## **Robotics**



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

This Workbook can help you organize your thoughts as you prepare to meet with your merit badge counselor

## Merit Badge Counselors may not require the use of this or any similar workbooks.

You still must satisfy your counselor that you can demonstrate each skill and have learned the information. You should use the work space provided for each requirement to keep track of which requirements have been completed, and to make notes for discussing the item with your counselor, not for providing full and complete answers.

If a requirement says that you must take an action using words such as "discuss", "show",

"tell", "explain", "demonstrate", "identify", etc, that is what you must do.

No one may add or subtract from the official requirements found on Scouting.org.

The requirements were last issued or revised in 2011 • This workbook was updated in October 2021

Scout's Name:	Unit	:
Counselor's Name:	Phone No.:	Email:
Comments or suggestions for changes		this workbook to: Workbooks@USScouts.Org badge should be sent to: Merit.Badge@Scouting.Org
	d 5 require you to document y uld be separate from and in ac	our work in a robot engineering notebook. ddition to this workbook.
Safety. Do each of the following:		
	ne most likely hazards you may end and prevent, and respond to these h	counter while working with robots and what you should azards.
Hazard:		
Anticipate:		
_		
Mitigate & Prevent:		
_		
_		
_		
Respond:		

Workbook © Copyright 2021 - U.S. Scouting Service Project, Inc. - All Rights Reserved Requirements © Copyright, Boy Scouts of America (Used with permission.)

This workbook may be reproduced and used locally by Scouts and Scouters for purposes consistent with the programs of the Boy Scouts of America (BSA), the World Organization of the Scout Movement (WOSM) or other Scouting and Guiding Organizations.

However it may NOT be used or reproduced for electronic redistribution or for commercial or other non-Scouting purposes without the express permission of the U. S. Scouting Service Project, Inc. (USSSP).

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 ar 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 fol	
a. The kinds of things robots	can do and how robots are best used today.
What they can do:	
How they are best used:	
Tion they are been about	
h. The similarities and differen	nces between remote-control vehicles, telerobots, and autonomous robots.
Similarities:	ices between remote-control vehicles, telerobots, and autonomous robots.
Similarities.	

c. Three different methods robots can use to move themselves other than wheels or tracks.

1.	
2.	
•	

Differences:

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	
		Mobility	
		Manipulation	
		Programming	
		5 5	

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 feedl	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.
		C.	Build a robo	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.
				<b>tion 1</b> . Program your robot to perform the task you chose for your robot in 4a. Include a sample of you ogram's source code in your robot engineering notebook.
			Inc	<b>Ition 2</b> . Prepare a flowchart of the desired steps to program your robot for accomplishing the task in 4a. clude procedures that show activities based on sensor inputs. Place this in your robot engineering tebook.
		e.		bot and record the results in your robot engineering notebook. Include suggestions on how you could

Rob	Robotics		Scout's Name:
5. <b>Demonstrate</b> . Do the following:			strate. Do the following:
a. Demonstrate for your counselor the robo			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:

CODOTICS			Scout's Name:	
. Compe	titions. Do ONE of the fo	ollowing.		
☐ 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 organiz	ed and manage	ed.	
			netitions. Tell your counselor about these, including the type of competition, ats, and how many teams are involved.	
	Competition1:		·	
	Type of competition	on:		
	Time commitment			
	Age of the particip	ants:		
	How many teams			
	Competition 2:		T	
	Type of competition	n:		
	Time commitment	:		
	Age of the particip	ants:		
	How many teams	are involved:		

Robotics		Scout's Name:
Competit	on 3:	
	of competition:	
	commitment:	
Age o	of the participants:	
	many teams are involved:	
	ee career opportunities in robotics.	
1.		
2.		
3.		
Pick one and find ou	ut the education, training, and experience required f	or this profession.
Career:		
Education:		
Training:		
Experience:		
Discuss this with yo	ur counselor, and explain why this profession might	t interest you.

When working on merit badges, Scouts and Scouters should be aware of some vital information in the current edition of the *Guide to Advancement* (BSA publication 33088).Important excerpts from that publication can be downloaded from <a href="http://usscouts.org/advance/docs/GTA-Excerpts-meritbadges.pdf">http://usscouts.org/advance/docs/GTA-Excerpts-meritbadges.pdf</a>.

You can download a complete copy of the Guide to Advancement from <a href="http://www.scouting.org/filestore/pdf/33088.pdf">http://www.scouting.org/filestore/pdf/33088.pdf</a>.