



**TRAIL
LIFE
USA**

Communications Technology

Name _____

Do all of the following requirements (1-5)

- ____1. Identify 5 kinds of communication technology, list examples of devices in your home that use each kind and do the following:
- ____a. Explain the difference between wired and wireless communications devices.
 - ____b. Explain the difference between broadcast and private communications.
 - ____c. Explain how 911 dispatch service works and when is it used.
 - ____d. Explain the use of the emergency broadcast services such as National Weather Service Radio and the Emergency Alert Service.
- ____2. Using a chart and/or text list of the US Radio Frequency Allocation from the US Department of Commerce <http://www.ntia.doc.gov/>, and information on the electromagnetic spectrum from NASA <http://imagine.gsfc.nasa.gov/>, do the following:
- ____a. Define electromagnetic radiation, frequency, radio frequency (RF) and spectrum.
 - ____b. Draw your own spectrum chart showing at least the following frequencies:
 - human hearing (audio)
 - human eyesight (visible light)
 - alternating current (electric power for your home)
 - AM and FM commercial broadcast radio
 - citizens' band radio, television
 - public service (police and fire)
 - and a least one amateur radio band



- _____3. Make a drawing showing how cell phone systems work and do the following:
- _____a. Explain the principles behind cell phone communications.
 - _____b. Explain why they are called cell phones.
 - _____c. Describe cell phone coverage gaps.
 - _____d. Describe the functions of the cellular data networks including at least: texting, Internet access, location services, and other smart phone/mobile device apps.
 - _____e. Compare the traditional landline telephone system, cellular system, and Internet telephony.
- _____4. Encryption of electronic communication signals use coding techniques so that no one other than the intended recipient can decode the message.
- _____a. Read a book or several articles about the history and methods of encryption.
 - _____b. Show an example code including encoding and decoding key(s).
 - _____c. Demonstrate encoding and decoding messages with another person.
 - _____d. **Learn who the wartime “code talkers” were and how they used encrypted, or secret communication.**
- _____5. **Read a study guide for an amateur radio technician license (e.g. “Now You’re Talking” or the newer “Ham Radio License Manual” published by ARRL).**
- _____a. Learn about the FCC, ITU, radio licenses, call signs, basic safety precautions for working with radio gear, the phonetic alphabet, and how the phonetic alphabet helps to communicate more clearly.
 - _____b. Answer at least 2 questions from each question group in the study guide.

Do three of the following optional requirements from any topic (6-22)

Amateur Radio

- _____6. Acquire an FCC amateur radio license by taking and passing the Technician Class License exam. After you receive your license, contact someone on amateur radio using your new call sign.

- ____7. Participate in an amateur radio field day and learn about the purpose of this event. Make at least 5 contacts over a radio with the help of an experienced radio operator.
- ____8. Attend the National Weather Service severe weather Storm Spotter training in your area. Explain how amateur radio operators help safety officials during severe weather conditions.
- ____9. Describe how amateur radio operators provide emergency communications when catastrophic disasters happen.

Technology

- ____10. Learn about the history of communication technology by doing the following:
 - ____a. Make a timeline showing at least five types of communication technologies and the people who are credited with inventing them.
 - ____b. Read a biography of a communications and broadcasting pioneer such as Alexander Graham Bell, Samuel Morse, Guglielmo Marconi and Edward R. Murrow.
- ____11. Learn about Samuel Morse and the Morse code and do the following:
 - ____a. Explain when Morse code was developed and why it was used.
 - ____b. Explain how Morse code is still used today.
 - ____c. Make a simple telegraph and practice using it with a partner.
 - ____d. Use Morse code to send and decode a telegraph message.
- ____12. Build an AM crystal radio or some other type of radio receiver and:
 - ____a. Determine what factors affect the quality of your reception.
 - ____b. Experiment to find which techniques result in the best reception on your radio.
- ____13. Investigate the technologies that are used to send information over the Internet.
 - ____a. Make a diagram of how the Internet transfers messages.
 - ____b. Define packets, hubs, routers, switches, and IP addresses.
- ____14. Draw a diagram showing how communication satellites send messages around the world.

- ____15. Draw a diagram showing how GPS satellite signals allow a GPS navigation system to determine where you are in the world.
- ____16. Define the terms pixel, RGB color, and HDTV. Explain how video information is broadcast.
- ____17. Tour a radio or TV station, 911-dispatcher facility, telephone company, or a radio or broadcasting museum. Discuss what types of equipment you saw and how it was used. Draw a diagram of the basic communications technologies used and how they are connected.

Media

- ____18. By yourself or with a buddy, create your own radio show of at least 5 minutes duration and present it to your family, unit or troop.
 - ____a. Use KTLU, WTLU or another set of meaningful call letters for your radio station. Note: Call letters start with K or W for stations west or east of the Mississippi River.
 - ____b. Identify your intended audience.
 - ____c. Write a program schedule or script for the show to possibly include news, sports, weather, interviews, music, sound effects, commercials, a short drama, and/or an in-depth report on a subject.
 - ____d. Practice speaking like a radio announcer in a loud clear voice.
- ____19. By yourself or with a buddy, create a video of at least 5 minutes duration and present it to your family, unit or troop.
 - ____a. Develop a show concept such as an informational or entertaining show with a clearly defined purpose and message to communicate. Possible concepts include a video about Trail Life USA to present at your church or a Troop recruiting night, a video letter to encourage someone overseas, or an informational video to share with a younger unit.
 - ____b. Write a script for the show.
 - ____c. Make the video using a video camera and video editing software.

____20. Research how communications technology is helpful to missionaries in remote areas. Read a biography of a missionary in a remote area and explain how communications technology helped them.

Leadership/Careers

____21. Lead one of the following activities for a younger unit:

____a. Teach the rules and etiquette that should be followed when using communication technology such as Instant Messenger or text messaging including: when it is and is not appropriate to use such technology, why it is important to follow family rules for these items, and what to do if someone is bullying or doing other inappropriate things while using this technology. Have them role-play communications following the rules and etiquette.

____b. Teach to a younger unit several age appropriate secret codes and then have them split into pairs to exchange encoded messages with each other.

____c. Lead a younger unit in the telephone game. Then lead a discussion with them on how technology has helped messages to be transmitted more quickly and more accurately.

____d. Lead a younger unit in making tin-can phones. Have them test and tell what happens to the phone if the string is loose or is touching something else. Explain to them how a real telephone works and how it is different from a tin can phone.

____e. Explain the rules for operating a citizen band (CB) radio and why are there rules for using the airwaves. Lead the younger unit in communicating via walkie-talkies or other two-way radios while following the rules.

____22. Research careers in the development or use of communication technology. Choose one career and interview or shadow for part of a day someone in that career. List the education and skills required to work in this field.

Trail Badge Mentor Signature

Date

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