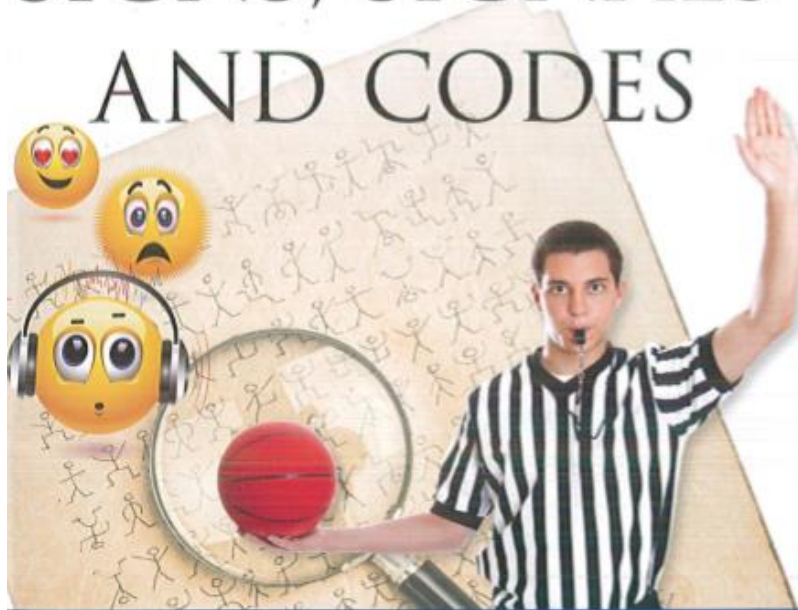


MERIT BADGE SERIES



SIGNS, SIGNALS
AND CODES



BOY SCOUTS OF AMERICA

Note to the Counselor

Thank you for offering your talents as a merit badge counselor. Scouting's merit badge program succeeds because of the dedication and generosity of people like you.

The requirements for this merit badge are intended to familiarize Scouts with several forms of communication that may or may not be new to them. Traditional skills are covered, such as signaling by Morse code and semaphore. Scouts also will learn the basics of braille and American Sign Language and how these systems aid communication for people with disabilities. Additionally, the requirements highlight the ways in which signs and signals are essential in public safety, from traffic signs to tornado sirens, hurricane flags, and rescue signals.

Given the breadth of requirements for this merit badge, you, as counselor, are not expected to be an expert in all these methods of communication. Rather, you will help to guide Scouts as they explore the signs, signals, and codes introduced in this pamphlet, making the learning experience fun and hands-on. Where practical, Scouts should demonstrate the skills in an outdoor setting and use the means of communication referred to in the requirements.

Many references and resources are available to help Scouts meet the challenges presented by the requirements and to assist you, the counselor, in guiding the Scouts as they learn these skills of communication. Candidates for this merit badge are encouraged to explore beyond what is presented in this pamphlet. Local libraries and online sources offer a wealth of information including helpful illustrations, as well as opportunities for interactive practice of Morse code and other skills. For a few recommendations, see the resources section of this pamphlet.

Thank you again for your service.

35777
ISBN 978-0-8395-0060-2
©2015 Boy Scouts of America
2015 Printing



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.
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.
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.

To satisfy the braille writing requirement 5b for this merit badge, you do not need to emboss braille dots in thick paper. Rather, you may use a pencil or pen to draw the dots on ordinary paper, copying the characters of the braille alphabet to spell out your message letter by letter.

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.
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
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.



Contents

Introduction: A World of Signals	9
International Morse Code.....	15
Semaphore and Nautical Flags	21
American Sign Language	31
Braille Code.....	36
Silent Scout Signals	43
Trail Markers and Rescue Signals	47
Signals in Sports and at Work	57
Sound Signals	67
Symbols	73
Cryptography	83
Resources	91



Introduction: A World of Signals

You live in a world of coded messages, with signs, signals, and symbols all around you. In a typical day, you will likely encounter scores of signals and signs. You will recognize many of them at a glance, from the icons on a smartphone to the traffic signs along a roadway. These are so familiar, their meanings are instantly clear to you.

Others, however, may not be so obvious. Have you ever noticed the dots next to the elevator buttons in a multistory building? Do you know what they mean? If you were seaside one summer and saw a flag flying that had a black block centered on a red field, would you recognize the warning? Do you know which rescue signals to use if you get lost in the wilderness?

In fulfilling the requirements for the Signs, Signals, and Codes merit badge, you will learn all these signals and more. You will get to know the special languages used by sports officials, military teams, and people with disabilities. You'll have an opportunity to create your own secret code and write messages that others cannot read without the code key.

Along the way, you will practice skills that Scouts have learned since Scouting began. Maybe you will never need to send a signal by Morse code or semaphore, but by learning these methods, you will be prepared to communicate in an emergency, should the situation arise. Your life and the lives of others might depend on your ability to send a distress signal when all other methods of communication fail. It's good to be ready.

The Development of Signaling

The first signals probably grew out of people's gestures. Someone long ago waved a hand, beckoning to another person to come closer. Or perhaps he raised a stick, warning a stranger to keep his distance. Though instantly recognizable, these kinds of hand signals were limited to the immediate distance over which they could be seen.

Long-distance visual communications became possible when people discovered how to make and control fire. A bonfire built on a hilltop could signal danger, or it might be understood as a summons, calling across the miles to anyone who saw it. To have clear meaning, its message would need to be decided in advance—a prearranged signal that everybody understood.

The ancient Greeks established long chains of message beacons. Each signal crew lit a fire as soon as a flicker was seen on the far horizon, passing the message from beacon to beacon. The Greek armies also discovered that, when the sun's rays fell at the proper angle, the brightly polished surfaces of their shields blazed with a glare that could be seen for miles. From this came the *heliograph*, a signaling device for flashing sunlight from a mirror.

Like beacon fires, smoke signals are also an old form of long-distance communication. In ancient China, soldiers stationed along the Great Wall signaled with smoke from tower to tower, transmitting a message hundreds of miles in a few hours. Aboriginal Australians would send up smoke to announce their presence, especially when they entered lands that were not their own. The native peoples of North America used elaborate smoke-signal codes, with each tribe having its own system of sending news, signaling a warning, or calling people together.

People also learned to send audible signals. Pounding on a hollow tree trunk produced sounds that could be heard a long way. Over time, the equipment improved, and techniques of drum signaling developed that are still used today.



Coded Messages

You probably know the story of Paul Revere's midnight ride of April 18, 1775, to warn of the approach of British soldiers. The famous phrase, "One if by land, two if by sea," is an example of a prearranged signal. The participants had decided beforehand what the lantern signal would mean.

Two lanterns blazing from steeple of Old North Church in Boston, per description from the church's website: "... the church sexton, Robert Newman, and Vestryman Capt. John Pulling, Jr. climbed the steeple and held high two lanterns as a signal from Paul Revere that the British were marching to Lexington and Concord by sea ..."

For more complex communications, signal codes were needed. To read or decipher the message, the recipient would require the code key but would not need to know beforehand what the message said.



In the United States, when the Erie Canal was completed in 1825, the news was sent from Buffalo to New York City in 90 minutes by a booming line of cannons spaced within hearing distance of each other.

In the United States, Jonathan Grout had the job of building a series of semaphore relays from the island of Martha's Vineyard to Boston, Massachusetts. The system relayed news of incoming ships in Nantucket Sound. Even today, many towns along Boston's South Shore still have their Signal Hill.



A practical method of sending encoded information was designed by the Chappe brothers in France in the late 18th century. The eldest brother, Claude, was in a boarding school about a mile from the other two, and the boys wanted a way to communicate. They set up a post with movable arms attached, something like a windmill, and used levers to operate the arms from the ground. Before long, they had devised a code with dozens of different signal positions. Their system was called semaphore, from the Greek for "signal carrier."

The ingenuity of the Chappe brothers attracted official interest. After refinements were made to simplify the code, the French government financed the building of a test line. In 1794, the first "télégramme" in history creaked toward Paris over the "windmills" of the Chappe system. One station would receive the message and relay it to the next by duplicating the position of the signal arms, until finally the message was read at the last station. The French army adopted semaphore for military communications, and the system soon spread to other countries in Europe and North America.

The Electric Telegraph

During a European vacation, a young American named Samuel Morse saw the most advanced semaphore systems in action. They inspired his idea for transmitting messages using electricity instead of with mechanical movable arms. A telegraph line with 40 miles of wire was built from Washington, D.C., to Baltimore, Maryland. On May 24, 1844, before a small group gathered in the nation's capital, the first message was sent humming over the wires to Baltimore. Within a few moments, it had been interpreted and telegraphed back to the waiting crowd. The successful test marked the beginning of the modern era of communications.

By 1851, more than 20,000 miles of telegraph lines had been strung across the United States. The first successful cable across the Atlantic Ocean was completed in 1866, linking the United States with Great Britain. By 1872, the world was wired with more than 600,000 miles of telegraph lines and 30,000 miles of transoceanic cables.



Wireless Telegraphy

The next step in the development of signal communications was from wired to wireless: that is, using radio waves. By 1897, the Italian inventor Guglielmo Marconi had built the first commercial wireless telegraphy system based on radio transmissions. This system relied on Morse code for transmitting messages. (Morse code is covered in detail in the next section of this pamphlet.)

By 1920, voice transmission began to gain ground for many applications and became the basis for radio broadcasting. Wireless telegraphy continued for many military communications.

Radio voice and satellite communications have replaced many uses of Morse code and semaphore. However, both systems remain important communications methods that are still practiced in some military and ham radio settings, especially in emergency situations when regular means of communication break down. For this reason, Scouts continue to learn and use these signals.





International Morse Code

For use with his electric telegraph system, Samuel Morse developed a code of dots and dashes. The principle of Morse code is that each letter of the alphabet is formed from combinations of something short and something long, whether those “somethings” (the dots and dashes) are short and long sounds (dit and dah), short and long light flashes, or interrupted electrical pulses. Morse code can be sent using a great variety of visual or sound signals—by flashlight, headlight, searchlight, lantern, blinker, mirror, flag, horn, whistle, or radio.

Learning Morse Code

The quickest and most effective way to learn the code is by sound. You can use anything that makes a suitably short and long sound to indicate dit and dah. To tap out the code, you might practice with a switch-operated electric buzzer or maybe a Morse code smartphone app. Or you could simply use your voice and say “di,” “dit,” and “dah.”

Morse code was adopted by radio operators worldwide. Morse code sent by radio could be heard and understood when other types of signals, including voice communications, were disrupted by interference.

Character	Code	Sound
A	• —	di-dah
B	— • • •	dah-di-di-dit
C	— • — •	dah-di-dah-dit
D	— • •	dah-di-dit
E	•	dit
F	• • — •	di-di-dah-dit
G	— — •	dah-dah-dit
H	• • • •	di-di-di-dit
I	• •	di-dit
J	• — — —	di-dah-dah-dah
K	— • —	dah-di-dah
L	• — • •	di-dah-di-dit
M	— —	dah-dah
N	— •	dah-dit
O	— — —	dah-dah-dah
P	• — — •	di-dah-dah-dit
Q	— — • —	dah-dah-di-dah
R	• — •	di-dah-dit
S	• • •	di-di-dit
T	—	dah
U	• • —	di-di-dah
V	• • • —	di-di-di-dah
W	• — —	di-dah-dah
X	— • • —	dah-di-di-dah
Y	— • — —	dah-di-dah-dah
Z	— — • •	dah-dah-di-dit
1	• — — — —	di-dah-dah-dah-dah
2	• • — — —	di-di-dah-dah-dah
3	• • • — —	di-di-di-dah-dah
4	• • • • —	di-di-di-di-dah
5	• • • • •	di-di-di-di-dit
6	— • • • •	dah-di-di-di-dit
7	— — • • •	dah-dah-di-di-dit
8	— — — • •	dah-dah-dah-di-dit
9	— — — — •	dah-dah-dah-dah-dit
0	— — — — —	dah-dah-dah-dah-dah
,	— — • • — —	dah-dah-di-di-dah-dah
?	• • — — • •	di-di-dah-dah-di-dit
.	• — • — • —	di-dah-di-dah-di-dah

There is no single right way to learn Morse code. You may choose to learn the alphabet in order from A to Z. Or you might start with the letters composed only of dits, then the letters made of dahs, and then learn the letters with both dits and dahs. Or you might work according to the frequency with which letters are used in the English language: ETAOINS HRDLUCM PFVWYB GJQKXZ. Break the letters up into groups of six or seven and learn one group at a time until you can recognize each letter quickly and without hesitation.

The best method for you is the one that seems easiest or most logical. No matter how you go about it, the secret is practice and more practice.

As soon as you know a few letters, practice sending and receiving. For most people, receiving is harder than sending, so you will need to practice with a buddy to master both. Have your buddy send code while you receive it. Then switch places and have him receive while you send.

Send single letters at first. Don't worry about speed. The important thing is to accurately communicate. Proceed at a pace that allows the receiver to clearly hear and write down each letter. As you become proficient with the individual letters, move on to the slow sending of complete words and then short, simple messages.

When using a buzzer, whistle, or other sound-producing device, make each "dit" short and snappy. Make the "dah" about three times as long as the "dit." The break between the dits and dahs of a letter should be the length of a dit; the interval between letters should be the length of a dah. When sending Morse code by flashlight or blinker, make the dits, dahs, and intervals the same length as in signaling with sound.

International Morse code consists of combinations of dots and dashes representing the letters of the alphabet and numerals. To sound out the code, say "dit" for a dot (•). For a dash (—), make the sound "dah." When you say "dit" and "dah" together quickly, shorten "dit" to "di." For example, the sound for the letter A is "di-dah."

The distress
signal SOS

(••• — — — •••)
is an internationally
recognized call
for help, whether
sent by radio, flags,
flashing lights,
or any other
signaling method.

During emergencies, ham radio operators may handle messages for the Red Cross and other agencies. Sometimes, if power lines and cell towers are down, Morse code messages can be heard much better than voice messages.

Procedure Signals

Besides learning the Morse code letters, for communicating complete messages you also must know a few procedure signals. In sending, you use the procedure signals for "attention," "error," "end of word," "end of message," etc. In receiving, you need the signals for "go ahead," "repeat," "word received," and "message received."

Procedure Signals

Used by SENDER		
Morse Code	Meaning	Explanation
AAAA	Attention	I have a message for you. Are you ready to receive?
8 E's	Error	I made a mistake. I will start again on the word.
Pause (interval)	End of word	End of word. More coming.
AAA	Period	End of sentence. More coming.
AR (sent as one letter)	End of message	Message completed. Did you get it?
Used by RECEIVER		
Morse Code	Meaning	Explanation
K	Go ahead	I am ready to receive. You may start sending.
IMI	Repeat	Please send again; I missed it.
T	Word received	I understood the word.
R	Message received	I got it OK.

Amateur (Ham) Radio

Earning the Radio merit badge no longer requires knowledge of Morse code because the code is no longer used extensively in business, government, or the military. However, the code is still used by radio hobbyists worldwide, and you can hear it on shortwave radio bands today. For fun, Scouts still use Morse code or wigwag flags to communicate, just as Scouts always have. It is also valuable in emergency situations when other methods of communication fail.

To satisfy the Morse code requirement for this merit badge, you can copy the series of dits and dahs that make up each letter of the message you receive. When you have finished copying the dots and dashes, compare what you have written down against the list of Morse code characters in the chart, and write out the English-letter equivalents to see what message was sent.

For example, if you hear dah / di-di-di-dit / dit, write it like this: — / ••••• / •. Then use the chart to translate this string of dashes and dots into the word "the." Use this process to copy each word you hear, translate the Morse characters to English letters, and read the message.

Wigwag

In the past, Scouts traditionally used wigwagging to signal with Morse code. The sender swings a single signal flag to his right for a *dit*, to his left for a *dah*, and dips the flag down in front of him to indicate an interval. The flag is about 2 feet square, attached to a staff 4 to 6 feet long. For signaling against a dark background (trees, for instance), the flag used is white with a red center that is about 8 inches square. For signaling against a light background, such as the sky, the flag used is red with a white square in its center. In an emergency, you can wigwag with your Scout neckerchief.



In wigwagging, letters with several dits or dahs must be made without stopping between swings of the flag. If the sender stops in the middle of A (di-dah), for instance, the receiver will read it as the letters E (dit) and T (dah).



Semaphore has been a traditional code in the U.S. Coast Guard, the Army, and especially the Navy, where its speed and simplicity have made it useful for silent signaling from ship to shore and between ships close together. The code remains in worldwide use. The Royal Canadian Mounted Police have used hand semaphore for signaling in the mountains or other situations where voice or electronic communication is difficult.

Semaphore and Nautical Flags

In the hands of a skilled signaler, semaphore is the quickest method for sending a flag message (even quicker than wigwag). But like any method of flag signaling, semaphore can be used only in the daytime and only over short distances (typically not more than a mile). The visibility must be good, with sender and receiver in plain sight of one another.

Semaphore may be signaled with hand-held flags, disks, or paddles. Flags are not required; their purpose is to make the semaphore characters more obvious. You might want to learn to signal not only with flags, but also with your bare or gloved hands—a potentially useful skill in an emergency when no flags or other signaling devices are available.

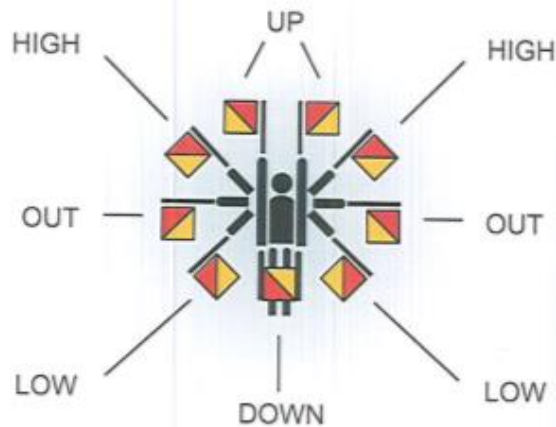
Each of the two flags commonly used in semaphore is 18 inches square and is divided diagonally into red and yellow triangles. The flags are attached to lightweight poles or staffs about 2 feet long, with the red triangle at the top and next to the staff. (Semaphore flags used at sea are red and yellow. On land, the flags are typically blue and white or red and white.)

To signal with semaphore flags, you hold a flagstaff in each hand, grasping each so that the staff is a continuation of your forearm. Place your forefinger along the staff to help you maintain the correct angle. Get a buddy to help you from the start so he can check to see that you hold the flagstaff as a rigid extension of your arm.

Semaphore flag signaling takes its basic movements—as well as its name—from the earlier semaphore system of mechanical movable arms.

Learning Semaphore

Semaphore is an alphabet signaling system, with the letters formed by extending each arm in one of eight directions and placing the two flags at specific angles to each other. The pattern resembles a clock face divided into these positions for each hand: up, high, out, low, and down.



Semaphore flag positions

As you can see in the chart, the letters from A through G are made with one flag in a specific position of the "clock face" while the other flag remains at the "down" position. Similarly for succeeding groups of letters, one flag is held in a particular position while the other flag is placed at the proper angle to it. These groups of letters are called circles.

Learn and practice the letters of the first circle, then send your buddy several words made from only those letters: ACE, BAD, CAGE, EDGE, FADE, GAB, etc. As you send each letter, move crisply from the position of one into the position of the next. That is, do not flail or flutter the flags, but do insert a definite pause before you form the next letter of a word. If you must think of the next letter, hold the previous letter until the next one comes to mind.

Keep your arms stiff. Have your buddy check that you make the angles correctly. If your technique is sloppy, the receiver won't be sure of the flag's exact position. You might be holding your arm straight out in the 9 o'clock position, but if you crook the flag out at an angle, the receiver might read it in the 10:30 or "high" position.

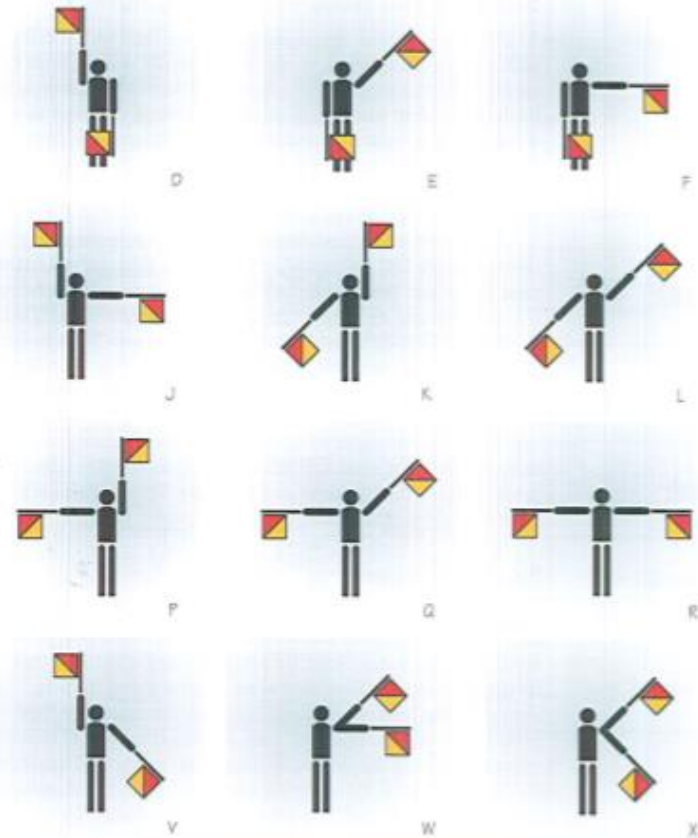
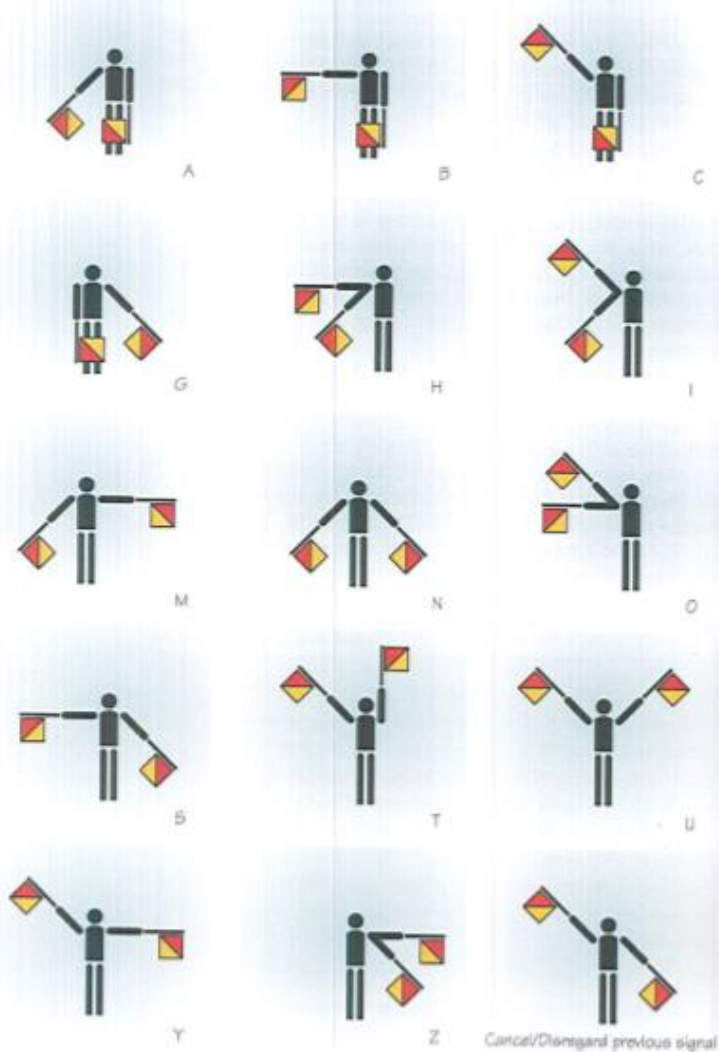
When you have learned the first circle of letters, proceed to the next group: H through N (except J). Note that as you make each of these letters, you hold one flag in the "low" position. Practice sending words made from these letters: HILL, HIM, KILN, MILK, etc. Whenever double letters appear in a word (such as the double L's in HILL), use the rest or interval signal to separate them. Make the first letter, then make the interval signal, then immediately bring the flags again to the position of the letter.

Proceed to the next group of letters, O through S. These are made with the right arm straight out from the body. Practice making words with these and the other letters you have learned: PAIR, POOR, QUAIL, RAN, SEND, SHARP, etc.

Next, learn the letters T, U, and Y, each of which is made with the right hand held high. J and V have the right hand up. Practice making these words: JAY, TOY, URN, VAN, YOU, etc.

W, X, and Z require the right hand to cross the body. Whenever you cross a flag in front of you so that both flags are on the same side, twist your body slightly in the same direction. Practice making these words: EXIT, WAY, WEST, ZERO, etc.

Instead of spelling out numbers, you may use the "numeral" signal. The first 10 letters of the alphabet, when sent after this sign, are read as numbers: A is 1; B, 2; C, 3; D, 4; E, 5; F, 6; G, 7; H, 8; I, 9; and K, 0. Generally, however, it is better to spell out numbers to avoid mistakes and confusion. Navy signalers always spell out any numbers ("ONE," "TWO," etc.) in their messages. Additionally, no punctuation marks are used in semaphore. If they are needed, they, too, must be spelled out.



The semaphore characters presented here are shown as you would see them when facing the signaler. To learn the semaphore code, work in short sessions to memorize each character or each group of letters. There is no easy shortcut; learning the positions takes time and practice. Start slowly with emphasis on letter distinctness. Make your movements crisp so the receiver immediately knows the exact position of each flag. Practice with another Scout until the flags become extensions of your arms.

Sending and Receiving Semaphore

To send a semaphore message, first get the receiver's attention with the attention signal, made by repeatedly waving both flags up and down in a scissor-like motion. When the receiver sends the letter C, then you can go ahead. To indicate the end of a word, make the rest or interval signal by bringing the flags down in front of you with their poles crossed. Two "rests" indicate the end of a sentence. Except for the interval or rest position, the flags do not overlap.

The receiver acknowledges each word by sending C. If the receiver sends IMI ("I missed it"), it means they did not catch your last word. You repeat the word and continue from there.

If you make an error, immediately send eight E's and start again from the beginning of the correct word you want to send. End the message with AR and wait for the receiver to make the letter R (short for "Roger"). Then you will know that your message has been correctly received.

Because it is easier to send than to receive semaphore, you should practice at least half the time with a buddy sending messages for you to receive and translate. Write down each letter you see and note the intervals or pauses between words.

Nautical Flags

Though semaphore flags may traditionally be associated with ships and the sea, they are far from being the only flags seen on or near the water. Ships fly national flags to identify their countries of origin. They may raise various signal flags in emergencies ("Man overboard!") and to communicate their movements and intentions ("I am altering course"); to make requests ("I need medical assistance"); or to warn of hazards ("I have a diver in the water—keep clear," or "I am disabled and cannot maneuver," or "You are running into danger!").

As shown in the chart of flags and pennants, nautical flags (also called maritime signal flags) not only have meanings all their own, they also can be arranged to spell out words. Compare the alphabet flags illustrated here with the semaphore characters that are pictured earlier in this section. While semaphore denotes each letter by means of two identical flags that are positioned relative to a person, each alphabet flag is distinct and stands alone for an individual letter, A through Z.

ALPHABET FLAGS			NUMERAL PENNANTS	
A Alfa — — Have diver down, keep clear		Kilo — — — Watch to communicate		1 — — — —
B Bravo — — — — Dangerous goods		Lima — — — — Stop instantly		2 — — — —
C Charlie — — — — Yes		Mika — — — — My vessel is stopped, making no way		3 — — — —
D Delta — — — — Keep clear, maneuvering with difficulty		November — — — — No		4 — — — —
E Echo — — — — Altering course to starboard		Oscar — — — — Man overboard		5 — — — —
F Foxtrot — — — — Disabled, communicate with me		Papa — — — — All sea-fishing: Nets on obstruction		6 — — — —
G Golf — — — — Require a pilot, fishing; hauling nets		Quebec — — — — Request free pratique		7 — — — —
H Hotel — — — — Pilot on board		Romeo — — — — Engines going astern		8 — — — —
I India — — — — Altering course to port		Sierra — — — — Engines going astern		9 — — — —
J Juliett — — — — On fire, have dangerous cargo, keep clear		Tango — — — — Keep clear, engaged in our towing		0 — — — —
		Uniform — — — — You are running into danger		
		Victor — — — — Require assistance		
		Whiskey — — — — Require medical assistance		
		X-ray — — — — Stop your intentions, watch for signals		
		Yankee — — — — Dropping my anchor		
		Zulu — — — — Require a tug, fishing; shooting nets		
		1st Substitute — — — — 		
		2nd Substitute — — — — 		
		3rd Substitute — — — — 		
		CODE — — — — (Answering Pennant or Business Pennant)		

Commercial ships and naval vessels use signal flags for communications in international waters and when arriving in ports. In a vessel's signal flags, harbor masters, the Coast Guard—and anyone who knows the “language”—can read a ship's status and intentions. For example, naval vessels hoist the “B” hazard flag when loading munitions. Cruise ships in port fly the “P” flag as a signal to passengers that the ship will soon go to sea.

Besides communicating specific information, signal flags also are used in a colorful tradition called “dressing ship,” in which the flags are displayed from bow to stern. “Dressing” is done for special occasions, such as launching a new craft on its first voyage, entering a port for the first time, honoring special visitors, or celebrating holidays. Stop by a marina, especially one with larger boats, on the Fourth of July and see the flags fly! It's a beautiful sight.



Maritime Warning Flags

Have you ever watched a broadcast about an approaching tropical storm or hurricane that showed two red-and-black flags flying from a U.S. Coast Guard Station? The two flags signal that a hurricane warning has been issued. Similarly, one flag signals a storm warning (with strong but less than hurricane-force winds). Two pennants warn of gale-force winds; a single pennant is a small-craft advisory. This system of indicating hazardous sea conditions tells people to seek shelter in the face of an approaching storm. If you see any of these four warning flags flying, you should not go out in a boat.



With your parent's permission, find a “nautical flag translator” on the Internet. Type in a phrase such as “Do a Good Turn Daily” to see how the words are represented using alphabet flags. Enter the same phrase in a semaphore translator and compare the two results. Use the two translators to spell your name with flags.



People use the American Manual Alphabet for fingerspelling to communicate with others in conjunction with American Sign Language.

American Sign Language

"Signing" is a common method of communication among people who are deaf. Signing is also done by people who can hear but who cannot physically speak. More than 100 sign languages are in use around the world. Countries have their own, native sign languages. American Sign Language (ASL) is the main sign language of deaf communities in the United States and most parts of Canada.

American Sign Language is generally considered to have originated about 200 years ago when the first schools for deaf children were opened. At the beginning of the 19th century, America had no schools specifically for deaf children. A recent college graduate named Thomas Hopkins Gallaudet had a young neighbor, Alice Cogswell, who had been deaf since she was 2 years old. Gallaudet was able to teach Alice words using drawings and writing in the dirt.

The girl's father asked Gallaudet to go to Europe to learn teaching methods for the deaf. Gallaudet studied at a school in Paris, France, learning manual communication methods (sign language) from the school's faculty members who were deaf. One of the teachers, Laurent Clerc, returned to the United States with Gallaudet to help teach American children. The two men helped to establish what would become the American School for the Deaf in Hartford, Connecticut, in 1817.

American Sign Language is a visual language that is distinct from other languages. In fact, ASL is often accepted as a "foreign" language for meeting degree requirements at many colleges. Like any language, ASL has its own rules of grammar and syntax (how words are put together). ASL has regional "dialects" or varieties, and it is a living language that grows and changes over time.

As ASL developed at the American School for the Deaf, it included features of Native American sign languages as well as French Sign Language and the personal signing systems that students brought to the school.

Learning ASL

Several components make up each ASL sign. Signs are made by either one or both hands. Each sign has a *handshape*—the shape a hand takes when making the sign. Because your hand is three-dimensional, the *orientation* of the handshape (facing you or facing away from you) is important. Where you make the sign in relation to your body is also important. For example, in the word “think,” the tip of the finger touches the forehead, while the same handshape touching the chin means “disappointed.”

Signs may also require movement or a distinctive body posture or facial expression. The movement can be in a circle, forward or backward, up and down, etc. Changing the movement can change the meaning. For example, the sign for “chair” is made by moving the hand up and down twice; the sign for “sit” is made by moving the hand down once. A simple change of movement alters the sign’s meaning.



V handshape



Bert V



Closed hand



Flat hand



Curved hand



Claw hand



Cocked index



Open hand



One-hand index



Bert hand

Shown are some common handshapes used in American Sign Language. Knowing the names of these handshapes is important because ASL classes, dictionaries, and instructors use these terms to describe how to make signs. It is also important to know how to correctly form these handshapes because changing the handshape of a sign changes the sign’s meaning.

As you begin to learn ASL, keep in mind that the language is not based on English. Its grammar does not resemble the grammar of spoken English. ASL is a different language entirely.

When you are beginning to learn ASL, it's generally easiest to start with common signs and phrases. These include signs or phrases for greetings, introductions, family members, numbers, colors, frequently used nouns and verbs, the Scout Law, and the Scout Oath or Promise. You might also learn signs for giving directions, helping in first aid or emergency situations, telling time and dates, and asking common questions.

Learning ASL is similar to learning any foreign language. It takes time, patience, hard work, and practice. Work with your merit badge counselor to arrange basic lessons with someone who is fluent in ASL. Or for information on self-study courses, online video tutorials, and practice apps, see the resources section of this pamphlet.



Stop



Go



Busy

Native American peoples used sign language to communicate between tribes that did not share the same spoken language. The manual signs represent not only things in nature, such as rivers and mountains, but also emotions, sensations, and ideas. For example, slowly turning the hand, relaxed at the wrist, indicates doubt or possibility; a similar gesture, with quicker movement, is the question sign. The sign language of the Plains Indians of North America is so sophisticated that a detailed conversation can be carried on using gestures alone.

Fingerspelling

Many people who are deaf learn to fingerspell by using hand shapes and positions that stand for the 26 letters of the English alphabet. Fingerspelling is like writing in air. The chart at the beginning of this chapter shows how each letter of the American Manual Alphabet is formed.

Fingerspelling uses the handshapes of ASL. Notice, for example, that the signs for P and K use the same handshape but different hand orientations.

Be aware that fingerspelling and American Sign Language are not the same. Fingerspelling is only a minor part of ASL. The manual alphabet is used mostly for spelling out proper nouns (like people's names) and for terms that have no matching sign in ASL. You can use the manual alphabet to spell your first name as part of fulfilling the requirements for this merit badge.

Practicing ASL

When you communicate with someone who is deaf, maintain eye contact. Looking away is considered rude. Do not expect the person to read your lips. Not all people who are deaf are able to read lips.

As you sign, go slowly. Don't be embarrassed to ask the person to repeat a sign or to slow down. Most people who are deaf will welcome your attempt to communicate and will be patient with you. Remember that ASL is a gestural language that does not follow the same pattern as spoken or written English, but if you aren't sure how to sign a word or phrase, then fingerspelling it letter-by-letter is appropriate.



Braille Code

Braille is a system of writing and printing in which letters and numbers, formed by raised points or dots, can be read by touch. Every written language has its own braille code, and there are also braille codes for mathematics, music, and computers.

The Development of Braille

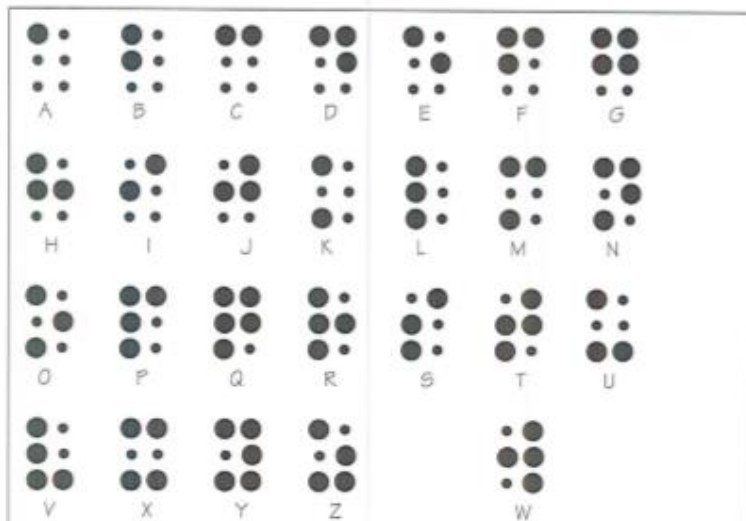
Braille code was invented by a Frenchman named Louis Braille, who lost his eyesight in an accident when he was 3 years old. At age 10, Louis got a scholarship to attend a school for blind youth, where most of the lessons were given as lectures. The school had a small collection of books with raised letters but they were difficult to read.

When Louis was 12, a former soldier named Charles Barbier visited the school and demonstrated the “point writing” code he had invented. Barbier had developed the code at the request of Napoleon Bonaparte so that soldiers could communicate secret information silently and without a light at night. The code used a *cell*, or template, with two columns of six dots each. This meant that a total of 12 raised dots could be required to represent a single symbol or character. The cell was too large to fit under a fingertip—it could not be recognized with a single touch—and Barbier’s code was too hard to read and learn, so it was not successful.

Louis, however, saw the code’s possibilities for enabling people who are blind to read and write. He set out to revise and simplify the code. By 1829, he had reduced Barbier’s 12 dots to six, creating the braille cell that is the basis for modern braille code. Each letter, number, and punctuation mark is made up of one to six raised dots arranged in a cell that is two dots wide and three dots high. People read braille by lightly passing their fingertips over the dots.

Louis Braille (1809–1852)

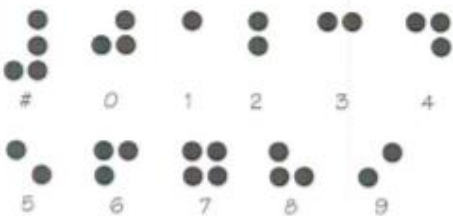
Born Jan. 4, 1809, in a small town near Paris, Louis Braille was an intelligent and creative child who had a good ear for music. After accidentally blinding himself while toying with an awl—a pointed tool for making holes—in his father’s workshop, Louis went on to become not only a top student at the Royal Institute for Blind Youth, but also an accomplished cellist and organist. As a teenager, he developed the tactile (touchable) code that bears his name, and he published the first braille book when he was 20. At first, his code was not widely used. Even at the school where Louis became a professor after he graduated, braille was not taught until after his death. By 1868, however, braille began to spread worldwide and today nearly every country uses braille.



The braille alphabet



Most punctuation marks are formed using the dots in the lower two rows of the cell. A lower-right dot placed in front of a word indicates that the word begins with a capital letter.



Numbers are formed by placing the braille number sign (#) before the braille letters A through J.

The Braille Alphabet

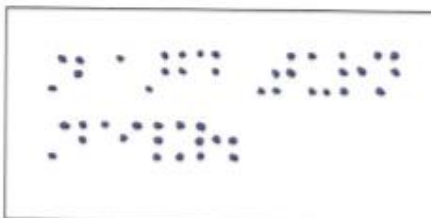
The braille alphabet is shown here. Notice that the first 10 letters (A–J) use only the dots in the upper two rows of the cell. The next 10 letters (K–T) are formed by adding the lower-left dot to each of the first 10 letters. The remaining letters (except W) are formed by adding both lower dots to each of the first five letters. The letter W is an exception because the French alphabet did not have a W when Louis Braille created the code in the 1820s. The symbol for W was added later.

Writing Braille

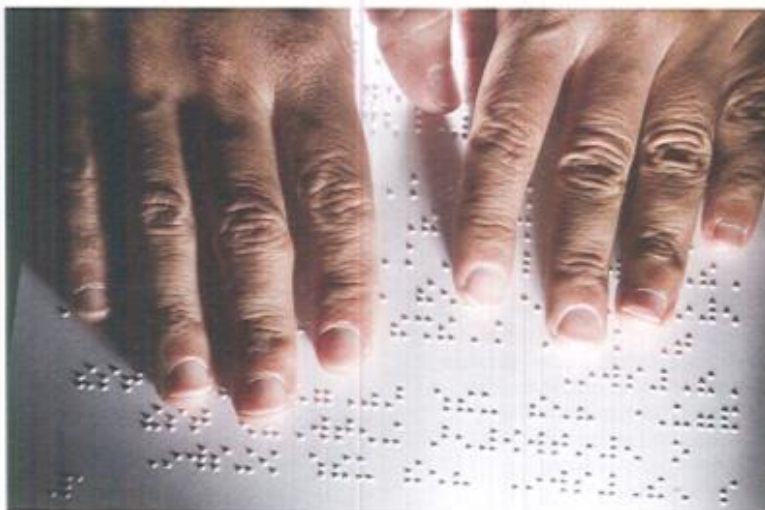
The raised dots are embossed in heavy paper by hand or by machine. The characters are embossed from the back of the paper, working in reverse, and are read from the face of the paper in normal reading direction.



People can write braille code by hand, using a slate and stylus; or the code can be typed by striking keys on a braillewriter. Software programs also exist to translate braille, special computer printers can emboss braille dots on thick paper, and braille displays can make the characters on a computer screen appear on a touchable surface. Other devices in use today include electronic portable note-takers with braille keyboards and synthesized voice readouts.



To satisfy the braille writing requirement for this merit badge, you do not need to emboss braille dots in thick paper. Rather, you may use a pencil or pen to draw the dots on ordinary paper, copying the characters of the braille alphabet to spell out your message letter by letter.



Reading Braille

People who are blind learn to read braille by touch, and people who have vision learn to read it by sight. A person who is blind must learn to recognize all of the braille characters before learning how to read.

To recognize the braille characters by touch, a person must first develop the ability to tell the difference between line thicknesses and symbols using the fingertips. In a technique called tracking, the fingertips glide lightly and quickly across the lines of raised dots, moving from left to right (horizontally). Vertical tracking, or rubbing the dots up and down, is considered poor technique because it slows the speed and accuracy with which a person reads braille. Reading vertically is called "scrubbing."

If you are learning to read braille by sight, try making a set of flash cards to help you memorize braille letters, numbers, punctuation marks, and special symbols. You can make your own cards, or search the Internet (with your parent's permission) for free printable flash cards.

A skillful braille reader may use the "scissor" reading technique: the left hand reads to the middle of the line, then the right hand takes over and reads to the end of the line, and then the left hand drops down to the next line of dots and continues reading. A good braille reader has a light touch, only "tickling" the tops of the dots.

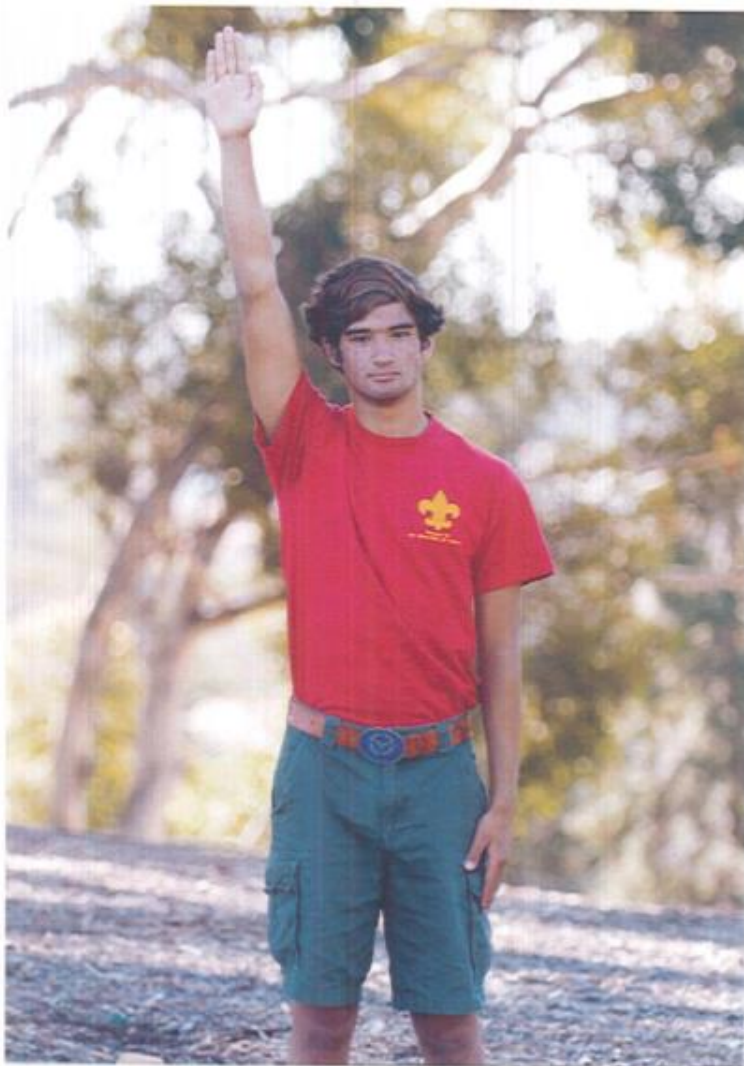
Helen Keller (1880–1968)

Alabama-born Helen Keller was only 19 months old when a serious illness left her unable to see or hear. She was largely cut off from the world, frustrated by her lack of language and limited ability to communicate, until age 7, when her parents hired a teacher named Anne Sullivan. Anne taught Helen



letters by making the signs for them in her palm. Relying on her sense of touch, Helen learned sign language and braille. As a 10-year-old, she learned to speak. At 24, Keller graduated with honors from Radcliffe College, becoming the first deaf-blind person to earn a bachelor's degree. She worked as an author, political activist, and lecturer, traveling extensively to speak on

behalf of people with disabilities. The lifelong relationship between Helen Keller and her teacher and companion, Anne Sullivan, inspired a famous play, "The Miracle Worker," by the author William Gibson.



Silent Scout Signals

Scouts use silent signals to direct their patrol and troop in activities at camp, meetings, ceremonies, and other events. As with any visual signal, silent Scout signals require attention from the receivers and a clear line of sight to the sender. The signals can be anything the group wants to use, as long as the sender and the receivers understand beforehand what the individual signals mean and how to respond to them. For example, the Scout sign, when held high, calls the group to silent attention.

Gathering

For gathering the group together, the leader may use an arm held high above his head and moved in a circular motion.

After getting the group's attention with the gathering signal, the leader may hold his arms straight out to the sides at shoulder height, directing the members of his unit to line up in straight lines in front of him. Holding the arms partway up is a signal to form a half circle facing him. The leader could also gather the members of his unit and then hold one arm straight out to his side or straight in front of him, directing everyone to line up in single-file formation. Then he might use a pulling motion over his head as he moves off in the desired direction of travel, indicating "follow me."

In the outdoors, loud shouts frighten away the wildlife. Silent signals preserve the peace of the wilderness and enhance the possibilities of seeing animals in their natural habitat.

Other Common Signals

Other familiar hand signals include:

- "Go that way" or "Move farther out"—Hand held high and moved away from the body in a certain direction
- "Hurry up" or "Faster"—Hand held in a fist and pumped up and down over the head
- "Stop"—Hand held motionless above the head
- "Get down!"—Hand held palm out at the end of the outstretched arm, then moved sharply toward the ground (accompanied in an emergency by a vocal signal yelling out the command, directing the group to squat or lie down)
- "No" or "Disregard"—Hand held open and moved several times from side to side across the face

Flags and Lights

One or more flags can be used to convey silent signals over longer distances. A flag such as a patrol flag is larger than a hand and can be seen from farther away. To improve the distance over which group signals may be seen and understood, lights may also be used, especially in darkness.

Other Messages

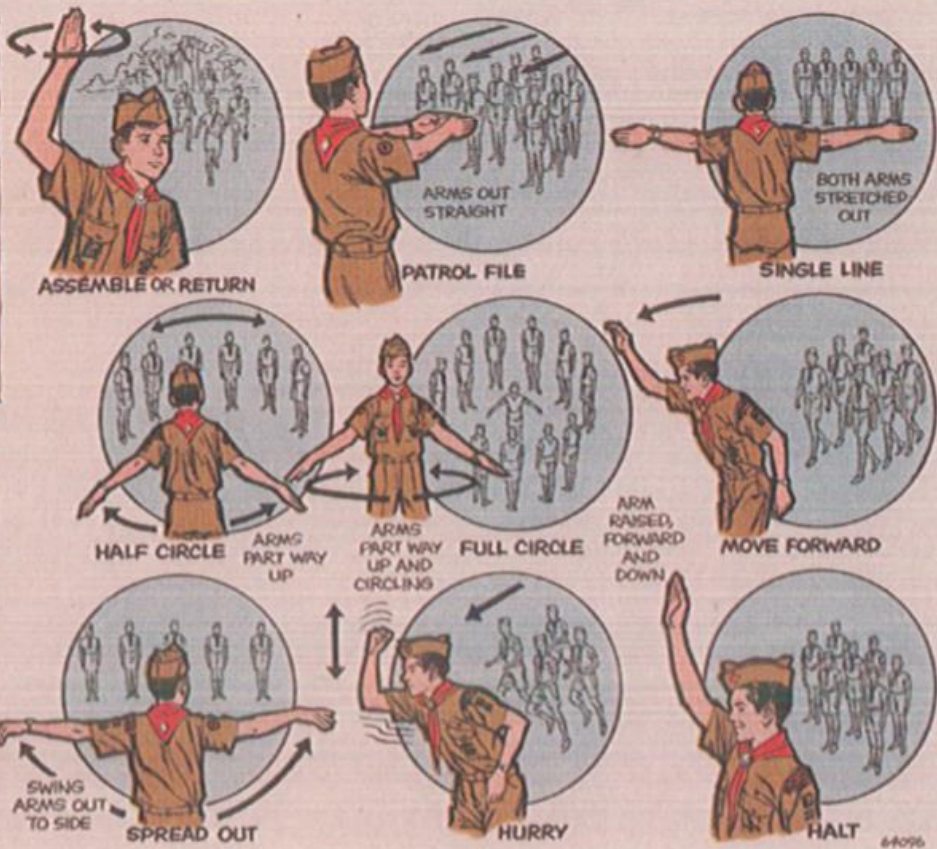
The group may establish any number of signals to convey other messages, as many or as few as the group members need and can remember. The signals should be easy to remember, but they also must be practiced until they become second nature for the group using them. In an emergency, there will not be time to look up the signal in a book or ask someone what it means.

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.



These silent signals appeared in the October 1964 issue of *Boys' Life*, but they can still be used today to communicate quietly and effectively.



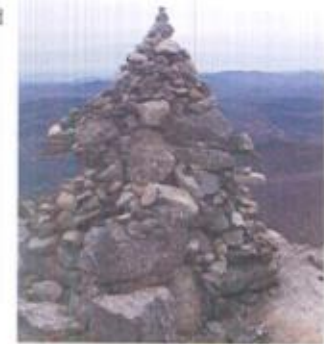
Trail Markers and Rescue Signals

Trail signs help hikers find their way. Many recreational areas have established trails that are well-marked. In some areas, however, networks of trails intersect with no signs to help hikers travel to their destination. Other, more remote areas may have few or no well-defined trails. On your Scout outings, especially wilderness treks, you need to know how to follow and how to make trail markers.

Cairns and Blazes

A cairn, a traditional method of marking trails, is simply a pile of stones. Some cairns are small and identify the trail along which you are traveling. Other cairns are large and high enough to be visible over long distances such as in the desert, along waterways and coastlines, or in mountainous regions.

Another traditional marking method is trailblazing. Originally, blazes were marks chopped into trees to show the direction of travel. This method is not used today because it damages the environment. Instead, modern blazes take the form of metal, wood, or plastic pieces attached to posts or other objects. Or marks may be painted on trees, rocks, or other surfaces along the trail.



During the era of westward expansion in America, large cairns were built, often on high hills and mountains, along trails like the Oregon Trail, Santa Fe Trail, and California Trail. Travelers could see the cairns for miles, and maybe for days, marking the safe crossings of rivers and through mountain passes. Some of these cairns still stand today, more than a hundred years later.

In mountainous areas, different colors of blazes may indicate the difficulty levels of hiking trails, similar to how green circles, blue squares, and black diamonds are often used to identify the difficulty levels of downhill or cross-country ski trails and hills.

Blazes are often brightly colored to contrast with the surrounding forest or terrain. Usually they are placed from knee high to eye level and are spaced so that the next blaze is visible from the last blaze along the trail. When following markers and blazes, hikers may find multiple marks of different colors or designs on the same tree, rock, or signpost. The different marks typically indicate side paths branching off from the main trail. To avoid taking the wrong path, hikers must stay alert to changes in trail markers and watch for places where the trail forks or turns aside from the desired direction of travel.

Always prepare ahead by studying the area where you plan to hike. Learn about the terrain, whether and how the trails are marked, the dangers you may face, and any special no-trace considerations. Remember that it's best to stay on established trails and limit or avoid cross-country travel to avoid damaging the environment. Always carry a good compass and a map of the area—do not rely entirely on GPS, which can and does fail. Always have a plan and a backup plan, and let others know when and where you are going and when you expect to return.



Well-known trails like the Pacific Crest and Appalachian Trails use a variation of blazes. Emblems on posts mark the thousands of miles of these national trails.

SIGNS, SIGNALS, AND CODES MERIT BADGE



BRAILLE SUPPLEMENT

