

## **Astronomy\* pre-requisites**

**complete requirement #6c, #8)**

### **Merit badge requirements**

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. Then explain 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.

3. With the aid of diagrams (or real telescopes if available), do each of the following:

- (a) Explain why binoculars and telescopes are important astronomical tools. Demonstrate or explain how these tools are used.
- (b) Describe the similarities and differences of several types of astronomical telescopes, including at least one that observes light beyond the visible part of the spectrum (i.e., radio, X-ray, ultraviolet, or infrared).
- (c) Explain the purposes of at least three instruments used with astronomical telescopes.
- (d) Describe the proper care and storage of telescopes and binoculars both at home and in the field.

4. Do the following\*:

- (a) Identify in the sky at least 10 constellations, at least four of which are in the zodiac.
- (b) Identify in the sky at least eight conspicuous stars, five of which are of magnitude 1 or brighter.
- (c) Make two sketches of the Big Dipper. In one sketch, show the Big Dipper's orientation in the early evening sky. In another sketch, show its position several hours later. In both sketches, show the North Star and the horizon. Record the date and time each sketch was made.
- (d) Explain what we see when we look at the Milky Way.

5. Do the following:

- (a) List the names of the five most visible planets. Explain which ones can appear in phases similar to lunar phases and which ones cannot, and explain why.

(b) Using the Internet (with your parent's permission) and other resources, find out when each of the five most visible planets that you identified in requirement 5a will be observable in the evening sky during the next 12 months, then compile this information in the form of a chart or table.

(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 and indicate at least five seas and five craters. Label these landmarks.

(b) Sketch the phase and position of the Moon, at the same hour and place, for four nights within a one-week period. 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.

(d) With the aid of diagrams, explain the relative positions of the Sun, Earth, and the Moon at the times of lunar and solar eclipses, and at the times of new, first-quarter, full, and last-quarter phases of the Moon.

7. Do the following:

(a) Describe the composition of the Sun, its relationship to other stars, and some effects of its radiation on Earth's weather and communications.

(b) Define sunspots and describe some of the effects they may have on solar radiation.

(c) Identify at least one red star, one blue star, and one yellow star (other than the Sun). Explain the meaning of these colors.

8. With your counselor's approval and guidance, do ONE of the following:

(a) Visit a planetarium or astronomical observatory. Submit a written report, a scrapbook, or a video presentation afterward to your counselor that includes the following information:

1. Activities occurring there
2. Exhibits and displays you saw
3. Telescopes and other instruments being used
4. Celestial objects you observed

(b) Plan and participate in a three-hour observation session that includes using binoculars or a telescope. List the celestial objects you want to observe, and find each on a star chart or in a guidebook. Prepare a log or notebook. Discuss with your counselor what you hope to observe prior to your observation session. Review your log or notebook with your counselor afterward.\*\*

- (c) Plan and host a star party for your Scout troop or other group such as your class at school. Use binoculars or a telescope to show and explain celestial objects to the group.
  - (d) Help an astronomy club in your community hold a star party that is open to the public.
  - (e) Personally take a series of photographs or digital images of the movement of the Moon, a planet, an asteroid, meteor, or a comet. In your visual display, label each image and include the date and time it was taken. Show all positions on a star chart or map. Show your display at school or at a troop meeting. Explain the changes you observed.
9. Find out about three career opportunities in astronomy. 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.

## Chess pre-requisites

The name of each chess piece

How to set up a chess board

How each chess piece moves, including castling and en passant captures

Explain the Four rules for castling.

Merit badge requirements

1. Discuss with your merit badge counselor the history of the game of chess. Explain why it is considered a game of planning and strategy.
2. Discuss with your merit badge counselor the following:
  - (a) The benefits of playing chess, including developing critical thinking skills, concentration skills, and decision-making skills, and how these skills can help you in other areas of your life
  - (b) Sportsmanship and chess etiquette
3. Demonstrate to your counselor that you know each of the following. Then, using Scouting's Teaching EDGE\*, teach someone (preferably another Scout) who does not know how to play chess:
  - (a) The name of each chess piece
  - (b) How to set up a chessboard
  - (c) How each chess piece moves, including castling and en passant captures
4. Do the following:
  - (a) Demonstrate scorekeeping using the algebraic system of chess notation.
  - (b) Discuss the differences between the opening, the middle game, and the endgame.
  - (c) Explain four opening principles.
  - (d) Explain the four rules for castling.
  - (e) On a chessboard, demonstrate a "scholar's mate" and a "fool's mate."
  - (f) Demonstrate on a chessboard four ways a chess game can end in a draw.
5. Do the following:
  - (a) Explain four of the following elements of chess strategy: exploiting weaknesses, force, king safety, pawn structure, space, tempo, time.
  - (b) Explain any five of these chess tactics: clearance sacrifice, decoy, discovered attack, double attack, fork, interposing, overloading, overprotecting, pin, remove the defender, skewer, zwischenzug.

(c) Set up a chessboard with the white king on *e1*, the white rooks on *a1* and *h1*, and the black king on *e5*. With White to move first, demonstrate how to force checkmate on the black king.

(d) Set up and solve five direct-mate problems provided by your merit badge counselor.

6. Do ONE of the following:

(a) Play at least three games of chess with other Scouts and/or your merit badge counselor. Replay the games from your score sheets and discuss with your counselor how you might have played each game differently.

(b) Play in a scholastic (youth) chess tournament and use your score sheets from that tournament to replay your games with your merit badge counselor. Discuss with your counselor how you might have played each game differently.

(c) Organize and run a chess tournament with at least four players, plus you. Have each competitor play at least two games.

## **Citizenship in the community**

### **Pre-requisites 3a 7a & b**

### **We will be showing the movie alpha**

### **Merit badge requirements**

1. Discuss with your counselor what citizenship in the community means and what it takes to be a good citizen in your community. Discuss the rights, duties, and obligations of citizenship, and explain how you can demonstrate good citizenship in your community, Scouting unit, place of worship, or school.
2. Do the following:
  - (a) On a map of your community, locate and point out the following:
    1. Chief government buildings such as your city hall, county courthouse, and public works/services facilities
    2. Fire station, police station, and hospital nearest your home
    3. Parks, playgrounds, recreation areas, and trails
    4. Historical or other interesting points of interest
  - (b) Chart the organization of your local or state government. Show the top offices and tell whether they are elected or appointed.
3. Do the following:
  - (a) Attend a meeting of your city, town, or county council or school board; OR attend a municipal, county, or state court session.
  - (b) Choose one of the issues discussed at the meeting where a difference of opinions was expressed, and explain to your counselor why you agree with one opinion more than you do another one.
4. Choose an issue that is important to the citizens of your community; then do the following:
  - (a) Find out which branch of local government is responsible for this issue.
  - (b) With your counselor's and a parent's approval, interview one person from the branch of government you identified in requirement 4a. Ask what is being done about this issue and how young people can help.
  - (c) Share what you have learned with your counselor.
5. With the approval of your counselor and a parent, watch a movie that shows how the actions of one individual or group of individuals can have a positive effect on a community. Discuss with your counselor what you learned from the movie about what it means to be a valuable and concerned member of the community.

6. List some of the services (such as the library, recreation center, public transportation, and public safety) your community provides that are funded by taxpayers. Tell your counselor why these services are important to your community.
7. Do the following:
  - (a) Identify three charitable organizations outside of Scouting that interest you and bring people in your community together to work for the good of your community.
  - (b) Pick ONE of the organizations you chose for requirement 7a. Using a variety of resources (including newspapers, fliers and other literature, the Internet, volunteers, and employees of the organization), find out more about this organization.
  - (c) With your counselor's and your parent's approval, contact the organization you chose for requirement 7b, and find out what young people can do to help. While working on this merit badge, volunteer at least eight hours of your time for the organization. After your volunteer experience is over, discuss what you have learned with your counselor.
8. Develop a public presentation (such as a video, slide show, speech, digital presentation, or photo exhibit) about important and unique aspects of your community. Include information about the history, cultures, and ethnic groups of your community; its best features and popular places where people gather; and the challenges it faces. Stage your presentation in front of your merit badge counselor or a group, such as your patrol or a class at school.

## **Citizenship in the nation**

### **The pre-requisites**

- a. Visit a place that is listed as a National Historic Landmark or that is on the National Register of Historic Places. Tell your counselor what you learned about the landmark or site and what you found interesting about it.
- b. Tour your state capitol building or the U.S. Capitol. Tell your counselor what you learned about the capitol, its function, and the history.
- c. Tour a federal facility. Explain to your counselor what you saw there and what you learned about its function in the local community and how it serves this nation.
- d. Choose a national monument that interests you. Using books, brochures, the Internet (with your parent's permission), and other resources, find out more about the monument. Tell your counselor what you learned, and explain why the monument is important to this country's citizens

#3: Watch the national evening news five days in a row OR read the front page of a major daily newspaper five days in a row. Discuss the national issues you learned about with your counselor. Choose one of the issues and explain how it affects you and your family. (a written log would be needed)

#8: Name your two senators and the member of Congress from your congressional district. Write a letter about a national issue and send it to one of these elected officials, sharing your view with him or her. Show your letter and any response you receive to your counselor. (if response not received that is ok)

### **Merit badge requirements**

1. Explain what citizenship in the nation means and what it takes to be a good citizen of this country. Discuss the rights, duties, and obligations of a responsible and active American citizen.
2. Do TWO of the following:
  - (a) Visit a place that is listed as a National Historic Landmark or that is on the National Register of Historic Places. Tell your counselor what you learned about the landmark or site and what you found interesting about it.
  - (b) Tour your state capitol building or the U.S. Capitol. Tell your counselor what you learned about the capitol, its function, and the history.
  - (c) Tour a federal facility. Explain to your counselor what you saw there and what you learned about its function in the local community and how it serves this nation.

- (d) Choose a national monument that interests you. Using books, brochures, the Internet (with your parent's permission), and other resources, find out more about the monument. Tell your counselor what you learned, and explain why the monument is important to this country's citizens.
3. Watch the national evening news five days in a row OR read the front page of a major daily newspaper five days in a row. Discuss the national issues you learned about with your counselor. Choose one of the issues and explain how it affects you and your family.
4. Discuss each of the following documents with your counselor. Tell your counselor how you feel life in the United States might be different without each one.
- (a) Declaration of Independence
  - (b) Preamble to the Constitution
  - (c) The Constitution
  - (d) Bill of Rights
  - (e) Amendments to the Constitution
5. List the six functions of government as noted in the preamble to the Constitution. Discuss with your counselor how these functions affect your family and local community.
6. With your counselor's approval, choose a speech of national historical importance. Find out about the author, and tell your counselor about the person who gave the speech. Explain the importance of the speech at the time it was given, and tell how it applies to American citizens today. Choose a sentence or two from the speech that has significant meaning to you, and tell your counselor why.
7. Name the three branches of our federal government and explain to your counselor their functions. Explain how citizens are involved in each branch. For each branch of government, explain the importance of the system of checks and balances.
8. Name your two senators and the member of Congress from your congressional district. Write a letter about a national issue and send it to one of these elected officials, sharing your view with him or her. Show your letter and any response you receive to your counselor.

## **Citizenship in the World**

### **Pre-requisites**

**#4, #5, #7**

### **Merit badge requirements**

1. Explain what citizenship in the world means to you and what you think it takes to be a good world citizen.
2. Explain how one becomes a citizen in the United States, and explain the rights, duties, and obligations of U.S. citizenship. Discuss the similarities and differences between the rights, duties, and obligations of U.S. citizens and the citizens of two other countries.
3. Do the following:
  - (a) Pick a current world event. In relation to this current event, discuss with your counselor how a country's national interest and its relationship with other countries might affect areas such as its security, its economy, its values, and the health of its citizens.
  - (b) Select a foreign country and discuss with your counselor how its geography, natural resources, and climate influence its economy and its global partnerships with other countries.
4. Do TWO of the following:
  - (a) Explain international law and how it differs from national law. Explain the role of international law and how international law can be used as a tool for conflict resolution.
  - (b) Using resources such as major daily newspapers, the Internet (with your parent's permission), and news magazines, observe a current issue that involves international trade, foreign exchange, balance of payments, tariffs, and free trade. Explain what you have learned. Include in your discussion an explanation of why countries must cooperate in order for world trade and global competition to thrive.
  - (c) Select TWO of the following organizations and describe their role in the world.
    - (1) The United Nations and UNICEF
    - (2) The World Court
    - (3) Interpol
    - (4) World Organization of the Scout Movement
    - (5) The World Health Organization
    - (6) Amnesty International
    - (7) The International Committee of the Red Cross

(8) CARE (Cooperative for American Relief Everywhere)

(9) European Union

5. Do the following:

- (a) Discuss the differences between constitutional and nonconstitutional governments.
- (b) Name at least five different types of governments currently in power in the world.
- (c) Show on a world map countries that use each of these five different forms of government.

6. Do the following:

(a) Explain how a government is represented abroad and how the United States government is accredited to international organizations.

(b) Describe the roles of the following in the conduct of foreign relations.

1. Ambassador
2. Consul
3. Bureau of International Information Programs
4. Agency for International Development
5. United States and Foreign Commercial Service

(c) Explain the purpose of a passport and visa for international travel.

7. Do TWO of the following (with your parent's permission) and share with your counselor what you have learned:

- (a) Visit the web site of the U.S. State Department. Learn more about an issue you find interesting that is discussed on this web site.
- (b) Visit the web site of an international news organization or foreign government, OR examine a foreign newspaper available at your local library, bookstore, or newsstand. Find a news story about a human right realized in the United States that is not recognized in another country.
- (c) Visit with a student or Scout from another country and discuss the typical values, holidays, ethnic foods, and traditions practiced or enjoyed there.
- (d) Attend a world Scout jamboree.
- (e) Participate in or attend an international event in your area, such as an ethnic festival, concert, or play.

## Electricity

### Pre-requisites

**#2 and bring copy of home electric bill. Approved check list for #2 is below.**

#### Sample Home Electrical Inspection Checklist

##### Outlets

- Check for outlets that have loose-fitting plugs, which can overheat and lead to fire.
- Replace any missing or broken wall plates.
- Make sure there are safety covers on all unused outlets that are accessible to children.

##### Line Cords

- Make sure cords are in good condition-not frayed or cracked.
- Make sure they are placed out of traffic areas.
- Make sure that cords are not nailed or stapled to the wall, baseboard or to another object.
- Make sure that cords are not under carpets or rugs or any furniture rests on them.

##### Extension Cords

- Check to see that extension cords are not overloaded & only be used on a temporary basis, not as permanent wiring.
- Make sure extension cords have safety closures to help protect children from shock hazards and mouth burns.

##### Plugs

- Make sure your plugs fit securely into your outlets.
- Make sure no plugs have had the ground pin (the third prong) removed in order to make a three-prong fit a two-conductor outlet; this could lead to an electrical shock.
- Never force a plug into an outlet if it doesn't fit.
- Avoid overloading outlets with too many appliances.

##### Ground Fault Circuit Interrupters (GFCIs)

GFCIs can help prevent electrocution. When a GFCI senses current leakage in an electrical circuit, it assumes a ground fault has occurred. It then interrupts power fast enough to help prevent serious injury from electrical shock. GFCIs can be installed at the outlet, or as a replacement for the circuit breaker for an entire circuit at the fuse box.

- Kitchen   Bathrooms   Garage   Laundry room   Outdoors
- Test GFCIs according to the manufacturer's instructions monthly and after major electrical storms to make sure they are working properly.

##### Light Bulbs

- Check the wattage of all bulbs in light fixtures to make sure they are the correct wattage for the size of the fixture.
- Replace bulbs that have higher wattage than recommended; if you don't know the correct wattage, check with the manufacturer of the fixture.
- Make sure bulbs are screwed in securely; loose bulbs may overheat.

##### Circuit Breakers/Fuses

Make sure circuit breakers and fuses are the correct size current rating for their circuit. If you do not know the correct size, have an electrician identify and label the size to be used. Always replace a fuse with the correctly specified size fuse.

Make sure everyone in your home knows where the main breaker is located and how to shut off power to the entire house.

### **Plug In Appliances**

Make sure there are no plugged-in appliances where they might fall in contact with water. If a plugged-in appliance falls into water, NEVER reach in to pull it out—even if it's turned off. First turn off the power source at the panel board and then unplug the appliance. If you have an appliance that has gotten wet, don't use it until it has been checked by a qualified repair person.

### **Merit badge requirements**

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 how to render first aid to a person who is unconscious from 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 the *Electricity* merit badge pamphlet or one approved by your counselor. Discuss what you find with your counselor.
3. Make a simple electromagnet and use it to show magnetic attraction and repulsion.
4. Explain the difference between direct current and alternating current.
5. Make a simple drawing to show how a battery and an electric bell work.
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.

10. Explain the following electrical terms: volt, ampere, watt, ohm, resistance, potential difference, rectifier, rheostat, conductor, ground, circuit, and short circuit.

11. Do any TWO of the following:

(a) Connect a buzzer, bell, or light with a battery. Have a key or switch in the line.

(b) Make and run a simple electric motor (not from a kit).

(c) Build a simple rheostat. Show that it works.

(d) Build a single-pole, double-throw switch. Show that it works.

(e) Hook a model electric train layout to a house circuit. Tell how it works.

## Disabilities awareness

### Pre-requisites

#4 and #7

### Merit badge requirements

1. Do the following:
  - (a) Define and discuss with your counselor the following disabilities awareness terms: disability, accessibility, adaptation, accommodation, invisible disability, and person-first language.
  - (b) Explain why proper disability etiquette is important, and how it may differ depending on the specific disability.
2. Visit an agency that works with people with physical, mental, emotional, or educational disabilities. Collect and read information about the agency's activities. Learn about opportunities its members have for training, employment, and education. Discuss what you have learned with your counselor.
3. Do TWO of the following:
  - (a) Talk to a Scout who has a disability and learn about his experiences taking part in Scouting activities and earning different merit badges. Discuss what you have learned with your counselor.
  - (b) Talk to an individual who has a disability and learn about this person's experiences and the activities in which this person likes to participate. Discuss what you have learned with your counselor.
  - (c) Learn how people with disabilities take part in a particular adaptive sport or recreational activity. Discuss what you have learned with your counselor.
  - (d) Learn about independent living aids such as service animals, canes, and augmentative communication devices such as captioned telephones and videophones. Discuss with your counselor how people use such aids.
  - (e) Plan or participate in an activity that helps others understand what a person with a visible or invisible disability experiences. Discuss what you have learned with your counselor.
4. Do EITHER option A or option B:

**Option A.** Visit TWO of the following locations and take notes about the accessibility to people with disabilities. In your notes, give examples of five things that could be done to improve upon the site and five things about the site that make it friendly to people with disabilities. Discuss your observations with your counselor.

  - (a) Your school
  - (b) Your place of worship

- (c) A Scouting event or campsite
- (d) A public exhibit or attraction (such as a theater, museum, or park)

**Option B.** Visit TWO of the following locations and take notes while observing features and methods that are used to accommodate people with invisible disabilities. While there, ask staff members to explain any accommodation features that may not be obvious. Note anything you think could be done to better accommodate people who have invisible disabilities. Discuss your observations with your counselor.

- (a) Your school
- (b) Your place of worship
- (c) A Scouting event or campsite
- (d) A public exhibit or attraction (such as a theater, museum, or park)

5. Explain what advocacy is. Do ONE of the following advocacy activities:

- (a) Present a counselor-approved disabilities awareness program to a Cub Scout pack or other group. During your presentation, explain and use person first language.
- (b) Find out about disability awareness education programs in your school or school system, or contact a disability advocacy agency. Volunteer with a program or agency for eight hours.
- (c) Using resources such as disability advocacy agencies, government agencies, the Internet (with your parent's permission), and news magazines, learn about myths and misconceptions that influence the general public's understanding of people with disabilities. List 10 myths and misconceptions about people with disabilities and learn the facts about each myth. Share your list with your counselor, then use it to make a presentation to a Cub Scout pack or other group.

6. Make a commitment to your merit badge counselor describing what you will do to show a positive attitude about people with disabilities and to encourage positive attitudes among others. Discuss how your awareness has changed as a result of what you have learned.

7. Name five professions that provide services to people with disabilities. Pick one that interests you and find out the education, training, and experience required for this profession. Discuss what you learn with your counselor, and tell why this profession interests you.

## Emergency Preparedness

### Pre-requisites

#2, #7, #8, #9

### MB Requirements

1. Earn the First Aid merit badge.
2. Do the following:
  - (a) Discuss with your counselor the aspects of emergency preparedness:
    1. Prevention
    2. Protection
    3. Mitigation
    4. Response
    5. Recovery

Include in your discussion the kinds of questions that are important to ask yourself as you consider each of these.

- (b) Using a chart, graph, spreadsheet, demonstrate your understanding of each aspect of emergency preparedness listed in requirement 2a (prevention, protection, mitigation, response, and recovery) for 10 emergency situations from the list below. **You must use the first five situations listed below in boldface**, plus any other five of your choice. Discuss your findings with your counselor.

- (1) **Home kitchen fire**
- (2) **Home basement/storage room/garage fire**
- (3) **Explosion in the home**
- (4) **Automobile crash**
- (5) **Food-borne disease (food poisoning)**
- (6) Fire or explosion in a public place
- (7) Vehicle stalled in the desert
- (8) Vehicle trapped in a blizzard
- (9) Earthquake or tsunami
- (10) Mountain/backcountry accident
- (11) Boating or water accident

- (12) Gas leak in a home or a building
- (13) Tornado or hurricane
- (14) Major flooding or a flash flood
- (15) Toxic chemical spills and releases
- (16) Nuclear power plant emergency
- (17) Avalanche (snowslide or rockslide)
- (18) Violence in a public place

(c) Meet with and teach your family how to get or build a kit, make a plan, and be informed for the situations on the chart you created for requirement 2b. Complete a family plan. Then meet with your counselor and report on your family meeting, discuss their responses, and share your family plan.

3. Show how you could safely save a person from the following:

- (a) Touching a live household electric wire
- (b) A structure filled with carbon monoxide
- (c) Clothes on fire
- (d) Drowning using nonswimming rescues (including accidents on ice)

4. Show three ways of attracting and communicating with rescue planes/aircraft.

5. With another person, show a good way to transport an injured person out of a remote and/or rugged area, conserving the energy of rescuers while ensuring the well-being and protection of the injured person.

6. Do the following:

(a) Describe the National Incident Management System (NIMS)/Incident and the Incident Command System (ICS).

(b) Identify the government or community agencies that normally handle and prepare for emergency services similar to those of the NIMS or ICS. Explain to your counselor ONE of the following:

- (1) How the NIMS/ICS can assist a Boy Scout troop when responding in a disaster.
- (2) How a group of Scouts could volunteer to help in an even of these types of emergencies

(c) Find out who is your community's emergency management director and learn what this person does to **prevent, protect, mitigate, respond to, and recover from** emergency situations in your community. Discuss this information with your counselor, utilizing the information you learned from requirement 2b.

7. Do the following:

- (a) Take part in an emergency service project, either a real one or a practice drill, with a Scouting unit or a community agency.
- (b) Prepare a written plan for mobilizing your troop when needed to do emergency service. If there is already a plan, explain it. Tell your part in making it work.

8. Do the following:

- (a) Tell the things a group of Scouts should be prepared to do, the training they need, and the safety precautions they should take for the following emergency services:
  - (1) Crowd and traffic control
  - (2) Messenger service and communications
  - (3) Collection and distribution services
  - (4) Group feeding, shelter, and sanitation
- (b) Prepare a personal emergency service pack for a mobilization call. Prepare a family emergency kit (suitcase or waterproof box) for use by your family in case an emergency evacuation is needed. Explain the needs and uses of the contents.

9. Do ONE of the following:

- (a) Using a safety checklist approved by your counselor, inspect your home for potential hazards. Explain the hazards you find and how they can be corrected.
- (b) Review or develop a plan of escape for your family in case of fire in your home.
- (c) Develop an accident prevention program for five family activities outside the home (such as taking a picnic or seeing a movie) that includes an analysis of possible hazards, a proposed plan to correct those hazards, and the reasons for the corrections you propose.

## **Engineering**

### **Pre requisites**

#### **#1a, #2, and #8**

#### **Merit Badge Requirements**

1. Do the following:

- (a) With your parent's permission, use the internet to find a blog, podcast, website, or an article on the use or conservation of energy. Discuss with your counselor what details in the article were interesting to you, the questions it raises, and what ideas it addresses that you do not understand.
- (b) After you have completed requirements 2 through 8, revisit your source for requirement 1a. Explain to your counselor what you have learned in completing the requirements that helps you better understand the article.

2. Show you understand energy forms and conversions by doing the following:

- (a) Explain how THREE of the following devices use energy, and explain their energy conversions: toaster, greenhouse, lightbulb, bow drill, cell phone, nuclear reactor, sweat lodge.
- (b) Construct a system that makes at least two energy conversions and explain this to your counselor.

3. Show you understand energy efficiency by explaining to your counselor a common example of a situation where energy moves through a system to produce a useful result. Do the following:

- (a) Identify the parts of the system that are affected by the energy movement.
- (b) Name the system's primary source of energy.
- (c) Identify the useful outcomes of the system.
- (d) Identify the energy losses of the system.

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 on a daily basis (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.

5. In a notebook, identify and describe five examples of energy waste in your school or community. Suggest in each case possible ways to reduce this waste. Describe the idea of trade-offs in energy use. In your response, do the following:
  - (a) Explain how the changes you suggest would lower costs, reduce pollution, or otherwise improve your community.
  - (b) Explain what changes to routines, habits, or convenience are necessary to reduce energy waste. Tell why people might resist the changes you suggest.
6. Prepare pie charts showing the following information, and explain to your counselor the important ideas each chart reveals. Tell where you got your information. Explain how cost affects the use of a nonrenewable energy resource and makes alternatives practical.
  - (a) The energy resources that supply the United States with most of its energy
  - (b) The share of energy resources used by the United States that comes from other countries
  - (c) The proportion of energy resources used by homes, businesses, industry, and transportation
  - (d) The fuels used to generate America's electricity
  - (e) The world's known and estimated primary energy resource reserves
7. Tell what is being done to make FIVE of the following energy systems produce more usable energy. In your explanation, describe the technology, cost, environmental impacts, and safety concerns.
  - Biomass digesters or waste-to-energy plants
  - Cogeneration plants
  - Fossil fuel power plants
  - Fuel cells
  - Geothermal power plants
  - Nuclear power plants
  - Solar power systems
  - Tidal energy, wave energy, or ocean thermal energy conversion devices
  - Wind turbines
8. Find out what opportunities are available for a career in energy. Choose one position that interests you and describe the education and training required.

## **Family life**

### **Pre requisites**

**# Start 3 #4 & #5**

### **Merit badge requirements**

1. Prepare an outline on what a family is and discuss this with your merit badge counselor. Tell why families are important to individuals and to society. Discuss how the actions of one member can affect other members.
2. List several reasons why you are important to your family and discuss this with your parents or guardians and with your merit badge counselor.
3. Prepare a list of your regular home duties or chores (at least five) and do them for 90 days. Keep a record of how often you do each of them. Discuss with your counselor the effect your chores had on your family.
4. With the approval of your parents or guardians and your merit badge counselor, decide on and carry out a project that you would do around the home that would benefit your family. Submit a report to your merit badge counselor outlining how the project benefited your family.
5. Plan and carry out a project that involves the participation of your family. After completing the project, discuss the following with your merit badge counselor:
  - (a) The objective or goal of the project
  - (b) How individual members of your family participated
  - (c) The results of the project
6. Do the following:
  - (a) Discuss with your merit badge counselor how to plan and carry out a family meeting.
  - (b) After this discussion, plan and carry out a family meeting to include the following subjects:
    - (1) Avoiding substance abuse, including tobacco, alcohol, and drugs, all of which negatively affect your health and well-being
    - (2) Understanding the growing-up process and how the body changes, and making responsible decisions dealing with sex\*
    - (3) How your chores in requirement 3 contributed to your role in the family
    - (4) Personal and family finances
    - (5) A crisis situation within your family
    - (6) The effect of technology on your family
    - (7) Good etiquette and manners

\*This conversation may take place with only one or both of your parents or guardians.

7. Discuss the following with your counselor:

- (a) Your understanding of what makes an effective father and why, and your thoughts on the father's role in the family
- (b) Your understanding of the responsibilities of a parent

## Personal Management

### Pre requisites

#1, #2, #8, #9, & #10

1. Do the following:
  - (a) Choose an item that your family might want to purchase that is considered a major expense.
  - (b) Write a plan that tells how your family would save money for the purchase identified in requirement 1a.
    - (1) Discuss the plan with your merit badge counselor.
    - (2) Discuss the plan with your family.
    - (3) Discuss how other family needs must be considered in this plan.
  - (c) Develop a written shopping strategy for the purchase identified in requirement 1a.
    - (1) Determine the quality of the item or service (using consumer publications or rating systems).
    - (2) Comparison shop for the item. Find out where you can buy the item for the best price. (Provide prices from at least two different price sources.) Call around; study ads. Look for a sale or discount coupon. Consider alternatives. Can you buy the item used? Should you wait for a sale?
2. Do the following:
  - (a) Prepare a budget reflecting your expected income (allowance, gifts, wages), expenses, and savings. Track and record your actual income, expenses, and savings for 13 consecutive weeks. (You may use the forms provided in the merit badge pamphlet, devise your own, or use a computer-generated version.) When complete, present the results to your merit badge counselor.
  - (b) Compare expected income with expected expenses.
    - (1) If expenses exceed income, determine steps to balance your budget.
    - (2) If income exceeds expenses, state how you would use the excess money (new goal, savings).
3. Discuss with your merit badge counselor FIVE of the following concepts:
  - (a) The emotions you feel when you receive money.
  - (b) Your understanding of how the amount of money you have with you affects your spending habits.
  - (c) Your thoughts when you buy something new and your thoughts about the same item three months later. Explain the concept of buyer's remorse.

- (d) How hunger affects you when shopping for food items (snacks, groceries).
  - (e) Your experience of an item you have purchased after seeing or hearing advertisements for it. Did the item work as well as advertised?
  - (f) Your understanding of what happens when you put money into a savings account.
  - (g) Charitable giving. Explain its purpose and your thoughts about it.
  - (h) What you can do to better manage your money.
4. Explain the following to your merit badge counselor:
- (a) The differences between saving and investing, including reasons for using one over the other.
  - (b) The concepts of return on investment and risk.
  - (c) The concepts of simple interest and compound interest and how these affected the results of your investment exercise.
5. Select five publicly traded stocks. Explain to your merit badge counselor the importance of the following information for each stock:
- (a) Current price
  - (b) How much the price changed from the previous day
  - (c) The 52-week high and the 52-week low prices
6. Pretend you have \$1,000 to save, invest, and help prepare yourself for the future. Explain to your merit badge counselor the advantages or disadvantages of saving or investing in each of the following:
- (a) Common stocks
  - (b) Mutual funds
  - (c) Life insurance
  - (d) A certificate of deposit (CD)
  - (e) A savings account or U.S. savings bond
7. Explain to your merit badge counselor the following:
- (a) What a loan is, what interest is, and how the annual percentage rate (APR) measures the true cost of a loan.
  - (b) The different ways to borrow money.
  - (c) The differences between a charge card, debit card, and credit card. What are the costs and pitfalls of using these financial tools? Explain why it is unwise to make only the minimum payment on your credit card.
  - (d) Credit reports and how personal responsibility can affect your credit report.

- (e) Ways to reduce or eliminate debt.
8. Demonstrate to your merit badge counselor your understanding of time management by doing the following:
- (a) Write a "to do" list of tasks or activities, such as homework assignments, chores, and personal projects, that must be done in the coming week. List these in order of importance to you.
  - (b) Make a seven-day calendar or schedule. Put in your set activities, such as school classes, sports practices or games, jobs or chores, and/or Scout or church or club meetings, then plan when you will do all the tasks from your "to do" list between your set activities.
  - (c) Follow the one-week schedule you planned. Keep a daily diary or journal during each of the seven days of this week's activities, writing down when you completed each of the tasks on your "to do" list compared to when you scheduled them.
  - (d) Review your "to do" list, one-week schedule, and diary/journal to understand when your schedule worked and when it did not work. With your merit badge counselor, discuss and understand what you learned from this requirement and what you might do differently the next time.
9. Prepare a written project plan demonstrating the steps below, including the desired outcome. This is a project on paper, not a real-life project. Examples could include planning a camping trip, developing a community service project or a school or religious event, or creating an annual patrol plan with additional activities not already included in the troop annual plan. Discuss your completed project plan with your merit badge counselor.
- (a) Define the project. What is your goal?
  - (b) Develop a timeline for your project that shows the steps you must take from beginning to completion.
  - (c) Describe your project.
  - (d) Develop a list of resources. Identify how these resources will help you achieve your goal.
  - (e) Develop a budget for your project.
10. Do the following:
- (a) Choose a career you might want to enter after high school or college graduation.
  - (b) Research the limitations of your anticipated career and discuss with your merit badge counselor what you have learned about qualifications such as education, skills, and experience.

## **Finger printing**

### **Pre requisites**

**None**

### **Merit badge requirements**

1. Give a short history of fingerprinting. Tell the difference between civil and criminal identification.
2. Explain the difference between the automated fingerprint identification systems (AFIS) now used by some law enforcement agencies and the biometric fingerprint systems used to control access to places like buildings, airports, and computer rooms.
3. Do the following:
  - (a) Name the surfaces of the body where friction or papillary ridges are found.
  - (b) Name the two basic principles supporting the science of fingerprints and give a brief explanation of each principle.
  - (c) Explain what it takes to positively identify a person using fingerprints.
4. Take a clear set of prints using ONE of the following methods.
  - (a) Make both rolled and plain impressions. Make these on an 8-by-8-inch fingerprint identification card, available from your local police department or your counselor.
  - (b) Using clear adhesive tape, a pencil, and plain paper, record your own fingerprints or those of another person.
5. Show your merit badge counselor you can identify the three basic types of fingerprint patterns and their subcategories. Using your own hand, identify the types of patterns you see.

## **Truck Transportation**

### **Pre-requisites**

**Tour a Transportation company, can be done before or after the class**

### **Merit badge requirements**

1. List the major truck lines serving your town.
2. Do the following:
  - (a) Describe the role of truck transportation within commerce (the movement of goods, funds, and information).
  - (b) Describe how trucks fit into a company's supply chain. This could be a manufacturer, importer, wholesaler, or retailer.
  - (c) On paper, map out how goods that are manufactured overseas are transported to a retailer in this country.
3. Describe the difference between the gasoline engine and the diesel engine that power trucks. List the advantages of each.
4. Visit a truck terminal and complete items 4a through 4e. After your visit, share what you have learned with your counselor.
  - (a) Find out what kind of maintenance program the company follows to help keep its fleet, drivers, and the roadway safe.
  - (b) Find out how dispatchers maintain communication with drivers on the road.
  - (c) Talk with a professional truck driver about safety. Learn about the truck driver's rules of the road for safe driving. List five safe-driving rules every professional truck driver must follow.
  - (d) Review the driver's log and find out what kind of information the log contains.
  - (e) Learn about important federal regulations that help ensure public safety.
5. Do the following:
  - (a) Outline the general organization of a trucking company. Describe what each department does.
  - (b) List five positions with trucking companies and describe each one.
6. Name five government agencies that work closely with the trucking industry. Describe their role.
7. List five different kinds of trucks. Tell the service each provides.

8. Assume that you are going to ship by truck 500 pounds of goods (freight class 65) from your town to another town 500 miles away. Your shipment must arrive within three days. Explain in writing:
  - (a) How to prepare the shipment
  - (b) How to compare at least three carriers for time in transit and rates
  - (c) How to choose which carrier to use
  - (d) How to insure the shipment for damages
9. Define the following terms: bill of lading, ETA, logbook, intermodal, containers, tariff, shippers, carrier, consignee, drayage, cartage.
10. Learn about opportunities in the field of truck transportation. Choose one career in which you are interested and discuss with your counselor the major responsibilities of that position and the qualifications, education, and training such a position requires.

## **Geocaching**

### **Pre requisites**

**#7,#8,#9**

### **Merit badge requirements**

1. Do the following:
  - (a) Explain to your counselor the most likely hazards you may encounter while participating in geocaching activities, and what you should do to anticipate, help prevent, mitigate, and respond to these hazards.
  - (b) Discuss first aid and prevention for the types of injuries or illnesses that could occur while participating in geocaching activities, including cuts, scrapes, snakebite, insect stings, tick bites, exposure to poisonous plants, heat and cold reactions (sunburn, heatstroke, heat exhaustion, hypothermia), and dehydration.
  - (c) Discuss how to properly plan an activity that uses GPS, including using the buddy system, sharing your plan with others, and considering the weather, route, and proper attire.
2. Discuss the following with your counselor:
  - (a) Why you should never bury a cache
  - (b) How to use proper geocaching etiquette when hiding or seeking a cache, and how to properly hide, post, maintain, and dismantle a geocache
  - (c) The principles of Leave No Trace as they apply to geocaching
3. Explain the following terms used in geocaching: waypoint, log, cache, accuracy, difficulty and terrain ratings, attributes, trackable. Choose five additional terms to explain to your counselor.
4. Explain how the Global Positioning System (GPS) works. Then, using Scouting's Teaching EDGE, demonstrate to your counselor the use of a GPS unit. Include marking and editing a waypoint, changing field functions, and changing the coordinate system in the unit.
5. Do the following:
  - (a) Show you know how to use a map and compass and explain why this is important for geocaching.
  - (b) Explain the similarities and differences between GPS navigation and standard map-reading skills and describe the benefits of each.
  - (c) Explain the UTM (Universal Transverse Mercator) system and how it differs from the latitude/longitude system used for public geocaches.
  - (d) Show how to plot a UTM waypoint on a map. Compare the accuracy to that found with a GPS unit.

6. Describe to your counselor the four steps to finding your first cache. Then mark and edit a waypoint.
7. With your parent's permission\*, go to [www.Geocaching.com](http://www.Geocaching.com). Type in your zip code to locate public geocaches in your area. Share with your counselor the posted information about three of those geocaches. Then, pick one of the three and find the cache.
8. Do ONE of the following:
  - (a) If a Cache to Eagle® series exists in your council, visit at least three of the locations in the series. Describe the projects that each cache you visit highlights, and explain how the Cache to Eagle® program helps share our Scouting service with the public.
  - (b) Create a Scouting-related Travel Bug® that promotes one of the values of Scouting. "Release" your Travel Bug into a public geocache and, with your parent's permission, monitor its progress at [www.geocaching.com](http://www.geocaching.com) for 30 days. Keep a log, and share this with your counselor at the end of the 30-day period.
  - (c) Set up and hide a public geocache, following the guidelines in the *Geocaching* merit badge pamphlet. Before doing so, share with your counselor a six-month maintenance plan for the geocache where you are personally responsible for the first three months. After setting up the geocache, with your parent's permission, follow the logs online for 30 days and share them with your counselor.
  - (d) Explain what Cache In Trash Out (CITO) means, and describe how you have practiced CITO at public geocaches or at a CITO event. Then, either create CITO containers to leave at public caches, or host a CITO event for your unit or for the public.
9. Plan a geohunt for a youth group such as your troop or a neighboring pack, at school, or your place of worship. Choose a theme, set up a course with at least four waypoints, teach the players how to use a GPS unit, and play the game. Tell your counselor about your experience, and share the materials you used and developed for this event.

## Game Design

### Pre requisites

#8

### Merit badge requirements

1. Do the following:

- (a) Analyze four games you have played, each from a different medium. Identify the medium, player format, objectives, rules, resources, and theme (if relevant). Discuss with your counselor the play experience, what you enjoy in each game, and what you dislike. Make a chart to compare and contrast the games.
- (b) Describe four types of play value and provide an example of a game built around each concept. Discuss with your counselor other reasons people play games.

2. Discuss with your counselor five of the following 17 game design terms. For each term that you pick, describe how it relates to a specific game.

**Thematic game elements:** story, setting, characters

**Gameplay elements:** play sequence, level design, interface design

**Game analysis:** difficulty, balance, depth, pace, replay value, age appropriateness

**Related terms:** single-player vs. multiplayer, cooperative vs. competitive, turn-based vs. real-time, strategy vs. reflex vs. chance, abstract vs. thematic

3. Define the term intellectual property. Describe the types of intellectual property associated with the game design industry. Describe how intellectual property is protected and why protection is necessary. Define and give an example of a licensed property.

4. Do the following:

- (a) Pick a game where the players can change the rules or objectives (examples: basketball, hearts, chess, kickball). Briefly summarize the standard rules and objectives and play through the game normally.
- (b) Propose changes to several rules or objectives. Predict how each change will affect gameplay.
- (c) Play the game with one rule or objective change, observing how the players' actions and emotional experiences are affected by the rule change. Repeat this process with two other changes.
- (d) Explain to your counselor how the changes affected the actions and experience of the players. Discuss the accuracy of your predictions.

5. Design a new game. Any game medium or combination of mediums is acceptable. Record your work in a game design notebook.

- (a) Write a vision statement for your game. Identify the medium, player format, objectives, and theme of the game. If suitable, describe the setting, story, and characters.
- (b) Describe the play value.
- (c) Make a preliminary list of the rules of the game. Define the resources.
- (d) Draw the game elements.

**You must have your merit badge counselor's approval of your concept before you begin creating the prototype.**

6. Do the following:

- (a) Prototype your game from requirement 5. If applicable, demonstrate to your counselor that you have addressed player safety through the rules and equipment. Record your work in your game design notebook.
- (b) Test your prototype with as many other people as you need to meet the player format. Compare the play experience to your descriptions from requirement 5b. Correct unclear rules, holes in the rules, dead ends, and obvious rule exploits. Change at least one rule, mechanic, or objective from your first version of the game, and describe why you are making the change. Play the game again. Record in your game design notebook whether or not your change had the expected effect.
- (c) Repeat 6b at least two more times and record the results in your game design notebook.

7. Blind test your game. Do the following:

- (a) Write an instruction sheet that includes all of the information needed to play the game. Clearly describe how to set up the game, play the game, and end the game. List the game objectives.
- (b) Share your prototype from requirement 6a with a group of players that has not played it or witnessed a previous playtest. Provide them with your instruction sheet(s) and any physical components. Watch them play the game, but do not provide them with instruction. Record their feedback in your game design notebook.
- (c) Share your game design notebook with your counselor. Discuss the player reactions to your project and what you learned about the game design process. Based on your testing, determine what you like most about your game and suggest one or more changes.

8. Do ONE of the following:

- (a) With your parent's permission and your counselor's approval, visit with a professional in the game development industry and ask him or her about his or her job and how it fits into the overall development process. Alternately, meet with a professional in game development education and discuss the skills he or she emphasizes in the classroom.
- (b) List three career opportunities in game development. Pick one and find out about the education, training, and experience required for the profession. Discuss this with your counselor. Explain why this profession might interest you.

## **Electronics**

### **Pre requisites**

#### **#6**

#### Merit badge requirements

1. Describe the safety precautions you must exercise when using, building, altering, or repairing electronic devices.
2. Do the following:
  - (a) Draw a simple schematic diagram. It must show resistors, capacitors, and transistors or integrated circuits. Use the correct symbols. Label all parts.
  - (b) Tell the purpose of each part.
3. Do the following:
  - (a) Show the right way to solder and desolder.
  - (b) Show how to avoid heat damage to electronic components.
  - (c) Tell about the function of a printed circuit board. Tell what precautions should be observed when soldering printed circuit boards.
4. Do the following:
  - (a) Discuss each of the following with your merit badge counselor:
    1. How to use electronics for a control purpose
    2. The basic principles of digital techniques
    3. How to use electronics for three different audio applications
  - (b) Show how to change three decimal numbers into binary numbers and three binary numbers into decimal numbers.
  - (c) Choose ONE of the following three projects. For your project, find or create a schematic diagram. To the best of your ability, explain to your counselor how the circuit you built operates.
    1. A control device
    2. A digital circuit
    3. An audio circuit
5. Do the following:
  - (a) Show how to solve a simple problem involving current, voltage, and resistance using Ohm's law.

(b) Tell about the need for and the use of test equipment in electronics. Name three types of test equipment. Tell how they operate.

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.

## **First aid**

### **Pre requisites**

#### **# 5 bring a picture**

##### Merit badge requirements

1. Satisfy your counselor that you have current knowledge of all first-aid requirements for Tenderfoot, Second Class, and First Class ranks.
2. Explain how you would obtain emergency medical assistance from:
  - (a) Your home
  - (b) A remote location on a wilderness camping trip
  - (c) An activity on open water
3. Define the term triage. Explain the steps necessary to assess and handle a medical emergency until help arrives.
4. Explain the universal precautions as applied to the transmission of infections. Discuss the ways you should protect yourself and the victim while administering first aid.
5. Prepare a first-aid kit for your home. Display and discuss its contents with your counselor.
6. Describe the early signs and symptoms of each of the following and explain what actions you should take:
  - (a) Shock
  - (b) Heart attack
  - (c) Stroke
7. Do the following:
  - (a) Describe the conditions that must exist before performing CPR on a person. Then demonstrate proper CPR technique using a training device approved by your counselor.
  - (b) Explain the use of an automated external defibrillator (AED). Identify the location of the AED at your school, place of worship, and troop meeting place, if one is present.
8. Show the steps that need to be taken for someone suffering from a severe cut on the leg and on the wrist. Tell the dangers in the use of a tourniquet and the conditions under which its use is justified.
9. Explain when a bee sting could be life threatening and what action should be taken for prevention and for first aid.
10. Describe the signs and symptoms and demonstrate the proper procedures for handling and immobilizing suspected closed and open fractures or dislocations of the
  - (a) Forearm

- (b) Wrist
- (c) Upper leg
- (d) Lower leg
- (e) Ankle

11. Describe the signs, symptoms, and possible complications and demonstrate care for someone with a suspected injury to the head, neck, or back.

12. Describe the symptoms, proper first-aid procedures, and possible prevention measures for the following conditions:

- (a) Anaphylaxis/allergic reactions
- (b) Bruises
- (c) Sprains or strains
- (d) Hypothermia
- (e) Frostbite
- (f) Burns - first, second, and third degree
- (g) Convulsions/seizures
- (h) Dehydration
- (i) Muscle cramps
- (j) Heat exhaustion
- (k) Heat stroke
- (l) Abdominal pain
- (m) Broken, chipped, or loosened tooth

13. Do the following:

- (a) Describe the conditions under which an injured person should be moved.
- (b) If a sick or an injured person must be moved, tell how you would determine the best method. Demonstrate this method.
- (c) With helpers under your supervision, improvise a stretcher and move a presumably unconscious person.

14. Teach another Scout a first-aid skill selected by your counselor.