# Splash!

## Water

## Scouts BSA Nova Award Workbook

This workbook can help you but you still need to read the Scouts BSA 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 Scouts BSA Nova Awards Guidebook (Pub. 34033 – SKU 614936).

The requirements were issued in 2018 • This workbook was updated in June 2019.

Scout'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 help you explore how water affects your life every day.
Splash! is part of the Science category.**

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

c **A.** Watch about three hours total of science-related shows or documentaries that discuss water as it relates to the hydrologic cycle, primary sources, primary users (including wildlife), health, sources of pollution, waste treatment, and related sciences and technologies.

| 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), History Channel, the National Academy of Sciences YouTube Channel, and www.waterblues.org. You may choose to watch a live performance or movie developed by a local museum or state or federal agency. 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 five questions or ideas from the show(s) you watched.**

**1.**

**2.**

**3.**

**4.**

**5.**

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

**1.**

**2.**

c **B. Read (about three hours total) about water as it relates to the hydrologic cycle, primary sources, primary users, health, sources of pollution, waste treatment, and related sciences and technologies.**

| What was read? | Date | Start Time | Duration |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Examples of magazines include - but are not limited to - [Odyssey, Popular Science, Science Illustrated, Natural History, Scientific American, Nature Conservancy, Sage Magazine, Smithsonian, National Geographic, LakeLine, and WaterWorld,

**Then do the following:**

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

| | |
|---|---|
| 1. | |
| 2. | |
| 3. | |
| 4. | |
| 5. | |
| 6. | |
| 7. | |

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

| | |
|---|---|
| 1. | |
| 2. | |

c **C Do a combination of reading and watching (about three hours total).**

| 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 each article or show.**

| | |
|---|---|
| 1. | |
| 2. | |
| 3. | |
| 4. | |

5.

6.

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

1.

2.

2. Complete ONE merit badge from the following list. (Choose one that you have not already used toward another Nova award.)

- c Chemistry
- c Energy
- c Engineering
- c Environmental Science
- c Fish and Wildlife Management
- c Fishing
- c Fly Fishing
- c Forestry
- c Geology
- c Nature
- c Oceanography
- c Public Health
- c Soil and Water Conservation
- c Sustainability
- c Weather

After completion, discuss with your counselor how the merit badge you earned pertains to water, e.g., wastewater treatment and pollution, and the science you used..

**3. Choose two requirements from A or B or C or D and complete ALL the requirements for the two you selected..**

c **A. Examine models of the structures of liquid water and ice. (You can use either a physical model or a computer model.) Note the similarities and differences between them. Discuss with your counselor how the structures of water and ice affect their properties and their ability to dissolve compounds and carry impurities.**

**Helpful Links**

**Be sure you have your parent's or guardian's permission before using the internet.)**

**The Interactive Library - Explain It With Molecules: www.edinformatics.com/interactive_molecules - 3D structures of water and ice**

**University of Alcalá "Intermolecular hydrogen bonds in liquid water and in ice": http://biomodel.uah.es/en/water/p1.htm**

c **B. Prepare two demonstrations or activities involving surface tension or hydrophobicity, and present them to a Cub Scout den or other youth group. Explain the science involved, and discuss your presentation with your counselor..**

**Helpful Links**

Information and Tools to Examine Properties of Water— "A gentle to water and its structure": www.chem1.com/acad/sci/aboutwater.html

Steven Dutch - "Ice Structure" www.uwgb.edu/dutchs/Petrology/Ice%20Structure.HTM

The Interactive Library - Explain It With Molecules: http://www.edinformatics.com/interactive_molecules/

University of Alcallá - "Intermolecular hydrogen bonds in liquid water and in ice": http://biomodel.uah.es/en/water/p1.htm

**Some Sources of Materials:**

Hydrophobic materials - Naturesorb (dried sphagnum peat moss); Scotchgard (for coating sand grains)

Tulle fabric - From fabric store (use instead of screen)

Dialysis tubing - Carolina Biological Supply

**Some Experiments**

"Surface tension": www.youtube.com/watch?v=u5AxlJSiEEs

Massachusetts Institute of Technology - "Surface Tension": http://video.mit.edu/watch/surface-tension-8413/

WonderHowTo - "How to do a science trick demonstrating surface tension with pepper, soap, and water": http://science.wonderhowto.com/how-to/do-science-trick-demonstrating-surface-tension-with-pepper-soap-and-water-396289/

SteveSpangler.com - "Magic Sand - Sand That Is Always Dry": www.youtube.com/watch?v=10EnRI80zvk (hydrophobic material)

SteveSpangler.com - "Mysterious Water Suspension": www.youtube.com/watch?v=y2fZYx3K6jI (water cohesion forces)

Michigan Tech MindTrekkers - 8211; Surface Tension Trap https://docs.google.com/document/d/1B3-xNizlBkfrvY492P0qf3XP6JfUzyhAOghmYn5bpdo/edit

c **C. Use the Internet (with your parent's or guardian's permission) to determine the annual water use for your state in gallons and acre-feet.**

c **1. What are the main sources (provide percentages)?.**

c **2. Who are the main users (provide percentages)?**

c **3. What are the trends in total and per capita water use over time?**

c **4. Discuss what you learned with your counselor.**

**Helpful Link:**
**USGS Water Use in the United States**
**https://water.usgs.gov/watuse/**

c **D. Household water use. Create a list all of the ways that water is used around your home in a 24-hour period, including the bathroom, kitchen, and any appliances. Don' t forget outdoor water uses such as pools, hot tubs, sprinkler systems, landscape and gardens, pets and/or livestock, and cleaning efforts such as washing cars, boats, pets, etc. :**

c **1. Estimate how much water is used for each function over a specific time period. Add your estimates to come up with an estimate of total water usage by your family for one month or one year..**

c **2. Compare your estimate with the actual total found on your home water bill, and account for any large differences. (Hint: ask your parent or guardian to help you locate that information on the monthly water bill or well meter.)**

**Note: If you live in a multi-family housing unit and do not have an individual water bill, you may be able to obtain the information from your unit's management. If not, measure your water usage for at least two tasks (for example, by leaving the drain closed when you take a shower, then measuring the amount of water that collected in the tub during your shower), and use that data to revise your estimates.**

c **3. How does your local usage compare to the average use per capita in your state? The United States Geological Survey (usgs.org) is a good source for data on average water usage.**

c **4. Identify several ways to reduce your water consumption, and practice them for one month. Estimate how much clean water you have saved.**

c **5. Discuss your work and what you learned with your counselor.**

**.4. Visit a place where water is being processed either by humans or by nature (wastewater treatment plant, naturalist center, conservation department, etc.), take a tour, and speak with a professional about the processing of the water.**

| Location visited | |
|---|---|

**Discuss with your counselor the STEM being used.**

**5. Discuss with your counselor what you have learned about how water 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.**