

Radio

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 637685).

	The requirements were last issued or revised in 2018	 This workbook was updated in <u>January 2018</u>.
cout's Na	me:	Unit:
	s Name:	
Com	http://www.USScouts.Org Please submit errors, omissions, comments or suggestion ments or suggestions for changes to the requirements for the	
. Explair	n what radio is.	
	iscuss the following:	
a.	The differences between broadcast radio and hobby	radio.

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b. The differences between broadcasting and two-way communications.

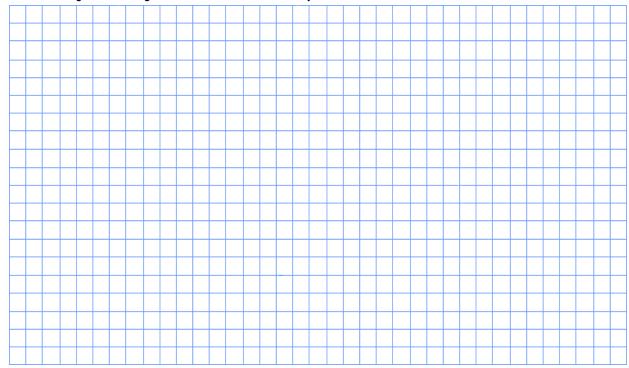
c. Radio call signs and how they are used in broadcast radio and amateur radio.

Radio call signs and now they are used in broadcast radio and amateur radio.						

d. The phonetic alphabet and how it is used to communicate clearly.

2. Do the following:

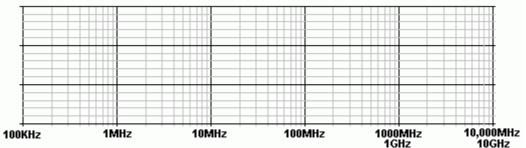
a. Sketch a diagram showing how radio waves travel locally and around the world.



International Telecommunication

Union:

- 3. Do the following:
 - a. Draw a chart of the electromagnetic spectrum covering 300 kilohertz (kHz) to 3000 megahertz (MHz).
 - b. Label the MF, HF, VHF, UHF, and microwave portions of the spectrum on your diagram.
 - c. Locate on your chart at least eight radio services such as AM and FM commercial broadcast, citizens band (CB), television, amateur radio (at least four amateur radio bands), and public service (police and fire).



1000MHz 1GHz 10,000MHz 10GHz 100KHz Explain how radio waves carry information. Include in your explanation: transceiver, transmitter, receiver, amplifier, and antenna. Transceiver: Transmitter: Receiver: Amplifier:

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Antenn	na:																																	
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Frequency modulation (FM), Continuous wave (CW) Morse Code transmission Single sideband (SSB) transmission Digital transmission. Explain how NOAA Weather Radio (NWR) can alert you to danger.	Amplitude modulation	
modulation (FM), Continuous wave (CW) Morse Code transmission Single sideband (SSB) transmission Digital transmission.	(AM:	
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Explain how NOAA Weather Radio (NWR) can alert you to danger.	transmission.	
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	Explain how NO	DAA Weather Radio (NWR) can alert you to danger.

c. Discuss how information is sent when using amplitude modulation (AM), frequency modulation (FM), continuous

d.

	d.	Explain how cellular telephon	es work. Identify their benefits and limitations in an emergency.
6.	Explain to outlets, a	the safety precautions for work and antenna systems.	king with radio gear, including the concept of grounding for direct current circuits, power
	General	safety precautions:	
	Groundi	ng for direct current circuits:	
	Groundi	ng for Power outlets:	
	Cravnadi	na far antanna avatama.	
	Groundi	ng for antenna systems:	

Radio

Scout's Name: _____

Radio	Scout's Name:
	nstallation (an amateur radio station, broadcast station, or public communications center, for example) approved y your counselor.
Discuss what maintain the	types of equipment you saw in use, how it was used, what types of licenses are required to operate and equipment, and the purpose of the station.
Equipment:	
Licenses:	
Purpose:	
i dipose.	
8. Find out abou	ut three career opportunities in radio.
1.	
2. 3.	
	If find out the education, training, and experience required for this profession.
Career:	
Education:	
Training:	

Rad	dio	Scout's Name:
	Experience:	
	-	
	Discuss this wi	ith your counselor, and explain why this profession might interest you.
9.		e following: (a OR b OR c OR d)
		teur Radio . Tell why the FCC has an amateur radio service.
	'	. Tell why the 1 GO has all amateur radio service.
		Describe some of the activities that amateur radio operators can do on the air, once they have earned an
		amateur radio license.

9.

		Scout's Name:
2.	Explain differences by privileges	between the Technician, General, and Extra Class license requirements and
	Technician:	
	General:	
	Extra Class:	
	Explain who adminis	ters amateur radio exams.
3.	Explain at least five	Q signals or amateur radio terms.
J.	Q signal or Term	Explanation
	Q Signal of Term	Explanation
	1	

Radio

Radio		Scout's Name:
4.	Explain how you wou	ld make an emergency call on voice or Morse code.
5.	Explain the difference	es between handheld transceivers and home "base" transceivers.
	Handheld	
	Base	
		obile amateur radio transceivers and amateur radio repeaters.
	Transceivers:	
	Repeaters:	

Radio		Scout's Name:
	☐ 6.	Using proper call signs, Q signals, and abbreviations, carry on a 10-minute real or simulated amateur radio contact using voice, Morse code, or digital mode. (Licensed amateur radio operators may substitute five QSL cards as evidence of contacts with five amateur radio operators. Properly log the real or simulated ham radio contact, and record the signal report.)
□ b.	Radio B	roadcasting
	<u> </u>	Discuss with your counselor FCC broadcast regulations. Include power levels, frequencies, and the regulations for low-power stations.
	☐ 2.	Prepare a program schedule for radio station "KBSA" of exactly one-half hour, including music, news,
		commercials, and proper station identification
		Record your program on audiotape or in a digital audio format using proper techniques.
	3.	Listen to and properly log 15 broadcast stations.
		Call sign Freq.
		1.
		2.
		3.
		4.
		5.
		6.
		7.
		8

Scout's Name: Radio 9. 10. 11. 12. 13. 14. 15. Determine the program format and target audience for five of these stations. Call Sign **Program Format Target Audience** 1. 2. 3. 4. 5. 4. Explain to your counselor at least eight terms used in commercial broadcasting, such as segue, cut, fade, continuity, remote, Emergency Alert System, network, cue, dead air, PSA, and play list. Segue: ☐ Cut: Fade: Continuity: Remote: Emergency Alert System: Network:

Radio			Scout's Name:				
		Cue:					
		☐ Dead Air:					
		☐ PSA:					
		☐ Playlist:					
	☐ 6.	Discuss with your podcasts.	counselor alternative radio platforms such as internet streaming, satellite radio, and				
□ c.	Shortw	ave and Medium-V					
	☐ 1.	Listen across several shortwave bands for four one-hour periods - at least one period during daylight hours and at least one period at night. Log the stations properly and locate them geographically on a map, globe, or web-based mapping service					
		(Note: You n	nay want to use the map included in this workbook if a globe isn't available)				
		1					

201100 011119	ht. Log the stations p	oropony and loo		iap, globo, or v	vob baooa me	ipping oo
Compare yo	ur daytime and night t during each sessior	time shortwave	logs; note the fr	equencies on	which your se	lected sta
	3					
	differences in the sign					
Compare yo	ur medium-wave bro n only during the nigh	adcast station l	ogs and explain	why some dist	ant stations a	re heard
- a						
23. 130410						

	5.	Demonstrate listening to a radio broadcast using a smartphone/cell phone. Include international broadcasts i your demonstration.					
□ d.		r Radio Direction Finding					
	1.	Describe amateur radio direction finding and explain why direction finding is important as both an activity and in competition.					
	2.	Describe what frequencies and equipment are used for ARDF or fox hunting					
	□ 3.	Build a simple directional antenna for either of the two frequencies used in ARDF.					
	☐ 3. ☐ 4.	Participate in a simple fox hunt using your antenna along with a provided receiver.					
	<u></u> 5.	Show on a map how you located the "fox" using your receiver.					

Scout's Name: _

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 http://usscouts.org/advance/docs/GTA-Excerpts-meritbadges.pdf.

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

Radio

