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Teaching the Weather Merit Badge: STEM Education in the Boy Scouts of America

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THE UNIVERSITY OF UTAH

BYU Merit Badge PowWow

Background

- The Boy Scouts of America (BSA) is one of the nation's largest values-based youth development organizations.
- In 1927 the weather merit badge was introduced to the BSA as an elective.
- To earn the weather merit badge scouts must identify cloud types, explain fundamental weather phenomenon, learn safety rules for different types of dangerous weather, and learn about weather related careers.
- Scouts fulfill the requirements under the guidance of a volunteer instructor or counselor.

BSA is one organization that provides STEM education outside of formal schooling by offering many merit badges in STEM subjects such as weather.

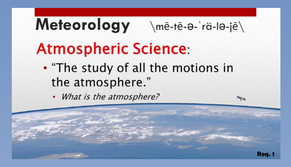
BYU Pow Wow

- The BSA Merit Badge PowWow at Brigham Young University (BYU) has been held for more than 57 years and is one of the largest PowWows in the United States.
- Occurs on two Saturdays each fall and spring.
- Nearly 40 different merit badges are offered.
- Scouts register for up to three merit badge classes.
- An instructor and several counselors helps scouts fulfill the requirements.
- Three weather merit badge classes are taught each week with 30-60 scouts in each class.

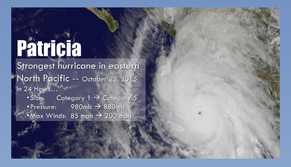
Teaching a Class

- Wide age group: 11-18 year old audience.
- Prepare a worksheet for scouts to complete.
- Show clean PowerPoint slides for each requirement (see examples below).
- Keep the scouts involved. Ask questions and have scouts share personal weather stories.
- Show weather instruments used by meteorologists: rawinsonde, tipping rain bucket, anemometer, temperature sensor, etc.
- Give a homework assignment, preferably related to requirement 9 or 10.

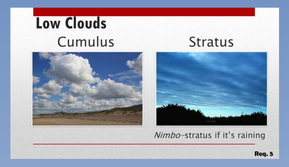
Clear Definitions



Discuss Current Events



Pictures and Videos

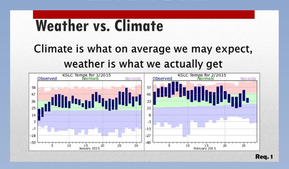


Web Based Visuals

References to Pop Culture

Analogies

Current Data



Applications and Careers

Volunteers Needed

- Teaching youth comes with challenges, but an effective instructor can spark a scout's interest in a STEM field.
- Scouts learn more effectively when taught by an enthusiastic instructor who has background in the subject.
- Without a knowledgeable volunteer, this merit badge is taught by someone less interested in meteorology or is not taught at all.
- Contact your local BSA district or council for volunteer opportunities.

More than 7,000 scouts attend the BYU Merit Badge PowWow each spring and fall.

Three weather merit badges classes are taught at the PowWow and over 100 scouts complete the requirements for the weather merit badge.

While it is difficult to track how the class has influenced a scout's interest in STEM subjects, most feedback has been positive. One scout exclaimed, "I had no idea that the weather was so cool!"

Weather Merit Badge Requirements

Requirement 1:
Define meteorology:
Explain what weather is and what climate is:
How does weather affects farmers? Why are weather forecasts important to farmers?
How does weather affects sailors? Why are weather forecasts important to sailors?
How does weather affects aviators? Why are weather forecasts important to aviators?
How does weather affects the construction industry? Why are weather forecasts important to construction?

Requirement 2:
Explain the difference between a severe weather watch and a warning.
Name five dangerous weather-related conditions. Give the safety rules for each when outdoors.

Requirement 3:
Explain the difference between high- and low- pressure systems in the atmosphere.
Which is related to good weather?
Which is related to poor weather?
Draw a cross section of a cold front.
Draw a cross section of a warm front.

Requirement 4:
What causes wind?
Why does it rain?
What causes lightning?
How does hail form?

Requirement 5:
What types of clouds are found in the low levels of the atmosphere? What kind of weather is related to these types of clouds?
What types of clouds are found in the middle levels of the atmosphere? What kind of weather is related to these types of clouds?
What types of clouds are found in the high levels of the atmosphere? What kind of weather is related to these types of clouds?

Requirement 6:
Draw a diagram of the water cycle and label its major processes.

Requirement 7:
Identify some human activities that can alter the environment, and describe how they affect the climate and people.

Requirement 8:
Describe how the tilt of Earth's axis helps determine the climate of a region near the equator, near the poles, and across the area in between.

Requirement 9:
Do ONE of the following:
a. Make one of the following instruments: wind vane, anemometer, rain gauge, hygrometer. Keep a daily weather log for one week using information from this instrument as well as from other sources. Record the following information at the same time every day: wind direction and speed, temperature, precipitation, and types of clouds. In the log, also list the weather forecasts from radio or television at the same time each day and show how the weather really turned out.
b. Visit a National Weather Service office or talk with a local radio or television weathercaster, private meteorologist, local agricultural extension service officer, or university meteorology instructor. Find out what type of weather is most dangerous or damaging to your community.

Requirement 10:
Do ONE of the following:
a. Give a talk of at least five minutes to a group (such as your unit or a Cub Scout pack) explaining the outdoor safety rules in the event of lightning, flash floods, and tornadoes. Before your talk, share your outline with your counselor for approval.
b. Read several articles about acid rain and give a prepared talk of at least five minutes to a group (such as your unit or a Cub Scout pack) about the articles. Before your talk, share your outline with your counselor for approval.

Requirement 11:
Find out about a weather-related career opportunity that interests you. Discuss with and explain to your counselor what training and education are required for such a position, and the responsibilities required of such a position.

PowerPoint slides and worksheet used in my class can be downloaded here:

http://home.chpc.utah.edu/~u0553130/Brian_Blaylock/wxMeritBadge.html#SLIDES

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More info about the BYU PowWow at **http://powwow.byu.edu/**