



Worksheet

Prerequisites: #3, #8

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

- (a) The differences between broadcast radio and hobby radio
- (b) The differences between broadcasting and two-way communications
- (c) Radio station call signs and how 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.
- (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.
- (c) Explain the difference between a distant (DX) and a local station.
- (d) Discuss what the Federal Communications Commission (FCC) does and how it is different from the International Telecommunication Union.

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).

*Workspace on next page

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

5. Do the following:

- (a) Explain the differences between a block diagram and a schematic diagram.
- (b) Draw a block diagram for a radio station that includes a transceiver, amplifier, microphone, antenna, and feed line.
- (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.
- (d) Explain how NOAA Weather Radio (NWR) can alert you to danger.
- (e) Explain how cellular telephones work. Identify their benefits and limitations in an emergency.

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

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.

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.

G. Do ONE of the following options:

- (a) **Option A: Amateur Radio**

- (1) Tell why the FCC has an amateur radio service. Describe activities that amateur radio operators can do on the air, once they have earned an amateur radio license.
- (2) Explain differences between the Technician, General, and Extra Class license requirements and privileges. Explain who administers amateur radio exams.
- (3) Explain at least five Q signals or amateur radio terms.
- (4) Explain how you would make an emergency call on voice or Morse code.
- (5) Explain the differences between handheld, mobile, and base station transceivers and their uses. Explain the use of amateur radio repeaters.
- (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.)

For more information on Amateur Radio, and becoming a licensed Amateur Radio Operator, visit www.blc-arc.org.

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Symbol Length and Spacing

- A DOT is one unit of time
- A DASH is three units of time
- Symbol spacing is one unit (DOT Length)
- Character spacing is three units (DASH length)
- Word spacing is seven units



**Bay-Lakes Council
Amateur Radio Club**

www.blc-arc.org

Communicating with Other

Hams Contact Basics: Good Amateur Practices

Q-Signals

Q-signals are a system of radio shorthand as old as wireless and developed from even older telegraphy codes. Q-signals are a set of abbreviations for common information that save time and allow communication between operators who don't speak a common language. Modern ham radio uses them extensively. The table below lists the most common Q-signals used by hams. While Q-signals were developed for use by Morse operators, their use is common on phone, as well. You will often hear, "QRZed?" as someone asks "Who is calling me?" or "I'm getting a little QRM" from an operator receiving some interference or "Let's QSY to 146.55" as two operators change from a repeater frequency to a nearby simplex communications frequency.

Q-Signals

Abbr. Questions

QRG Your exact frequency (or that of) is kHz.
Will you tell me my exact frequency (or that of)?

QRL I am busy (or I am busy with). Are you busy?
Usually used to see if a frequency is busy.

QRM Your transmission is being interfered with
(1. Nil; 2. Slightly; 3. Moderately; 4. Severely; 5. Extremely).
Is my transmission being interfered with?

QRN I am troubled by static . (1 to 5 as under QRM.)
Are you troubled by static?

QRO Increase power. Shall I increase power?

QRP Decrease power. Shall I decrease power?

QRQ Send faster (_wpm). Shall I send faster?

QRS Send more slowly (_wpm). Shall I send more slowly? **QRT** Stop
sending. Shall I stop sending?

QRU I have nothing for you. Have you anything for me?

QRV I am ready. Are you ready?

QRX I will call you again at hours (on kHz).
When will you call me again? Minutes are usually implied rather than
hours.

QRZ You are being called by (on kHz).
Who is calling me?

QSB Your signals are fading. Are my signals fading?

QSK I can hear you between signals; break in on my transmission.
Can you hear me between your signals and if so can I break in on your
transmission?

QSL I am acknowledging receipt.
Can you acknowledge receipt (of a message or transmission)?

QSO I can communicate with direct (or relay through). Can you
communicate with direct or by relay?

QSP I will relay to . Will you relay to ?

QST General call preceding a message addressed to all amateurs and
ARRL members. This is in effect "CQ ARRL."

QSX I am listening to on kHz. Will you listen to on kHz?

QSY Change to transmission on another frequency (or on kHz). Shall I
change to transmission on another frequency (or on kHz)?

QTC I have messages for you (or for).
How many messages have you to send?
These Q signals are the ones used most often on the air. (Q abbreviations
take the form of questions only when they are sent followed by a question
mark.)

QTH ^a My location is . What is your location?

QTR The time is . What is the correct time?
ITU Phonetic Alphabet

Word
Alfa
Bravo
Charlie
Delta
Echo
Foxtrot
Golf
Hotel
India
Juliet
Kilo

Lima
Mike
November
Oscar
Papa
Quebec
Romeo
Sierra
Tango
Uniform
Victor
Whiskey
X-Ray
Yankee

Letter Pronunciation

A **AL** FAH
B **BRAH** VOH
C **CHAR** LEE
D **DELL** TAH
E **ECK** OH
F **FOKS** TROT
G **GOLF**
H **HOH** TELL
I **IN** DEE AH
J **JEW** LEE ETT
K **KEY** LOH
L **LEE** MAH
M **MIKE**
N **NO VEM** BER
O **OSS** CAH
P **PAH PAH**
Q **KEH BECK**
R **ROW** ME OH
S **SEE AIR** RAH
T **TANG** GO
U **YOU** NEE FORM V **VIK** TAH
W **WISS** KEY
X **ECKS** RAY
Y **YANG** KEY
Z **Zulu ZOO** LOO

Note: The **boldfaced** syllables are
emphasized. The pronunciations shown in this table were designed for
those who speak any of the international languages. The pronunciations
given for "Oscar" and "Victor" may seem awkward to English-speaking
people in the US.

SCOUT FREQUENCIES

HF SSB Voice

Band WOSM Calling Frequencies Suggested Band Segment for US Stations Notes

80 m 3.940 & 3.690(1) 3.920 — 3.940 3.670 — 3.690 (1)

(1) Extra segment

40 m 7.190 & 7.090 (2)

7.180 — 7.200

7.270 — 7.290 (2)

7.090 not available in Region 2

20 m 14.290

14.270 — 14.290

14.320 — 14.340

17 m 18.140

18.140 — 18.150

15 m 21.360

21.360 — 21.400

12 m 24.960

24.960 — 24.980

10 m 28.390 (3)

28.350 — 28.400 (3) (3) Includes N50.160 —

6 m 50.160

50.200

HF CW

Band WOSM Calling Frequencies Suggested Band Segment for US Stations Notes

80 m 3.570 (3) 40 m 7.030 (3) 20 m 14.060 17

m 18.080 15 m 21.140 (3) 12 m 24.910 10 m

28.180 (3) 6 m 50.160

3.560 — 3.570 (3) (3) Includes Nov7.030 —

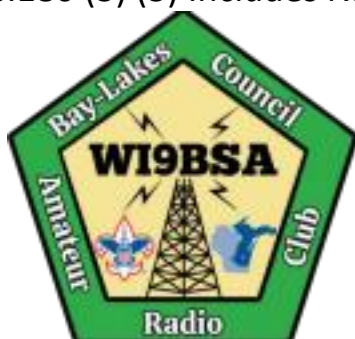
7.040 (3) (3) Includes Nov14.050 — 14.060

=.070 — 18.080

21.130 — 21.140 (3) (3) Includes N24.900 —

24.910

28.170 — 28.180 (3) (3) Includes N50.150



Amateur Radio Operator Rating Strips



Morse Code Interpreter Strip



ARRL Service to Scouting Award
Community Organization Knot



Jamboree on the Air - JOTA is an annual event held across the globe. It is the single largest gathering of Scouts with over 7 million Scouts from all nations participating.

What can Scouts do with Amateur Radio?

- JOTA
- APRS tracking
- Scout Nets
- Talk to Astronauts
- Send a selfie anywhere using SSTV
- EME bounce
- Order a pizza
- Send an email using Winlink
- Radiogram
- Weather spotting/Skywarn
- Antenna building
- Fox Hunting
- Emergency communications
- Release a Pico balloon

www.blc-arc.org