts, or others who are not merit badge counselors to assist in the counseling process. Those providing such assistance must be under the direction of a registered and approved counselor who is readily available onsite, and provides personal supervision to assure all applicable BSA policies and procedures—including those related to BSA Youth Protection—are in place and followed.

[7.0.3.3] — Partial Completions

A Scout need not pass all the requirements of one merit badge with the same counselor. It may be that due to timing or location issues, etc., he must meet with a different counselor to finish the badge. The Application for Merit Badge has a place to record what has been finished—a “partial.” In the center section on the reverse of the blue card, the counselor initials for each requirement passed. In the case of a partial completion, the counselor does not retain his or her portion of the card. A subsequent counselor may choose not to accept partial work, but this should be rare. A Scout, if he believes he is being treated unfairly, may work with his unit leader to find another counselor. An example for the use of a signed partial would be to take it to camp as proof of prerequisites. Partial completions have no expiration except the Scout’s 18th birthday. Units, districts, or councils shall not establish other expiration dates for partial merit badges.

[7.0.4.8] — Unofficial Worksheets and Learning Aids

Worksheets and other materials that may be of assistance in earning merit badges are available from a variety of places including unofficial sources on the Internet and even troop libraries. Use of these aids is permissible as long as the materials can be correlated with the current requirements that Scouts must fulfill. Completing “worksheets” may suffice where a requirement calls for something in writing, but this would not work for a requirement where the Scout must discuss, tell, show, or demonstrate, etc. Note that Scouts shall not be required to use these learning aids in order to complete a merit badge.



Nova WILD!



Cub Scout Nova Award Workbook

This workbook can help you but you still need to read the Cub Scout Nova Awards Guidebook.

The work space provided for each requirement should be used by the Scout to make notes for discussing the item with his counselor, not for providing the full and complete answers. Each Scout must do each requirement.

No one may add or subtract from the official requirements found in the Cub Scout Nova Awards Guidebook (Pub. 34032).

The requirements were issued in 2015 • This workbook was updated in August 2016.

Scout's Name: _____

Unit: **Cub Pack 147 Oxford, MA**

Counselor's Name: **Mary Ann Perveiler**

Counselor's Phone No.: _____

This module is designed to help you Tell your counselor what you have learned

☐ 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 wildlife, endangered species, invasive species, food chains, biodiversity, ecosystems, or wildlife habitats.

What was watched?	Date	Start Time	Duration

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.

Then do the following:

☐ 1. Make a list of at least two questions or ideas from what you watched.

1.	
2.	

Complied by: Pack 147 Oxford, MA

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- ☐ 2. Discuss two of the questions or ideas with your counselor.

1.	
2.	

- ☐ B. Read (about one hour total) about wildlife, endangered species, invasive species, food chains, biodiversity, ecosystems, or wildlife habitats.

What was read?	Date	Start Time	Duration

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.

Then do the following:

- ☐ 1. Make a list of at least two questions or ideas from what you read.

1.	
2.	

- ☐ 2. Discuss two of the questions or ideas with your counselor.

1.	
2.	

- ☐ C Do a combination of reading and watching (about one hour total) about wildlife, endangered species, invasive species, food chains, biodiversity, ecosystems, or wildlife habitats.

What was watched or read?	Date	Start Time	Duration

Then do the following:

- ☐ 1. Make a list of at least two questions or ideas from what you read and watched.

1.	
2.	

- ☐ 2. Discuss two of the questions or ideas with your counselor.

1.	
2.	

- ☐ 2. Complete ONE adventure from the following list. (Choose one that you have not already earned.) Discuss with your counselor what kind of science, technology, engineering, or math was used in the adventure.

Wolf Cub Scouts

Digging in the Past

Grow Something

Spirit of the Water

Bear Cub Scouts

A Bear Goes Fishing

Critter Care

Webeles Scouts

Into the Wild

Into the Woods

3. Explore

- ☐ A. What is wildlife? Wildlife refers to animals that are not normally domesticated (raised by humans).

[illegible]

- ☐ B. Explain the relationships among producer, prey, predator, and food chain. (You may draw and label a food chain to help you answer this question.)

[illegible]

- ☐ C. Draw (or find) pictures of your favorite native plant, native reptile or fish, native bird, and native mammal that live in an ecosystem near you.



- ☐ Why do you like these? How do they fit into the ecosystem?

- ☐ D. Discuss what you have learned with your counselor.

- ☐ 4. Act like a naturalist. Choose TWO from A or B or C or D or E or F, and complete ALL the requirements for those options.

- ☐ A. Investigate the endangered species in your state.

- ☐ 1. Make a list, drawing, or photo collection of three to five animals and plants that are endangered.

1.	
2.	
3.	
4.	
5.	

- ☐ 2. Design a display (a poster, PowerPoint presentation, or other type of display) to show at least 10 of the threatened, endangered, or extinct species in your state. (You may use your drawings or photo collection in your display.)

1.		6.	
2.		7.	
3.		8.	
4.		9.	
5.		10.	

- ☐ 3. Discuss with your counselor the differences between threatened, endangered, and extinct species.

- ☐ Discuss how threatened animals or plants could become endangered or extinct.


- ☐ How might the loss of these animals or plants affect the ecosystem and food chain?

What can be done to preserve these species?

B. Investigate invasive species.

1. Make a list, drawing, or photo collection of at least five mammals, plants, fish, birds, insects, or any other organisms that are invasive in your state or region of the country.

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- ☐ 2. Design a presentation (a poster, PowerPoint presentation, or other display) including at least one of the invasive species from your list.

- ☐ Explain where they came from, how they got to your area, what damage they are causing, and what is being done to get rid of them. Share your presentation with your counselor and your family or your den.

- ☐ 3. Discuss with your counselor what an invasive species is, how invasive animals or plants cause problems for native species, and how these invasive species could affect an ecosystem and food chain.

- ☐ C. Visit an ecosystem near where you live.
- ☐ 1. Investigate the types of animals and plants that live in that ecosystem.

- ☐ 2. Draw a food web of the animals and plants that live in this ecosystem. Mark the herbivores, omnivores, and carnivores. Include at least one decomposer or scavenger.

- ☐ 3. Discuss with your counselor (using your food web drawing) how the animals or plants in the food web fit into a food chain. Which animals are predators and which can be prey? How does each plant and animal obtain its energy? Describe the energy source for all the plants and animals.

- ☐ D. Investigate one wild mammal, bird, fish, or reptile that lives near you.

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- ☐ 1. Create a diorama representing the habitat of this creature. Include representations of everything it needs to survive; its home, nest, or den; and possible threats. You may use a variety of different materials within your diorama (usually constructed in a shoebox or similar container)..
- ☐ 2. Explain to your counselor what your animal must have in its habitat in order to survive.

- ☐ E. Investigate your wild neighbors.

 - ☐ 1. Make a bird feeder and set it up in a place where you may observe visitors. The feeder could be complex or as simple as a pinecone covered with peanut butter and rolled in birdseed and then tied with a string to an appropriate location, like a tree branch.
 - ☐ 2. Fill the feeder with birdseed. (Make sure that your feeder does not remain empty once you have started feeding birds.)
 - ☐ 3. Provide a source of water.
 - ☐ 4. Watch and record the visitors to your feeder for two or three weeks. (It may take a while for visitors to discover your food source.)

[illegible]

- ☐ 5. Identify your visitors using a field guide, and keep a list of what visits your feeder. (Visitors are not always birds! Sometimes deer, rabbits, chipmunks, squirrels, and raccoons visit bird feeders—or the area under the feeder! The kinds of nonbird visitors will depend on where you live. You may want to investigate how to collect the tracks of any nighttime visitors.)

- ☐ 6. Discuss with your counselor what you learned about your wild neighbors.

- ☐ F. Earn the Cub Scout Outdoor Ethics Awareness Award OR the Cub Scout World Conservation Award (if you have not already earned them for another Nova award)..
- ☐ 5. Visit a place where you can observe wildlife. Examples include parks (national, state, and local), zoos, wetlands, nature preserves, and national forests.

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- ☐ A. During or after your visit, talk to someone about:

- ☐ 1. The native species, invasive species, and endangered or threatened species that live there. If you visit a zoo, talk to someone about the ecosystems for different zoo animals and whether any of the zoo animals are invasive in different areas of the world. (For example, pythons are often found in zoos, but they are an invasive species in Florida.)

- ☐ 2. The subjects studied in school that enable him or her to work with wildlife. Examples of experts to talk to include forest ranger, wildlife biologist, botanist, park ranger, naturalist, game warden, zookeeper, docent, or another adult whose career involves wildlife.

- ☐ B. Discuss with your counselor what you learned during your visit.

- ☐ 6. Discuss with your counselor:

- ☐ A. Why wildlife is important.

- ☐ B. Why biodiversity is important.

- ☐ C. The problems with invasive species and habitat destruction.

Important excerpts from the [*Guide To Advancement - 2015*](#), No. 33088 (SKU-620573)

[1.0.0.0] — Introduction

The current edition of the *Guide to Advancement* is the official source for administering advancement in all Boy Scouts of America programs: Cub Scouting, Boy Scouting, Varsity Scouting, Venturing, and Sea Scouts. It replaces any previous BSA advancement manuals and previous editions of the *Guide to Advancement*.

[Page 2, and 5.0.1.4] — Policy on Unauthorized Changes to Advancement Program

No council, committee, district, unit, or individual has the authority to add to, or subtract from, advancement requirements. There are limited exceptions relating only to youth members with special needs. For details see section 10, "Advancement for Members With Special Needs".

[Page 2] — The "Guide to Safe Scouting" Applies

Policies and procedures outlined in the *Guide to Safe Scouting*, No. 34416, apply to all BSA activities, including those related to advancement and Eagle Scout service projects.

[7.0.3.1] — The Buddy System and Certifying Completion

A youth member must not meet one-on-one with an adult. Sessions with counselors must take place where others can view the interaction, or the Scout must have a buddy: a friend, parent, guardian, brother, sister, or other relative—or better yet, another Scout working on the same badge—along with him attending the session. If merit badge counseling or instruction includes any Web-based interaction, it must be conducted in accordance with the BSA Social Media Guidelines (<http://www.scouting.org/Marketing/Resources/SocialMedia>). For example, always copy one or more authorized adults on email messages between counselors and Scouts.

When the Scout meets with the counselor, he should bring any required projects. If these cannot be transported, he should present evidence, such as photographs or adult verification. His unit leader, for example, might state that a satisfactory bridge or tower has been built for the Pioneering merit badge, or that meals were prepared for Cooking. If there are questions that requirements were met, a counselor may confirm with adults involved. Once satisfied, the counselor signs the blue card using the date upon which the Scout completed the requirements, or in the case of partials, initials the individual requirements passed.

Note that from time to time, it may be appropriate for a requirement that has been met for one badge to also count for another. See "Fulfilling More Than One Requirement With a Single Activity," 4.2.3.6.

[7.0.3.2] — Group Instruction

It is acceptable—and sometimes desirable—for merit badges to be taught in group settings. This often occurs at camp and merit badge midways, fairs, clinics, or similar events. Interactive group discussions can support learning. The method can also be attractive to "guest experts" assisting registered and approved counselors. Slide shows, skits, demonstrations, panels, and various other techniques can also be employed, but as any teacher can attest, not everyone will learn all the material.

There must be attention to each individual's projects and his fulfillment of *all* requirements. We must know that every Scout—actually and *personally*—completed them. If, for example, a requirement uses words like "show," "demonstrate," or "discuss," then every Scout must do that. It is unacceptable to award badges on the basis of sitting in classrooms *watching* demonstrations, or remaining silent during discussions.

It is sometimes reported that Scouts who have received merit badges through group instructional settings have not fulfilled all the requirements. To offer a quality merit badge program, council and district advancement committees should ensure the following are in place for all group instructional events.

- A culture is established for merit badge group instructional events that partial completions are acceptable expected results.
- A guide or information sheet is distributed in advance of events that promotes the acceptability of partials, explains how merit badges can be finished after events, lists merit badge prerequisites, and provides other helpful information that will establish realistic expectations for the number of merit badges that can be earned at an event.
- Merit badge counselors are known to be registered and approved.
- Any guest experts or guest speakers, or others assisting who are not registered and approved as merit badge counselors, do not accept the responsibilities of, or behave as, merit badge counselors, either at a group instructional event or at any other time. Their service is temporary, not ongoing.
- Counselors agree to sign off only requirements that Scouts have actually and personally completed.
- Counselors agree not to assume prerequisites have been completed without some level of evidence that the work has been done. Pictures and letters from other merit badge counselors or unit leaders are the best form of prerequisite documentation when the actual work done cannot be brought to the camp or site of the merit badge event.
- There is a mechanism for unit leaders or others to report concerns to a council advancement committee on summer camp merit badge programs, group instructional events, and any other merit badge counseling issues—especially in instances where it is believed BSA procedures are not followed. See "Reporting Merit Badge Counseling Concerns," 11.1.0.0.
- There must be attention to each individual's projects and his fulfillment of all requirements. We must know that every Scout—actually and personally—completed them.

It is permissible for guest speakers, guest experts, or others who are not merit badge counselors to assist in the counseling process. Those providing such assistance must be under the direction of a registered and approved counselor who is readily available onsite, and provides personal supervision to assure all applicable BSA policies and procedures—including those related to BSA Youth Protection—are in place and followed.

[7.0.3.3] — Partial Completions

A Scout need not pass all the requirements of one merit badge with the same counselor. It may be that due to timing or location issues, etc., he must meet with a different counselor to finish the badge. The Application for Merit Badge has a place to record what has been finished—a "partial." In the center section on the reverse of the blue card, the counselor initials for each requirement passed. In the case of a partial completion, the counselor does not retain his or her portion of the card. A subsequent counselor may choose not to accept partial work, but this should be rare. A Scout, if he believes he is being treated unfairly, may work with his unit leader to find another counselor. An example for the use of a signed partial would be to take it to camp as proof of prerequisites. Partial completions have no expiration except the Scout's 18th birthday. Units, districts, or councils shall not establish other expiration dates for partial merit badges.

[7.0.4.8] — Unofficial Worksheets and Learning Aids

Worksheets and other materials that may be of assistance in earning merit badges are available from a variety of places including unofficial sources on the Internet and even troop libraries. Use of these aids is permissible as long as the materials can be correlated with the current requirements that Scouts must fulfill. Completing "worksheets" may suffice where a requirement calls for something in writing, but this would not work for a requirement where the Scout must discuss, tell, show, or demonstrate, etc. Note that Scouts shall not be required to use these learning aids in order to complete a merit badge.



Out of This World

Cub Scout Nova Award Workbook



This workbook can help you but you still need to read the Cub Scout Nova Awards Guidebook.

The work space provided for each requirement should be used by the Scout to make notes for discussing the item with his counselor, not for providing the full and complete answers. Each Scout must do each requirement.

No one may add or subtract from the official requirements found in the Cub Scout Nova Awards Guidebook (Pub. 34032).

The requirements were issued in 2015 • This workbook was updated in August 2016.

Scout's Name: _____

Unit: **Cub Pack 147 Oxford, MA**

Counselor's Name: **Mary Ann Perveiler**

Counselor's Phone No.: _____

This module is designed to help you discover the wonders of space exploration

☐ 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 the planets, space, space exploration, NASA, or astronomy.

What was watched?	Date	Start Time	Duration

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.

Then do the following:

☐ 1. Make a list of at least two questions or ideas from what you watched.

1.	
2.	

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- ☐ 2. Discuss two of the questions or ideas with your counselor.

1.	
2.	

- ☐ B. Read (about one hour total) about about the planets, space, space exploration, NASA, or astronomy.

What was read?	Date	Start Time	Duration

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.

Then do the following:

- ☐ 1. Make a list of at least two questions or ideas from what you read.

1.	
2.	

- ☐ 2. Discuss two of the questions or ideas with your counselor.

1.	
2.	

- ☐ C Do a combination of reading and watching (about one hour total) about the planets, space, space exploration, NASA, or astronomy.

What was watched or read?	Date	Start Time	Duration

Then do the following:

- ☐ 1. Make a list of at least two questions or ideas from what you read and watched.

1.	
2.	

- ☐ 2. Discuss two of the questions or ideas with your counselor.

[illegible]

- ☐ 2. Complete ONE adventure from the following list. (Choose one that you have not already earned.) Discuss with your counselor what kind of science, technology, engineering, or math was used in the adventure.

Wolf Cub Scouts

Bear Cub Scouts

Webelos Scouts

Air of the Wolf

A Bear Picnic Basket

Adventures in Science

Collections and Hobbies

Robotics

Engineering

Germes Alive!

Super Science

Game Design

Motor Away

[illegible]

- ☐ 3. Choose TWO from A or B or C or D or E or F and complete ALL the requirements for the options you choose..
- ☐ A. Have a star party with your den, pack, or family. (Make sure you wear proper clothing for the nighttime temperature.)
- ☐ 1. Choose a clear night to investigate the stars. A fun time to watch stars is during a meteor shower. You may check <http://earthsky.org/astronomy-essentials> with your parent's or guardian's permission to find good times to watch meteors.
- ☐ 2. Find five different constellations and draw them. With your parent's or guardian's permission, you may use a free smartphone application such as Google Sky Map for Android phones or Night Sky for iPhones to help identify stars and constellations.
- ☐ 3. Share your drawings with your counselor. Discuss whether you would always be able to see those constellations in the same place.

- ☐ B. Explain how "revolution," or "orbit," compares with "rotation" when talking about planets and the solar system.

- ☐ Show these by walking and spinning around your counselor. Do the following:
- ☐ 1. Choose three planets to investigate (you may include the dwarf planet Pluto). Compare these planets to Earth. Find out how long the planet takes to go around the sun (the planet's year) and how long the planet takes to spin on its axis (the planet's day). Include at least TWO of these: distance from the sun, diameter, atmosphere, temperature, number of moons.
- ☐ 2. Discuss what you have learned with your counselor.

- ☐ C. Using materials you have on hand (plastic building blocks, food containers, recycled materials, etc.), design a model Mars rover that would be useful to explore the rocky planet's surface. Share your model with your counselor and explain the following:


- ☐ 1. The data the rover would collect

- ☐ 2. How the rover would work

- ☐ 3. How the rover would transmit data

- ☐ 4. Why rovers are needed for space exploration.

- ☐ D. Design on paper an inhabited base located on Mars or the moon. Consider the following: the energy source, how the base will be constructed, the life-support system, food, entertainment, the purpose and function, and other things you think would be important.



Then do the following:

- ☐ 1. Draw or build a model of your base using recycled materials.
 - ☐ 2. Discuss with your counselor what people would need to survive on Mars or the moon.

[illegible]

- ☐ E. Become an asteroid mapper. Obtain your parent's or guardian's permission and map an asteroid as part of the Jet Propulsion Laboratory and the California Institute of Technology's Dawn project: http://dawn.jpl.nasa.gov/DawnCommunity/asteroid_mappers.asp . Then discuss with your counselor your mapping activities, why mapping asteroids is important, and what you learned about space and asteroids.

- ☐ F. Eclipses
- ☐ 1. Investigate and make models or diagrams of solar and lunar eclipses. (Example: You may wish to use balls of different sizes and a flashlight to represent the sun.)

- ☐ 2. Using your model or diagram, discuss eclipses with your counselor, and explain the difference between a solar eclipse and a lunar eclipse.

- ☐ 4. Visit or explore. Choose A or B and complete ALL the requirements.

- ☐ A. Visit a place where space science is being done, used, explained, or investigated, such as one of the following: observatory, planetarium, air and space museum, star lab, astronomy club, NASA, or any other location where space science is being done, used, explained, or investigated.

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- ☐ 1. During your visit, talk to someone in charge about how people at the location use or investigate space science.

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Find out how this investigation could make the world a better place.

- ☐ 2. Discuss with your counselor the science being done, used, explained, or investigated at the place you visited.

1.	
2.	

3.

- ☐ B. Explore a career associated with space exploration.

--

Find out what subjects you would need to study as you get older.

Find out whether you must be an astronaut to explore space, and what other opportunities exist for people interested in space exploration.

- ☐ 5. Tell your counselor what you have learned about space exploration while working on this award.

Important excerpts from the [*Guide To Advancement - 2015*](#), No. 33088 (SKU-620573)

[1.0.0.0] — Introduction

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A youth member must not meet one-on-one with an adult. Sessions with counselors must take place where others can view the interaction, or the Scout must have a buddy: a friend, parent, guardian, brother, sister, or other relative—or better yet, another Scout working on the same badge—along with him attending the session. If merit badge counseling or instruction includes any Web-based interaction, it must be conducted in accordance with the BSA Social Media Guidelines (<http://www.scouting.org/Marketing/Resources/SocialMedia>). For example, always copy one or more authorized adults on email messages between counselors and Scouts.

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[7.0.3.2] — Group Instruction

It is acceptable—and sometimes desirable—for merit badges to be taught in group settings. This often occurs at camp and merit badge midways, fairs, clinics, or similar events. Interactive group discussions can support learning. The method can also be attractive to "guest experts" assisting registered and approved counselors. Slide shows, skits, demonstrations, panels, and various other techniques can also be employed, but as any teacher can attest, not everyone will learn all the material.

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- Any guest experts or guest speakers, or others assisting who are not registered and approved as merit badge counselors, do not accept the responsibilities of, or behave as, merit badge counselors, either at a group instructional event or at any other time. Their service is temporary, not ongoing.
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- Counselors agree not to assume prerequisites have been completed without some level of evidence that the work has been done. Pictures and letters from other merit badge counselors or unit leaders are the best form of prerequisite documentation when the actual work done cannot be brought to the camp or site of the merit badge event.
- There is a mechanism for unit leaders or others to report concerns to a council advancement committee on summer camp merit badge programs, group instructional events, and any other merit badge counseling issues—especially in instances where it is believed BSA procedures are not followed. See "Reporting Merit Badge Counseling Concerns," 11.1.0.0.
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Tech Talk

Cub Scout Nova Award Workbook



This workbook can help you but you still need to read the Cub Scout Nova Awards Guidebook.

The work space provided for each requirement should be used by the Scout to make notes for discussing the item with his counselor, not for providing the full and complete answers. Each Scout must do each requirement.

No one may add or subtract from the official requirements found in the Cub Scout Nova Awards Guidebook (Pub. 34032).

The requirements were revised in 2015 • This workbook was updated in August 2016.

Scout's Name: _____

Unit: **Cub Pack 147 Oxford, MA**

Counselor's Name: **Mary Ann Perveiler**

Counselor's Phone No.: _____

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

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 technology.

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.

What was watched?	Date	Start Time	Duration

Then do the following:

1. Make a list of at least two questions or ideas from what you watched.

1.	
2.	

Complied by: Pack 147 Oxford, MA

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2. Discuss two of the questions or ideas with your counselor.

1.	
2.	

- ☐ B. Read (about one hour total) about anything related to technology.

What was read?	Date	Start Time	Duration

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.

Then do the following:

1. Make a list of at least two questions or ideas from what you read.

1.	
2.	

2. Discuss two of the questions or ideas with your counselor.

1.

2.

- ☐ C Do a combination of reading and watching (about one hour total) about anything related to technology.

What was watched or read?	Date	Start Time	Duration

Then do the following:

1. Make a list of at least two questions or ideas from what you read and watched.

1.

2.

2. Discuss two of the questions or ideas with your counselor.

1.

2.

2. Complete ONE adventure from the following list. (Choose one that you have not already earned.)

Wolf Cub Scouts

Bear Cub Scouts

Webelos Scouts

☐ Finding Your Way

☐ Make It Move

☐ Build It

☐ Motor Away

☐ A World of Sound

☐ Fix It

☐ Movie Making

Discuss with your counselor what kind of science, technology, engineering, or math was used in the adventure

3. Explore EACH of the following:

☐ A. Look up a definition of the word technology and discuss the meaning with your counselor.

- ☐ B. Find out how technology is used in EACH of the following fields:

Communication

Business

Construction

Sports

Entertainment

- C. Discuss your findings with your counselor:

4. Visit a place where technology is being designed, used, or explained, such as one of the following: an amusement park, a police or fire station, a radio or television station, a newspaper office, a factory or store, or any other location where technology is being designed, used, or explained.

Place visited: _____

Who did you speak with? _____

- A. During your visit, talk to someone in charge about the following:

1. The technologies used where you are visiting

2. Why the organization is using these technologies

- B. Discuss with your counselor the technology that is designed, used, or explained at the place you visited.

- 5 Discuss with your counselor how technology affects your everyday life.

Important excerpts from the ['Guide To Advancement'](#), No. 33088:

The *'Guide to Advancement'* (which replaced the publication *'Advancement Committee Policies and Procedures'*) is the official Boy Scouts of America source on advancement policies and procedures.

- **[Inside front cover, and 5.0.1.4] — Unauthorized Changes to Advancement Program**
No council, committee, district, unit, or individual has the authority to add to, or subtract from, advancement requirements. (There are limited exceptions relating only to youth members with disabilities. For details see section 10, "Advancement for Members With Special Needs".)
- **[Inside front cover, and 7.0.1.1] — The ['Guide to Safe Scouting'](#) Applies**
Policies and procedures outlined in the *'Guide to Safe Scouting'*, No. 34416, apply to all BSA activities, including those related to advancement and Eagle Scout service projects. [Note: Always reference the online version, which is updated quarterly.]
- **[7.0.3.1] — The Buddy System and Certifying Completion**
Youth members must not meet one-on-one with adults. Sessions with counselors must take place where others can view the interaction, or the Scout must have a buddy: a friend, parent, guardian, brother, sister, or other relative —or better yet, another Scout working on the same badge— along with him attending the session. When the Scout meets with the counselor, he should bring any required projects. If these cannot be transported, he should present evidence, such as photographs or adult certification. His unit leader, for example, might state that a satisfactory bridge or tower has been built for the Pioneering merit badge, or that meals were prepared for Cooking. If there are questions that requirements were met, a counselor may confirm with adults involved. Once satisfied, the counselor signs the blue card using the date upon which the Scout completed the requirements, or in the case of partials, initials the individual requirements passed.
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There must be attention to each individual's projects and his fulfillment of *all* requirements. We must know that every Scout—actually and *personally*— completed them. If, for example, a requirement uses words like "show," "demonstrate," or "discuss," then every Scout must do that. It is unacceptable to award badges on the basis of sitting in classrooms *watching* demonstrations, or remaining silent during discussions. Because of the importance of individual attention in the merit badge plan, group instruction should be limited to those scenarios where the benefits are compelling.



Swing!

Cub Scout Nova Award Workbook



This workbook can help you but you still need to read the Cub Scout Nova Awards Guidebook.

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No one may add or subtract from the official requirements found in the Cub Scout Nova Awards Guidebook (Pub. 34032).

The requirements were issued in 2015 • This workbook was updated in August 2016.

Scout's Name: _____

Unit: **Cub Pack 147 Oxford, MA**

Counselor's Name: **Mary Ann Perveiler**

Counselor's Phone No.: _____

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

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 motion or machines.

What was watched?	Date	Start Time	Duration

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.

Then do the following:

1. Make a list of at least two questions or ideas from what you watched.

1.	
2.	

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2. Discuss two of the questions or ideas with your counselor.

1.

2.

- ☐ B. Read (about one hour total) about anything related to motion or machines.

What was read?	Date	Start Time	Duration

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.

Then do the following:

1. Make a list of at least two questions or ideas from what you read.

1.

2.

2. Discuss two of the questions or ideas with your counselor.

1.	
2.	

- ☐ C Do a combination of reading and watching (about one hour total) about anything related to motion or machines.

What was watched or read?	Date	Start Time	Duration

Then do the following:

1. Make a list of at least two questions or ideas from what you read and watched.

1.	
2.	

2. Discuss two of the questions or ideas with your counselor.

1.

2.

2. Complete ONE adventure from the following list. (Choose one that you have not already earned.)

Wolf Cub Scouts

☐ Motor Away

☐ Paws of Skill

Bear Cub Scouts

☐ Baloo the Builder!

☐ A Bear Goes Fishing

Webelos Scouts

☐ Adventures in Science

☐ Engineer

☐ Sportsman

Discuss with your counselor what kind of science, technology, engineering, or math was used in the adventure.

3. Explore EACH of the following.

A. Levers

1. Make a list or drawing of the three types of levers. (A lever is one kind of simple machine.)

- 1.

- 2.

- 3.

2. Show

1. How each lever works

☐ Lever 1☐ Lever 2☐ Lever 3

- ☐ 2. How the lever in your design will move something
3. The class of each lever
4. Why we use levers

	Class	Why we use this type of lever
1.		
2.		
3.		

B. 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.

- C. Discuss your findings with your counselor

4. Do the following:

- A. Visit a place that uses levers, such as a playground, carpentry shop, construction site, restaurant kitchen, or any other location that uses levers.

Visitations to places like carpentry shops, construction sites, restaurant kitchens, etc. will require advance planning by the counselor. The counselor should call ahead to make arrangements and make plans to have appropriate supervision of all Scouts.

The site will very likely have rules and instructions that must be followed. The counselor should help ensure that all the participants are aware of and follow those rules. This may include safety procedures and other instructions.

Place visited: _____

- B. Discuss with your counselor the equipment or tools that use levers in the place you visited.

6. Discuss with your counselor how levers affect your everyday life.

Important excerpts from the ['Guide To Advancement'](#), No. 33088:

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- **[Inside front cover, and 5.0.1.4] — Unauthorized Changes to Advancement Program**
No council, committee, district, unit, or individual has the authority to add to, or subtract from, advancement requirements. (There are limited exceptions relating only to youth members with disabilities. For details see section 10, "Advancement for Members With Special Needs".)
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1-2-3-Go!

Cub Scout Nova Award Workbook



This workbook can help you but you still need to read the Cub Scout Nova Awards Guidebook.

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The requirements were revised in 2015 • This workbook was updated in August 2016.

Scout's Name: _____

Unit: **Cub Pack 147 Oxford, MA**

Counselor's Name: **Mary Ann Perveiler**

Counselor's Phone No.: _____

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

Math and physics are used in almost every kind of invention, including cars, airplanes, and telescopes.
Math also includes cryptography, the use of secret codes.

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 that involves math or physics.

What was watched?	Date	Start Time	Duration

Then do the following:

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.

1. Make a list of at least two questions or ideas from what you watched.

1.	
2.	

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Requirements © Copyright - Boy Scouts of America – used with permission.

2. Discuss two of the questions or ideas with your counselor.

1.

2.

- ☐ B. Read (about one hour total) about anything that involves math or physics.

What was read?	Date	Start Time	Duration

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.

Then do the following:

1. Make a list of at least two questions or ideas from what you read.

1.

2.

2. Discuss two of the questions or ideas with your counselor.

1.	
2.	

- ☐ C Do a combination of reading and watching (about one hour total) about anything that involves math or physics.

What was watched or read?	Date	Start Time	Duration

Then do the following:

1. Make a list of at least two questions or ideas from what you read and watched.

1.	
2.	

2. Discuss two of the questions or ideas with your counselor.

[illegible]

2. Complete ONE adventure from the following list. (Choose one that you have not already earned.) Discuss with your counselor what kind of science, technology, engineering, or math was used in the adventure.

Wolf Cub Scouts

Code of the Wolf

Bear Cub Scouts

Robotics

Webelos Scouts

Game Design

[illegible]

3. Explore TWO options from A or B or C and complete ALL the requirements for those options. Keep your work to share with your counselor. The necessary information to make your calculations can be found in a book or on the Internet. (See the Helpful Links box for ideas.) You may work with your counselor on these calculations.

☐ A. Choose TWO of the following places and calculate how much you would weigh there.

- ☐ 1. On the sun or the moon
☐ 2. On Jupiter or Pluto
☐ 3. On a planet that you choose

☐ B. Choose ONE of the following and calculate its height:

- ☐ 1. A tree
☐ 2. Your house
☐ 3. A building of your choice

☐ C. Calculate the volume of air in your bedroom.

Make sure your measurements have the same units—all feet or all inches—and show your work.

$\text{Volume} = \text{Length} \times \text{Width} \times \text{Height}$
--

4. Secret Codes

A. Look up, then discuss with your counselor each of the following:

1. Cryptography

2. At least three ways secret codes or ciphers are made

1.

2.

3.

3. How secret codes and ciphers relate to mathematics

B. Design a secret code or cipher.

Then do the following:

1. Write a message in your code or cipher.

2. Share your code or cipher with your counselor.

5. Discuss with your counselor how math affects your everyday life.

Helpful Links

You may choose other links if preferred.

"Your Weight On Other Planets": Essortment Website:

www.essortment.com/all/weightonlanivrp.htm

"Your Weight in Space": Intrepid Sea, Air & Space Museum Website:

www.intrepidmuseum.org/EducaonTleacher-Resources/documents/Space%209-12Postatispix

"How to Calculate the Height of a Tree with a Shadow": Yahoo! Voices Website: [voices.yahoo.com/how-](http://voices.yahoo.com/how-calculate-height-tree-shadow-6407960.html)

[calculate-height-tree-shadow-6407960.html](http://voices.yahoo.com/how-calculate-height-tree-shadow-6407960.html)

"How to Calculate Volume of a Room": eHow Website:

www.ehow.com/how%202266390_calculate-volume-room%20html

"CryptoKids": National Security Agency Website:

www.nsa.gov/kids

"Cryptology for Kids": Purdue University Center for Education and Research in Information Assurance and Security Website:

www.cerias.purdue.edu/education/k-12/teaching_resources/lessons_presentations/cryptology.html

"The Secret World of Codes and Code Breaking": University of Cambridge NRICH Website.

nrich.maths.org/2197

"How to Create Secret Codes and Ciphers": wikiHow Website:

www.wikihow.com/Create-Secret-Code-and-ciphers

Important excerpts from the ['Guide To Advancement'](#), No. 33088:

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Youth members must not meet one-on-one with adults. Sessions with counselors must take place where others can view the interaction, or the Scout must have a buddy: a friend, parent, guardian, brother, sister, or other relative —or better yet, another Scout working on the same badge— along with him attending the session. When the Scout meets with the counselor, he should bring any required projects. If these cannot be transported, he should present evidence, such as photographs or adult certification. His unit leader, for example, might state that a satisfactory bridge or tower has been built for the Pioneering merit badge, or that meals were prepared for Cooking. If there are questions that requirements were met, a counselor may confirm with adults involved. Once satisfied, the counselor signs the blue card using the date upon which the Scout completed the requirements, or in the case of partials, initials the individual requirements passed.
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Dr. Luis W. Alvarez

Cub Scout Supernova Award Workbook



This workbook can help you but you still need to read the Cub Scout Nova Awards Guidebook.

The work space provided for each requirement should be used by the Scout to make notes for discussing the item with his counselor, not for providing the full and complete answers. Each Scout must do each requirement.

No one may add or subtract from the official requirements found in the Cub Scout Nova Awards Guidebook (Pub. 34032 – SKU 614935).

The requirements were issued in 2012 • This workbook was updated in August 2016.

Scout's Name: _____

Unit: **Cub Pack 147 Oxford, MA**

Counselor's Name: **Mary Ann Perveiler**

Counselor's Phone No.: _____

Although it is not a requirement, it is recommended that you earn at least two of the four NOVA awards for Cub Scouts before earning the Dr. Luis W. Alvarez Supernova Award. This Supernova award can be earned by Cub Scouts like you who want to soar in science.

- ☐ 1. Complete both of the adventures appropriate for your rank.

Wolf Cub Scouts

- ☐ Air of the Wolf
☐ Code of the Wolf

Bear Cub Scouts

- ☐ Make It Move
☐ Super Science

- ☐ 2. Complete the following adventure appropriate for your rank.

Wolf Cub Scouts

- ☐ Call of the Wild

Bear Cub Scouts

- ☐ Forensics
OR
☐ Marble Madness

- ☐ 3. Find interesting facts about Dr. Luis W. Alvarez using resources in your school or local library or on the Internet (with your parent's or guardian's permission and guidance).

Then discuss what you learn with your mentor, including answers to the following questions:

Complied by: Pack 147 Oxford, MA

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What very important award did Dr. Alvarez earn?

What was his famous theory about dinosaurs?

- ☐ 4. Find out about three other famous scientists, technology innovators, engineers, or mathematicians approved by your mentor.

1.	
2.	
3.	

Discuss what you learned with your mentor.

- ☐ 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.

Person you spoke with:

Ask them why they think math and science are important in your education.

Discuss what you learn with your mentor.

- ☐ 6. Participate in a science project or experiment in your classroom or school OR do a special science project approved by your teacher.

Project you did:

Discuss this activity with your mentor.

- ☐ 7. Do ONE of the following:
- ☐ A. Visit with someone who works in a STEM-related career.

Person you visited:

--

Discuss what you learned with your mentor.

[illegible]

- ☐ B. Learn about a career that depends on knowledge about science, technology, engineering, or mathematics.

Career:

--

Discuss what you learned with your mentor.

[illegible]

- ☐ 8. Learn about the scientific method (or scientific process).

Discuss this with your mentor, and include a simple demonstration to show what you learned.

What did you demonstrate?

- ☐ 9. Participate in a Nova- or other STEM-related activity in your Cub Scout den or pack meeting that is conducted by a Boy Scout or Venturer who is working on his or her Supernova award. If this is not possible, participate in another Nova- or STEM-related activity in your den or pack meeting.

Activity you participated in:

:

Date

- ☐ 10. Submit an [application for the Cub Scout Supernova award](#) to the district Nova or advancement committee for approval.

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Dr. Charles H. Townes

Webelos Scout Supernova Award Workbook

This workbook can help you but you still need to read the Cub Scout Nova Awards Guidebook.

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The requirements were issued in 2015 • This workbook was updated in August 2016.

Scout's Name: _____

Unit: **Cub Pack 147 Oxford, MA**

Counselor's Name: **Mary Ann Perveiler**

Counselor's Phone No.: _____

Although it is not a requirement, it is recommended that you earn at least two of the four Nova awards for Cub Scouts before earning the Dr. Charles H. Townes Supernova Award.

This Supernova award can be earned by Webelos Scouts like you.

- ☐ 1. Complete the following Webelos adventures: : Adventures in Science, Engineer, and Scouting Adventure.
- ☐ Adventures in Science ☐ Engineer ☐ Scouting Adventure
- ☐ 2. Complete three of the following adventures: Build It, Building a Better World, Castaway, First Responder, Into the Wild, and Into the Woods.
- ☐ Build I ☐ Building a Better World ☐ Castaway
- ☐ First Responder ☐ , Into the Wild ☐ Into the Woods
- ☐ 3. Find interesting facts about Dr. Charles H. Townes using resources in your school or local library or on the Internet (with your parent's or guardian's permission and guidance).

Then discuss what you learn with your mentor, including answers to the following questions:

What very important award did Dr. Townes earn?

What was Dr. Townes' most famous invention?

- ☐ 4. Find out about five other famous scientists, technology innovators, engineers, or mathematicians approved by your mentor.

1.	
2.	
3.	
4.	
5.	

Discuss what you learned with your mentor.

- ☐ 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.

Person you spoke with:

Ask them why they think math and science are important in your education.

Discuss what you learn with your mentor.

- ☐ 6. Participate in a science project or experiment in your classroom or school.

Project you did:

Discuss this activity with your mentor.

☐ 7. Do ONE of the following:

☐ A. Visit with someone who works in a STEM-related career.

Person you visited:

Discuss what you learned with your mentor.

☐ B. Learn about a career that depends on knowledge about science, technology, engineering, or mathematics.

Career:

Discuss what you learned with your mentor.

- ☐ 8. Under the direct supervision of your mentor, do an experiment that shows how the scientific method (or scientific process) is used

Experiment Conducted:

--

Prepare a short report on the results of your experiment for your mentor.

[illegible]

- ☐ 9. Participate in a Nova- or other STEM-related activity in your Webelos Scout den or pack meeting that is conducted by a Boy Scout or Venturer who is working on his or her Supernova award. If this is not possible, participate in another Nova- or STEM-related activity in your den or pack meeting.

Activity you participated in:

<ul style="list-style-type: none"> • •
--

Date

--

- ☐ 10. Submit an [application for the Webelos Scout Supernova award](#) to the district STEM or advancement committee for approval.

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