

Robotics

Merit Badge Workbook

Merit badges are earned by doing: reading the pamphlet, practicing the skills, and showing your counselor what you have learned.
This workbook gives you a place to organize your notes and track your progress along the way.
Merit badge counselors may not require the use of this or any similar workbook.
You still must satisfy your counselor that you can demonstrate each skill and have learned the information.
Use the space under each requirement to note what you have done and what you want to talk about, not to write out full answers.
When a requirement says discuss, show, tell, explain, or demonstrate, that is what you must do.
No one may add to or subtract from the official requirements found on scouting.org (Guide to Advancement 7.0.4.8).
Scouting America last updated this badge's requirements page on October 22, 2026.
Requirements change from time to time. Double-check scouting.org before you start.

Scout's name: _____ Unit: _____ Date started: _____

Counselor's name: _____ Phone no.: _____ Email: _____

Links marked "Scouting America resources" are the ones Scouting America shares on its official badge page.
This workbook is unofficial and not endorsed by Scouting America.

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1. Safety. Do 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, prevent, and respond to these hazards. Describe the appropriate safety gear and clothing that should be used when working with robotics.

Scouting America resources: Hazards and Robot Safety (video)

Hazards when working with robots

Hazard	How I anticipate, mitigate, and prevent it	How I respond

Safety gear and clothing to use 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).

Scouting America resources: How to Treat Cuts and Scrapes (video)

Injuries in robotics activities and competitions

Injury	Prevention	First aid
cuts		
eye injuries		
burns (chemical or heat)		

Other injuries that could occur, with prevention and first aid

Requirement 1 completed on _____ counselor initials _____

2. Robotics Industry. Discuss the following with your counselor:

(a) The kinds of things robots can do and how robots are best used today.

Scouting America resources: TYPES OF ROBOTS | Robots Classification (video)

Things robots can do, and how they are best used today

(b) The similarities and differences between remote-control vehicles, telerobots, and autonomous robots.

Scouting America resources: What's The Difference Between Autonomous Robots and Controlled Robots? (video)
What Is the Difference Between Autonomous and Teleoperated Robots? (video)

Type	What I learned about it
Remote-control vehicles	
Telerobots	
Autonomous robots	

How they are alike

How they differ

(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.

Scouting America resources: The No Wheel, Circular Gear, or Sprocket Robot Race (video)

Three ways robots can move other than wheels or tracks

Method	When it would be appropriate to use it

Requirement 2 completed on _____ counselor initials _____

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.

Scouting America resources: 5 Sub-Disciplines of Robotics (video)

The five major fields of robotics (I discussed three)

Field	My pick	Its importance to robotics development
human-robot interface		
mobility		
manipulation		
programming		
sensors		

Robot system I used (if I chose one) _____ Pictures or video I found _____

Requirement 3 completed on _____ counselor initials _____

4. Design, Build, Program, Test. Do the following:

Scouting America resources: What Qualifies as a Robot for Robotics Merit Badge? (video) · Methods Robots Use to Move (video) Robotics: Degrees of Freedom (video)

(a) With your counselor's approval, choose a task for the robot or robotic subsystem that you plan to build. Include sensor feedback and programming in the task. Document this information in your robot engineering notebook.

The task I chose for my robot, including its sensor feedback and programming

Counselor approved on _____

(b) Design your robot. The robot design should use sensors and programming and have at least 2 degrees of freedom. Document the design in your robot engineering notebook using drawings and a written description.

Sensors I will use _____ Degrees of freedom _____

Written description of my design

Drawing of my design (draw here or attach)

(c) Build a robot or robotic subsystem of your original design to accomplish the task you chose for requirement 4(a).

Date built | Main parts and materials

(d) Discuss with your counselor the programming options available for your robot. Then do ONE of the following:

Programming options I discussed with my counselor

☐ **(1)** Program your robot to perform the task you chose for your robot in 4(a). Include a sample of your program's source code in your robot engineering notebook.

Scouting America resources: VEXcode VR (website)

Programming language or software | Date

Sample of my source code (write here or attach)

☐ **(2)** Prepare a flowchart of the desired steps to program your robot for accomplishing the task in 4(a). Include procedures that show activities based on sensor inputs. Place this in your robot engineering notebook.

Scouting America resources: General Guide to Creating Flowcharts (video) · Flowchart Tutorial for Beginners (video)

My flowchart, with steps based on sensor inputs (draw here or attach)

(e) Test your robot and record the results in your robot engineering notebook. Include suggestions on how you could improve your robot, as well as pictures or sketches of your finished robot.

My test log

Date	What I tested	What happened

How I could improve my robot

Picture or sketch of my finished robot (draw here or attach)

Requirement 4 completed on _____ counselor initials _____

5. Demonstrate. Do the following:

(a) Demonstrate for your counselor the robot you built in requirement 4.

Date demonstrated _____ Where _____

(b) Share your robot engineering notebook with your counselor. Talk about how well your robot accomplished the task, the improvements you would make in your next design, and what you learned about the design process.

How well my robot accomplished the task

Improvements I would make in my next design

What I learned about the design process

Requirement 5 completed on _____ counselor initials _____

6. Competitions. Do ONE of the following.

Scouting America resources: About FIRST Robotics Competition (2021) (video) · About VEX Robotics (video)

☐ **(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.

Competition _____ Date _____ Where _____

What I saw and learned about the competition

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.

Three youth robotics competitions

Competition	Type of competition	Time commitment	Age of participants	How many teams

Requirement 6 completed on _____ counselor initials _____

7. Do ONE of the following:

☐ **(a)** Identify three career opportunities that would use skills and knowledge in robotics. Pick one and research the training, education, certification requirements, experience, and expenses associated with entering the field. Research the prospects for employment, starting salary, advancement opportunities and career goals associated with this career. Discuss what you learned with your counselor and whether you might be interested in this career.
Scouting America resources: Learn About the Careers of Robotics Technicians (video) · Careers in Robotics (video)

Three careers that use robotics skills and knowledge

Career	How it uses robotics skills and knowledge

The career I picked _____

What I found

Topic	My findings
Training	
Education	
Certification requirements	
Experience	
Expenses	
Prospects for employment	
Starting salary	
Advancement opportunities	
Career goals	

Whether I might be interested in this career, and why

☐ **(b)** Identify how you might use the skills and knowledge in robotics to pursue a personal hobby. Research the additional training required, expenses, and affiliation with organizations that would help you maximize the enjoyment and benefit you might gain from it. Discuss what you learned with your counselor and share what short-term and long-term goals you might have if you pursued this.

Scouting America resources: How To Make Anything—Learn to Think Like an Engineer (video) · Why Try Computer Quilting? (video) How I Built a Difference | My Engineering Journey (video) · Tertill Weeding Robot Overview (video)

My hobby idea

How I might use robotics skills and knowledge in it

What I found

Topic	My findings
Additional training required	
Expenses	
Affiliation with organizations	

Goal	What I might aim for if I pursued this
Short-term	
Long-term	

Requirement 7 completed on counselor initials

Counselor sign-off

Your counselor signs your blue card or approves the badge in Scoutbook, and your unit records it. This line is for your own records.

Counselor's signature Date completed

Official Scouting America resources

Scouting America resources: Robotics merit badge page (requirements and resources) · Robotics merit badge pamphlet (free PDF) All merit badges

Made by Cole at ScoutSmarts.com, an Eagle Scout who loves helping Scouts.
Spot an error or a requirement change? Tell me at scoutsmarts.com/contact.
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