

Signs, Signals, and Codes Merit Badge

Troop 344/9344
Pemberville, OH



1624 02165

Signs, Signals, and Codes

Merit Badge Requirements



1. Discuss with your counselor the importance of signs, signals, and codes, and why people need these different methods of communication. Briefly discuss the history and development of signs, signals, and codes.
2. Explain the importance of signaling in emergency communications. Discuss with your counselor the types of emergency or distress signals one might use to attract airborne search-and-rescue personnel if lost in the outdoors or trying to summon assistance during a disaster. Illustrate these signaling examples by the use of photos or drawings.

Signs, Signals, and Codes

Merit Badge Requirements



3. Do the following:
 - a. Describe what Morse code is and the various means by which it can be sent. Spell your first name using Morse code. Send or receive a message of six to 10 words using Morse code.
 - b. Describe what American Sign Language (ASL) is and how it is used today. Spell your first name using American Sign Language. Send or receive a message of six to 10 words using ASL.
4. Give your counselor a brief explanation about semaphore, why it is used, how it is used, and where it is used. Explain the difference between semaphore flags and nautical flags. Then do the following:
 - a. Spell your first name using semaphore. Send or receive a message of six to 10 words using semaphore.
 - b. Using illustrations or photographs, identify 10 examples of nautical flags and discuss their importance.

Signs, Signals, and Codes Merit Badge Requirements



5. Explain the braille reading technique and how it helps individuals with sight impairment to communicate. Then do the following:
 - a. Either by sight or by touch, identify the letters of the braille alphabet that spell your name. By sight or touch, decode a braille message at least six words long.
 - b. Create a message in braille at least six words long, and share this with your counselor.
6. Do the following:
 - a. Describe to your counselor six sound-only signals that are in use today. Discuss the pros and cons of using sound signals versus other types of signals.
 - b. Demonstrate to your counselor six different silent Scout signals. Use these Scout signals to direct the movements and actions of your patrol or troop.

Signs, Signals, and Codes

Merit Badge Requirements



7. On a Scout outing, lay out a trail for your patrol or troop to follow. Cover at least one mile in distance and use at least six different trail signs and markers. After the Scouts have completed the trail, follow no-trace principles by replacing or returning trail markers to their original locations.
8. For THREE of the following activities, demonstrate five signals each. Tell what the signals mean and why they are used:
 - a. Sports official's hand signs/signals
 - b. Heavy-equipment operator's hand signals
 - c. Aircraft carrier catapult crew signals
 - d. Cyclist's hand signals
 - e. An activity selected by you and your counselor

Signs, Signals, and Codes

Merit Badge Requirements



9. Share with your counselor 10 examples of symbols used in everyday life. Design your own symbol. Share it with your counselor and explain what it means. Then do the following:
 - a. Show examples of 10 traffic signs and explain their meaning.
 - b. Using a topographical map, explain what a map legend is and discuss its importance. Point out 10 map symbols and explain the meaning of each.
 - c. Discuss text-message symbols and why they are commonly used. Give examples of your favorite 10 text symbols or emoticons. Then see if your counselor or parent can identify the meaning or usage of each symbol.
10. Briefly discuss the history of secret code writing (cryptography). Make up your own secret code and write a message of up to 25 words using this code. Share the message with a friend or fellow Scout. Then share the message and code key with your counselor and discuss the effectiveness of your code.



Requirement 1

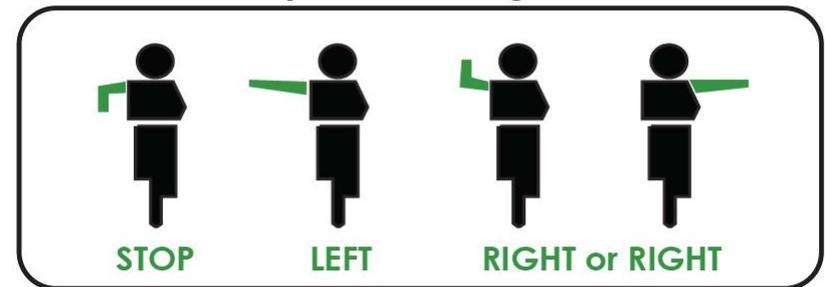
Discuss with your counselor the importance of signs, signals, and codes, and why people need these different methods of communication. Briefly discuss the history and development of signs, signals, and codes.

Importance of Signs, Signals, and Codes

- Signs are any kind of visual graphics created to display information to people.
- A signal is something someone does to pass on information. This can be anything from a hand gesture to spoken words.
- Signs and signals help people understand that world. The main purpose of signs and signals is to communicate, to convey information designed to assist the receiver with decision-making based on the information provided.

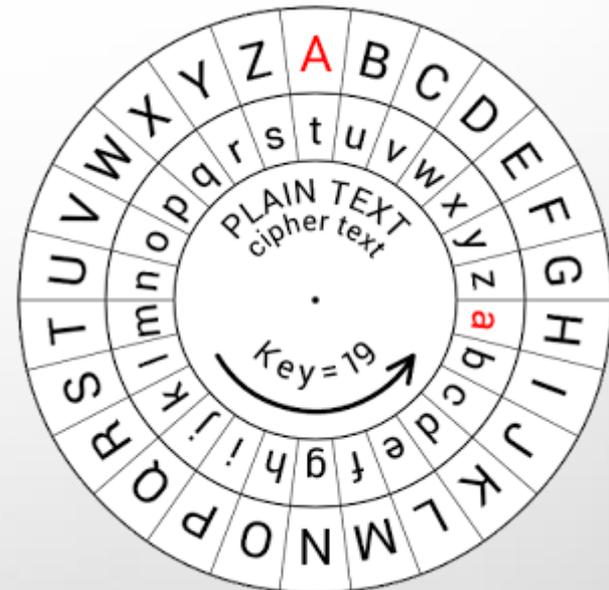


Bicycle Hand Signals:



Importance of Signs, Signals, and Codes

- A code is a system of symbols, letters, words, or signals that are used instead of ordinary words and numbers to send messages or store information.
- Codes and ciphers are forms of secret communication. A code replaces words, phrases, or sentences with groups of letters or numbers, while a cipher rearranges letters or uses substitutes to disguise the message. The technology of such secret communication is called cryptology.



Importance of Signs, Signals, and Codes

- The first signals probably grew out of people's gestures.
- Signs, as we know of today, started around the time of the Greek, Roman and Egyptian cities, dating from about 3000 B.C. and beyond. Most of these signs were made of stone or terra cotta with the use of imagery more than text, since, many people were illiterate, during, that time.
- Codes and secret writing has been employed about as long as writing has existed. Cryptology has long been employed by governments, military, businesses, and organizations to protect their messages. Today, encryption is used to protect storage of data and transactions between computers.



Stone mason sign from Pompeii



Requirement 2

Explain the importance of signaling in emergency communications. Discuss with your counselor the types of emergency or distress signals one might use to attract airborne search-and-rescue personnel if lost in the outdoors or trying to summon assistance during a disaster. Illustrate these signaling examples by the use of photos or drawings.

Signaling in Emergencies

- Knowing basic rescue signals could save your life or the life of others.
- To attract the attention of rescuers, use signals to make yourself audible or visible.



International Ground-to-Air Signaling Code

- There are many instances where self-rescue may not be possible.
- We often over-confidently assume we'll be able to make it to safety under our own power, but if something catastrophic happens, you'd better know how to call for help.
- You should know the international ground-to-air signaling code.
- This standard system is designed to send a clear visual message to any aircraft that might pass your location.
- These letters should be constructed on a clear patch of ground, with as much contrast between the symbols and backdrop as possible.
- Make the symbol as large as you can — at least 10 feet wide is recommended.

NO.	MESSAGE	CODE SYMBOL
1	Require assistance	V
2	Require medical assistance	X
3	No or Negative	N
4	Yes or Affirmative	Y
5	Proceeding in this direction	→

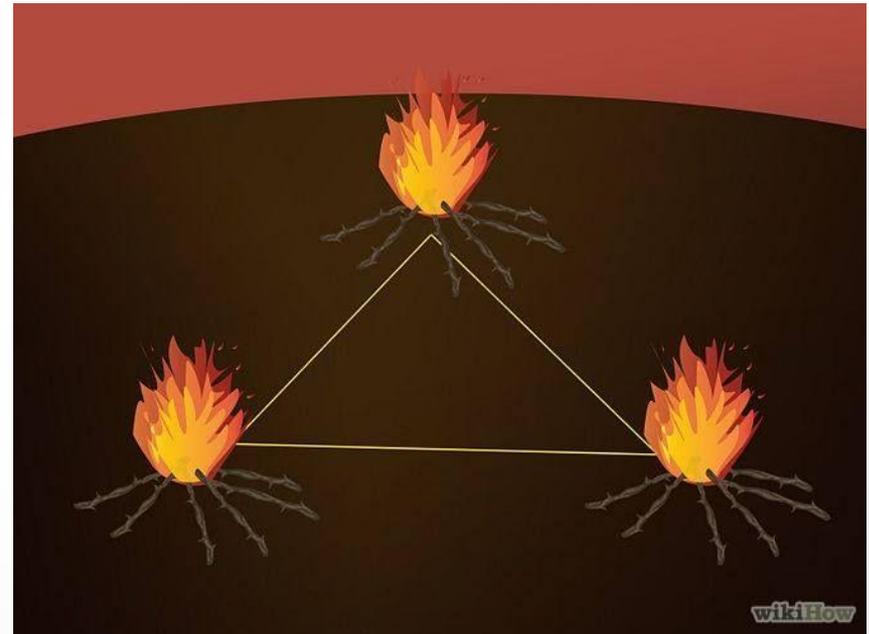
Other Types of Ground Signals

- **Spelling out Letters:** You can spell out the word SOS (Save Our Souls)
- **Whistle blasts:** Whistle blast are useful for alerting ground units that you are close to them. However, you can also give three loud blasts of a whistle at varying times of the day and night, to signal your location. Even if search teams are not in your area, someone else maybe close by and hear the whistle – which will alert them to your presence.
- **Signal Mirror:** Signal mirrors can be used to alert aircraft flying overhead as to your location. They are designed so that the mirror emits a cone shaped light ray which gets the pilots attention. When the pilot sees the mirror flashes, they can get a fix on your location, due to the unique design.



The Rule of 3's in Distress Signals

- Most distress signals are given in a sequence of 3's, for instance – three whistle blasts, three glints from a mirror, three fires arranged in a triangle shape and so on.





Requirement 3

Do the following:

- a. Describe what Morse code is and the various means by which it can be sent. Spell your first name using Morse code. Send or receive a message of six to 10 words using Morse code.
- b. Describe what American Sign Language (ASL) is and how it is used today. Spell your first name using American Sign Language. Send or receive a message of six to 10 words using ASL.

Morse Code

- The Morse code is a code that uses a series of dots and dashes to represent the different letters of the alphabet and numbers.
- The various letters, numbers and other characters are made up by combining these two elements in different combinations.

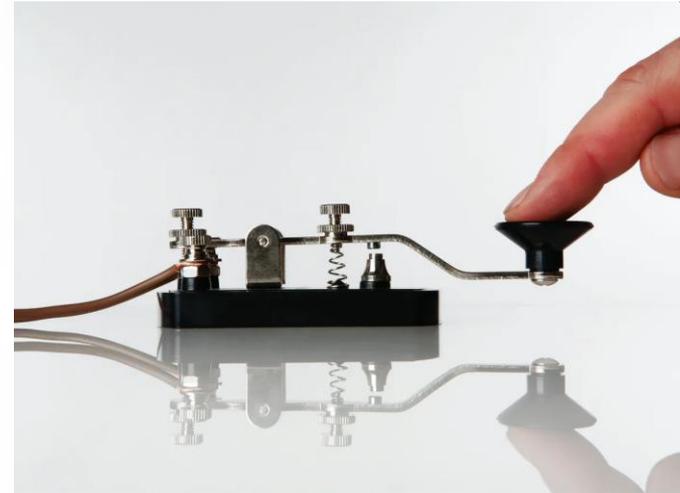
A	• —
B	— • • •
C	— • — •
D	— • •
E	•
F	• • — •
G	— — •
H	• • • •
I	• •
J	• — — —
K	— • — —
L	• — • •
M	— —
N	— •
O	— — —
P	• — — •
Q	— — • —
R	• — •
S	• • •
T	—

U	• • —
V	• • • —
W	• — —
X	— • • —
Y	— • — —
Z	— — • •

1	• — — — —
2	• • — — —
3	• • • — —
4	• • • • —
5	• • • • •
6	— • • • •
7	— — • • •
8	— — — • •
9	— — — — •
0	— — — — —

Morse Code

- **Morse code** is usually transmitted by on-off keying of an information-carrying medium such as electric current, radio waves, visible light, or sound waves.
- The current or wave is present during the time period of the dot or dash and absent during the time between dots and dashes.



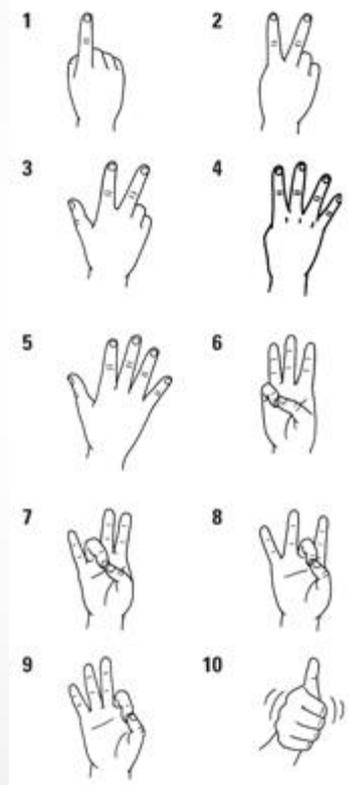
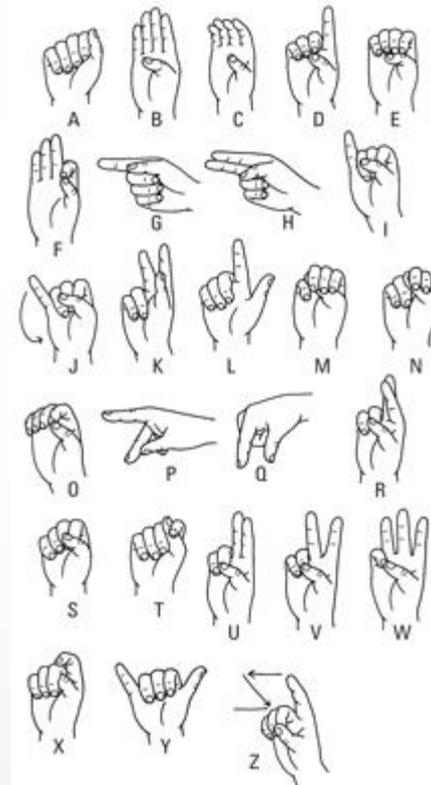
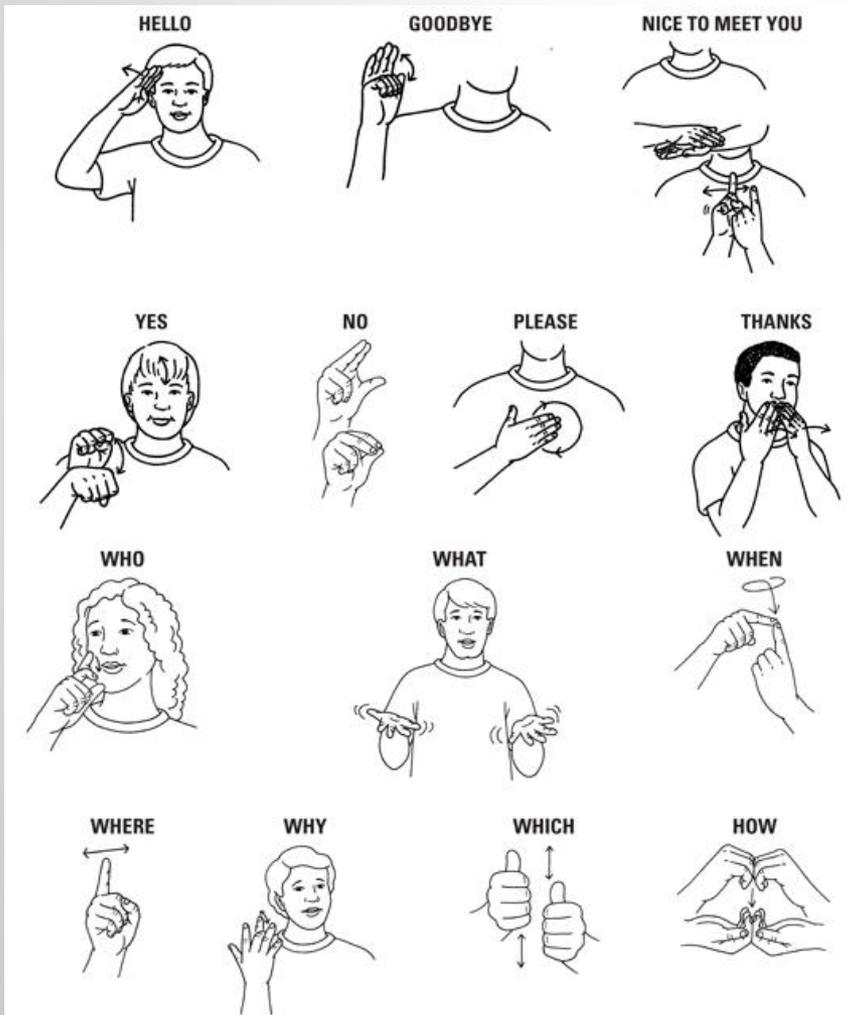
American Sign Language (ASL)

- American Sign Language (ASL) is a visual language.
- With signing, the brain processes linguistic information through the eyes.
- The shape, placement, and movement of the hands, as well as facial expressions and body movements, all play important parts in conveying information.
- Each country has its own sign language, and regions have dialects, much like the many languages spoken all over the world.
- Like any spoken language, ASL is a language with its own unique rules of grammar and syntax.
- Like all languages, ASL is a living language that grows and changes over time.
- ASL is used predominantly in the United States and in many parts of Canada.



A young boy signs "I love you."

American Sign Language Cheat Sheet



If you don't know the sign for something, you need to use the manual alphabet to spell the word, or *fingerspell*.



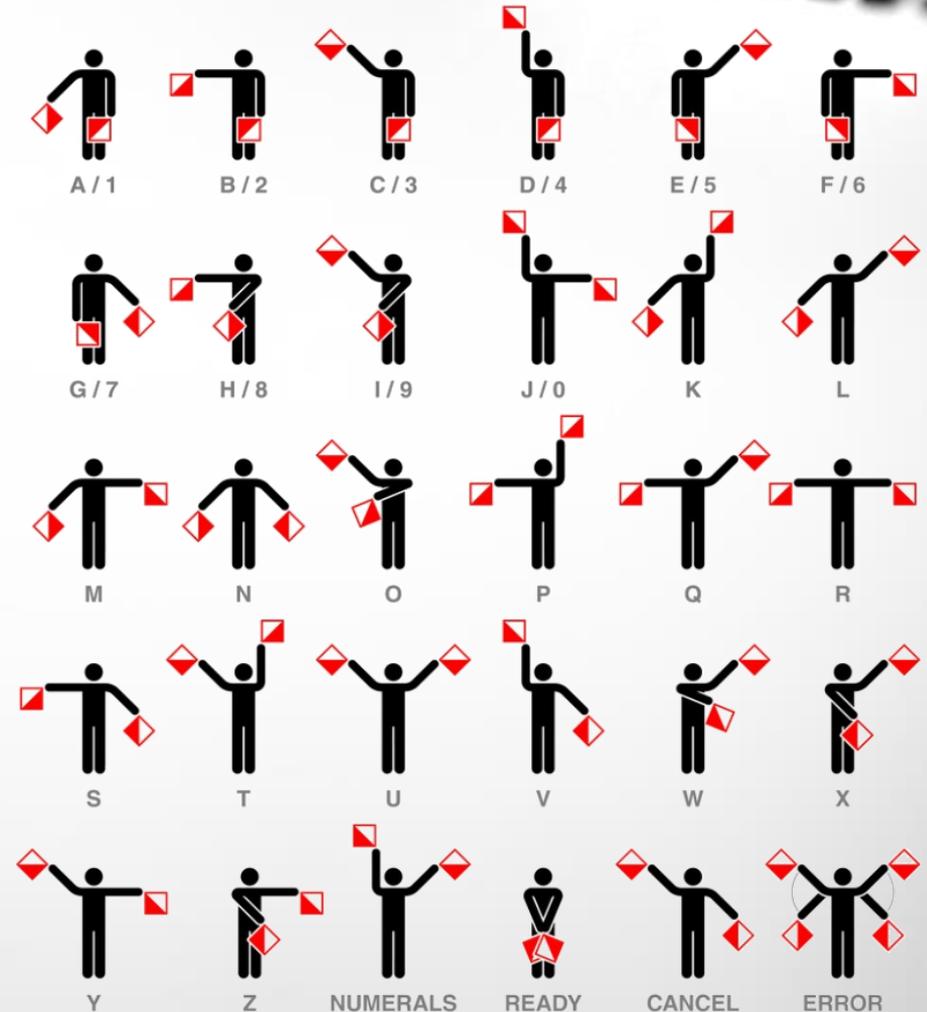
Requirement 4

Give your counselor a brief explanation about semaphore, why it is used, how it is used, and where it is used. Explain the difference between semaphore flags and nautical flags. Then do the following:

- a. Spell your first name using semaphore. Send or receive a message of six to 10 words using semaphore.
- b. Using illustrations or photographs, identify 10 examples of nautical flags and discuss their importance.

Semaphore

- The **Semaphore** flag signaling system is an alphabet signaling system based on the waving of a pair of hand-held flags in a particular pattern.
- The flags are usually square, red and yellow, divided diagonally with the red portion in the upper hoist.

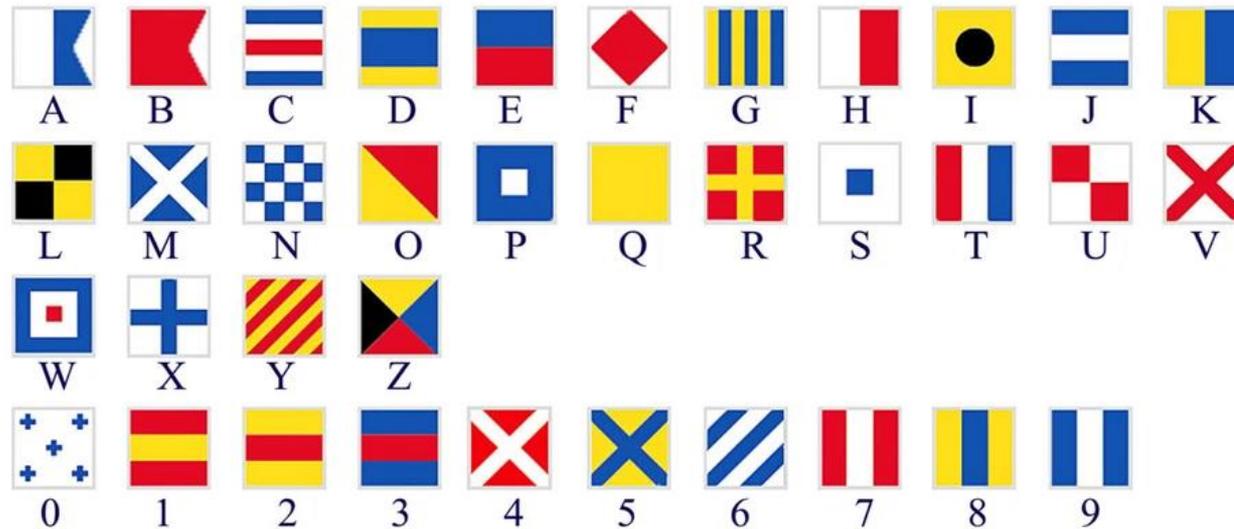


Semaphore

- Before the invention of the telegraph, semaphore signaling from high towers was used to transmit messages between distant points.
- Modern semaphores included movable arms or rows of lights simulating arms, displayed from towers and used to signal railroad trains.
- Semaphores were adopted and widely used in the maritime world in the 19th century.
- Flag semaphore is still in use by the Navy and also continues to be a subject of study and training for Scouts.



Nautical Flag Alphabet



- Nautical flags are an international code system used for two ships to signal to each other or for a ship to signal to shore.
- Nautical flags are made up of 26 square flags (which represent the letters of the alphabet) along with 10 numbered pendants
- For easy recognition nautical flags are either red and white, yellow and blue, blue and white, black and white along with plain red, white and blue.
- Nautical flags and the knowledge of their meanings are valuable at sea in case of danger or breakdowns in other communications systems such as radio.

Nautical Flags

- Solo or combined, nautical flags convey meaning.
- For example, if you see the **A (Alpha) flag**, this means “diver down, keep clear.”
- If you see the **W (Whiskey) flag**, the boat has a medical emergency and needs help.
- The combination of the **D (Delta) and V (Victor) flags**, meanwhile, means “I’m maneuvering with difficulty and require assistance.”
- The **J (Juliet) and L (Lima) flags** mean “you’re running the risk of going aground.”
- Signals with two nautical flags typically mean some type of distress or maneuvering issue.

	Alfa Diver Down Keep Clear		November No		Answering Pendant
	Bravo Dangerous Cargo		Oscar Man Overboard		0
	Charlie Yes		Papa About to Sail		1
	Delta Keep Clear		Quebec Request Pratique		2
	Echo Altering Course to Starboard		Romeo		3
	Foxtrot Disabled		Sierra Engines Going Astern		4
	Golf Want a Pilot		Tango Keep Clear		5
	Hotel Pilot on Board		Uniform Standing into Danger		6
	India Altering Course to Port		Victor Require Assistance		7
	Juliett On Fire Keep Clear		Whiskey Require Medical Assistance		8
	Kilo Desire to Communicate		X-ray Stop Your Intention		9
	Lima Stop Instantly		Yankee Am Dragging Anchor		1st
	Mike I am Stopped		Zulu Require a Tug		2nd
					3rd



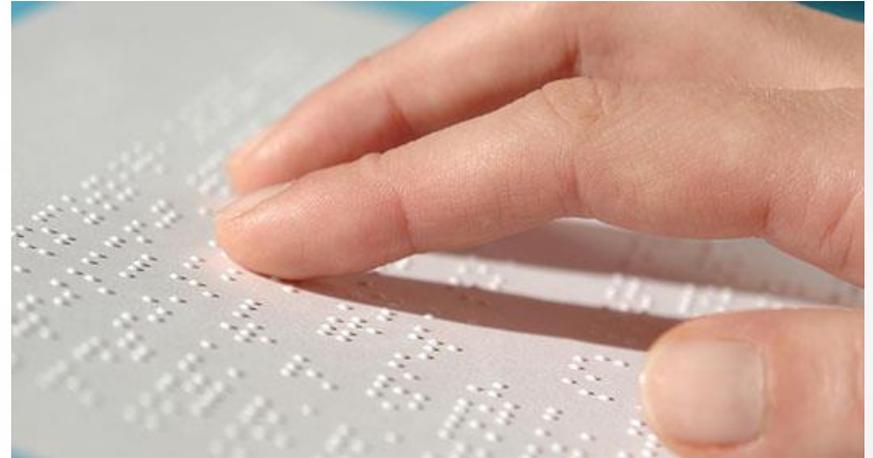
Requirement 5

Explain the braille reading technique and how it helps individuals with sight impairment to communicate. Then do the following:

- a. Either by sight or by touch, identify the letters of the braille alphabet that spell your name. By sight or touch, decode a braille message at least six words long.
- b. Create a message in braille at least six words long, and share this with your counselor.

Braille

- Braille is a system of raised dots that can be read with the fingers by people who are blind or who have low vision.



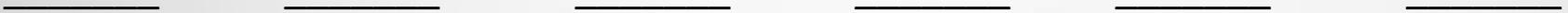
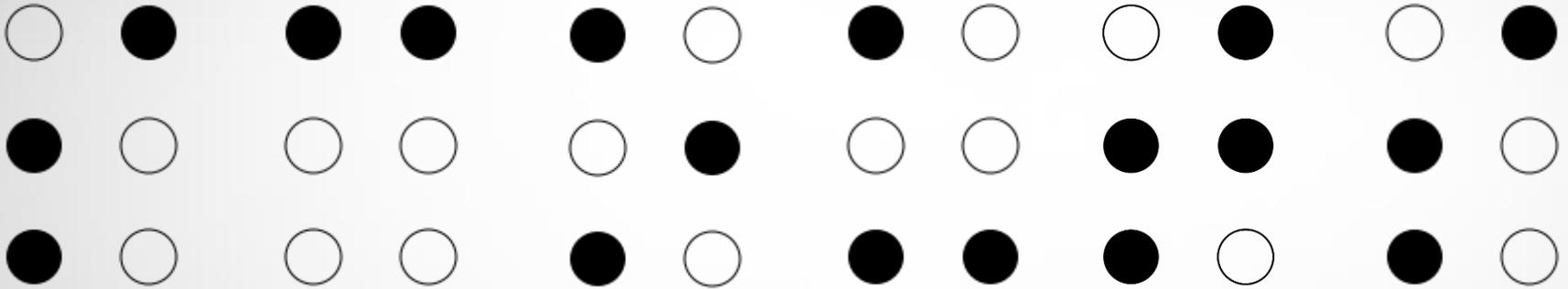
Braille

- Braille symbols are formed within units of space containing six dots known as braille cells.
- Sixty-four combinations are possible using one or more of these six dots.
- A single cell can be used to represent an alphabet letter, number, punctuation mark, or even a whole word.

Braille alphabe⠠⠠

A ⠠⠠	B ⠠⠠	C ⠠⠠	D ⠠⠠	E ⠠⠠	F ⠠⠠	1 ⠠⠠	2 ⠠⠠	3 ⠠⠠	4 ⠠⠠	5 ⠠⠠
G ⠠⠠	H ⠠⠠	I ⠠⠠	J ⠠⠠	K ⠠⠠	L ⠠⠠	6 ⠠⠠	7 ⠠⠠	8 ⠠⠠	9 ⠠⠠	0 ⠠⠠
M ⠠⠠	N ⠠⠠	O ⠠⠠	P ⠠⠠	Q ⠠⠠	R ⠠⠠	Number ⠠⠠	+ ⠠⠠	- ⠠⠠	× ⠠⠠	: ⠠⠠
S ⠠⠠	T ⠠⠠	U ⠠⠠	V ⠠⠠	W ⠠⠠	X ⠠⠠	= ⠠⠠	< ⠠⠠	> ⠠⠠	(⠠⠠) ⠠⠠
Y ⠠⠠	Z ⠠⠠	Capital ⠠⠠	Letter ⠠⠠	And ⠠⠠	The ⠠⠠	. ⠠⠠	√ ⠠⠠	% ⠠⠠		
. ⠠⠠	, ⠠⠠	! ⠠⠠	? ⠠⠠	: ⠠⠠	; ⠠⠠	- ⠠⠠	« ⠠⠠	» ⠠⠠		
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Braille



Decode the above message.



Requirement 6

Do the following:

- a. Describe to your counselor six sound-only signals that are in use today. Discuss the pros and cons of using sound signals versus other types of signals.
- b. Demonstrate to your counselor six different silent Scout signals. Use these Scout signals to direct the movements and actions of your patrol or troop.

Sound Signals

- Fire Alarm
- Trains
- Boating signals
- Ambulance/police siren
- School bells
- Back-up alarms



Pros and Cons of Sound Signals

Pros

Can convey information and warnings very quickly e.g. a fire bell.

Sounds are accessible and understandable by people no matter what language they speak.

Can convey information to many people at once.

Humans are sensitive to sound and will often pick information conveyed by sound above other methods.

Cons

Need to know what the sound signal represents in order to understand the information/message.

People with poor hearing might not be able to access the information.

Can be distracting especially if people are trying to concentrate.

Silent Scout Signals

Silent Signals

USING THESE SILENT HAND SIGNALS IN CAMP, ON THE TRAIL, OR IN THE FIELD ARE THE MARK OF A WELL-ORGANIZED, WELL-TRAINED TROOP. LEARN THEM AND USE THEM AND YOUR TROOP WILL MOVE QUICKLY AND QUIETLY.

ATTENTION
HAND RAISED HIGH
IN SCOUT SIGN.

AT THIS MOST USED SIGNAL, EVERYONE STOPS TALKING AND WHATEVER HE'S DOING, RAISES HIS HAND THE SAME WAY AND WATCHES FOR THE FOLLOWING SIGNALS.

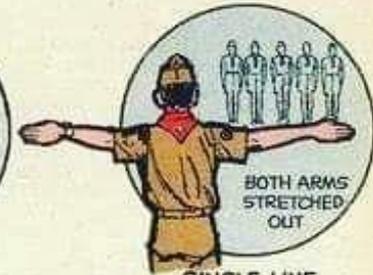


ASSEMBLE OR RETURN



ARMS OUT STRAIGHT

PATROL FILE

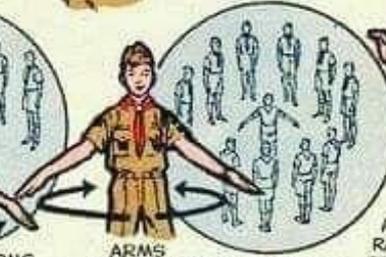


BOTH ARMS STRETCHED OUT

SINGLE LINE



HALF CIRCLE
ARMS PART WAY UP



FULL CIRCLE
ARMS PART WAY UP AND CIRCLING



ARM RAISED, FORWARD AND DOWN

MOVE FORWARD



SWING ARMS OUT TO SIDE

SPREAD OUT



HURRY



HALT



Requirement 7

On a Scout outing, lay out a trail for your patrol or troop to follow. Cover at least one mile in distance and use at least six different trail signs and markers. After the Scouts have completed the trail, follow no-trace principles by replacing or returning trail markers to their original locations.

Trail Markers

	Rocks	Pebbles	Sticks	Long Grass
Straight ahead				
Turn right				
Turn left				
Do not go this way				

I have gone home



Number of paces
in direction indicated





Requirement 8

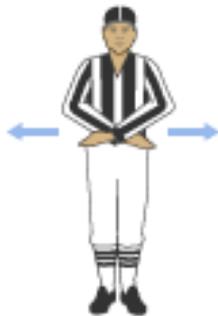
For THREE of the following activities, demonstrate five signals each. Tell what the signals mean and why they are used:

- a. Sports official's hand signs/signals
- b. Heavy-equipment operator's hand signals
- c. Aircraft carrier catapult crew signals
- d. Cyclist's hand signals
- e. An activity selected by you and your counselor

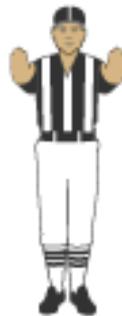
Sports Official's Hand Signs/Signals: Football



Holding



Penalty declined, incomplete pass, missed field goal, missed extra point, no play



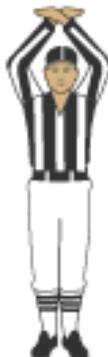
Pass interference



First down (one arm pointing)



Facemasking



Time out



Offside



Clipping



Touchdown, successful field goal, successful extra point



Personal foul



Illegal motion

Sports Official's Hand Signs/Signals: Basketball



JUMPBALL



CHARGING



TRAVELING



TECHNICAL
FOUL



3SEC.
VIOLATION



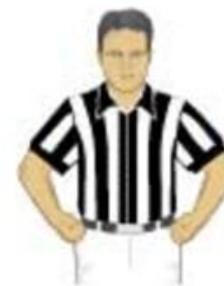
POINTS
SCORED
(1 OR 2
FINGERS)



PERSONAL
FOUL

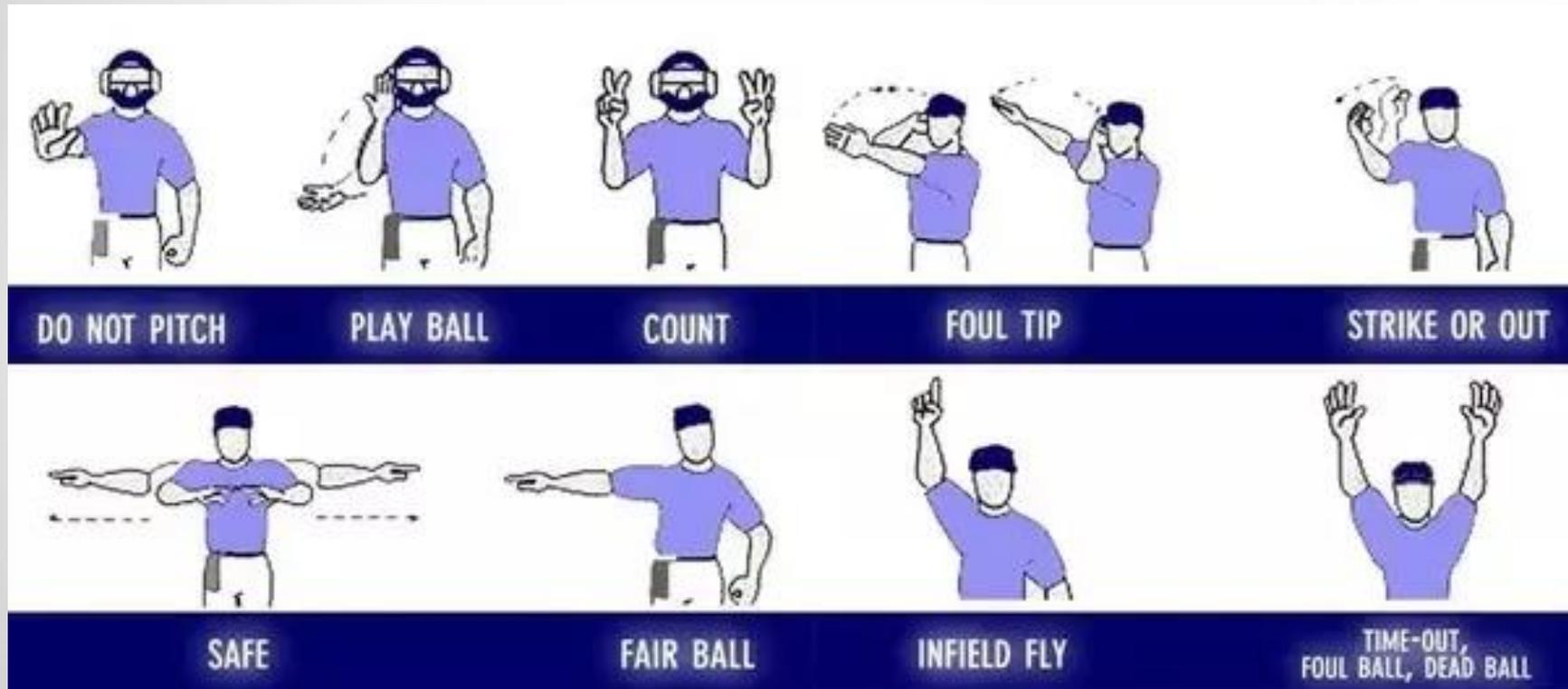


3-POINT
SHOT

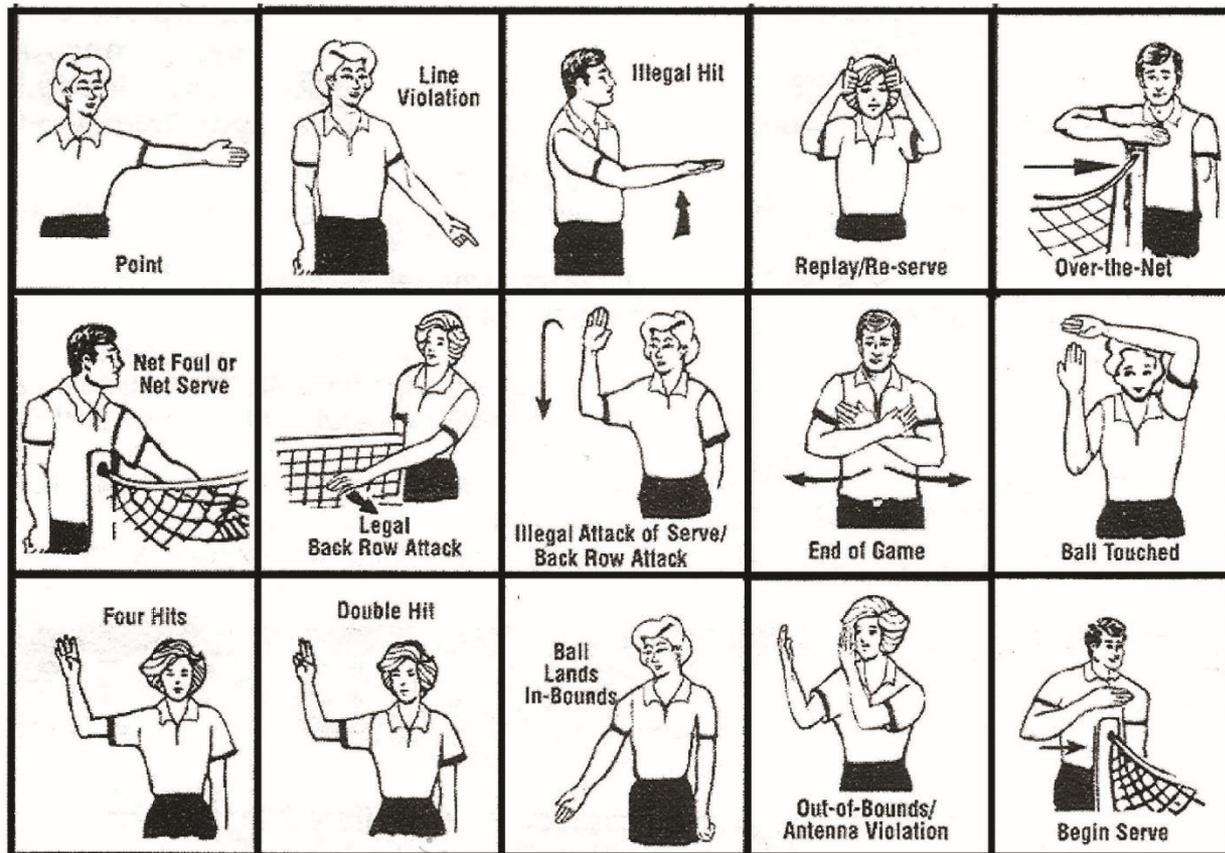


BLOCKING

Sports Official's Hand Signs/Signals: Baseball/Softball



Sports Official's Hand Signs/Signals: Volleyball



Heavy-Equipment Operator's Hand Signals

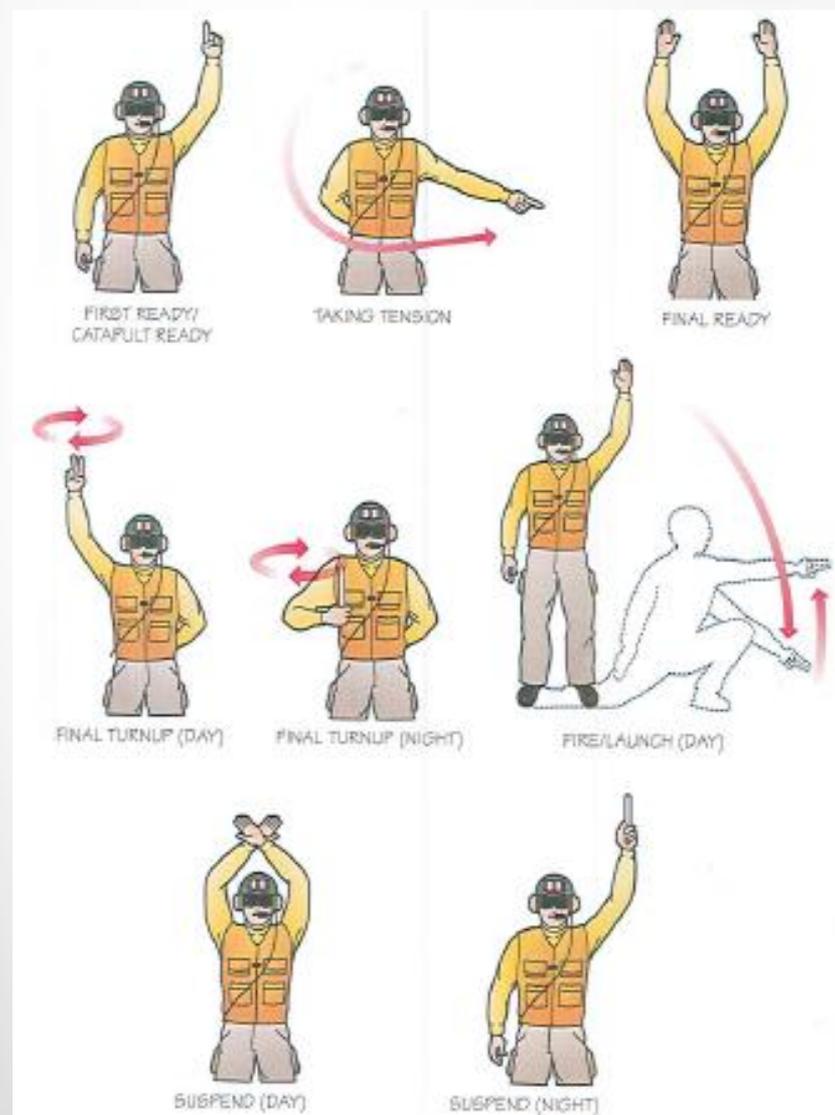
Excavator Hand Signals

 Load Up	 Load Down	 Swing Left	 Swing Right
 Turn Left	 Turn Right	 Travel	 This Far To Go
 Everything Slow	 Stop Engine	 Stop	 Emergency Stop

Spotter Hand Signals



Aircraft Carrier Catapult Crew Signals



Cyclist's Hand Signals



◀ LEFT TURN



▶ RIGHT TURN



■ STOP



● SLOW DOWN

Motorcycle Hand Signals

Left Turn
Left arm straight out with palm facing down.

Right Turn
Bend elbow 90 degrees, then point clenched fist at the sky.

Stop
Bend elbow 90 degrees, keep palm open, point fingers down to road.

Speed Up
Extend arm swing palm in an upward direction.

Slow Down
Extend arm swing palm down toward the road.

Follow Me
Extend arm forward with palm facing outward.

You Lead/ Come
Pull up along side rider you want to lead Point to their bike swing arm forward.

Road Hazard
If hazard is on left point with left finger. If on right point with right foot.

Single File
Extend left index finger, bend arm up to sky.

Double File
Extend left index and middle finger bend arm up to sky.

Comfort Stop
Left arm out make a fist and shake fist with short up and down movements.

Refreshment Stop
Left arm out make a "thumbs up" gesture towards your mouth.

Turn Signal On
Alternate extending fingers and making fist.

Pull Off
Left arm up index finger pointed, swing arm towards right. Usually emergency.

Cops Ahead
Patting top of helmet with left hand. Respect all laws when riding.

Fuel
Point to fuel tank using left index finger.



Requirement 9

Share with your counselor 10 examples of symbols used in everyday life. Design your own symbol. Share it with your counselor and explain what it means. Then do the following:

- a. Show examples of 10 traffic signs and explain their meaning.
- b. Using a topographical map, explain what a map legend is and discuss its importance. Point out 10 map symbols and explain the meaning of each.
- c. Discuss text-message symbols and why they are commonly used. Give examples of your favorite 10 text symbols or emoticons. Then see if your counselor or parent can identify the meaning or usage of each symbol.

Everyday Symbols



5 Cardinal Rules of Symbol Design

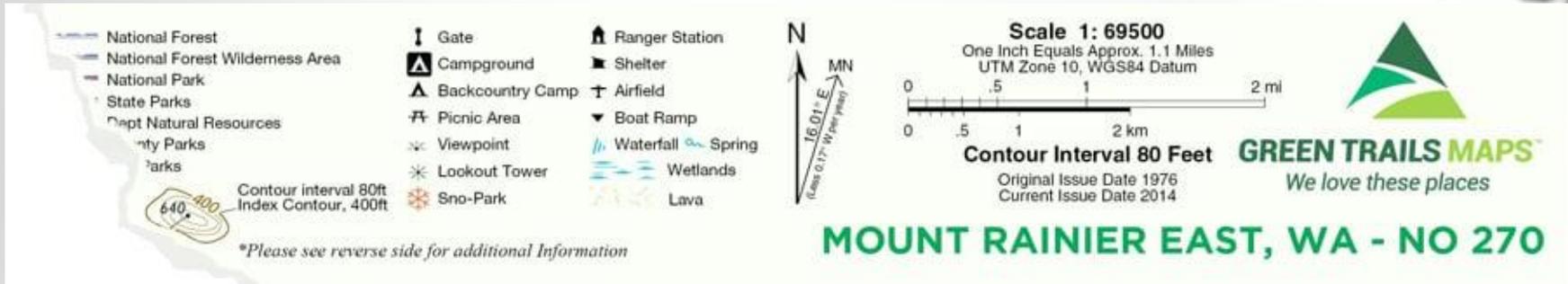


- Your symbol should reflect your idea in a unique and honest way.
 - Your symbol should relate to the idea you are trying to express.
- Avoid too much detail.
 - Simple symbols are recognized faster than complex ones. Strong lines and letters show up better than thin ones, and clean, simple symbols reduce and enlarge much better than complicated ones.
- Your symbol should work well in black and white (one-color printing).
 - If it doesn't look good in black and white, it won't look good in any color.
- Make sure your symbol is scalable.
 - It should be aesthetically pleasing in both small and large sizes as well as in a variety of mediums.
- Your symbol should be artistically balanced.
 - The best way to explain this is that your symbol should seem "balanced" to the eye--no one part should overpower the rest.
 - Just as a painting would look odd if all the color and details were segregated in one corner, so do asymmetric symbols.
 - Color, line density and shape all affect a symbol's balance.

Traffic Signs



Topographic Map Legend



- A **map legend** is a description, explanation, or table of symbols printed on a map or chart to permit a better understanding or interpretation of it.
- Map legends usually contain information on the map scale as well.

Topographic Map Colors

In general these are the major color categories used on USGS topo maps.

- **Brown lines** – contours (note that intervals vary)
- **Black lines** – roads, railroads, trails, and boundaries
- **Red lines** – survey lines (township, range, and section lines)
- **Blue areas** – streams and solid is for larger bodies of water
- **Green areas** – vegetation, typically trees or dense foliage
- **Pink or light gray areas** – cities and dense buildings (“built-up areas”)
- **Purple areas** – used to show what was new on the latest editions of their maps (USGS no longer does this but it is still on some maps)

Topographic Map Symbols

BATHYMETRIC FEATURES

Area exposed at mean low tide; sounding datum line***	
Channel***	
Sunken rock***	

BOUNDARIES

National	
State or territorial	
County or equivalent	
Civil township or equivalent	
Incorporated city or equivalent	
Federally administered park, reservation, or monument (external)	
Federally administered park, reservation, or monument (internal)	
State forest, park, reservation, or monument and large county park	
Forest Service administrative area*	
Forest Service ranger district*	
National Forest System land status, Forest Service lands*	
National Forest System land status, non-Forest Service lands*	
Small park (county or city)	

BUILDINGS AND RELATED FEATURES

Building	
School; house of worship	
Athletic field	
Built-up area	
Forest headquarters*	
Ranger district office*	
Guard station or work center*	
Racetrack or raceway	
Airport, paved landing strip, runway, taxiway, or apron	
Unpaved landing strip	
Well (other than water), windmill or wind generator	
Tanks	
Covered reservoir	
Gaging station	
Located or landmark object (feature as labeled)	
Boat ramp or boat access*	
Roadside park or rest area	
Picnic area	
Campground	
Winter recreation area*	
Cemetery	

COASTAL FEATURES

Foreshore flat	
Coral or rock reef	
Rock, bare or awash; dangerous to navigation	
Group of rocks, bare or awash	
Exposed wreck	
Depth curve; sounding	
Breakwater, pier, jetty, or wharf	
Seawall	
Oil or gas well; platform	

CONTOURS

Topographic

Index	
Approximate or indefinite	
Intermediate	
Approximate or indefinite	
Supplementary	
Depression	
Cut	
Fill	
Continental divide	

Bathymetric

Index***	
Intermediate***	
Index primary***	
Primary***	
Supplementary***	

CONTROL DATA AND MONUMENTS

Principal point**		3-20
U.S. mineral or location monument		USMM 438
River mileage marker		Mile 69
Boundary monument		
Third-order or better elevation, with tablet		BM 9134 BM + 277
Third-order or better elevation, recoverable mark, no tablet		5628
With number and elevation		67 4567
Horizontal control		
Third-order or better, permanent mark		Neace Neace
With third-order or better elevation		BM 52 Pike BM393
With checked spot elevation		1912
Coincident with found section corner		Cactus Cactus
Unmonumented**		+

Topographic Map Symbols

CONTROL DATA AND MONUMENTS – continued

Vertical control

Third-order or better elevation, with tablet	BM × 5280
Third-order or better elevation, recoverable mark, no tablet	× 528
Bench mark coincident with found section corner	BM + 5280
Spot elevation	× 7623

GLACIERS AND PERMANENT SNOWFIELDS

Contours and limits	
Formlines	
Glacial advance	
Glacial retreat	

LAND SURVEYS

Public land survey system

Range or Township line	
Location approximate	
Location doubtful	
Protracted	
Protracted (AK 1:63,360-scale)	
Range or Township labels	R1E T2N (33W T4S)
Section line	
Location approximate	
Location doubtful	
Protracted	
Protracted (AK 1:63,360-scale)	
Section numbers	1 - 36 1 - 36
Found section corner	
Found closing corner	
Witness corner	
Meander corner	
Weak corner*	

Other land surveys

Range or Township line	
Section line	
Land grant, mining claim, donation land claim, or tract	
Land grant, homestead, mineral, or other special survey monument	
Fence or field lines	

MARINE SHORELINES

Shoreline	
Apparent (edge of vegetation)***	
Indefinite or unsurveyed	

MINES AND CAVES

Quarry or open pit mine	×
Gravel, sand, clay, or borrow pit	×
Mine tunnel or cave entrance	→
Mine shaft	□
Prospect	x
Tailings	
Mine dump	
Former disposal site or mine	

PROJECTION AND GRIDS

Neatline	
Graticule tick	
Graticule intersection	
Datum shift tick	

State plane coordinate systems

Primary zone tick	
Secondary zone tick	
Tertiary zone tick	
Quaternary zone tick	
Quintary zone tick	

Universal transverse mercator grid

UTM grid (full grid)	
UTM grid ticks*	

RAILROADS AND RELATED FEATURES

Standard gauge railroad, single track	
Standard gauge railroad, multiple track	
Narrow gauge railroad, single track	
Narrow gauge railroad, multiple track	
Railroad siding	
Railroad in highway	
Railroad in road	
Railroad in light duty road*	
Railroad underpass; overpass	
Railroad bridge; drawbridge	
Railroad tunnel	
Railroad yard	
Railroad turntable; roundhouse	

RIVERS, LAKES, AND CANALS

Perennial stream	
Perennial river	
Intermittent stream	
Intermittent river	
Disappearing stream	
Falls, small	
Falls, large	
Rapids, small	
Rapids, large	
Masonry dam	
Dam with lock	
Dam carrying road	

Topographic Map Symbols

RIVERS, LAKES, AND CANALS – <i>continued</i>	
Perennial lake/pond	
Intermittent lake/pond	
Dry lake/pond	
Narrow wash	
Wide wash	
Canal, flume, or aqueduct with lock	
Elevated aqueduct, flume, or conduit	
Aqueduct tunnel	
Water well, geyser, fumarole, or mud pot	
Spring or seep	
ROADS AND RELATED FEATURES	
Please note: Roads on Provisional-edition maps are not classified as primary, secondary, or light duty. These roads are all classified as improved roads and are symbolized the same as light duty roads.	
Primary highway	
Secondary highway	
Light duty road	
Light duty road, paved*	
Light duty road, gravel*	
Light duty road, dirt*	
Light duty road, unspecified*	
Unimproved road	
Unimproved road*	
4WD road	
4WD road*	
Trail	
Highway or road with median strip	
Highway or road under construction	
Highway or road underpass; overpass	
Highway or road bridge; drawbridge	
Highway or road tunnel	
Road block, berm, or barrier*	
Gate on road*	
Trailhead*	

* USGS-USDA Forest Service Single-Edition Quadrangle maps only.
 In August 1993, the U.S. Geological Survey and the U.S. Department of Agriculture's Forest Service signed an Interagency Agreement to begin a single-edition joint mapping program. This agreement established the coordination for producing and maintaining single-edition primary series topographic maps for quadrangles containing National Forest System lands. The joint mapping program eliminates duplication of effort by the agencies and results in a more frequent revision cycle for quadrangles containing National Forests. Maps are revised on the basis of jointly developed standards and contain normal features mapped by the USGS, as well as additional features required for efficient management of National Forest System lands. Single-edition maps look slightly different but meet the content, accuracy, and quality criteria of other USGS products.

SUBMERGED AREAS AND BOGS	
Marsh or swamp	
Submerged marsh or swamp	
Wooded marsh or swamp	
Submerged wooded marsh or swamp	
Land subject to inundation	

SURFACE FEATURES	
Levee	
Sand or mud	
Disturbed surface	
Gravel beach or glacial moraine	
Tailings pond	

TRANSMISSION LINES AND PIPELINES	
Power transmission line; pole; tower	
Telephone line	
Aboveground pipeline	
Underground pipeline	

VEGETATION	
Woodland	
Shrubland	
Orchard	
Vineyard	
Mangrove	

** Provisional-Edition maps only.
 Provisional-edition maps were established to expedite completion of the remaining large-scale topographic quadrangles of the conterminous United States. They contain essentially the same level of information as the standard series maps. This series can be easily recognized by the title "Provisional Edition" in the lower right-hand corner.

*** Topographic Bathymetric maps only.

Topographic Map Information
 For more information about topographic maps produced by the USGS, please call: 1-888-ASK-USGS or visit us at <http://ask.usgs.gov/>

Text Message Symbols

- When you're typing with your thumbs, you need to save your effort by communicating with as few letters as possible. Consequently, users created text message symbols as a sort of shorthand to make texting easier and faster. Most symbols make sense and have become a mainstay in texting language.
- Emoticons are pictures or faces made from characters on a cell phone's keypad. You may choose to send emoticons to express your mood or add some humor or personality to a message rather than typing out an entire message.

Texting Abbreviations

- **BF** = Boy Friend
- **BFF** = Best Friends Forever
- **J4F** = Just For Fun
- **FWIW** = For What It's Worth
- **FYI** = For Your Information
- **HRU** = How Are You
- **ICYMI** = In Case You Missed It
- **IDC** = I Don't Care
- **IKR** = I Know Right
- **IMHO** = In My Humble Opinion
- **IMO** = In My Opinion
- **U4E** = You Forever
- **BRO** = Brother
- **IC** = I See
- **GR8** = Great
- **LMK** = Let Me Know
- **LTNS** = Long Time No See
- **MU** = Miss You
- **PLS** = Please
- **POV** = Point Of View
- **UR** = Your
- **RT** = Real Time
- **RTM** = Read The Manual
- **WB** = Welcome Back
- **SIS** = Sister
- **TGIF** = Thank God It's Friday
- **SOL** = Sooner Or Later
- **STBY** = Sucks To Be You
- **WKND** = Weekend
- **TBH** = To Be Honest



Text Emoticons

To send this:	Type this:	To send this:	Type this:
 Smile	:-) or :)	 Open-mouthed	:-D or :d
 Surprised	:-O or :o	 Tongue out	:-P or :p
 Wink	;-) or ;)	 Sad	:-(or :(
 Confused	:-S or :s	 Disappointed	:- or :
 Crying	:'( Embarrassed	:-\$ or :\$
 Hot	(H) or (h)	 Angry	:-@ or :@
 Angel	(A) or (a)	 Devil	(6)
 Don't tell anyone	:-#	 Baring teeth	8o
 Nerd	8-	 Sarcastic	^o)
 Secret telling	:-*	 Sick	+o(
 I don't know	:^)	 Thinking	*-)
 Party	<:o)	 Eye-rolling	8-)



Requirement 10

Briefly discuss the history of secret code writing (cryptography). Make up your own secret code and write a message of up to 25 words using this code. Share the message with a friend or fellow Scout. Then share the message and code key with your counselor and discuss the effectiveness of your code.

History of Cryptography

Hieroglyph – The Oldest Cryptographic Technique

- The first known evidence of cryptography can be traced to the use of 'hieroglyph'. Some 4000 years ago, the Egyptians used to communicate by messages written in hieroglyph. This code was the secret known only to the scribes who used to transmit messages on behalf of the kings. One such hieroglyph is shown below.



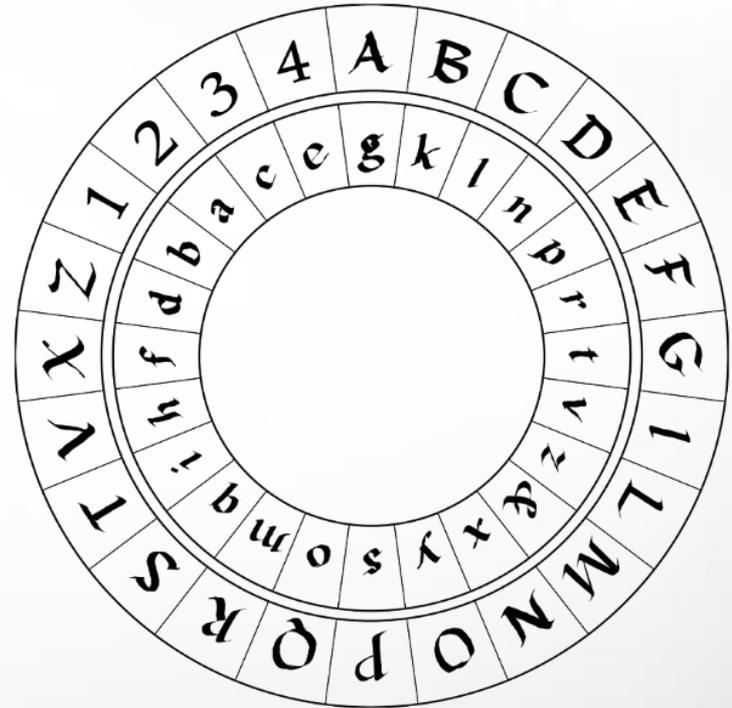
History of Cryptography

- Later, the scholars moved on to using simple alphabetic substitution ciphers during 500 to 600 BC. This involved replacing alphabets of message with other alphabets with some secret rule. This rule became a key to retrieve the message back from the garbled message.
- An early Roman method of cryptography, popularly known as the Caesar Shift Cipher, relies on shifting the letters of a message by an agreed number (three was a common choice), the recipient of this message would then shift the letters back by the same number and obtain the original message.



History of Cryptography

- The Italian philosopher and architect Leon Batista Alberti invented a cipher disk in 1467.
- He used two different alphabets arranged in two rings, with the larger ring encircling the smaller one.
- Lining up a letter from one ring with a different letter in the other ring created a simple substitution cipher that could be used to encrypt or decrypt a message.



History of Cryptography

a	b	c	d	e	f	g	h	i	j
└	┐	┌	┘	□	├	┐	└	┌	┘
k	l	m	n	o	p	q	r	s	t
┘	┐	┘	┘	┘	┘	┘	┘	∨	>
u	v	w	x	y	z				
<	∧	∨	>	<	∧				

- In the early 18th century, the Freemasons began using a cipher commonly known as the “pigpen cipher” to keep their records and communications private.
- The method replaces letters with symbols that are fragments of a grid.

History of Cryptography

- Thomas Jefferson invented a cipher wheel in the early 1790's.
- The device had a set of wooden disks, each with the 26 letters of the alphabet arranged around its edge.
- The order of the letters was random and different on each disk.
- To use the Wheel Cypher, both parties must have one and must decide beforehand how to orient the wheels so that messages can be sent and decoded.



History of Cryptography

- Only after the 19th century, cryptography evolved to the more sophisticated art and science of information security.
- In the early 20th century, the invention of mechanical and electromechanical machines, such as the Enigma rotor machine, provided more advanced and efficient means of coding the information.
- During the period of World War II, both cryptography and cryptanalysis became excessively mathematical.



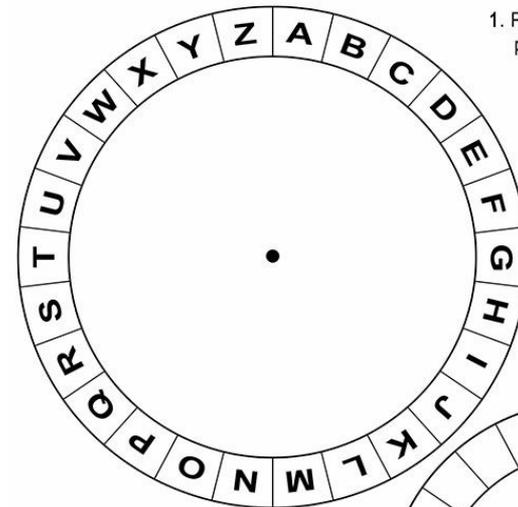
Enigma Rotor Machine

Creating Your Own Code

- To create your own secret code, you can use any of the methods discussed or do research to find the code system you want to use, or make up your own code.
- Whatever type of encryption you use, you must also make a key that gives instructions or shares the secret for deciphering the messages you write in that code.
- Give the key to the recipients of your messages so they will know how to convert the coded text back to the original message.

Decoder Wheel Activity: Custom Code Version

Create and decipher secret codes with your friends!



1. Print this page on heavy stock paper (& another for a friend)!
2. Create matching symbols or letters in the blanks of each of your small wheels.
3. Cut out the two circles.
4. Center the small circle on top of the larger circle & secure through the center with a paper fastener or small nut & bolt.

How it Works

Select a key combination by lining up any letter on the larger dial with a symbol of your choice on the inner dial. Tell your friend which two you lined up & once their dial is set to match you can write & decipher messages by using the symbols on the inner dial in place of the real letters on the outer dial. (more detailed instructions in the post)

