



Programming

Merit Badge Workbook



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.

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.

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

No one may add or subtract from the official requirements found in Boy Scout Requirements (Pub. 33216 – SKU 621535). The requirements were last issued or revised in 2013 • This workbook was updated in October 2016.

Scout's Name: _____ Unit: _____
Counselor's Name: _____ Counselor's Phone No.: _____

<http://www.USScouts.Org> • <http://www.MeritBadge.Org>

Please submit errors, omissions, comments or suggestions about this **workbook** to: Workbooks@USScouts.Org
Comments or suggestions for changes to the **requirements** for the **merit badge** should be sent to: Merit.Badge@Scouting.Org

The Programming merit badge website, <http://www.boyslife.org/programming>, provides information and resources that may assist you in completing the following requirements.

- 1. **Safety.** - Do the following:
 - a. Show your counselor your current, up-to-date Cyber Chip.

Earn the Cyber Chip

Earning the Cyber Chip can help you learn how to stay safe while you are online and using social networks or the latest electronic gadgets. Topics include cell phone use, texting, blogging, gaming, cyberbullying, and identity theft. Find out more about the Cyber Chip at www.scouting.org/cyberchip.

Note: A workbook for the Boy Scout Cyber Chip is attached at the end of this workbook.

- b. Discuss first aid and prevention for the types of injuries or illnesses that could occur during programming activities, including repetitive stress injuries and eyestrain.

Repetitive Stress Injuries	
Eyestrain	

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Other

2. History. - Do the following:

- a. Give a brief history of programming, including at least three milestones related to the advancement or development of programming.

- b. Describe the evolution of programming methods and how they have improved over time.

3. General knowledge. - Do the following:

- a. Create a list of 10 popular programming languages in use today and describe which industry or industries they are primarily used in and why.

	Language	Industry	Why is it used?
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

- b. Describe three different programmed devices you rely on every day.

1.		
2.		
3.		

4. Intellectual property. - Do the following:

- a. Explain how software patents and copyrights protect a programmer.

- b. Describe the difference between licensing and owning software.

- c. Describe the differences between freeware, open source, and commercial software, and why it is important to respect the terms of use of each.

5. Projects. - Do the following:

- a. With your counselor's approval, choose a sample program. Then, as a minimum, modify the code or add a function or subprogram to it. Debug and demonstrate the modified program to your counselor.

The Programming merit badge website, <http://www.boyslife.org/programming>, has a number of sample programs that you could use for requirement 5a. However, you have the option of finding a program on your own. It's a good idea to seek your merit badge counselor's guidance.

Language	
Environment	
Industry	
Program:	

- Modify the code or add a function or subprogram to it.

Modification:

- Debug and demonstrate the modified program

Debugging
performed

- Demonstrate the program

- b. With your counselor's approval, choose a second programming language and development environment, different from those used for requirement 5a and in a different industry from 5a. Then write, debug, and demonstrate a functioning program to your counselor, using that language and environment.

Language

Environment

Industry

Program

Debugging
performed

- Demonstrate the program

- c. With your counselor's approval, choose a third programming language and development environment, different from those used for requirements 5a and 5b and in a different industry from 5a or 5b. Then write, debug, and demonstrate a functioning program to your counselor, using that language and environment.

Language

Environment

Industry

Program

Debugging performed

- Demonstrate the program

- d. Explain how the programs you wrote for requirements 5a, 5b, and 5c process inputs, how they make decisions based on those inputs, and how they provide outputs based on the decision making.

6. Careers. - Find out about three career opportunities in programming.

1. <input style="width: 95%; height: 25px;" type="text"/>
2. <input style="width: 95%; height: 25px;" type="text"/>
3. <input style="width: 95%; height: 25px;" type="text"/>

- Pick one and find out the education, training, and experience required.

Career	<input style="width: 95%; height: 25px;" type="text"/>
Education	<input style="width: 95%; height: 25px;" type="text"/>
	<input style="width: 95%; height: 25px;" type="text"/>
	<input style="width: 95%; height: 25px;" type="text"/>
Training	<input style="width: 95%; height: 25px;" type="text"/>
	<input style="width: 95%; height: 25px;" type="text"/>
	<input style="width: 95%; height: 25px;" type="text"/>
Experience	<input style="width: 95%; height: 25px;" type="text"/>
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- Discuss this with your counselor and explain why this career might be of interest to you.

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



Boy Scout Cyber Chip Workbook



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A. Cyber Chip Requirements for Grades 6-8

1. Read and sign the Level II Internet Safety Pledge from NetSmartz. (BSA Cyber Chip green card)

Internet Safety Pledge	
1.	I will think before I post
2.	I will respect other people online
3.	I will respect digital media ownership
4.	I won't meet face-to-face with anyone I meet in the digital world unless I have my parent's permission
5.	I will protect myself online.

2. Write and sign a personalized contract with your parent or guardian that outlines rules for using the computer and mobile devices, including what you can download, what you can post, and consequences for inappropriate use.

General comments	<table border="1" style="width: 100%; height: 100px;"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>					
What I can download	<table border="1" style="width: 100%; height: 100px;"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>					

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What I can post

Consequences for inappropriate use

- 3. Watch the video "Tracking Teresa," along with two additional videos of your choosing, to see how friends can help each other to stay safe online. (NetSmartz.org/scouting)

	Video Name	Date Watched
<input type="checkbox"/>	Tracking Teresa	
<input type="checkbox"/>		
<input type="checkbox"/>		

- 4. As an individual or with your patrol, use the EDGE method and mini lessons to teach Internet safety rules, behavior, and "netiquette" to your troop or another patrol. You are encouraged to use any additional material and information you have researched. Each member of the patrol must have a role and present part of the lesson. (NetSmartz.org/scouting)

- 5. Discuss with your unit leader the acceptable standards and practices for using allowed electronic devices, such as phones and games, at your meetings and other Scouting events.

B. Cyber Chip Requirements for Grades 9-12

- 1. Read and sign the Level II Internet Safety Pledge from NetSmartz. (BSA Cyber Chip green card)

Internet Safety Pledge
1. I will think before I post
2. I will respect other people online
3. I will respect digital media ownership
4. I won't meet face-to-face with anyone I meet in the digital world unless I have my parent's permission
5. I will protect myself online.

- 2. Write and sign a personalized contract with your parent or guardian that outlines rules for using the computer and mobile devices, including what you can download, what you can post, and consequences for inappropriate use.

General comments	
What I can download	
What I can post	
Consequences for inappropriate use	

- 3. Discuss with your parents the benefits and potential dangers teenagers might experience when using social media.

- Give examples of each.

- 4. Watch three "Real-Life Story" videos to learn the impact on teens. (NetSmartz.org/scouting)

	Video Name	Date Watched
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		

- 5. As an individual or patrol, use the EDGE method and the Teen Volunteer Kit to teach Internet safety rules, behavior, and "netiquette" to your troop or another patrol. You are encouraged to use any additional material and information you have researched. Each member of the patrol must have a role and present part of the lesson. (NetSmartz.org/scouting)

- 6. Discuss with your unit leader the acceptable standards and practices for using allowed electronic devices such as phones and games at your meetings and other Scouting events.

Note: All Cyber Chips will expire annually. Each Scout will need to “recharge” the chip by going back to the NetSmartz Recharge area. This space will hold new information, news, and a place for the Scout to recommit to net safety and netiquette. Then, with the unit leader, the Scout can add the new date to the Cyber Chip card or certificate.

Requirement resources can be found here:
<http://www.scouting.org/cyberchip.aspx> and <http://www.netsmartz.org/scouting>

Important excerpts from the Guide To Advancement - 2015, No. 33088 (SKU-620573)

[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, Varsity Scouting, Venturing, and Sea Scouts. It replaces any previous BSA advancement manuals 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. If merit badge counseling or instruction includes any Web-based interaction, it must be conducted in accordance with the BSA Social Media Guidelines (<http://www.scouting.org/Marketing/Resources/SocialMedia>). For example, always copy one or more authorized adults on email messages between counselors and Scouts.

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, fairs, clinics, 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.

- A culture is established for merit badge group instructional events that partial completions are acceptable expected results.
- A guide or information sheet is distributed in advance of events that promotes the acceptability of partials, explains how merit badges can be finished after events, lists merit badge prerequisites, and provides other helpful information that will establish realistic expectations for the number of merit badges that can be earned at an event.
- 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 to sign off only requirements that Scouts have actually and personally completed.
- 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.

It is permissible for guest speakers, guest experts, or others who are not merit badge counselors to assist in the counseling process. Those providing such assistance must be under the direction of a registered and approved counselor who is readily available onsite, and provides personal supervision to assure all applicable BSA policies and procedures—including those related to BSA Youth Protection—are in place and followed.

[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. Partial completions 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.