

# SSBG Merit Badge & STEM NOVA Prerequisites

## Energy Merit Badge

Requirement 1: Do the following:

- a. Find an article on the use or conservation of energy. Discuss with your counselor what in the article was interesting to you, the questions it raises, and what ideas it addresses that you do not understand.

Requirement 4: Conduct an energy audit of your home. Keep a 14-day

log that records what you and your family did to reduce energy use. Include the following in your report and, after the 14-day period, discuss what you have learned with your counselor.

- a. List the types of energy used in your home such as electricity, wood, oil, liquid petroleum, and natural gas, and tell how each is delivered and measured, and the current cost; OR record the transportation fuel used, miles driven, miles per gallon, and trips using your family car or another vehicle.
- b. Describe ways you and your family can use energy resources more wisely. In preparing your discussion, consider the energy required for the things you do and use daily (cooking, showering, using lights, driving, watching TV, using the computer). Explain what is meant by sustainable energy sources. Explain how you can change your energy use through reuse and recycling.

## Inventing Merit Badge

Requirement 2: Do ONE of the following:

- a. Identify and interview with a buddy (and with your parent's permission and merit badge counselor's approval) an individual in your community who has invented a useful item. Report what you learned to your counselor.
- b. Read about three inventors. Select the one you find most interesting and tell your counselor what you learned.

Requirement 8: Do ONE of the following:

- a. Participate with a club or team (robotics team, science club, or engineering club) that builds a useful item. Share your experience with your counselor.
- b. Visit a museum or exhibit dedicated to an inventor or invention, and create a presentation of your visit to share with a group such as your troop or patrol.

## **Motor Boating Merit Badge**

Participants must complete the Texas Parks & Wildlife Department Boater Safety Course prior to attending the class. You need the course if you were born on or after Sept. 1, 1993, and will be operating a boat over 15 hp, a PWC, or a sailboat over 14 feet long in Texas. You must be at least 13 years old to take this online course. You do not have to be a resident of Texas to take this online course.

The Course can be done online at <https://www.boat-ed.com/texas/> for a fee of \$20.

## **Oceanography Merit Badge**

Requirement 4: Draw a cross-section of underwater topography. Show what is meant by:

- Continental shelf
- Continental slope
- Abyssal plain
- Name and put on your drawing the following: seamount, guyot, rift valley, canyon, trench, and oceanic ridge. Compare the depths in the oceans with the heights of mountains on land.

Requirement 8: Do one of the following:

- Write a 500-word report on a book about oceanography
- Visit one of the following and write a 500-word about your visit:
  - o Oceanographic research ship
  - o Oceanographic institute, marine laboratory, or marine aquarium
- Prepare a five-minute speech about “Why Oceanography is Important” or “Career Opportunities in Oceanography” and present the speech to the merit badge class.

## **Robotics Merit Badge**

Requirement 6: Competitions. Do one of the following:

- Attend a robotics competition and report to your counselor what you saw and learned about the competition and how teams are organized and managed.
- Learn about three youth robotics competitions. Tell your counselor about these, including the type of competition, time commitment, age of the participants, and how many teams are involved

## **Weather Merit Badge**

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 such as local radio and television stations, NOAA Weather Radio All Hazards, and Internet sources (with your parent's permission). Record the following information at the same time every day: wind direction and speed, temperature, precipitation, and types of clouds. Be sure to make a note of any morning dew or frost. 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. Determine how severe weather and flood warnings reach the homes in your community.

Requirement 10: Prepare a five-minute speech about one of the following topics and be ready to present at the merit badge day:

- a. Outdoor safety rules in the event of lightning, flash floods, and tornadoes.
- b. Articles about acid rain

## **STEM NOVA Designed to Crunch!**

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

A. Watch about three hours' total of math-related shows or documentaries that involve scientific models and modeling, physics, sports equipment design, bridge building, or cryptography. Then do the following:

- a. Make a list of at least five questions or ideas from the show(s) you watched.
- b. Discuss two of the questions or ideas with your counselor.

B. Research (about three hours total) several websites (with your parent's or guardian's permission) that discuss and explain cryptography or the discoveries of people who worked extensively with cryptography.

Then do the following:

- a. List and record the URLs of the websites you visited and the major topics covered on the websites you visited.
- b. Discuss with your counselor how cryptography is used in the military and in everyday life and how a cryptographer uses mathematics.

C. Read at least three articles (about three hours total) about physics, math, modeling, or cryptography. You may wish to read about how technology and engineering are changing sports equipment, how and why triangles are used in construction, bridge building, engineering, climate and/or weather models, how banks keep information secure, or about the stock market. Then do the following:

- a. Make a list of at least two questions or ideas from each article
- b. Discuss two of the questions or ideas with your counselor.
- D. Do a combination of reading and watching (about three hours total). Then do the following:
  - a. Make a list of at least two questions or ideas from each article or show.
  - b. Discuss two of the questions or ideas with your counselor.

## **STEM NOVA Shoot!**

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

- A. Watch about three hours' total of science-related shows or documentaries that involve projectiles, aviation, weather, astronomy, or space technology. Then do the following:
  - a. Make a list of at least five questions or ideas from the show(s) you watched.
  - b. Discuss two of the questions or ideas with your counselor.
- B. Read (about three hours total) about projectiles, aviation, space, weather, astronomy, or aviation or space technology. Then do the following:
  - a. Make a list of at least two questions or ideas from each article.
  - b. Discuss two of the questions or ideas with your counselor.
- C. Do a combination of reading and watching (about three hours total). Then do the following:
  - a. Make a list of at least two questions or ideas from each article or show.
  - b. Discuss two of the questions or ideas with your counselor.

Requirement 4: Choose A or B and complete ALL the requirements.

- A. Visit an observatory or a flight, aviation, or space museum.
  - a. During your visit, talk to a docent or person in charge about a science topic related to the site.
  - b. Discuss your visit with your counselor.
- B. Discover the latitude and longitude coordinates of your current position. Then do the following:
  - a. Find out what time a satellite will pass over your area.
  - b. Watch the satellite using binoculars. Record the time of your viewing, the weather conditions, how long the satellite was visible, and the path of the satellite. Then discuss your viewing with your counselor.

## **STEM NOVA Start Your Engines!**

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

- A. Watch about three hours' total of technology-related shows or documentaries that involves transportation or transportation technology. Then do the following:

- a. Make a list of at least five questions or ideas from the show(s) you watched.
  - b. Discuss two of the questions or ideas with your counselor.
- B. Read (about three hours total) about transportation or transportation technology. Then do the following:
- a. Make a list of at least two questions or ideas from each article.
  - b. Discuss two of the questions or ideas with your counselor.
- C. Do a combination of reading and watching (about three hours total). Then do the following:
- a. Make a list of at least two questions or ideas from each article or show.
  - b. Discuss two of the questions or ideas with your counselor.

## **STEM NOVA Whoosh!**

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

A. Watch about three hours total of engineering-related shows or documentaries that involve motion or motion-inspired technology. Then do the following:

- a. Make a list of at least five questions or ideas from the show(s) you watched.
- b. Discuss two of the questions or ideas with your counselor.

B. Read (about three hours total) about motion or motion-inspired technology. Then do the following:

- a. Make a list of at least two questions or ideas from each article.
- b. Discuss two of the questions or ideas with your counselor.

C. Do a combination of reading and watching (about three hours total). Then do the following:

- a. Make a list of at least two questions or ideas from each article or show.
- b. Discuss two of the questions or ideas with your counselor.

changing sports equipment, how and why triangles are used in construction, bridge building, engineering, climate and/or weather models, how banks keep information secure, or about the stock market. Then do the following:

a. Make a list of at least two questions or ideas from each article

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

D. Do a combination of reading and watching (about three hours total). Then do the following:

a. Make a list of at least two questions or ideas from each article or show.

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