

**STEM Merit Badge College**  
**December 2, 2017**  
**STEM Early College at N.C. A&T State University**

**Merit Badge Prerequisites**

*Below are the prerequisite requirements for the STEM Merit Badge College. If a Scout comes prepared for his class and completes the relevant prerequisites, he should be able to finish the badge at the event. Completing these prerequisites is not required but if they are not complete ahead of time, they will need to be completed later and certified by another counselor. Incomplete prerequisites could also hinder the Scout's ability to absorb all of the information at the event. **All Scouts are recommended to purchase and read the appropriate merit badge pamphlet before the STEM Merit Badge College. Pamphlets can be purchased at the Old North State Council Scout Shop in Greensboro or any other Scout Shop.***

**Architecture**

Requirement 1.

Do the following:

- a) Tour your community and list the different types of buildings you see. Try to identify buildings that can be associated with a specific period of history or style of architecture. Make a sketch of the building you most admire.
- b) Select an architectural achievement that has had a major impact on society. Using resources such as the Internet (with your parent's permission), books, and magazines, find out how this achievement has influenced the world today. Tell your counselor what you learned.

**Aviation**

Requirement 4(c).

Visit an aviation museum or attend an air show. Report on your impression of the museum or show.

*This requirement can be completed by attending the Warbirds & Warriors Airshow in Monroe, NC on either November 12 or November 13. The cost is \$10 to attend and details can be found here: <http://www.warbirdsovermonroe.com>.*

*Note: This is an optional requirement! An alternate for this requirement will be completed at the STEM Merit Badge College.*

## Chemistry

Requirement 4(a).

Cut a round onion into small chunks. Separate the onion chunks into three equal portions. Leave the first portion raw. Cook the second portion of onion chunks until the pieces are translucent. Cook the third portion until the onions are caramelized, or brown in color. Taste each type of onion. Describe the taste of raw onion versus partially cooked onion versus caramelized onion. Explain what happens to molecules in the onion during the cooking process.

## Digital Technology

Requirement 1

Show your counselor your current, up-to-date Cyber Chip.

<http://www.scouting.org/cyberchip.aspx>

Requirement 5b.

Using an Internet search engine (with your parent's permission), find ideas about how to conduct a troop court of honor or campfire program.

Print out a copy of the ideas from at least three different websites.

Requirement 6

Do **THREE** of the following. For each project you complete, copy the files to a backup device and share the finished projects with your counselor.

a. Using a spreadsheet or database program, develop a food budget for a patrol weekend campout OR create a troop roster that includes the name, rank, patrol, and telephone number of each Scout. Show your counselor that you can sort the roster by each of the following categories: rank, patrol, and alphabetically by name.

b. Using a word processor, write a draft letter to the parents of your troop's Scouts, inviting them to a troop event.

c. Using a graphics program, design and draw a campsite plan for your troop OR create a flier for an upcoming troop event, incorporating text and some type of visual such as a photograph or an illustration.

d. Using a presentation software program, develop a report about a topic approved by your counselor. For your presentation, create at least five slides, with each one incorporating text and some type of visual such as a photograph or an illustration.

e. Using a digital device, take a picture of a troop activity. Send or transfer this image to a device where it can be shared with your counselor.

f. Make a digital recording of your voice, transfer the file to a different device, and have your counselor play back the recording.

g. Create a blog and use it as an online journal of your Scouting activities, including group discussions and meetings, campouts, and other events. Include at least five entries and two photographs or illustrations. Share your blog with your counselor. You need not post the blog to the Internet; however, if you choose to go live with your blog, you must first share it with your parents AND counselor AND get their approval.

h. Create a Web page for your troop, patrol, school, or place of worship. Include at least three articles and two photographs or illustrations. Include at least one link to a website of interest to your audience. You need not post the page to the Internet; however, if you decide to do so, you must first share the Web page with your parents AND counselor AND get their approval.

**For requirement 6 the scout can bring it on a thumb drive.**

## Electronics

Requirement 6.

Find out about three career opportunities in electronics that interest you. Discuss with and explain to your counselor what training and education are needed for each position.

## Energy

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 the 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 on a daily basis. Explain what is meant by sustainable energy sources. Explain how you can change your energy use through reuse and recycling.

*To assist you in completed requirement 4a and 4b, please watch this video:*

<https://youtu.be/Sj61ia92xFo>

## Engineering

Requirement 2.

Select an engineering achievement that has had a major impact on society. Using resources such as the Internet (with your parent's permission), books, and magazines, find out about the engineers who made this engineering feat possible, the special obstacles they had to overcome, and how this achievement has influenced the world today. Tell your counselor what you learned.

Requirement 9.

Find out about three career opportunities in engineering. Pick one and research the education, training, and experience required for this profession. Discuss this with your counselor and explain why this profession might interest you.

## Entrepreneurship

Review the Entrepreneurship merit badge pamphlet and be prepared to discuss in class all of the terminology found in the requirements.

## **Environmental Science**

Requirement 1.

Make a time line of the history of environmental science in America. Identify the contribution made by the Boy Scouts of America to environmental science. Include dates, names of people or organizations, and important events.

Requirement 2.

Define the following terms: population, community, ecosystem, biosphere, symbiosis, niche, habitat, conservation, threatened species, endangered species, extinction, pollution prevention, brownfield, ozone, watershed, airshed, nonpoint source, hybrid vehicle, fuel cell.

***Please bring written definitions to the merit badge college for verification.***

Requirement 3(e).

Do one of the following:

- (1) Do research on one endangered species found in your state. Find out what its natural habitat is, why it is endangered, what is being done to preserve it, and how many individual organisms are left in the wild. Prepare a 100-word report about the organism, including a drawing. Present your report to your patrol or troop.
- (2) Do research on one species that was endangered or threatened but which has now recovered. Find out how the organism recovered and what its new status is. Write a 100-word report on the species and discuss it with your counselor.
- (3) With your parent's and counselor's approval, work with a natural resource professional to identify two projects that have been approved to improve the habitat for a threatened or endangered species in your area. Visit the site of one of these projects and report on what you saw.

Requirement 3(f).

Do one of the following:

- (1) Look around your home and determine 10 ways your family can help reduce pollution. Practice at least two of these methods for seven days and discuss with your counselor what you have learned.
- (2) Determine 10 ways to conserve resources or use resources more efficiently in your home, at school, or at camp. Practice at least two of these methods for seven days and discuss with your counselor what you have learned.
- (3) Perform an experiment on packaging materials to find out which ones are biodegradable. Discuss your conclusion with your counselor.

## Game Design

No prerequisites.

## Medicine

Requirement 10.

Serve as a volunteer at a health-related event or facility in your community (e.g., blood drive, "health fair", blood pressure screening, etc.) approved by your counselor.

## Nuclear Science

No prerequisites.

## Plant Science

NOTE: A parent will need to accompany the Scouts at all meetings at Syngenta after the merit badge college.

Requirement 6.

List by common name at least 10 native plants and 10 cultivated plants that grow near your home. List five invasive nonnative plants in your area and tell how they may be harmful. Tell how the spread of invasive plants may be avoided or controlled in ways that are not damaging to humans, wildlife, and the environment.

Requirement 7.

Name and tell about careers in agronomy, horticulture, and botany. Write a paragraph about a career in one of these fields that interests you.

## Programming

Requirement 1.

- a) Show your counselor your current, up-to-date Cyber Chip (<http://www.scouting.org/cyberchip.aspx>)

Read the *Programming* merit badge pamphlet and be prepared to discuss the following:

- 10 popular programming languages
- Three different programmed devices you rely on every day
- Software patents and copyrights
- Difference between licensing and owning software
- Differences between freeware, open source, and commercial software
- Three career opportunities in programming

## Robotics

Requirement 6.

Competitions. Do ONE of the following.

- a. Attend a robotics competition and report to your counselor what you saw and learned about the competition and how teams are organized and managed.
- b. 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.

## **Soil and Water Conservation**

Be prepared to discuss the following definitions and concepts:

- What is soil? How is it formed?
- Define soil erosion.
- Tell what is meant by “conservation practices”.
- Explain what a watershed is.
- Tell what is meant by “water pollution”.

## **Surveying**

No prerequisites.

## **Textile**

No prerequisites.