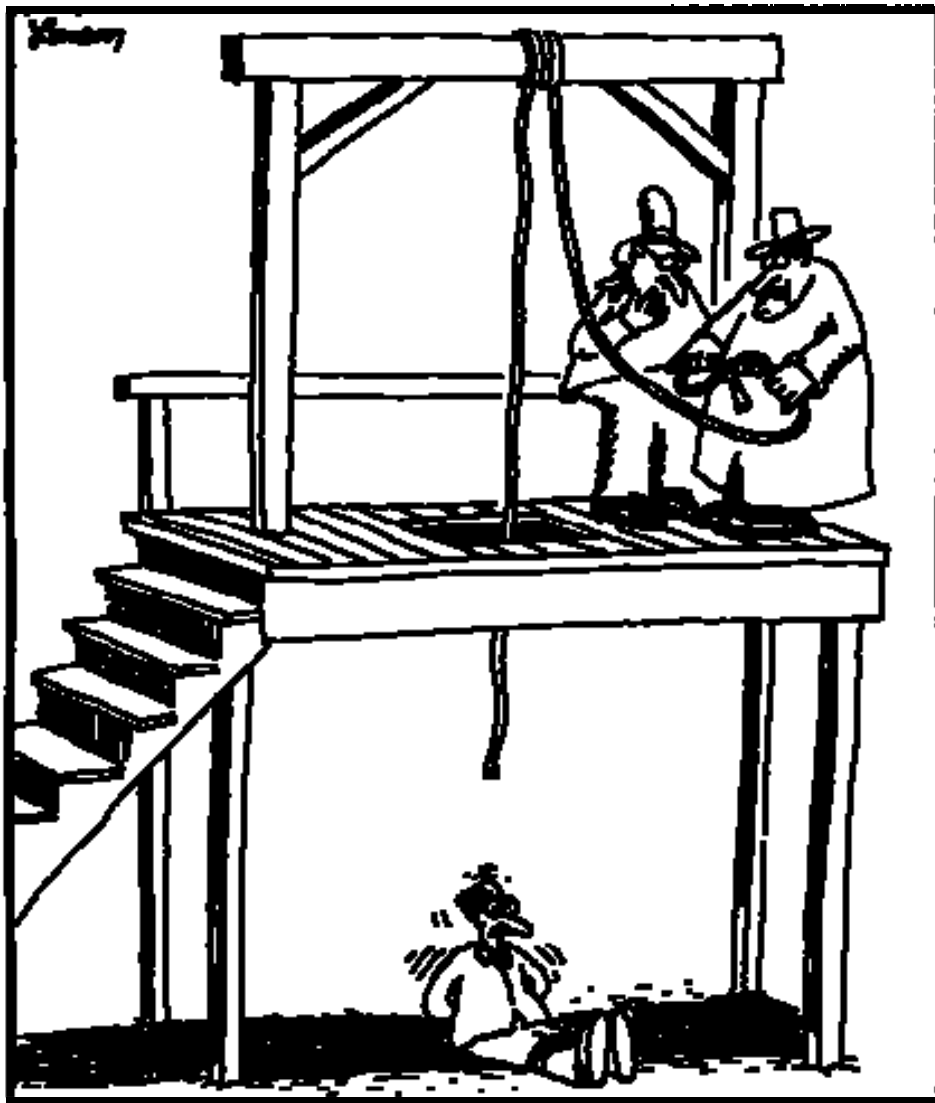


## Pioneering

It's More Than Just Knots and Rope



**"You meathead! Now watch! ...  
The rabbit goes through the hole,  
around the tree five or six times ..."**

**Mark Montrose  
Retired Scoutmaster – Troop 14, Santa Clara  
Venture Crew Advisor – Crew 14, Santa Clara  
Assistant District Commissioner – Pioneer District  
University of Scouting  
19 January 2008**

## The History of Rope

Began with simple elements – vines, reeds, leather thongs. The leather thong was the real forerunner of ropes. Multiple thongs were too weak for some purposes thus 2 or 3 thongs were combined. Twisting the leather strips into a solid rope was a short and natural step.

## Making rope

Two primary methods – twisting and braiding:

Twisting: fibers are twisted to the right to form a yarn, then a few yarns are twisted to the left to form a strand. Three (or sometimes four) strands are twisted to the right to form a rope. Three ropes are twisted to the left to form a large cable-laid rope.

Important element in twisted rope is the alternation of directions so the fibers and strands pull against each other and overcome their natural tendency to untwist and fray. Friction makes a hard compact rope.

Braided rope is made by special machine. It is smooth, compact and capable of long life before becoming soft. To test braided rope, moisten it. Poor grades will quickly make it pasty and sticky.

## Care for Rope

- Good rope is expensive. Keep it clean and free of mud or grease.
- If damp, do not coil or store until thoroughly dried out.
- Always keep in a dry place.
- Never throw into a corner to tangle and kink.
- Keep rope available instantly in case of emergency.
- Always keep rope coiled so that it will pay out smoothly when needed.

Coiling: Use only the hand method (not coiling around one's elbow), or lay flat on the ground. This helps one get access to the entire length quickly or to throw efficiently in case of an emergency.

## What One Can Do With Rope

Whipping

Knots

Lashing

Splicing

Useful campsite gadgets

## Categories of Knots

Unknown – what beginners try to tie.

Sailing

Scouting

Fishing

Climbing and Caving

Math

Celtic

Art (or fancy)

The Tie

## Glossary

- **Bight** can have two meanings:
  - The main part of the rope from the running end to the standing end
  - Where the rope is bent back to form a loop.
- **Running End** - the end of the rope that is being used to tie the knot.
- **Standing End** - the static end of the rope.
- **Jam** - when the knot tightens under tension and you cannot get it undone!

## Basic type of knots (sample list)

Stoppers – Used to stop the end of a rope fraying, or to stop it running through a small hole or constriction.

- Overhand or Half Knot
- Double Overhand
- Multifold-Overhand
- (Flemish) Figure Eight

Bends - To tie two ropes together.

- Square (Reef) - **BSA**
- Sheet bend - **BSA**
- Carrick (Josephine)
- Fisherman
- Weavers-Eight

Hitches - used to tie a rope to a spar, ring, post, or object. Hitches can also be used to tie one rope onto another rope.

- Half
- Clove - **BSA**
- Two Half - **BSA**
- Buntline
- Rolling Magnus
- Tautline - **BSA**
- Adjustable Jamming
- Marline or Single
- Strangle or Double Marline
- Constrictor

Loops

- Bowline – **BSA**
- Sheepshank - **BSA**
- Dutch Marine Bowline (Cowboy Bowline)
- Double Figure Eight
- Bowstring
- Tucked Double Overhand
- Butterfly or Lineman
- Artillery
- Pendant

The Noose

- Simple
- Strangle-Snare
- Scaffold or Gallows
- Hangman
- Reverse Eight

Fun

- Monkey Fist
- Dolly
- Woggle/Turkshead
- Man of War Sheapshank

Breast Plate (Fancy Knots)

- Bell
- Double Headed Carrick
- Handcuff Hitch Breastplate
- Mors du Cheval
- D-N

<http://www.folsoms.net/knots/> (The best site in my opinion)

<http://www.earlham.edu/~peters/knotlink.htm#knot%20tying> (Everything you wanted to know about knots)

<http://www.webofroses.com/scouting/knots.html>

<http://www.realknots.com/knots/index.htm>

# FORTY KNOTS

CAT. NO. 1057



A VISUAL AID FOR KNOT TYING  
OFFICIAL EQUIPMENT—BOY SCOUTS OF AMERICA  
The Scout Seal is Your Guarantee of Quality, Excellence and Performance



OVERHAND KNOT



SAILOR'S KNOT



SQUARE KNOT



LARK'S HEAD



FIGURE EIGHT KNOT



STEVEDORE'S KNOT



KILLICK HITCH



SHEET BEND



SHEET BEND DOUBLE



TIMBER HITCH



LARIAT LOOP



OVERHAND BOW



CAT'S PAW



CLOVE HITCH



BLACKWALL HITCH



GRANNY KNOT



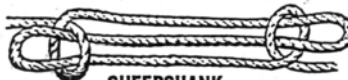
FISHERMAN'S KNOT



CARRICK BEND



FISHERMAN'S EYE



SHEEPSHANK



MILLER'S KNOT



RUNNING KNOT



BOWLINE



FIGURE EIGHT DOUBLE



BOWLINE ON BIGHT



DOUBLE OVERHAND



SLIPPERY HITCH



HALF HITCH



BOW KNOT



TWO HALF HITCHES



HITCHING TIE



ROLLING HITCH



CHAIN HITCH



TAUT-LINE HITCH



HALYARD BEND



FISHERMAN'S BEND



SURGEON'S KNOT



MARLINSPIKE HITCH



MIDSHIPMAN'S HITCH



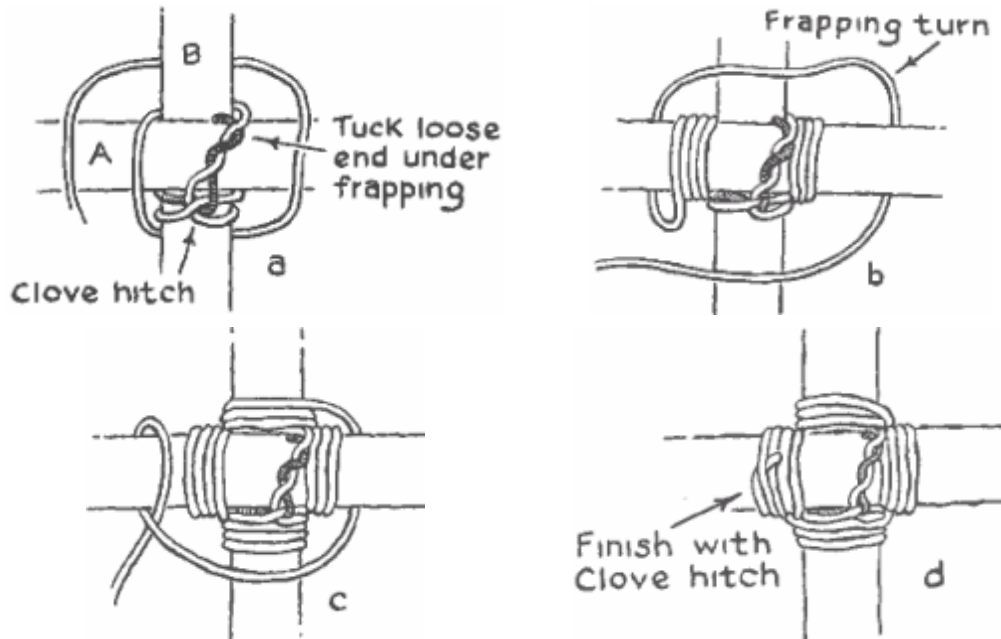
TILLER'S HITCH

Boy Scouts of America, Irving, Texas 75062

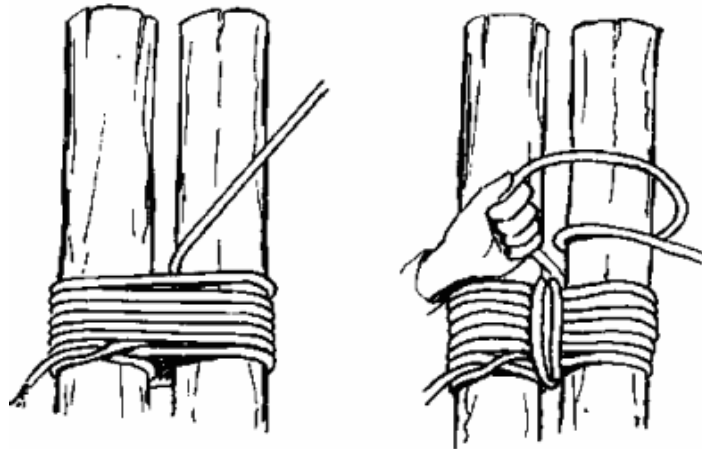
## Lashings

Use to bind together timber. A lot of rope is required, appropriately sized for the diameter of the timber. Frapping turns are used to draw the lashing tight.

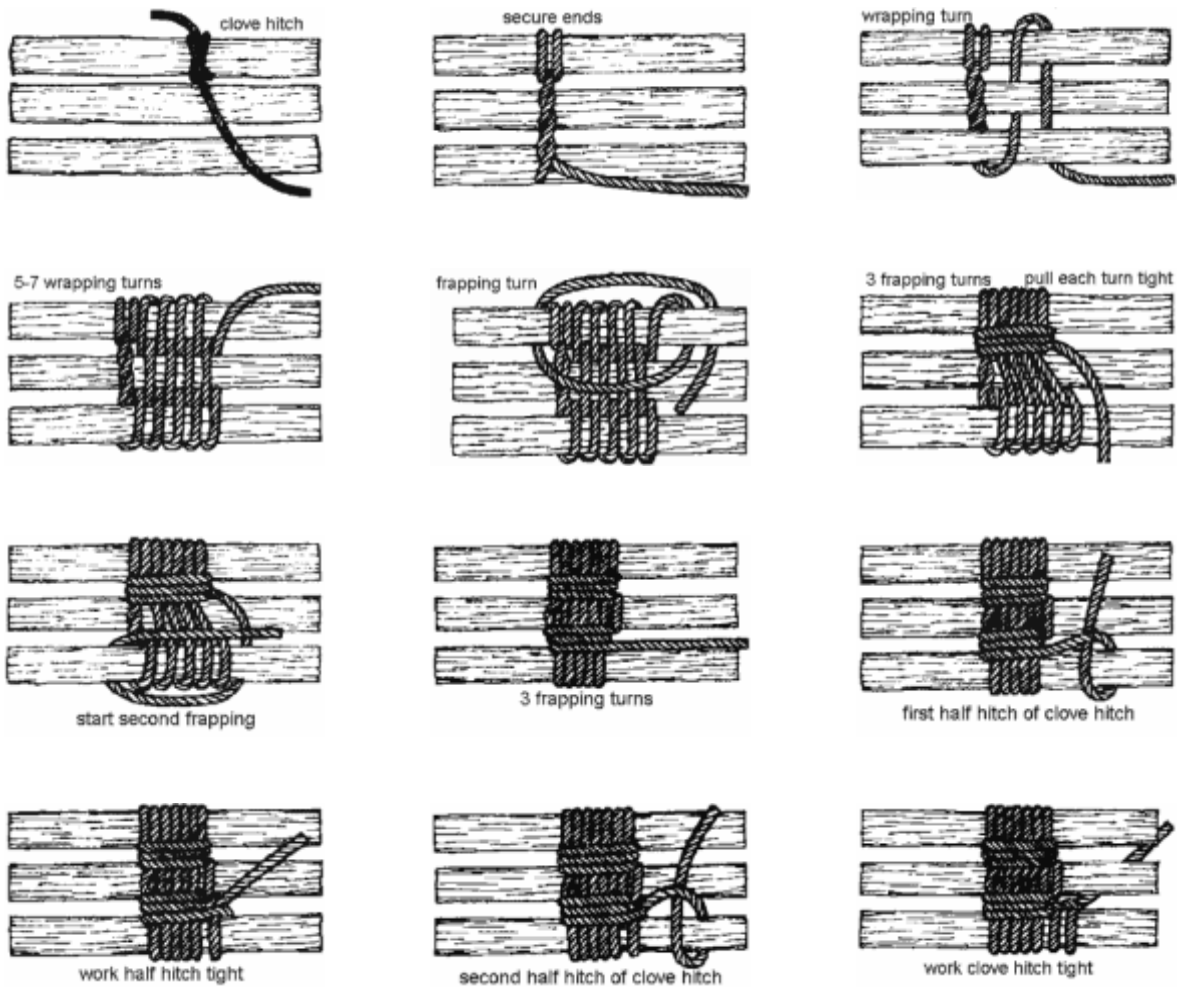
### Square Lashing



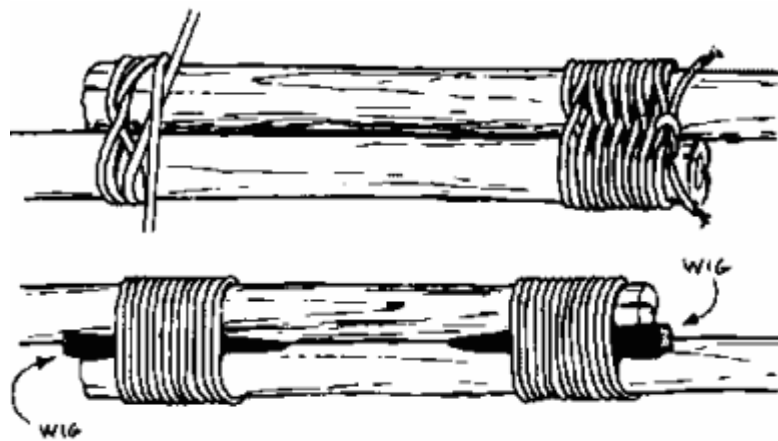
### Shear lashing



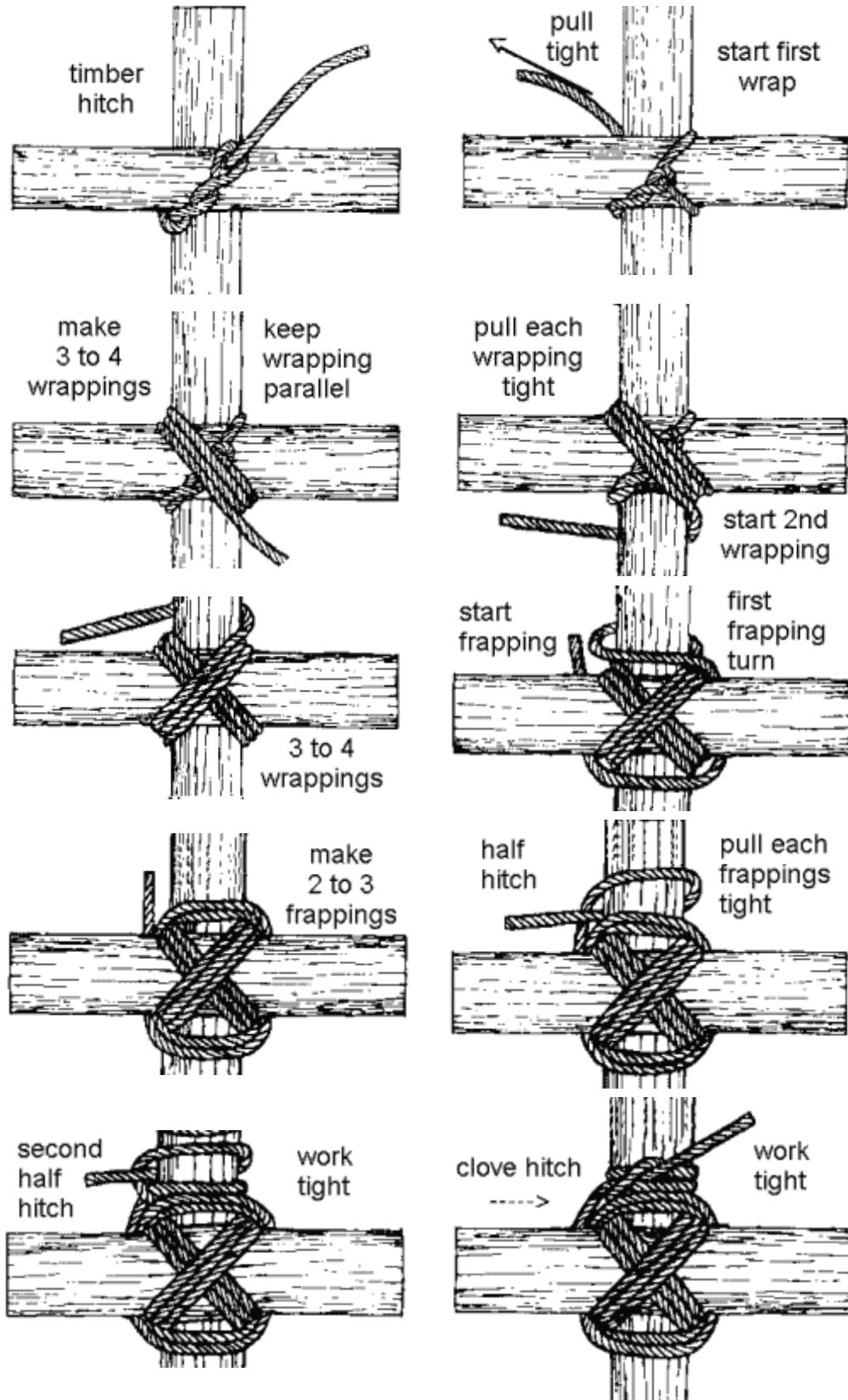
## Tripod Lashing



## Round Lashing

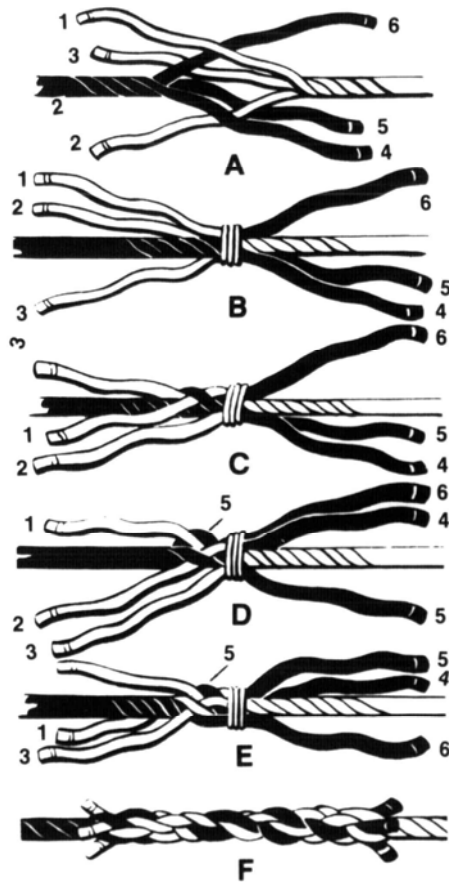


Diagonal Lashing



## Splices

Used to join ropes permanently and leave the rope almost as strong as it was originally. Short splice is strongest with a bump in the rope to keep it from passing over a block. The long splice keeps the rope at the same diameter. Eye and back have special purposes.

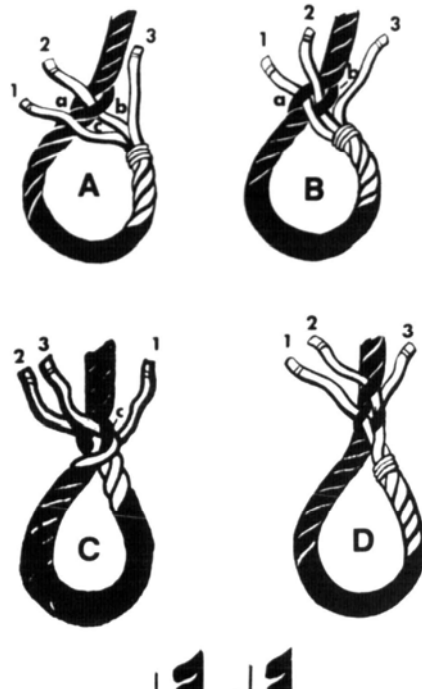


### SHORT SPLICE

Begin by unlaying (untwisting) the ropes a few turns. If the rope is large, make temporary whippings on the ends of the strands.

- Alternate the strands of the two ropes.
- Tie strands down to prevent more unlaying.
- Tuck strand 1 over an opposing strand and under the next strand.
- Tuck of strand 2 goes over strand 5, under the second, and out between the second and third.
- Repeat operation with strands 1 and 3 from same rope end.
- Remove tie and repeat operation on other rope end. Make two or more tucks for each strand. Then roll the tucks and cut off ends.

You can smooth the splice by rolling it under your foot on the floor.



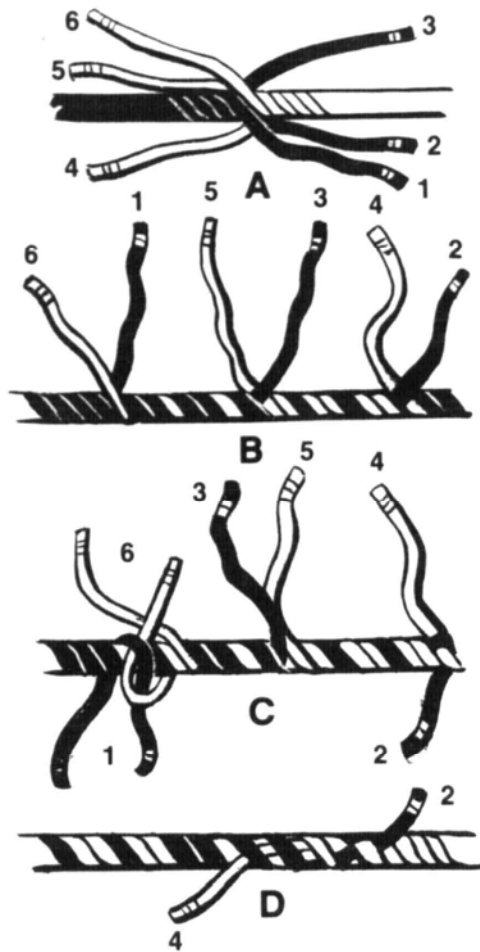
### EYE SPLICE

The eye splice is the strongest type of rope loop. Like the short splice, it is woven "one over, one under." Strands may be loosened for tucking by twisting the rope in the direction opposite the lay.

Begin by unlaying the end four or five turns.

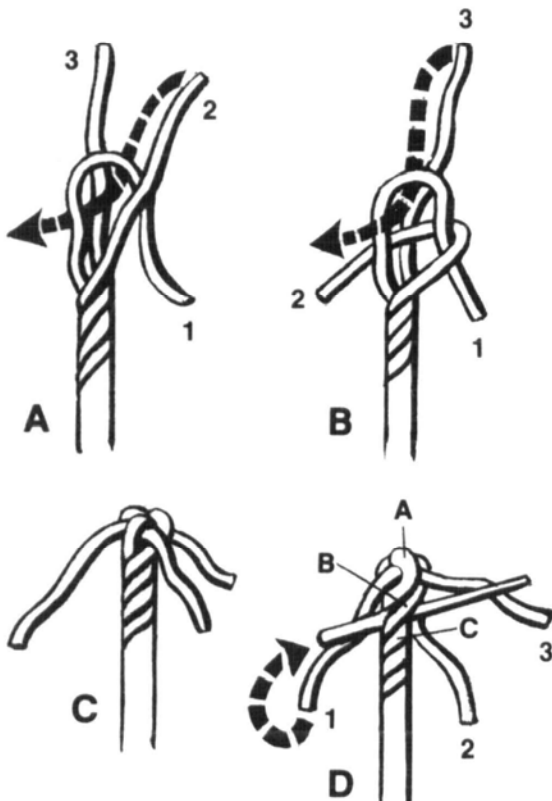
- Tuck strand 2 over strand c, under b, and then out between strands a and b.
- Tuck strand 1 once over strand b and under a.
- Turn rope over and tuck strand 3 under strand c and over next strand.
- Tuck each strand in turn over and under for several tucks.





## LONG SPLICE

- Unlay each rope end about 15 turns. Place the two rope ends together, alternating strands of each end.
- Using opposite pairs, unlay one end 4 and fill its place with the "partner" strand 2. Repeat operation exactly with another pair of strands 1 and 6 in opposite direction.
- Trim the longer strand 4 and tie each pair of opposing strands 2 and 4 with an overhand knot, tucking each strand twice. The tuck goes over one strand, under the second, and out between the second and third. Strands 3 and 5 are simply tied with an overhand knot. Strands 1 and 6 are halved, and opposite strands tied with an overhand before tucking.
- Roll and pound all tucks into the rope and then clip the individual strand ends.



## BACKSPLICE

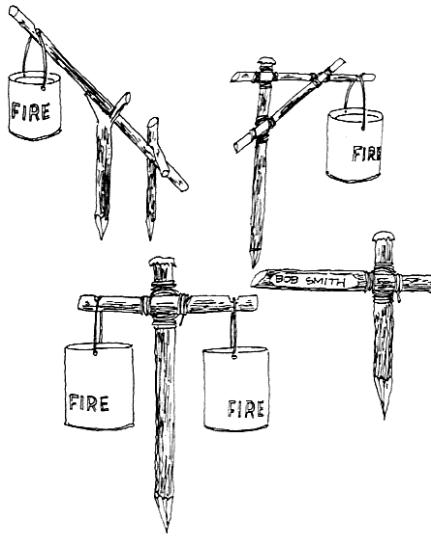
The backsplice is a method of preventing fraying or raveling in the end of a rope. It is more durable and permanent than whipping.

Begin by unlaying the rope and making a crown knot as shown in drawings A, B, C. The ends are then tucked with the over-and-under movement. See drawing D.

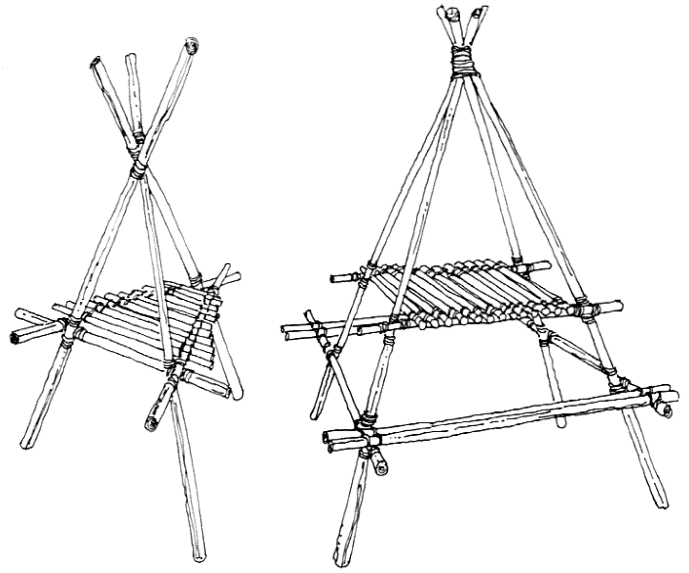
Finish by trimming the ends and smoothing the splice by rolling it on the floor with your foot.

# Examples of Useful Camp Gadgets

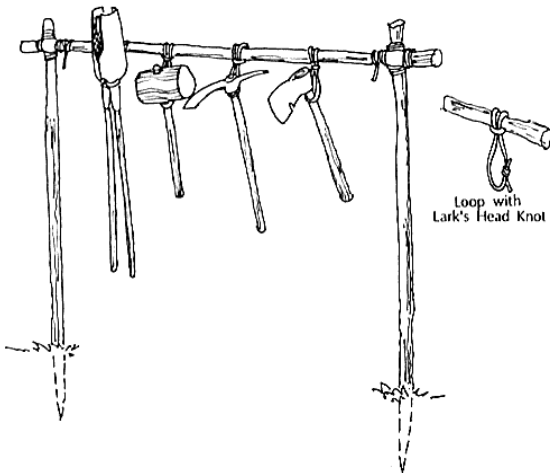
## Fire Pail Stand



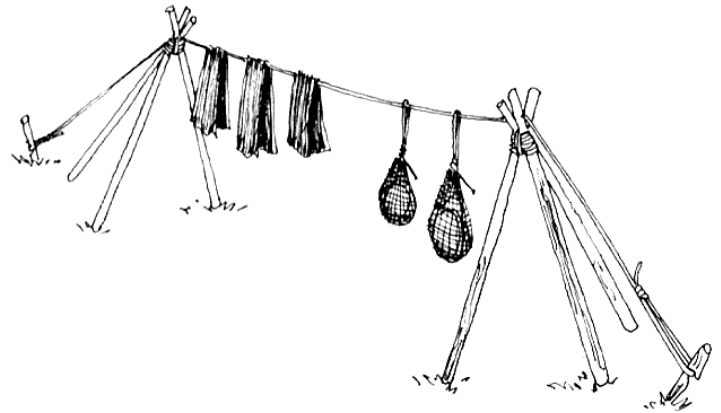
## Camp Table with and Without Seat



## Equipment Rack



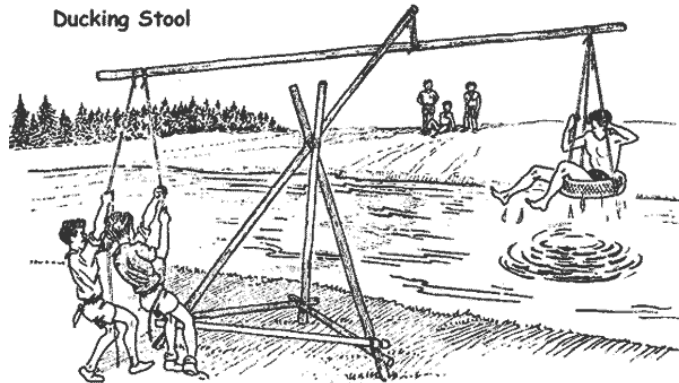
## Clothesline



## Wash Basin



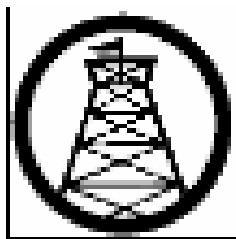
## Ducking Stool





# Boy Scout Merit Badge Requirements

## PIONEERING



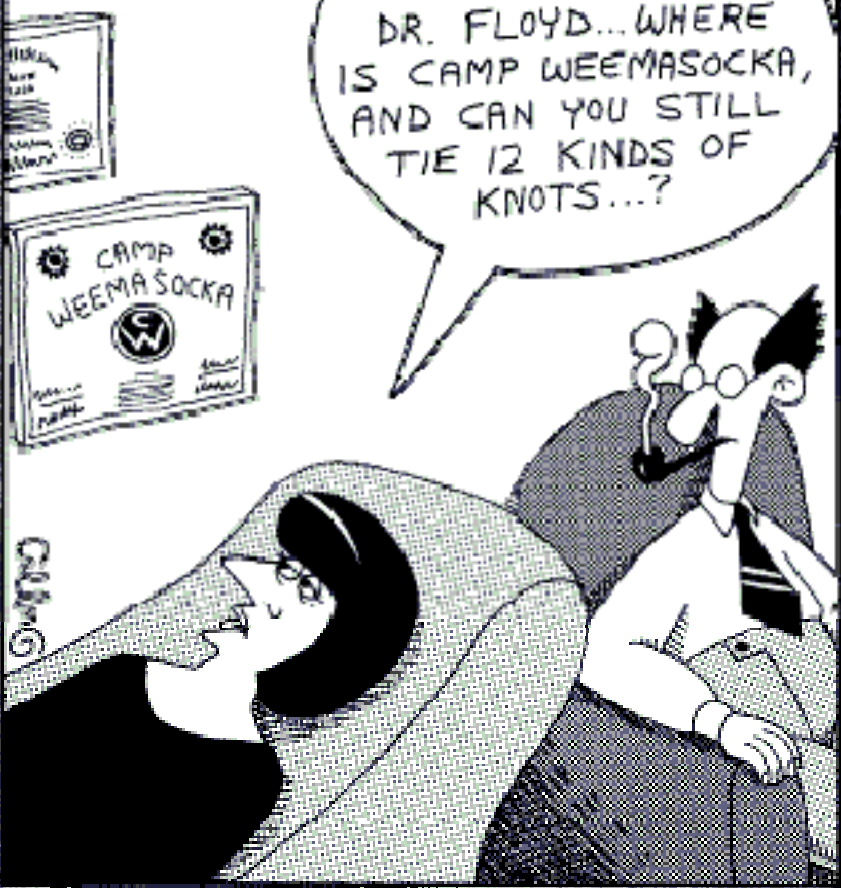
1. Demonstrate how to coil and throw a 40-foot length of ¼-inch rope.
2. Present five different rope samples, of any size or material. Explain the characteristics of each type of rope -- its strength, mildew resistance, durability, and stretch. Explain where and how each type of rope can be used in pioneering work.
3. Demonstrate how to tie the following seven basic knots: square knot, timber hitch, clove hitch, bowline, sheepshank, sheet bend, and round turn with two half hitches. Also select five more knots found in the *Pioneering* merit badge pamphlet. Tie each one for the examiner, and tell where it could be used in pioneering, camping, or other Scout activities.
4. Demonstrate how to make the back splice, eye splice, and short splice using ¼-inch three-strand rope.
5. Construct a device or machine to make rope. Then use the device with binder twine to make a six-foot length of rope consisting of three strands, each having three yarns. Also demonstrate one method of whipping the end of the rope.
6. Build a three-two-one or a log-and-stakes anchor using pioneering stakes. Build the anchor at a size suitable to anchor one end of a monkey bridge.
7. Demonstrate the use of rope tackle to lift a weight of 25 pounds. Pull a log at least six inches in diameter and six feet long with the tackle. Use the tackle to put a strain on a line.
8. By yourself, build an H-frame trestle with ropes and spars using square and diagonal lashings. Demonstrate how to tie two spars together using a west country shear lashing.
9. With a group of Scouts, build a pioneering project. Before building, present a rough sketch of the project and a list of the ropes and spars needed to build it. (Note: This requirement may be done at summer camp, district or council events, or on a troop camp outing.)

BSA Advancement ID#: 84

Source: *Boy Scout Requirements*, #33215, revised 2004

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VERY IMPRESSIVE,  
DR. FLOYD... WHERE  
IS CAMP WEEMASOCKA,  
AND CAN YOU STILL  
TIE 12 KINDS OF  
KNOTS...?



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