

## Radio Class B

4. Explain how radio waves carry information.

**A radio frequency transmitter sends out a radio frequency transmission. Just like this it is called a continuous wave signal and it has no information. Once you modulate the signal it then contains information. Some of the ways to modulate the continuous wave to produce information is to: switch it on and off – Morse Code; change its amplitude – Amplitude Modulation (AM); change its frequency – Frequency Modulation (FM); or change its phase – Digital Modulation.**

Include in your explanation: transceiver, transmitter, receiver, amplifier, and antenna.

Transceiver:	<b>A box containing both a transmitter and a receiver.</b>
Transmitter:	<b>A device for sending a modulated RF signal.</b>
Receiver:	<b>A device for receiving and un-modulating a RF signal.</b>
Amplifier:	<b>A device for increasing the amplitude of an RF signal. This can be for the transmitter and /or receiver.</b>
Antenna:	<b>A metallic devise used for sending and/or receiving an RF signal. It can be as simple as a length of wire.</b>

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5. Do the following:

- a. Explain the differences between a block diagram and a schematic diagram.

Block diagram:	<b>A block diagram shows how major units are hooked together. Major units in radio would be things like a Microphone, a Transceiver, an Amplifier, and an antenna.</b>
Schematic diagram:	<b>A schematic shows the components of a major unit and how they are interconnected. For an amplifier it could show how Transistors, Resistors, Capacitors, and Coils are wired together.</b>

- b. Draw a block diagram for a radio station that includes a transceiver, amplifier, microphone, antenna, and feed line.

**See attachment.**

- 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.

Amplitude modulation (AM):	<b>Changes the amplitude of the continuous wave.</b>
Frequency modulation (FM),	<b>Changes the frequency of the continuous wave.</b>
Continuous wave (CW) Morse Code transmission	<b>Turns the continuous wave off and on to produce the dits and dahs of Morse code.</b>
Single sideband (SSB) transmission	<b>In reality AM modulated signals are complex signals with a lot of duplicated and un-necessary information. A SSB transmitter eliminates the duplicated and un-necessary information. This greatly increases efficiency of the transmitted signal.</b>
Digital transmission.	<b>There are two ways to produce the Ones and Zeros of digital communications. One way is to changes the phase of the continuous wave. Another way is to transmit on two different frequencies – one for zeros and one for ones.</b>

- d. Explain how NOAA Weather Radio (NWR) can alert you to danger.

**NOAA Weather Radio (NWR) is a series of transmitters operating near 162 MHz across the country sending weather information direct from the National Weather Service. Many Amateur Radio handheld transceivers can receive these broadcasts, making them doubly useful on camping trips. In addition, special NWR receivers can silently monitor the broadcasts and turn themselves on when urgent weather danger threatens.**

- d. Explain how cellular telephones work. Identify their benefits and limitations in an emergency.

**Cellular telephones are radios. They transmit radio signals back and forth to a cell site to make phone calls, send text messages, or data for applications. As you change location, your radio is transferred to another cell site along your way of travel. For the system to work, the cell sites are connected by landline cables. This makes them vulnerable in disasters, as these landlines can fail and power can be lost. In emergencies the government can turn off cell towers.**