

Robotics

Merit Badge Workbook



This workbook can help you but you still need to read the merit badge pamphlet.

The work space provided for each requirement should be used by the Scout to make notes for discussing the item with his counselor, not for providing the full and complete answers. Each Scout must do each requirement.

No one may add or subtract from the official requirements found in **Boy Scout Requirements** (Pub. 33216 – SKU 34765).

The requirements were last issued or revised in 2011 • This workbook was updated in December 2013.

Scout's Name:	Unit:
Counselor's Name:	Counselor's Phone No.:
http://	www.USScouts.Org • http://www.MeritBadge.Org
	sions, comments or suggestions about this workbooks@USScouts.Org nges to the requirements for the merit badge should be sent to: Merit.Badge@Scouting.Org
	and 5 require you to document your work in a robot engineering notebook.
1. Safety. Do each of the following:	
	the most likely hazards you may encounter while working with robots and what you should and prevent, and respond to these hazards.
Hazard:	
Anticipate:	
Mitigate & Prevent:	
Respond:	

Scout's Name: _ Hazard: Anticipate: Mitigate & Prevent: Respond: Hazard: Anticipate: Mitigate & Prevent: Respond:

Robotics

Scout's Name: _ Hazard: Anticipate: Mitigate & Prevent: Respond: Hazard: Anticipate: Mitigate & Prevent: Respond:

Robotics

Robotics		Scout's Name:
	Describe the appro	opriate safety gear and clothing that should be used when working with robotics.
b.	Discuss first aid an competitions, inclu-	nd prevention for the types of injuries that could occur while participating in robotics activities and ding cuts, eye injuries, and burns (chemical or heat).
	Cuts,:	
	Eye injuries:	
	Chemical Burns:	
	Heat burns:	

Robotics	Scout's Name:				
2. Robotics industry. Discuss	the following with your counselor:				
a. The kinds of things r	The kinds of things robots can do and how robots are best used today.				
What they can do:					
How they are best u	sed:				
,					
	differences between remote-control vehicles, telerobots, and autonomous robots.				
Similarities:					
Differences:					
Zilliororioso.					
c. Three different meth	ods robots can use to move themselves other than wheels or tracks.				
1.					

3.

Ro	botics		Scout's Name:
		Describe who	en it would be appropriate to use each method.
		1.	
		2.	
		3.	
3.	manip	ral knowledge.	Discuss with your counselor three of the five major fields of robotics (human-robot interface, mobility, nming, sensors) and their importance to robotics development. Discuss either the three fields as they t system OR talk about each field in general.
		Human-robot interface	
		intoriaco	
		Mobility	
	_	,	
		Manipulation	
		Programming	

Rol	botics	;		Scout's Name:
		5	Sensors	
		•		ast one video to aid your discussion.
4.	Des	•		ram, test. Do each of the following:
	Ш		sensor feed	bunselor's approval, choose a task for the robot or robotic subsystem that you plan to build. Include back and programming in the task. Document this information in your robot engineering notebook.
		b.		robot. The robot design should use sensors and programming and have at least 2 degrees of freedom. ne design in your robot engineering notebook using drawings and a written description.
				t or robotic subsystem of your original design to accomplish the task you chose for requirement 4a.
		d.	Discuss with	n your counselor the programming options available for your robot.
			Then do eith	ner option 1 OR option 2.
				tion 1. Program your robot to perform the task you chose for your robot in 4a. Include a sample of your gram's source code in your robot engineering notebook.
			Inc	tion 2 . Prepare a flowchart of the desired steps to program your robot for accomplishing the task in 4a. lude procedures that show activities based on sensor inputs. Place this in your robot engineering ebook.
		e.		bot and record the results in your robot engineering notebook. Include suggestions on how you could be robot, as well as pictures or sketches of your finished robot.

Rol	ootics	3	Scout's Name:			
5.	Den	non	nstrate. Do the following:			
		a.	Demonstrate for your counselor the robot you built in requirement 4.			
		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 your robot accomplished the task:			
			Improvements you would make:			
			What you learned:			
			what you learned.			

CODOTICS			Scout's Name:	
. Compe	etitions. 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.			
	What you saw:			
	What you learned:			
	How teams are organi	zed and manage	ed.	
☐ 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.			
	Competition1:			
	Type of competit	ion:		
	Time commitmer	nt:		
	Age of the partic	pants:		
	How many teams	are involved:		
	Competition 2:			
	Type of competit	ion:		
	Time commitmer	ıt:		
	Age of the partic	pants:		
	How many teams	are involved:		

Robotics		Scout's Name:
Competition	3:	
Type of	competition:	
Time co	mmitment:	
Age of the	he participants:	
How ma	any teams are involved:	
. Careers. Name three	career opportunities in ro	botics.
1.		
2.		
3.		
Pick one and find out the	he education, training, an	d experience required for this profession.
Career:		
Education:		
Training:		
Experience:		
Discuss this with your o	counselor. and explain wh	ny this profession might interest you.
	, <u> </u>	

Requirement resources can be found here: http://www.meritbadge.org/wiki/index.php/Robotics#Requirement resources

Important excerpts from the Guide To Advancement - 2013, No. 33088 (SKU-618673)

[1.0.0.0] — Introduction

The current edition of the *Guide to Advancement* is the official source for administering advancement in all Boy Scouts of America programs: Cub Scouting, Boy Scouting, Versity Scouting, Venturing, and Sea Scouts. It replaces any previous BSA advancement manuals, including *Advancement Committee Policies and Procedures*, *Advancement and Recognition Policies and Procedures*, and previous editions of the *Guide to Advancement*.

[Page 2, and 5.0.1.4] — Policy on Unauthorized Changes to Advancement Program

No council, committee, district, unit, or individual has the authority to add to, or subtract from, advancement requirements. There are limited exceptions relating only to youth members with special needs. For details see section 10, "Advancement for Members With Special Needs".

[Page 2] — The "Guide to Safe Scouting" Applies

Policies and procedures outlined in the *Guide to Safe Scouting*, No. 34416, apply to all BSA activities, including those related to advancement and Eagle Scout service projects.

[7.0.3.1] — The Buddy System and Certifying Completion

A youth member must not meet one-on-one with an adult. Sessions with counselors must take place where others can view the interaction, or the Scout must have a buddy: a friend, parent, guardian, brother, sister, or other relative—or better yet, another Scout working on the same badge—along with him attending the session.

When the Scout meets with the counselor, he should bring any required projects. If these cannot be transported, he should present evidence, such as photographs or adult verification. His unit leader, for example, might state that a satisfactory bridge or tower has been built for the Pioneering merit badge, or that meals were prepared for Cooking. If there are questions that requirements were met, a counselor may confirm with adults involved. Once satisfied, the counselor signs the blue card using the date upon which the Scout completed the requirements, or in the case of partials, initials the individual requirements passed.

Note that from time to time, it may be appropriate for a requirement that has been met for one badge to also count for another. See "Fulfilling More Than One Requirement With a Single Activity," 4.2.3.6.

[7.0.3.2] — Group Instruction

It is acceptable—and sometimes desirable—for merit badges to be taught in group settings. This often occurs at camp and merit badge midways or similar events. Interactive group discussions can support learning. The method can also be attractive to "guest experts" assisting registered and approved counselors. Slide shows, skits, demonstrations, panels, and various other techniques can also be employed, but as any teacher can attest, not everyone will learn all the material.

There must be attention to each individual's projects and his fulfillment of *all* requirements. We must know that every Scout —actually and *personally*— completed them. If, for example, a requirement uses words like "show," "demonstrate," or "discuss," then every Scout must do that. It is unacceptable to award badges on the basis of sitting in classrooms *watching* demonstrations, or remaining silent during discussions. It is sometimes reported that Scouts who have received merit badges through group instructional settings have not fulfilled all the requirements. To offer a quality merit badge program, council and district advancement committees should ensure the following are in place for all group instructional events.

- Merit badge counselors are known to be registered and approved.
- Any guest experts or guest speakers, or others assisting who are not registered and approved as merit badge counselors, do not accept the
 responsibilities of, or behave as, merit badge counselors, either at a group instructional event or at any other time. Their service is temporary, not
 ongoing.
- Counselors agree not to assume prerequisites have been completed without some level of evidence that the work has been done. Pictures and
 letters from other merit badge counselors or unit leaders are the best form of prerequisite documentation when the actual work done cannot be
 brought to the camp or site of the merit badge event.
- There is a mechanism for unit leaders or others to report concerns to a council advancement committee on summer camp merit badge programs, group instructional events, and any other merit badge counseling issues—especially in instances where it is believed BSA procedures are not followed. See "Reporting Merit Badge Counseling Concerns," 11.1.0.0.
- There must be attention to each individual's projects and his fulfillment of all requirements. We must know that every Scout—actually and personally—completed them.

[7.0.3.3] — Partial Completions

A Scout need not pass all the requirements of one merit badge with the same counselor. It may be that due to timing or location issues, etc., he must meet with a different counselor to finish the badge. The Application for Merit Badge has a place to record what has been finished—a "partial." In the center section on the reverse of the blue card, the counselor initials for each requirement passed. In the case of a partial completion, the counselor does not retain his or her portion of the card. A subsequent counselor may choose not to accept partial work, but this should be rare. A Scout, if he believes he is being treated unfairly, may work with his unit leader to find another counselor. An example for the use of a signed partial would be to take it to camp as proof of prerequisites. Partials have no expiration except the Scout's 18th birthday. Units, districts, or councils shall not establish other expiration dates for partial merit badges.

[7.0.4.8] — Unofficial Worksheets and Learning Aids

Worksheets and other materials that may be of assistance in earning merit badges are available from a variety of places including unofficial sources on the Internet and even troop libraries. Use of these aids is permissible as long as the materials can be correlated with the current requirements that Scouts must fulfill. Completing "worksheets" may suffice where a requirement calls for something in writing, but this would not work for a requirement where the Scout must discuss, tell, show, or demonstrate, etc. Note that Scouts shall not be required to use these learning aids in order to complete a merit badge.