

## RADIO MERIT BADGE WORKBOOK

This Scoutmaster Bucky Merit Badge Workbook is based off the current *Scouts BSA Requirements*.

Consider also using the Radio merit badge class preparation page for clarification and expectations when participating in a Scoutmaster Bucky merit badge opportunity ([online](#) or [in-person](#)).

<https://scoutmasterbucky.com/merit-badges/radio/>

Scout's  
Name:

### Shortwave and Medium-Wave Listening

This workbook covers only one of the options for this merit badge. Check the Scoutmaster Bucky website for the other possibilities.

**REQUIREMENT 1:** Explain what radio is. Then discuss the following:

**REQUIREMENT A:** The differences between broadcast radio and hobby radio

**REQUIREMENT B:** The differences between broadcasting and two-way communications

**REQUIREMENT C:** Radio station call signs and how they are used in broadcast radio and amateur radio

**REQUIREMENT D:** The phonetic alphabet and how it is used to communicate clearly

**REQUIREMENT 2:** Do the following:

**REQUIREMENT A:** Sketch a diagram showing how radio waves travel locally and around the world.

**REQUIREMENT B:** Explain how the radio stations WWV and WWVH can be used to help determine what you can expect to hear when you listen to a shortwave radio.

**REQUIREMENT C:** Explain the difference between a distant (DX) and a local station.

**REQUIREMENT D:** Discuss what the Federal Communications Commission (FCC) does and how it is different from the International Telecommunication Union.

**REQUIREMENT 3:** Do the following:

- a. Draw a chart of the electromagnetic spectrum covering 300 kilohertz (kHz) to 3,000 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).

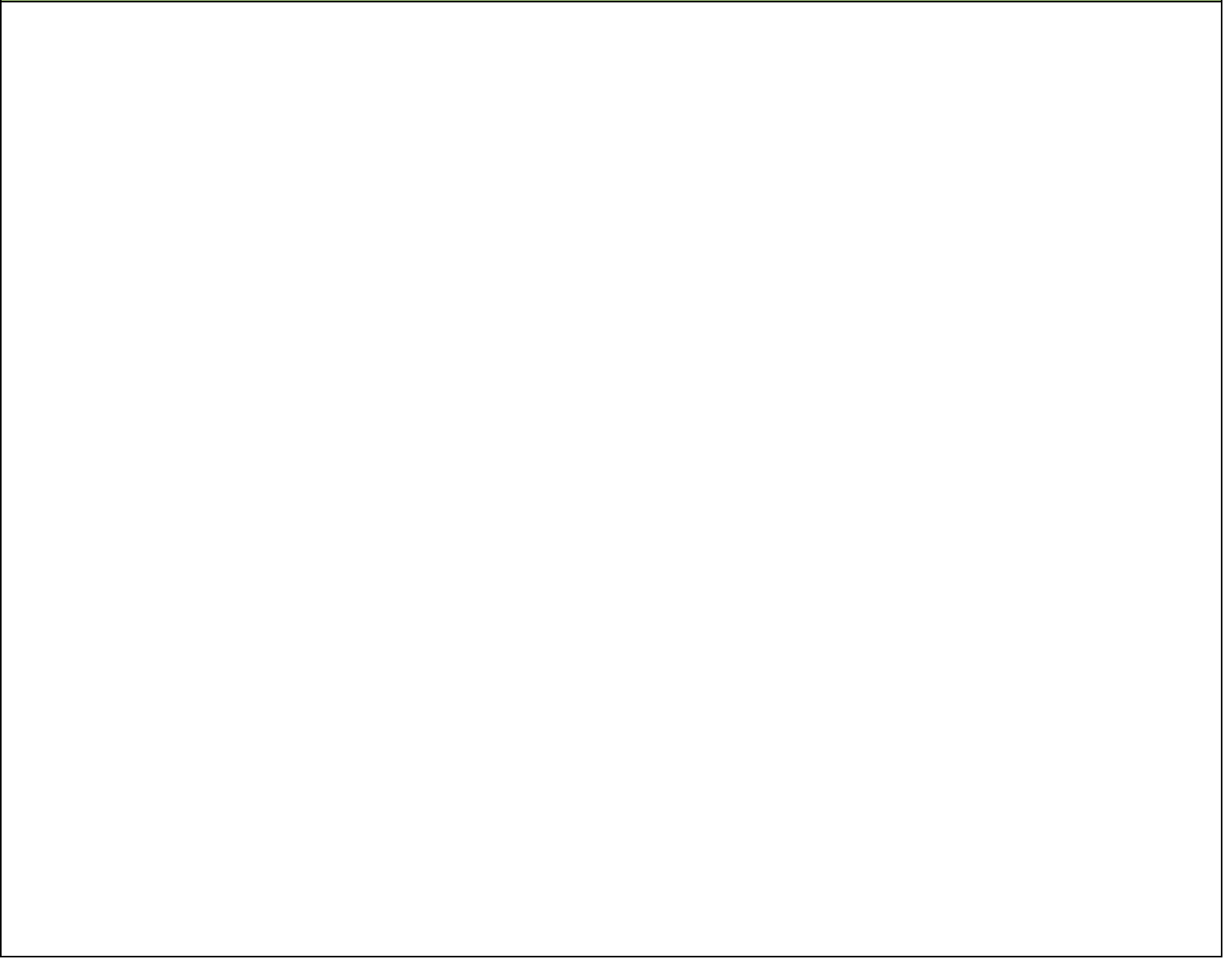


**REQUIREMENT 4:** Explain how radio waves carry information. Include in your explanation: transceiver, transmitter, receiver, amplifier, and antenna.

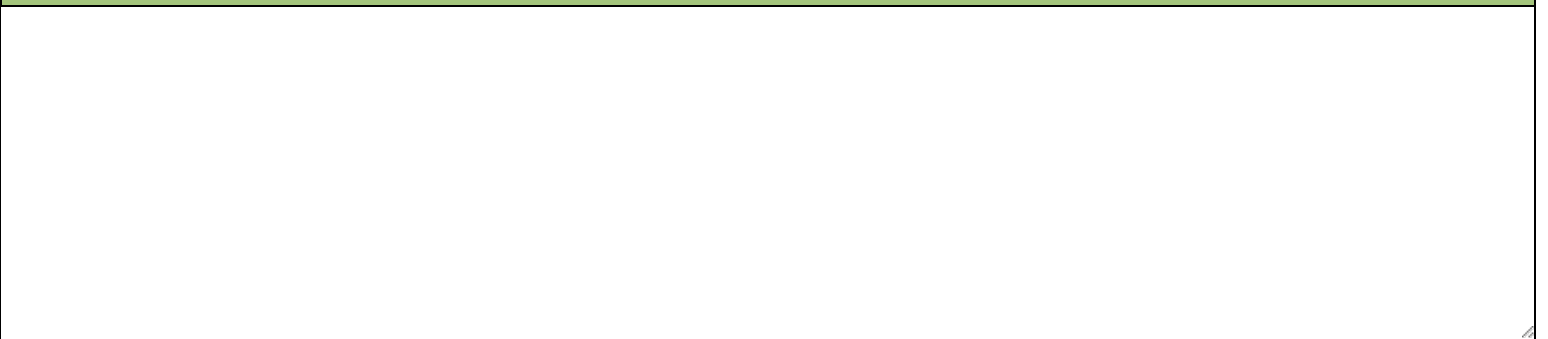
**REQUIREMENT 5:** Do the following:

**REQUIREMENT A:** Explain the differences between a block diagram and a schematic diagram.

**REQUIREMENT B:** Draw a block diagram for a radio station that includes a transceiver, amplifier, microphone, antenna, and feed line.



**REQUIREMENT C:** Discuss how information is sent when using amplitude modulation (AM), frequency modulation (FM), continuous wave (CW) Morse Code transmission, single sideband (SSB) transmission, and digital transmission.



**REQUIREMENT D:** Explain how NOAA Weather Radio (NWR) can alert you to danger.

**REQUIREMENT E:** Explain how cellular telephones work. Identify their benefits and limitations in an emergency.

**REQUIREMENT 6:** Explain the safety precautions for working with radio gear, including the concept of grounding for direct current circuits, power outlets, and antenna systems.

**REQUIREMENT 7:** Visit a radio installation (an amateur radio station, broadcast station, or public service communications center, for example) approved in advance by your counselor. Discuss what types of equipment you saw in use, how it was used, what types of licenses are required to operate and maintain the equipment, and the purpose of the station.

**REQUIREMENT 8:** Find out about three career opportunities in radio. Pick one and find out the education, training, and experience required for this profession. Discuss this with your counselor, and explain why this profession might interest you.

**REQUIREMENT 9:** Do ONE of the following (a OR b OR c OR d):

**REQUIREMENT C: Shortwave and Medium-Wave Listening**

**REQUIREMENT 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.

**REQUIREMENT 2:** Listen to several medium-wave stations for two one-hour periods, one period during daylight hours and one period at night. Log the stations properly and locate them on a map, globe, or web-based mapping service.



**REQUIREMENT 3:** Compare your daytime and nighttime shortwave logs; note the frequencies on which your selected stations were loudest during each session. Explain differences in the signal strength from one period to the next.

**REQUIREMENT 4:** Compare your medium-wave broadcast station logs and explain why some distant stations are heard at your location only during the night.

**REQUIREMENT 5:** Demonstrate listening to a radio broadcast using a smartphone/cell phone. Include international broadcasts in your demonstration.

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