# What a Life!

## Venturer Nova Award Workbook

This workbook can help you but you still need to read the Venturer Nova Awards Guidebook.
This Workbook can help you organize your thoughts as you prepare to meet with your counselor.
You still must satisfy your counselor that you can demonstrate each skill and have learned the information.
You should use the work space provided for each requirement to keep track of which requirements have been completed,
and to make notes for discussing the item with your counselor, not for providing full and complete answers.
If a requirement says that you must take an action using words such as "discuss", "show",
"tell", "explain", "demonstrate", "identify", etc, that is what you must do.

**Counselors may not require the use of this or any similar workbooks.**

No one may add or subtract from the official requirements found in the Venturer Nova Awards Guidebook (Pub.34031).
The requirements were issued in 2018 • This workbook was updated in March 2019.

Venturer's Name: _____ Unit: _____

Counselor's Name: _____ Counselor's Phone No.: _____

http://www.USScouts.Org • http://www.MeritBadge.Org

Please submit errors, omissions, comments or suggestions about this **workbook** to: **Workbooks@USScouts.Org**

Send comments or suggestions for changes to the **requirements** for the **Nova Award** to: **Program.Content@Scouting.Org**

**This module is designed to encourage you to explore different facets of the biological life and living systems around you, including macrobiotic and microbiotic life, ecology, genetics, and advances in medicine.**

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

☐ A Watch not less than three hours total of shows or documentaries related to areas of biology: botany, zoology, genetics, medicine, ecology, veterinary medicine or microbiology.

| What was watched? | Date | Start Time | Duration |
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Then do the following: .

☐ 1 Make a list of at least five questions or ideas from the show(s) you watched.

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| 1. | |
| 2. | |
| 3. | |
| 4. | |
| 5. | |

Some examples include - but are not limited to—shows found on PBS (NOVA), Discovery Channel, Science Channel, Animal Planet Channel, National Geographic Channel, TED Talks (online videos), and the History Channel. The Human Genome Institute at NIH website at http://www.genome.gov/10000002/education/ has educational information and activities related with human genetics. You may choose to watch a live performance or movie at an aquarium, nature center, and wildlife park 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

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

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☐ B Read (not less than three hours total) about anything related to a biological topic and do the following: .

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☐ 1 Make a list of at least five questions or ideas from each article.

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| 2. | |
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Examples of magazines include—but are not limited to—Discover, Science News, Natural History, Scientific American, National Geographic, and The Scientist.

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

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☐ C Combine reading and watching activities (not less than three hours total),: .

| What was read or watched? | Date | Start Time | Duration |
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and do the following

☐ 1 Make a list of at least five questions or ideas from your activity.

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

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☐ 2 Choose ONE subject from the following list. Complete ALL the requirements from among the Venturing STEM exploration topics. If you have already completed a Venturing STEM exploration in one of these fields, please choose a different field for this award.

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| ☐ Animal Science | ☐ Forestry | ☐ Medicine | ☐ Soil and water conservation |
| ☐ Environmental science | ☐ Gardening | ☐ Nature | ☐ Veterinary science |
| ☐ Fishing | ☐ Insect Study | ☐ Oceanography | ☐ Wildlife conservation |
| ☐ Fish and Wildlife Management | ☐ Mammal Study | ☐ Plant Science | |

Discuss with your counselor THREE salient points you learned from each activity

☐ 3 Be a biologist! Consider different areas of biological explorations presented below and pick TWO from A or B or C or D or E. Run the experiments or perform the activity and discuss your observations and conclusions with your counselor. Always be sure you have your parent's or guardian's permission before using the Internet.

☐ A Botanical Investigation: Effect of Light on Plant Growth.

☐ 1 Experiment: Plant pea seeds in potting soil, and grow and water one set under normal sunlight, another set under fluorescent light, and a last set of potted peas in large boxes with only one quarter-size hole for sunlight. Predict what difference(s) you expect to see among the three conditions, and allow plants to germinate and grow for at least two weeks.

Record specific observations about the height, leaf size, number of leaves, color, and stem diameter.

Document your results with photos.

Graph your quantitative results.

☐ 2 Discuss with your counselor:

What was your hypothesis?

Did your experimental results agree with your hypothesis?

What factors contributed to the differences, if any, between your hypothesis and the actual experimental results?

☐ 3 Discover. Explain to your counselor possible reasons that support your experimental results.

Helpful Links.
How to make a scientific report: http://unilearning.uow.edu.au/report/2b.html
Factor affecting plant growth: https://en.wikipedia.org/wiki/Plant#Factors_affecting_growth.
Being an agricultural technician: http://www.sciencebuddies.org/science-engineering-careers/life-sciences/agricultural-technician

Then answer TWO of the following questions.

☐ a How does sunlight affect the process of photosynthesis?

☐ b How do different colors of light affect plant growth?

☐ c What is the best color of light to grow a plant in?

☐ d How can this knowledge be used to improve the quality and yield of food crops?

☐ B Microscopic Discovery: Life in a Drop of Pond Water

☐ 1 Experiment: Collect a pint of water from a local pond, creek, river or estuary, or any source of standing water. Observe a drop of the water under the microscope at 100x magnification, using a slide with a well depression. Draw what you see, and research the identity of the microorganisms you discovered in the sample.

Divide your sample into three equal portions, and store them in jars with access to air (e.g., punch some holes into the lid):

To the first jar, add a pinch of rice flour or ground yeast. Predict what will change in one week.

To the second jar, add a teaspoon of household bleach. Predict what will change in one week.

Keep the third jar as a control sample. Predict what will change in one week.

At the end of the one-week incubation, take samples from each jar, and observe under the microscope what changes occurred.

☐ 2 Discuss with your counselor the following:

What was your original hypothesis?

Did your experimental results agree with your hypothesis?

What factors contributed to the differences, if any, between your hypothesis and the actual experimental results?

☐ 3 Discover: Explain to your counselor possible reasons that support your experimental results.

Helpful Links
Guide to identification of fresh water organisms: www.msnucleus.org/watersheds/mission/plankton.pdf
Pond life identification: http://www.biologycorner.com/worksheets/identifypond.html
The Microbial World—Yeasts and yeast-like fungi: http://archive.bio.ed.ac.uk/jdeacon/microbes/yeast.htm

☐ Then answer TWO of the following questions. (With your parent's or guardian's permission, you may use the internet to find this information.)

☐ What did you learn about the changes in your micro-ecosystem, and how can you extrapolate what you learned to a larger ecosystem?

☐ Which methods are used to purify the water?

☐ Research how to make yeast bread, yogurt OR cheese (Choose ONE only).

- ☐ Prepare a sample of the food product to show to your counselor.
- ☐ Discuss with your counselor how microbes were utilized in production of this food.

☐ C Zoology and Veterinary Science: Puppy Chow

☐ 1 Experiment: Visit an animal feed store or research the internet for information on nutritional requirements for the different life stages—juvenile, adult, and senior adult—of ONE animal.

☐ a Compare and contrast the nutrient content of feed for at least three major life stages of your selected animal subject.

☐ b Volunteer at an animal center for at least eight hours. Gather practical information about diet components and feeding requirements of at least three animals representing the different life stages.

☐ c Tabulate your data, and present it to your counselor.

☐ 2 Discuss with your counselor the following:

Why each life stage requires a different balance of nutrients.

Why is overfeeding a nutrient, such as protein, not a good practice?

Why do pets need at least an annual check-up?

Helpful Links
Life Stages feeding: https://protrain.hs.11nwd.net/e1/sitefiles/642/Documents/en_VNAChapter5_MAS.pdf
Animal Nutrition: www.aps.uoguelph.ca/~gking/Ag_2350/nutrition.htm

☐ 3 Discover: Take a tour of a local veterinary clinic or animal shelter and interview a medical professional about what is involved in a routine pet check-up, including vaccinations, and why.

Explain to your counselor what kind of education is required to be a veterinarian.

What are other related career options in this field?

Are there differences in routine check-ups of different pets

What is the difference in the digestive system of ruminants?

- ☐ D Genetics: DNA Demystified
  - ☐ 1 Experiment: With permission of your parents or guardians, find a recipe on the internet to create your own DNA extraction kit using household materials, and use it to purify DNA from strawberries.
    - ☐ a Perform the DNA extraction, recording your materials and observations at each step.
    - ☐ b Present a report of your experiment to your counselor.
  - ☐ 2 Discuss with your counselor the following:
    - ☐ a What is DNA, its composition and structure, and where is it found in a cell?
    - ☐ b What is the purpose of each of the components of your DNA extraction liquid?
    - ☐ c Why are strawberries a good choice for DNA extraction? What else could you use?

☐ d Why do you think you are able to see the DNA without using a microscope?

Helpful Links

The animated genome: https://unlockinglifescode.org/media/animations/659#660

Talking Glossary of Genetic Terms: http://www.genome.gov/glossary/

Brief history of Human Genome Project https://unlockinglifescode.org/timeline

Genomic Careers: http://www.genome.gov/genomiccareers/index.cfm

What do you think? Ethical and social questions surrounding genomic research: https://unlockinglifescode.org/wdyt/#/

Understanding genetics: http://genetics.thetech.org/about-genetics

☐ 3 Explain to your counselor TWO of the following questions:

☐ a What is the science of genetics? The fields of genetics and genomics offer dozens of career possibilities. Which are the three most interesting to you?

☐ b What are some diseases or disabilities that result from genetic mutations or alterations in human DNA? What possible environmental factors cause genetic mutations in humans?

☐ c Do you think that genomic medicine and personalized medicine will improve our health?

Are there any ethical or moral issues that need to be considered as these technologies are developed?

☐ E Ecology

☐ 1 Study at least four diverse environmental areas near where you live. Plan and execute a field trip to each of these areas, with the permission of your parents and your counselor.

☐ a Describe the reasons for selecting these areas, their boundaries, user groups, any outside forces that interact with them, and a list of what plants, animals, and other life you expect to find at each of them.

☐ b Explain the basic natural systems, cycles, and changes that occur over time. Include the four basic elements (what are these?), land—use patterns, and at least six different species in your analysis and how they have changed over time. Discuss both biological and physical components.

☐ c Under the guidance of a natural resources professional, carry out an investigation of an ecological subject approved by your counselor in one of the four identified environmental areas. Make sure to inventory and map the area, and to observe the living and nonliving parts of the ecosystem.

☐ 2 Discuss with your counselor the following:

☐ a How living things respond to changes in their environments.

☐ b What are the environmental concerns for that area? Explain them using photographs, graphs, or available data.

☐ c What project has been or could be done to improve the natural habitat threatened in that area?

Helpful Links

Environmental Information by Location: http://www.epa.gov/environmental-topics/environmental-information-location

Learning activities about Environment: http://www.epa.gov/students

National Geographic Education: http://www.nationalgeographic.org/lesson/?q=&grade_bands=9%E2%80%9312+(Ages+14%25%20E2%80%9318)&per_page=25&subjects=Ecology

National Park Service: http://www.nps.gov/teachers/teacher-resources.htm?q=ecology

Local flora and fauna guides

☐ 4 Discover: Research and discuss with your counselor THREE of the current environmental issues listed below and their effect on microbiotic and macrobiotic life.

- ☐ a Pollution
- ☐ b Global warming
- ☐ c Overpopulation
- ☐ d Natural resource depletion
- ☐ e Waste disposal
- ☐ f Climate change
- ☐ g Loss of biodiversity
- ☐ h Deforestation
- ☐ i Ocean acidification
- ☐ j Ozone layer depletion
- ☐ k Acid rain
- ☐ l Water pollution
- ☐ m Urban sprawl
- ☐ n Public health

☐ 5 Discuss with your counselor how macrobiotic and microbiotic life affects your everyday life.

**When working on Nova and Supernova awards, Scouts and Scouters should be aware of some vital information in the current edition of the *Guide to Advancement* (BSA publication 33088).Important excerpts from that publication can be downloaded from http://usscouts.org/advance/docs/GTA-Excerpts-nova.pdf.**
**You can download a complete copy of the *Guide to Advancement* .from http://www.scouting.org/filestore/pdf/33088.pdf.**