

2016 MiSci Scouts Workshop Prerequisites

Cub Scouts

Tiger Elective Adventures - Sky is the Limit Loop

Requirement Fulfilled Before Workshop (Pre-requisite):

- 1) With proper supervision, go outside and observe the night sky. Talk about the objects you see or might see.
- 3) Observe in the sky or select from a book or chart two constellations that are easy to see in the night sky. With your adult partner, find out the names of the stars that make up the constellation and how the constellation got its name. Share what you found with your den.
- 4) Create and name your own constellation. Share your constellation with your den.
- 6) Find out about two different jobs related to astronomy. Share this information with your den.
- 7) Find out about two astronauts who were Scouts when they were younger. Share what you learned with your den.

Tiger Elective Adventures – Curiosity, Intrigue, and Magical Mysteries Loop

Requirement Fulfilled Before Workshop (Pre-requisite):

- 1) Learn a magic trick. Practice your magic trick so you can perform it in front of an audience.
- 2) Create an invitation to a magic show
- 3) With your den or with your family, put on a magic show for an audience.

Wolf Elective Adventures – Motor Away Loop

All Requirements fulfilled upon completion of the workshop.

Wolf Elective Adventures – Air of the Wolf Loop

Requirement Fulfilled Before Workshop (Pre-requisite):

- 2A) With other members of your den, go outside and record sounds you hear. Identify which of these sounds is the result of moving air.
- 3A) Explain the rules for safely flying kites.
- 4) With your family, den, or pack, participate in a kite derby, space derby, or rain gutter regatta. Explain how air helps the vehicle move.

Bear Elective Adventures – Forensics Loop

Requirement Fulfilled Before Workshop (Pre-requisite):

- 1) Talk with our family and den about forensics and how it is used to help solve crimes.
- 6) Visit the sheriff's office or police station in your area. Find out how officers collect evidence.
- 7) Learn about different jobs in the forensic science. Choose two, and find out what is required to work in those jobs. Share what you learned with your den.
- 8) Learn how animals used to gather important evidence. Talk about your findings with your den.

Bear Elective Adventures – Robotics Loop

Requirement Fulfilled Before Workshop (Pre-requisite):

- 1) Identify six tasks performed by robots.
- 2) Learn about some instances where a robot could be used in place of a human for work. Research one robot that does this type of work, and present what you learn to your den.

Webelos and Arrow of Light Elective Adventures – Adventures in Science Badge

Requirement Fulfilled Before Workshop (Pre-requisite):

- 1) An experiment is a “fair test” to compare possible explanations. Draw a picture of a fair test that shows what you need to do to test a fertilizer’s effect on plant growth.
- 2) Prepare three questions, prior to your visit to the MiSci, where you will talk to a scientist about his or her work.

Do One of the Following:

- Carry out the experiment your plant experiment. Report what you learned about the effect of fertilizer on the plants that you grew.
- Carry out the plant experiment, but change the independent variable. Report the results about the effect of changing the variable on the plants that you grew.
- Study the night sky. Sketch the appearance of the North Star (Polaris) and the Big Dipper (part of the Ursa Major constellation) over at least six hours. Describe what you observed, and explain the meaning of your observations.
- Read a biography of a scientist. Tell your den leader or the other members of your den what the scientist is famous for and why his or her work is important.

Webelos and Arrow of Light Elective Adventures – Engineer Badge

Requirement Fulfilled Before Workshop (Pre-requisite):

- 1) Pick one type of engineer. With the help of the Internet, your local library, or a local engineer you may know or locate, discover and record in your book three things that describe what that engineer does. (Be sure to have your Webelos den leader, parent, or guardian’s permission to use the Internet.) Share your findings with your Webelos den.
- 2) Learn to follow engineering design principles by doing the following:
 - a. Examine a set of blueprints. Using these as a model, construct your own set of blueprints or plans to design a project.
 - b. Using your blueprints or plans from your own design, construct your project.
 - c. Share your project with your Webelos den.
- 3) Explore other fields of engineering and how they have helped form our past, present, and future.

Webelos and Arrow of Light Elective Adventures – Moviemaking Badge

Requirement Fulfilled Before Workshop (Pre-requisite):

- 1) Write a story outline describing a real or imaginary Scouting adventure. Create a pictured storyboard that shows your story.

Boy Scouts – Environmental Science Merit Badge

Requirements Fulfilled Before Workshop (Pre-requisites):

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.
2. Define the following terms: population, community, ecosystem, biosphere, symbiosis, niche, threatened species, endangered species, extinction, brownfield, ozone, nonpoint source, hybrid vehicle, fuel cell. (Note: other terms not listed here will be defined during the workshop.)
3. Do the following:
 - e. Endangered Species
 - ii. Do research on one species that was endangered, threatened, or of special concern that 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.
4. Choose two outdoor study areas that are very different from one another (e.g., hilltop vs. bottom of a hill; field vs. forest; swamp vs. dry land). For BOTH study areas, do the following:
 - a. Mark off a plot of 4 square yards in each study area, and count the number of species found there. Estimate how much space is occupied by each plant species and the type and number of non-plant species you find. Write a report that adequately discusses the biodiversity and population density of these study areas. Discuss your report with your counselor.
5. Using the construction project provided or a plan you create on your own, identify the items that would need to be included in an environmental impact statement for the project planned.
6. Find out about three career opportunities in environmental science. Pick one and find out the education, training, and experience required for this profession. Discuss this with your counselor, and explain why this profession might interest you.

***Note: Scouts will receive a workbook to help guide completion of these requirements upon registration for the workshop.**

Boy Scouts – Astronomy Merit Badge

Requirements to be fulfilled before Workshop (Pre-requisites):

1. Do the following:
 - a. Explain to your counselor the most likely hazards you may encounter while participating in astronomy activities, and what you should do to anticipate, help, prevent, mitigate, and respond to these hazards.
 - b. Explain first aid for injuries or illnesses, such as heat and cold reactions, dehydration, bites and stings, and damage to your eyes that could occur during observation.
 - c. Describe the proper clothing and other precautions for safely making observations at night and in cold weather. Tell how to safely observe the Sun, objects near the Sun, and the Moon.
2. Explain what light pollution is and how it and air pollution affect astronomy.
5. Do the following:
 - c. Describe the motion of the planets across the sky.
 - d. Observe a planet and describe what you saw.

6. Do the following:
 - a. Sketch the face of the moon, including at least five seas and five craters. Label these landmarks.
 - b. Sketch the phase and the daily position of the Moon at the same hour and place, for four days in a row. Include landmarks on the horizon such as hills, trees, and buildings. Explain the changes you observe.
 - c. List the factors that keep the moon in orbit around Earth.
7. Do the following:
 - c. Identify at least one red star, one blue star, and one yellow star (other than the Sun). Explain the meaning of these colors.
9. Find out about three career opportunities in astronomy. Pick one and find out about the education, training, and experience required for this profession. Discuss this with your counselor, and explain why this profession might interest you.

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Boy Scouts – Robotics Merit Badge

Requirements Fulfilled Before Workshop (Pre-requisites):

1. Safety. Do each of the following:
 - a. Explain to your counselor the most likely hazards you may encounter while working with robots and what you should do to anticipate, mitigate and prevent, and respond to these hazards. Describe the appropriate safety gear and clothing that should be used when working with robotics.
 - b. Discuss first aid and prevention for the types of injuries that could occur while participating in robotics activities and competitions, including cuts, eye injuries, and burns (chemical or heat).
2. Robotics industry. Discuss the following with your counselor:
 - a. The kinds of things robots can do and how robots are best used today.
 - b. The similarities and differences between remote-control vehicles, telerobots, and autonomous robots.
 - c. Three different methods robots can use to move themselves other than wheels or tracks. Describe when it would be appropriate to use each method.
3. General knowledge. Discuss with your counselor three of the five major fields of robotics (human-robot interface, mobility, manipulation, programming, sensors) and their importance to robotics development. Discuss either the three fields as they relate to a single robot system OR talk about each field in general. Find pictures or at least one video to aid your discussion.
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.
7. Careers. Name three career opportunities in robotics. Pick one and find out the education, training, and experience required for this profession. Discuss this with your counselor, and explain why this profession might interest you.

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Boy Scouts – Electricity Merit Badge

Requirements Fulfilled Before Workshop (Pre-requisites)

1. Demonstrate that you know how to respond to electrical emergencies, by doing the following:
 - a. Show how to rescue a person touching a live wire in the home.
 - b. Show to render first aid to a person who is unconscious from an electrical shock.
 - c. Show how to treat an electrical burn.
 - d. Explain what to do in an electrical storm.
 - e. Explain what to do in the event of an electrical fire.
2. Complete an electrical home safety inspection of your home, using the checklist found in this pamphlet or one approved by your counselor. Discuss what you find with your counselor.
6. Explain why a fuse blows or a circuit breaker trips. Tell how to find a blown fuse or tripped circuit breaker in your home. Show how to safely reset the circuit breaker.
7. Explain what overloading an electric circuit means. Tell what you have done to make sure your home circuits are not overloaded.
8. Make a floor plan wiring diagram of the lights, switches, and outlets for a room in your home. Show which fuse or circuit breaker protects each one.
9. Do the following:
 - a. Read an electric meter and, using your family's electric bill, determine the energy cost from the meter readings.
 - b. Discuss with your counselor five ways in which your family can conserve energy.

Boys Scouts – Weather Merit Badge

Requirements Fulfilled Before Workshop (Pre-requisites)

1. Define meteorology. Explain what weather is and what climate is. Discuss how the weather affects farmers, sailors, aviators, and the outdoor construction industry. Tell why weather forecasts are important to each of these groups.
2. Name five dangerous weather-related conditions. Give the safety rules for each when outdoors and explain the difference between a severe weather watch and a warning. Discuss the safety rules with your family.
9. Do ONE of the following:
 - a. Make one of the following instruments: wind vane, anemometer, rain gauge, and 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.
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.
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.

Boy Scouts – Chemistry Merit Badge

Requirements Fulfilled Before Workshop (Pre-requisites)

1. Do EACH of the following:
 - a. Describe three examples of safety equipment used in a chemistry laboratory and the reason each one is used.
 - b. Describe what a safety data sheet (SDS) is and tell why it is used.
 - c. Obtain an SDS for both paint and an insecticide.
Compare and discuss the toxicity, disposal, and safe-handling sections for these two common household products.
 - d. Discuss the safe storage of chemicals. How does the safe storage of chemicals apply to your home, your school, your community, and the environment?
4. Do EACH of the following:
 - 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.
 - b. Describe the chemical similarities and differences between toothpaste and an abrasive household cleanser. Explain how the end use or purpose of a product affects its chemical formulation.
5. List the four classical divisions of chemistry. Briefly describe each one, and tell how it applies to your everyday life.
6.
 - (a) Name two government agencies that are responsible for tracking the use of chemicals for commercial or industrial use. Pick one agency and briefly describe its responsibilities to the public and the environment.
 - c. Using reasons from chemistry, describe the effect on the environment of ONE of the following:
 - 1) The production of aluminum cans or plastic milk cartons
 - 2) Sulfur from burning coal
 - 3) Used motor oil
 - 4) Newspaper
7.
 - (b) Using resources found at the library and in periodicals, books, and the Internet (with your parent's permission), learn about two different kinds of work done by chemists, chemical engineers, chemical technicians, or industrial chemists. For each of the four jobs, find out the education and training requirements.

Brownies Girl Scouts – Inventor Badge

Requirement Fulfilled Before Workshop (Pre-requisite):

Step 3: Make a needs list

Choices – Do ONE of the following:

- Mornings.** Watch a brother, sister, or a parent get ready for school or work. Do they wake up on time? Is their alarm clock loud enough? Is there enough time to eat breakfast?
OR
- Lunch at school.** Watch how lunch happens in the cafeteria at school. Are the lines long? Are the chairs too high? Are the sandwiches too soggy?
OR
- Brownie meeting.** They're always fun – now imagine what could make them even better! Does every girl feel included? Can everyone hear each other? Do meetings feel special?

Brownies Girl Scouts – Senses Badge

All Requirements fulfilled upon completion of the workshop.

Brownies Girl Scouts – Bugs Badge

All Requirements fulfilled upon completion of the workshop.

Junior Girl Scouts – Entertainment Technology Badge

Requirement Fulfilled Before Workshop (Pre-requisite):

Step 2: Dig into video game development

Choices – Do ONE of the following:

- Use a free downloadable program.** With these programs, you can create an interactive story or game using characters they provide. The Massachusetts Institute of Technology has a great one called Scratch, or try the Carnegie Mellon University version, called Alice. Share your creation with friends.
OR
- Go onto an interactive site.** There are a lot of how-to-be-a-programmer sites out there that walk you through the steps of game programming (“Interactive Logo” and “Challenge You” are two to try). Check one out and do your best to build a game!
OR
- Talk to a developer!** Ask someone in the video game field to share their portfolio and creative process with you. You could invite a student, professor, or professional to chat with your group, or see if you can visit a studio.

Juniors Girl Scouts – Digital Photo Badge

Requirement Fulfilled Before Workshop (Pre-requisite):

Choices – Do ONE of the following:

- Interview a local photographer or photography student.** To find a professional photographer in your area, consider calling the local paper or a nearby portrait studio. A local community college or arts center might have photography students who could offer some tips and tricks.
OR
- Visit a camera store.** One way to learn about digital cameras is to get your hands on different kinds. Visit a local store that sells cameras, and ask the salesperson to teach you about the models that are available. Ask what makes some cameras better than others and which their favorite is.
OR
- Teach yourself the basics.** Team up with an adult and spend two hours reading about and watching videos on both the basics and tips on how to make the most of a digital camera.

Juniors Girl Scouts – Detective Badge

All Requirements fulfilled upon completion of the workshop.

Juniors Girl Scouts – Flowers Badge

Requirement Fulfilled Before Workshop (Pre-requisite):
Step 1: Uncover the science of one flower

Choices – Do ONE of the following:

- Go on a flower hunt.** Find your flower and five other kinds that you can name growing around your neighborhood. Don't pick them, but use a magnifying glass and get up close to see more. Record or sketch what you see in your botanist's notebook.
OR
- Grow your own flower.** Plant a seed or a bulb. Grow it inside or outside, but plant it in the right season and tend to it until it blooms.
OR
- Talk to a real botanist and learn more.** Interview a botanist, perhaps from a garden shop or at a college or university. Ask about flowers and why they became a flower scientist. Maybe they can show you flowers in books or in person.