



Troop 94

Knot Master Program



Knot tying is a skill taught at every level of Scouting. The "Knot Master" program is designed to provide each Scout with an opportunity to learn essential knots. As part of the program, each Scout carries a five-foot piece of rope attached to a carabiner. The color of the rope indicates their current level of proficiency.

After completing Level One, a Scout is awarded a green rope with a carabiner. They learn a special method for attaching the five-foot piece of rope to the carabiner using the 'carry' knot. This method allows the Scout to conveniently carry the rope at all Scout functions, showcasing their achievement in completing Level One. Furthermore, it embodies the Scout motto "Be Prepared," as a five-foot rope can be incredibly useful in various situations.

As the Scout progresses through the remaining three levels of the program, they are awarded ropes of different colors: green, blue, red, and ultimately black. Upon earning the black rope, the Scout is recognized as a "Knot Master."

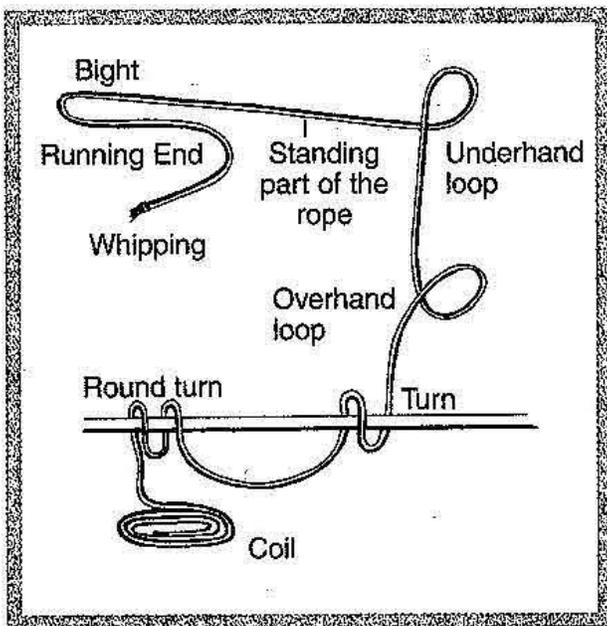
| Level One - Green | Level Two - Blue | Level Three - Red | Level Four - Black |
|-------------------|------------------|--------------------|-------------------------|
| Whipping | Sheet Bend | Bowline on a Bight | Figure 8 Follow Through |
| Square Knot | Taut-Line Hitch | Prusik Knot | Truck's Hitch |
| Clove Hitch | Bowline | Sheep Shank | Rolling Hitch |
| Timber Hitch | Sheer Lashing | Tiller's Hitch | Buntline Hitch |
| 2 Half Hitches | Tripod Lashing | Constrictor's Knot | Hunters Bend |
| Figure 8 | Square Lashing | Double Fisherman's | Mooring Hitch |
| Carrying Knot | Diagonal Lashing | Marline Hitch | Butterfly Loop |

Definitions:

Hitch – Used to make a rope fast to another object
Bend – Secures two rope ends to each other
Lashing – Secures one object to another with rope.
Working End – Part of the rope being manipulated
Standing Part – Inactive section of the rope
Bight – Curved part no smaller than a semicircle
Yarn – Fibers twisted together
Thread – Two or more yarns twisted together

String – The same as thread using larger yarns
Strand – Two or more large yarns twisted together laid up right-handed into rope
Cord – Several threads twisted together
Rope – Several strands twisted together
Frap – To bind or wrap tightly
Spar – Rigid Pole

BIGHT, LOOP, OVERHAND



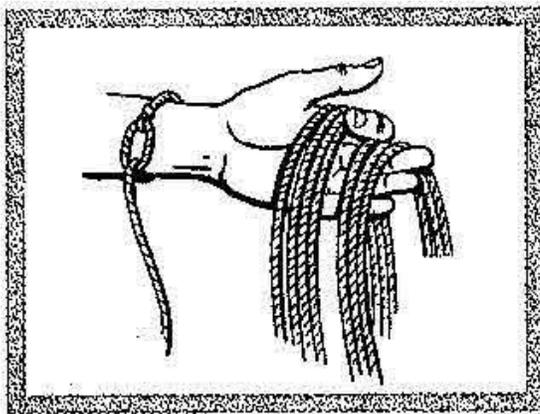
Knots are formed by using techniques called bight, loop, turn, and tuck. If you remember these terms and how to perform them, you can tie even the most complex knot.

- The bight is formed by laying the end of the rope against the standing part, or long end.
- Loops, overhand or underhand, are just what their names say.

A turn is wrapping the rope around something, and a tuck is inserting the running end or a bight into a loop.

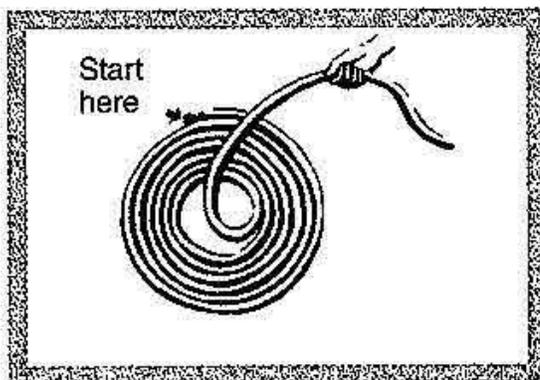
CARING FOR ROPE

A good rope is expensive and should not be handled carelessly. Keep it clean and free of mud or grease. If it is damp, do not coil or store it until it is thoroughly dried out. Always keep it in a dry place. Rope should never be thrown into a corner to tangle and kink. When a job is finished, the rope should be placed where it will be available instantly, if necessary, and should be coiled so that it will lay out smoothly when needed.



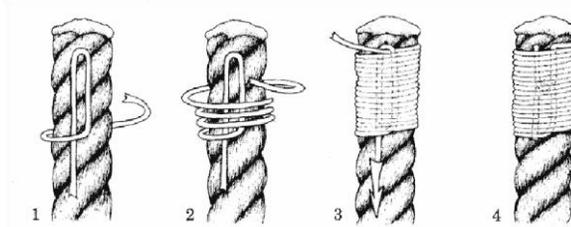
Coiling Rope

To coil rope, first shake it out in a straight line so there will be no kinks. Hold the end with one hand, and with your other hand pull in enough rope to make an 18-inch loop. As you place the loop in your hand, roll the rope a half-turn with your thumb and forefinger. This will counteract the twist you put in the rope as you made the loop and will help to eliminate kinks.



To make a tight coil, lay the outer circle first and coil in toward the center in a clockwise direction. Give a half-turn to each coil to eliminate kinks. If your coil is too loose, you can tighten it by twisting the center with the palm of your hand.

Level One - Green Rope



Whip Rope-Natural or double braided rope should be whipped on the ends with a smaller string or chord to keep the rope from unraveling. A good rule of thumb is that the whipping should be at least as long as the rope diameter.

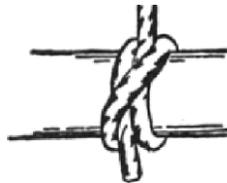
Fuse Rope- The ends of polypropylene or other synthetic fiber rope should be fused on the end to keep them from fraying. This can be accomplished by applying a hot iron or open flame to the end of the rope to melt the fibers together.

Square Knot



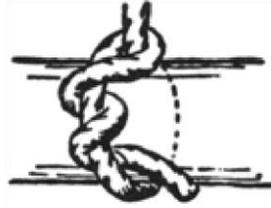
The Square Knot is a common and simple binding knot. It is used to connect two ropes of equal size. You can loosen the square knot easily by either pushing the ends toward the knot or by "upsetting" the knot by pulling back on one end and pulling the other through the loops.

Clove Hitch



The clove hitch, along with the bowline and the sheet bend, is often considered one of the most essential knots. It consists of two identical half hitches made successively around an object. It is most effectively used as a crossing knot. Although it can be used as a binding knot, it is not particularly secure in that role. Because it passes around an object in only one direction, it puts very little strain on the rope fibers.

Timber Hitch

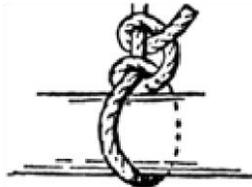


The timber hitch is a knot used to attach a single length of rope to a piece of wood. This is an important hitch, especially for dragging a heavy object like a log. It will hold firmly so long as there is a steady pull; slacking and jerking may loosen it. The timber hitch is also useful in

pioneering when attaching two timbers together. When it is used for dragging, a simple hitch should be added near the front end of the object to guide it. To make the knot, pass the rope completely around the wood. Pass the running end around the standing part, then through the loop that you have just formed.

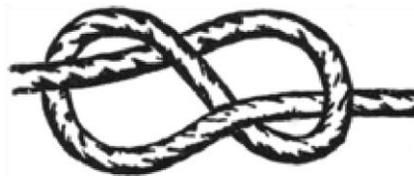
Make three turns around the loop then pull on the standing part to tighten. Take care that you double the rope back on itself before making the three turns, or it won't hold. Three are recommended for natural rope such as jute, whereas five turns are needed on synthetic rope like nylon.

Two Half Hitches



This is a reliable and useful knot for attaching a rope to a pole or boat mooring. As its name suggests, it is two half hitches, one after the other. To finish, push them together and snug them by pulling on the standing part.

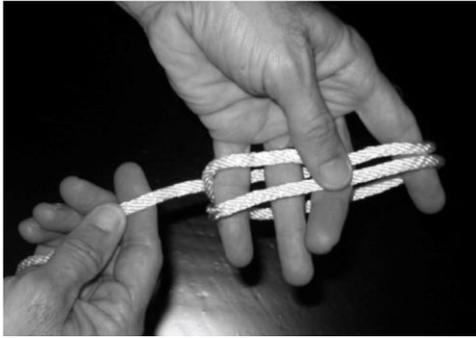
Figure Eight Knot



The figure-eight knot is very important in both sailing and rock climbing as a method of stopping ropes from running out of retaining devices.

The 'Carry Knot'

The carry knot is designed as a method to attach a five foot segment of rope to a 'D' Ring and carry the rope on your side attached to a belt loop or some other similar loop on your clothing or gear. Its appearance is similar to that on a noose however the section of rope that would pull the loop closed is folded back under the rope coil, thus prohibiting the loop to close. You can easily identify if the knot has been tied correctly by observing that one of the end pieces located at the loop end of the knot.



The knot is started by forming two loops around the end of your hand.



Next, hold the two loops in one hand with both rope ends exposed. Start wrapping the long end of the rope around the rope loops in your hand.



Continue wrapping the long end around the rope loops working your way towards the other end.



Continue wrapping the long end until you have about one inch of rope remaining.



Pass the end of the rope through the two loops.



Holding the entire knot in one hand, grasp one side of the single loop and pull it to tighten one of the two loops at the other end.



Grasp the other side of the single loop and pull it to tighten remaining loop at the other end.



This completes the 'Carry Knot'.

Level Two - Blue Rope

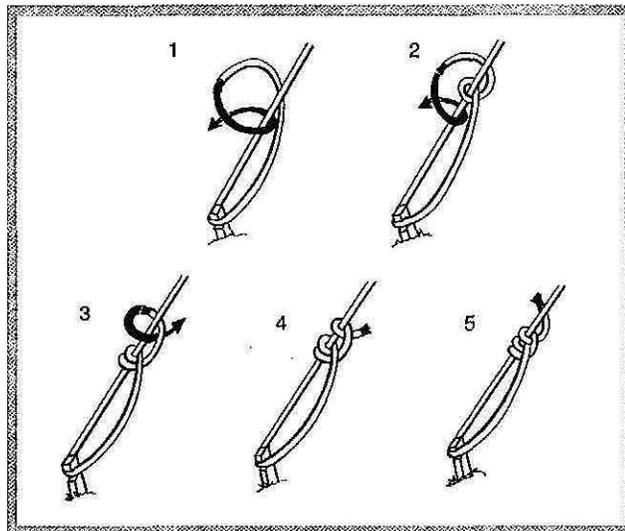
Sheet Bend



The sheet bend is the most important knot for joining two rope ends, especially if the ropes are of different sizes. Sailors named it in the days of sailing ships when they would "bend" (tie) the "sheets"(ropes attached to the clew of the sail).

Begin with a bight in the larger rope. Then weave the end of the smaller rope through the eye, around the bight, and back under itself. Snug it carefully before applying any strain to the knot.

Taut-line Hitch



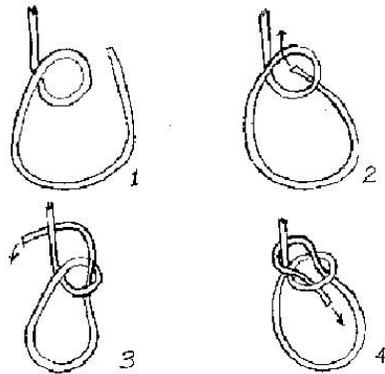
The Taut-line hitch is an adjustable loop knot for use on lines under tension. It is useful when the length of a line will need to be periodically adjusted in order to maintain tension. It is made by tying a Rolling hitch around the standing part after passing around an anchor object.

Tension is maintained by sliding the hitch to adjust size of the loop, thus changing the effective length of the standing part without retying the knot. It is typically used for securing tent lines in outdoor activities involving camping.

To begin, pass the rope around the peg. Bring the end under and over the standing part and twice through the loop formed. Again, bring the rope end under, over, and through the loop formed. Tighten the hitch around the standing part. When using the taut-line hitch to tie a

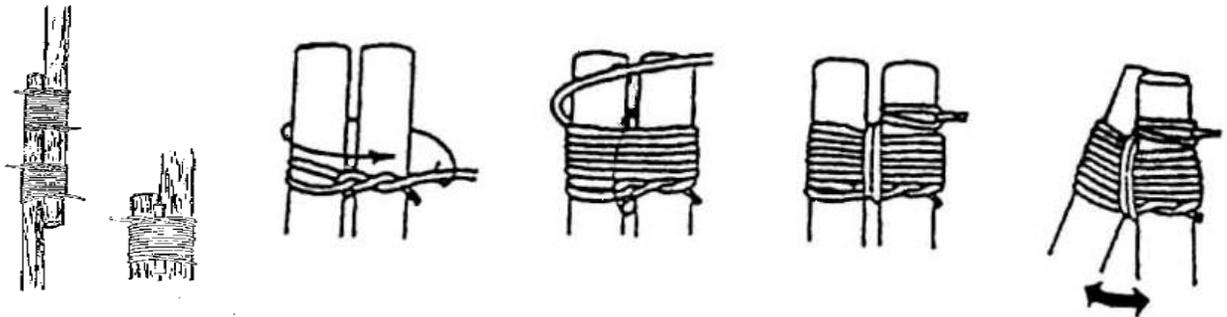
tent guy line, you can tighten or loosen the line by pushing the hitch up or down on the standing part.

Bowline



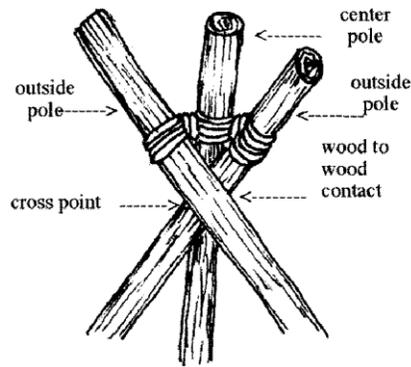
The bowline has been called the king of knots. It will never slip or jam if properly made and, thus, is excellent for tying around a person in a rescue. Begin by forming an overhand loop in the standing part. Then take the free end up through the eye, around the standing part and back where it came from.

Shear Lashing



The shear lashing is used for legs on pioneering projects. First tie a clove hitch around one spar, then bind the two with seven or eight parallel turns. Finish with two or three frapping turns between the spars and a clove hitch to the second spar. A shear lashing is also used to bind adjacent poles together. It is also a good way to reinforce a broken or weak pole. The frapping turns are used to tighten the lashing.

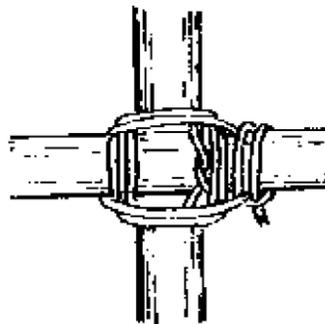
Tripod Lashing



The tripod lashing is a shear lashing that binds three poles together at the same point. The tripod lashing gets its name from the fact that its most common use is the construction of a tripod. The tripod lashing can be used just about anywhere in a structure that three poles cross each other at the same point and the same time in the sequence of construction. Tripod lashing takes two main forms; with racked wrapping turns (the rope is woven between the poles) and with plain wrapping turns (the rope is wrapped around the poles without weaving the rope between the poles). When the lashing is made with racking turns the rope contacts each pole around its entire circumference; this contact makes the tripod lashing with racking turns the

most secure form of tripod lashing; therefore tripod lashing with racking turns should be used when safety is important. However, for light structures where there would be no danger if the lashing slipped, the faster to tie tripod lashing with plain wrapping turns may be used.

Square Lashing

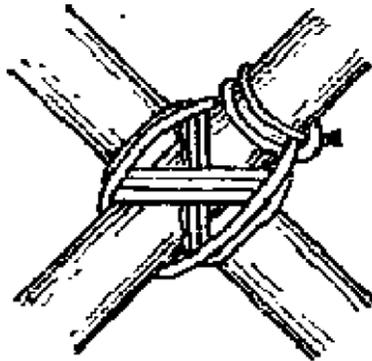


A Square Lashing is used to hold two poles that cross each other (usually at a 90-degree angle although not necessarily).

1. Start by crossing the two sticks or dowels at perpendicular or 90 degree angles.
2. Make a Clove Hitch on the vertical stick or dowel near the point where the two sticks cross. This fastens the rope to the stick.
3. Weave the rope under and over the crossed sticks alternately.

4. To do this, run the rope over the horizontal bar, around behind the vertical bar, then back over the face of the horizontal bar on the left.
5. Tighten snugly, then bring the rope behind the vertical bar and up the right front side of the horizontal bar.
6. Repeat this three or four times, keeping the rope tight.
7. When you have finished weaving the lashing, then "FRAP" it by wrapping the rope between the poles (in front of the back stick and in back of the front stick), pulling tightly. This tightens the connected poles.
8. Finish your lashing with another Clove Hitch.

Diagonal Lashing



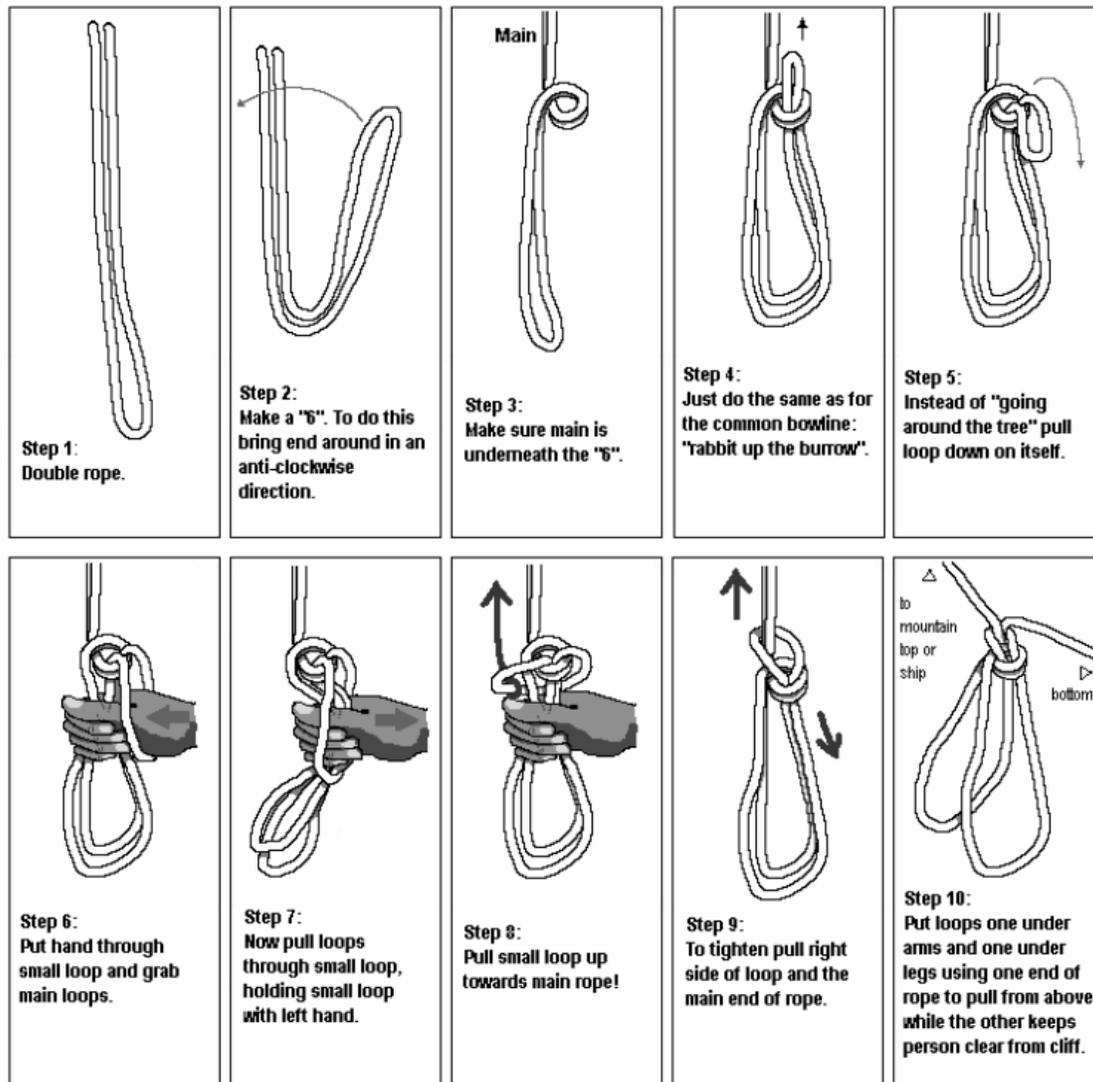
A Diagonal Lashing is used to bind two poles together that cross each other but do not touch (or are likely to be pulled apart) when their ends are lashed in place in a structure. Often used for securing diagonal braces used to hold a structure rigid.

1. Tie a timber hitch diagonally around both poles.
2. Start the wrapping turns on the opposite diagonal to the timber hitch, by pulling the rope tight so that the poles contact each other.
3. Take 3 to 4 wrapping turns; keep the wrapping turns parallel; pull each wrapping turn tight. [NOTE] If the wrapping turns are allowed to cross, the increased friction between the strands of the rope will make it difficult to tighten the wrapping turns.
4. Start the second set of wrapping turns by going past and around the vertical pole. [NOTE] Going around the pole the rope allows the direction of the rope to be changed without crossing the first set of wrapping diagonally.
5. Take 3 to 4 wrapping turns; be sure to keep the wrapping turns parallel; pull each wrapping turn tight.
6. Start the frapping turns by going past and around one of the poles. [NOTE] Going around the pole with the rope allows the direction of the rope to be changed without crossing the wrapping turns diagonally.
7. Take 2 to 3 frapping turns; keep the frapping turns parallel. Be sure to pull each turn tight.

8. End the lashing with a clove hitch. Take the first half hitch of the clove hitch by going past and then around one of the poles. Lock the half hitch tight against the lashing by working it tight.
9. Take a second half hitch around the pole.
10. Work the second half hitch tight against the first half hitch so that the clove hitch is locked against the lashing

Level Three - Red Rope

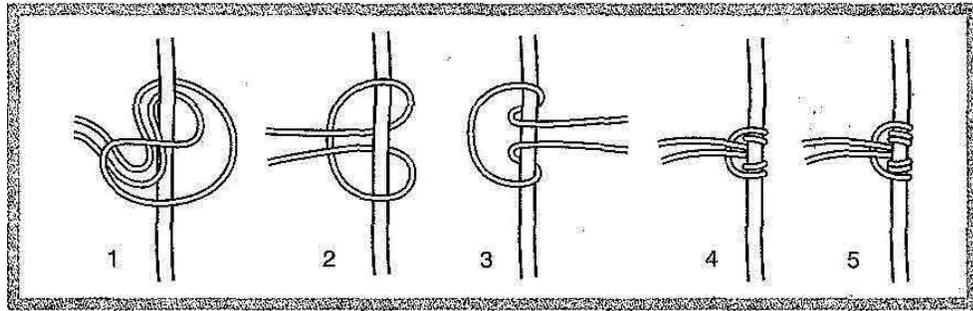
Bowline on a Bight



Prusik Knot

The Prusik knot secures a loop of smaller rope or accessory cord to a climbing rope in such a way that it can be slid along the rope, but when it is loaded will bend the rope and hold securely. The knot is commonly tied with accessory cord by a climber to ascend a rope or to secure a belay system in order to release the belayer. To tie a Prusik knot, use the loop of smaller rope to form a girth hitch around the larger rope, then bring the free bend of the loop around the larger rope. Bring the free bend of the loop around the larger rope a second time

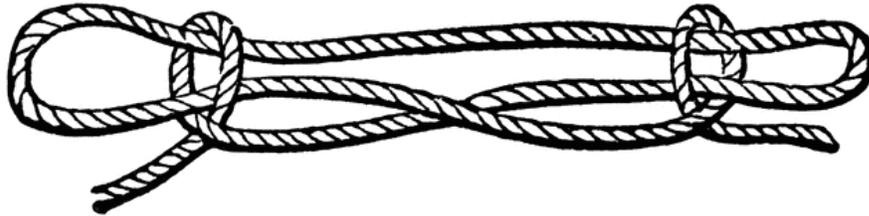
and pass it back through the other bend. Dress the knot so that it lies neatly on the larger rope, and remove any slack.



Follow steps 1–4 for tying a Prusik knot. (Step 5) Additional wraps can be added to increase friction

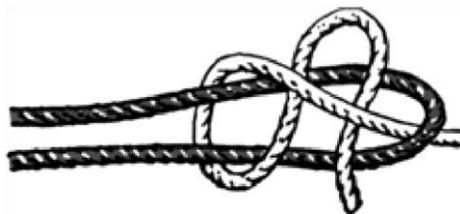
Sheepshank

The sheepshank is used to shorten a rope that is fastened at both ends.



1. Take up the slack.
2. Make an underhand loop as shown at "A", slide it over the bight at "B", and pull tight. Do the same to the other end to complete the knot.
3. The sheepshank is only a temporary knot as it stands, but it can be made more permanent by adding a second half hitch to each end.

Tiller's Hitch



A Tiller's Hitch is used to easily tie something down using one or two ropes and still be able to quickly untie it. It is basically a Sheet Bend with a slip knot.

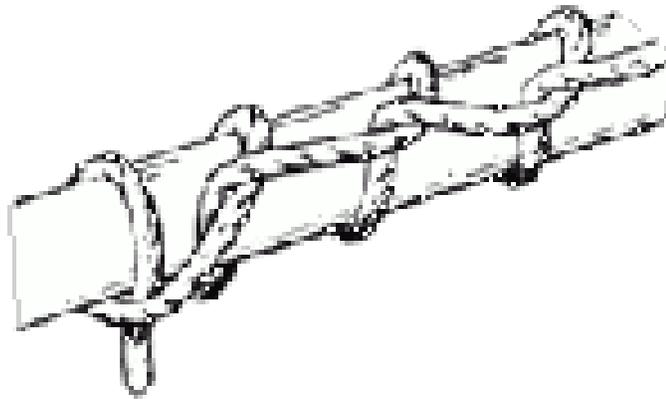
Fisherman's Knot



The Fisherman's knot is a specialized bend. It consists of two overhand knots wrapped around each other. It requires little dexterity to tie, so is often used in stubborn materials. When tightened, it becomes fairly compact, and the free ends can be cropped very close to the knot.

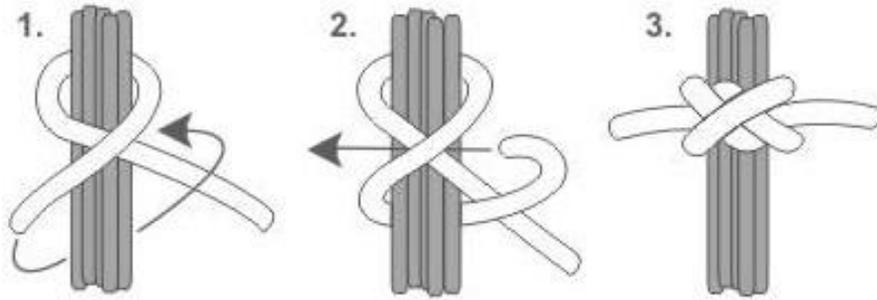
These qualities make it very useful for fishing line--it is less likely to jam a fishing rod, and is easier to tie with cold, wet hands. To tie the fisherman's knot, lay the two ends to be tied alongside each other and facing opposite ways. Tie an overhand knot on the first rope and pass the second rope through the loop formed. Tighten the overhand knot, to prevent the line inside it from flopping around. Then tie another overhand knot on the second rope with the first rope passing through it.

Marline Hitch



This hitch is very practical to lash long objects. The working end needs only one tug and will not slip easy. Before the 'zip tie' this hitch was used by electrical engineers to tie 'wiring-trees'

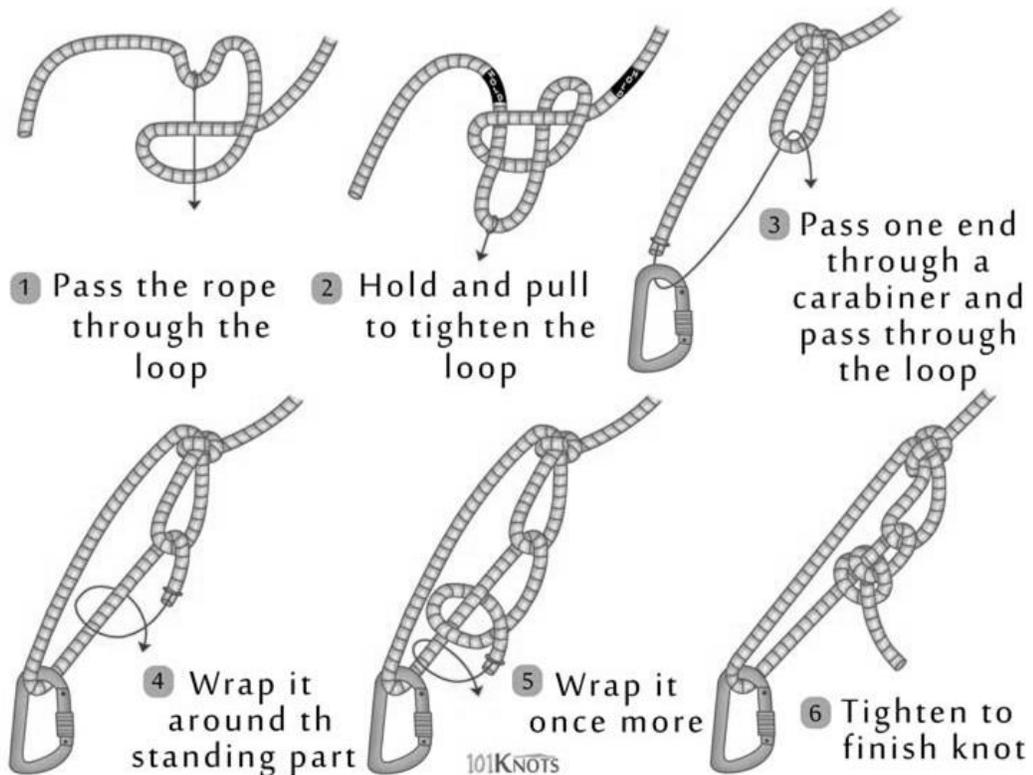
Constrictor's Knot



This is a useful knot to tie up loose material or ends of bags. Simple to tie, it grips itself and will not work loose. Also known as the Miller's Knot or the Bag Knot.

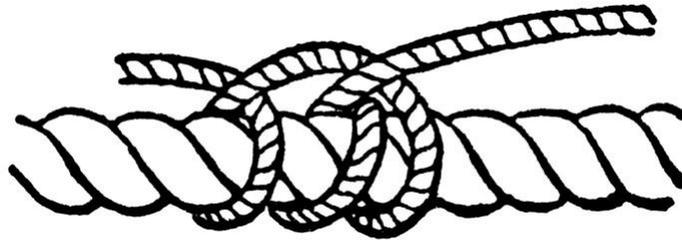
Level Four - Black Rope

Trucker's Hitch



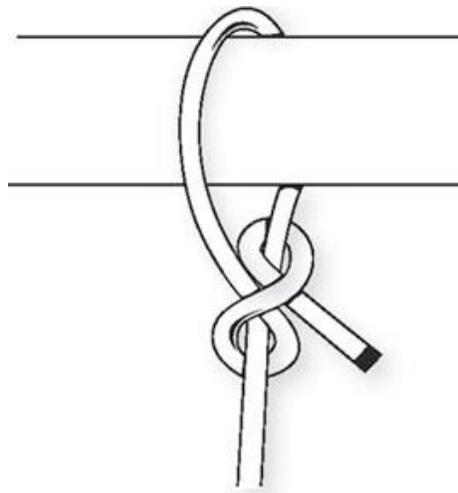
Tie off one end of rope. Tie a slippery half hitch in the middle of the line to form a small loop. With free end, make a half turn around a fitting and bring the free end back up to the loop. Feed through and pull line tight. Finish off with one or two half hitches.

Rolling Hitch



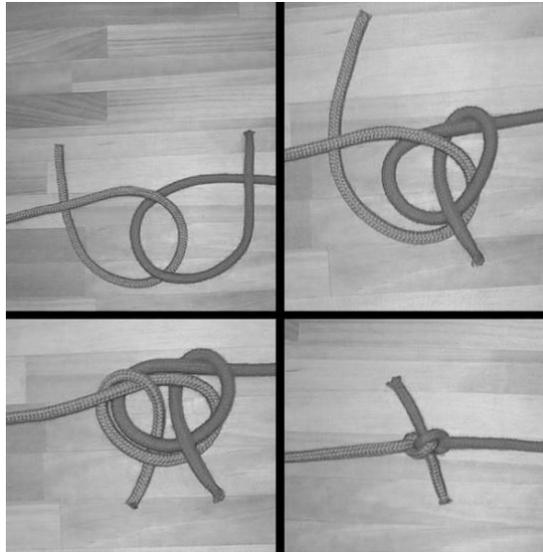
The **rolling hitch** (or **Magnus hitch**) is a knot used to attach a rope to a rod, pole, or other rope. A simple friction hitch, it is used for lengthwise pull along an object rather than at right angles. The rolling hitch is designed to resist lengthwise movement for only a single direction of pull.

Buntline Hitch



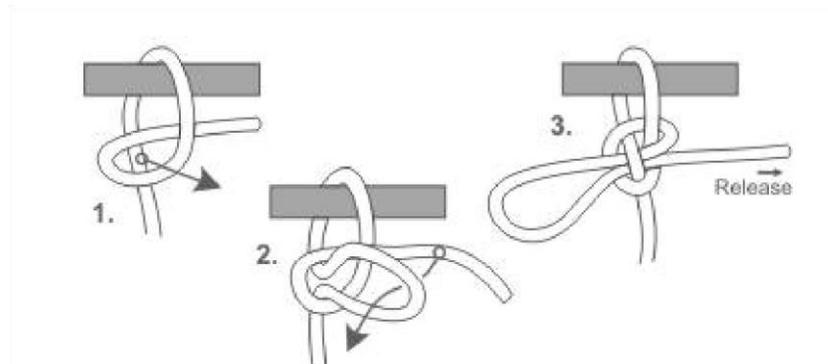
The buntline hitch is a knot used for attaching a rope to an object. It is formed by passing the working end around an object, then making a clove hitch around the rope's standing part, taking care that the turns of the clove hitch progress *towards* the object rather than away from it. Secure and easily tied, the buntline hitch will jam when subjected to extreme loads. Given the knot's propensity to jam, it is often made in slipped form.

Hunters Bend



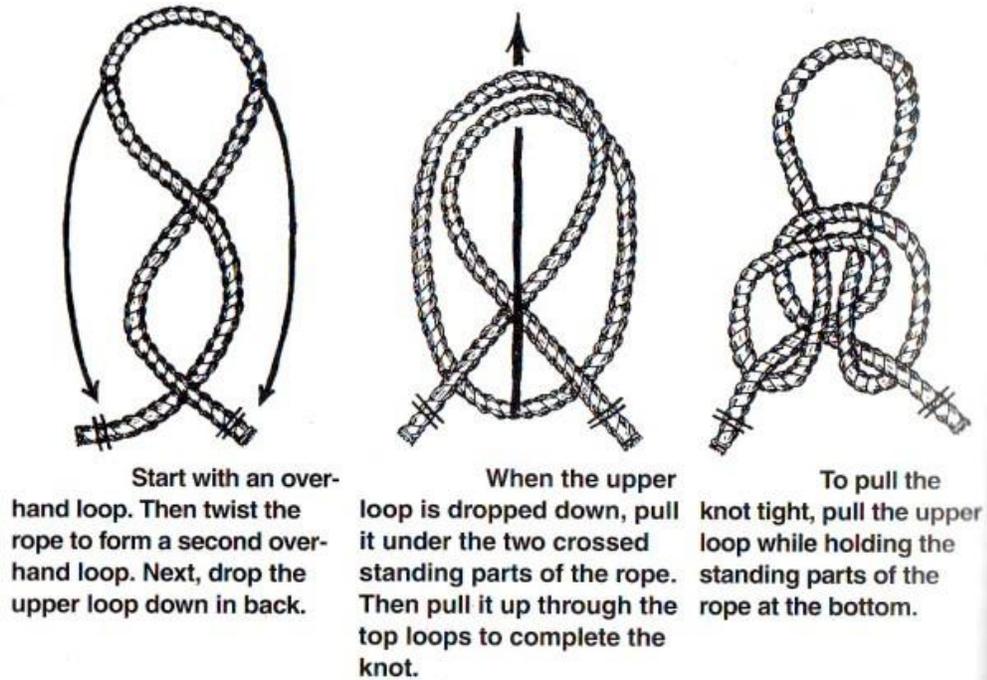
The Hunters Bend is a fairly simple knot that is used to tie two lines together. First you Place the running end under the standing part to form a loop. Second you Thread the 2nd running end under the 1st standing part and through the loop; then cross over the 2nd standing part. You finish off by Threading both running ends through the central loop in the opposite directions and tightening the knot.

Mooring Hitch



The Mooring Hitch is a more secure knot than the better known (and easier to tie) Slippy Hitch. This knot holds fast while under tension yet can be released quickly with a tug on the free end. Despite its name, however, this is a temporary knot and not to be trusted to moor a boat or anything else of value!

Alpine Butterfly Loop



A butterfly knot is a fixed loop tied in the middle of a rope. There are a number of other knots that do the same thing, but the butterfly knot tends to work better because it doesn't jam when strained and it's easy to untie.

Since it's tied in a symmetrical fashion, strain can be put on it from any direction. Even though this knot is usually tied in the middle of the rope, you can also tie it at the end of the line if you need a fixed loop that is easily untied.

The butterfly knot is a favored knot for mountain/rock climbers, used for hand or foot loops or used to hook their carabiners into. It has many uses in pioneering work.

Special Thanks

On behalf of all who have benefitted, we extend our heartfelt gratitude to Scout Troop 226 of Plano, Texas, for their exceptional generosity in sharing their Knotmaster Program. Your commitment to fostering skills and knowledge in the Scouting community and beyond is truly admirable. This invaluable resource has undoubtedly enhanced the learning experience for countless individuals, equipping them with vital skills that will serve them for a lifetime. Your contribution is making a significant difference and is greatly appreciated by all.