



ROPE MAKING

I. GOAL:

Students will learn the history of rope, the craft of rope making and the contributions' rope has made to the development of civilization. Each student will operate a rope machine and manufacture an individual length of rope, observing proper safety procedures.

II. OBJECTIVES:

- A. Students will be able to interpret the history and craft of rope making, from the primitive process of finger twisting to the machine production of rope today.
- B. Students will use critical thinking skills while discussing the contributions rope has made towards the development of civilization, and how it has helped man obtain food, shelter, and clothing since prehistoric times.
- C. Students will gain an understanding of various terms used in rope making, and learn about the various animals and vegetable fibers used, and how it has helped man obtain food, shelter, and clothing since prehistoric times.
- D. Students will learn the safe and proper method of operating the rope machine while manufacturing their own individual length of rope to take home.

III. THE PEOPLE:

Primitive people twisted strips of hide, sinew, hair, vines, and plant fibers into rope long before they learned to spin or weave. Rope making was a universal skill known in all tribes and civilizations. Braided ropes were used in Asia before 4000 BC. Ropes were used to decorate pottery in southeastern Europe in 3000 BC. The Mayas used rope to move the large blocks of stone they needed for building their marvelous temples. The ancient Egyptians developed rope making techniques in 2500 BC which are still in use today. Some tribes of American Indians chewed hide and sinew into strands that could be used for rope. Rope making in ancient India was so unique that only a special class of people made ropes. Homer frequently mentions rope in his **Odyssey**. The Romans even fabricated rope out of thin copper wire. In 14th century England, the first guilds of rope makers were established. Medieval monks made ropes to ring monastery bells and to use as belts. But it was the age of sailing ships that turned rope making into a vital industry. Phoenician ships were held together by rope. Columbus had 15 miles of rope on his ship. Records indicate the Emperor of China had rope made from ladies' hair. Hemp was planted along the watering holes of the western trails so that future pioneers could harvest it. Pioneers carried a rope machine when they came west for this purpose.



IV. THE PLACE:

Rope making was commonplace. Every community of any size had its rope walk (places where ropes could be made by laborers who "walked" out the twists in the strands). The first American ropewalk was founded in Salem, Massachusetts in 1635. Rope making was a common colonial pursuit by 1700. Most ropewalks during this time were along the coast or in port towns because the greatest need for rope was in the fishing and sailing industries. Walks were often 900 feet or more. South England boasted a 2,000 foot rope walk. Philadelphia had several competing rope walks. Smaller ropewalks served the rural areas. Farmers made some ropes for their own use out of flax; but they were of a lesser quality than those made in colonial ropewalks. The first ropewalk in the west was established by Hiram and Alfred Tubbs in San Francisco. Ropewalks were found indoors and out and on sailing ships. Later narrow sheds were built that were over 1,000 feet long and 30 feet wide. Three or four rope makers worked side by side in these ropewalks. Sheds were not heated in winter, nor were they closed during bad weather. The long wooden sheds, filled with dry fibrous material, were moved to locations outside of town, which was an added hardship for those who worked there. Rope makers had to be skilled artisans to produce quality ropes under these conditions. The entire rope making process was affected by the ability and experience of the rope maker. Although machines gradually replaced skilled rope makers, traditional techniques survived until after the Civil War.

V. THE CRAFT:

Rope was one of man's earliest tools. History records rope making as far back as 7,000 years ago, and is one of America's oldest industries. The materials that man used to make rope varied and depended on the locality and use of the rope. Rope has been made out of many things: hide, hair, plant fibers, tree bark, cotton wire, silk, and simple vines to name just a few. Twisting or braiding strands of these materials together made them stronger than single untwisted fibers. The first methods of rope making were similar to weaving plant fibers into mats and baskets. Fibers are spun into twine, and twine is used to make rope. The rope making operation is called "laying". In laying, the twine is led from a block (Paddle) for the desired length to the laying machine (rope maker) and back to the block. This is repeated until the desired thickness is achieved. Rope was (and is) used to build, hoist, haul, cross obstacles, support, tie, fish, hunt, snare food, fight, furnish, clothe and transport. Today there are hundreds of different types of ropes for a great variety of uses.

Topics for discussion:

1. Importance
 - A. Obtain food
 - B. Shelter
 - C. Clothing
2. Construction
 - A. Buildings
 - B. Suspension of bridges
 - C. Pyramids



3. Commerce
 - A. Ships
 - B. Fishing nets and lines
4. Agriculture
 - A. Wells
 - B. Harnesses
 - C. Livestock
5. Travel
 - A. Ships - crossed the ocean and discovered the New World
 - B. Wagons
 - C. Litters to transport the lame, sick, and aged.
6. What would we do without rope?
7. Ask the class what additional uses they can think of.

Safety Procedures:

1. Keep fingers and loose clothing away from moving parts such as the hooks and handle.
2. Wear gloves. Rope yarn often has splinters within the yarn.
3. Wash hands after making or handling new rope as it may contain oils or other chemicals.
4. If crank "runs away" or spins out of control, let it go. Do not try to stop the movement.
5. Removing "whiskers" from finished rope by burning should always be done by an adult.
6. Operation of rope making equipment should always be under adult supervision.

VI. OPERATION: A TWO PERSON OPERATION:

A. Threading the machine:

Following the threading diagram on the last page, string the machine 20% longer than you want your finished rope to be. Example: If you want your finished rope to be 6 feet long, your yarn (string) should be approximately 7 feet 2 inches. A 10 foot rope would use yarns 12 feet long and so on. Six yarns per rope is minimal. For larger ropes, double up on the number of yarns.

B. Preparing to spin the strands:

Slide the paddle to the end of the yarns. All yarns should have the same tension on them. Keeping tension on the yarns with the paddle, the rope machine operator begins to spin the handle in a counter-clockwise motion.

C. Manufacturing the rope:

When the twisted yarns begin to pass through the rope paddle slots, pull the strands through the paddle slots while keeping tension on the rope. The yarns will automatically form the rope. You may want to help by twisting the rope as you move the paddle towards the rope machine.



D. Finishing off the rope:

When the paddle reaches the rope machine, stop turning the handle, remove two strands from their hooks and place them on the third hook. You now have three strands on one hook. Holding the rope, give the machine two or three turns counter clockwise to set the twist. Then remove the three strands from the hook and tie them together by threading a short piece of yam through all three strand loops.

VII. GLOSSARY:

Below are specialized terms relating to ropes. They may be of some help in understanding how to make rope.

Abaca	The plant from which the fiber for "manila rope" is taken. Grown mostly in the Philippines.
Against the Sun	In the counter-clockwise or left-handed direction. The opposite of turning a rope with the sun.
Agave	The cactus-like plant from which sisal rope is made. Varieties of this plant grow in the Philippines, the East Indies, Africa, and Central and South America.
Binder Twine	Light twine used in packaging (and in making rope at Sutter's Fort).
Baler Twine	Heavy twine used for baling straw or hay.
Bitter End	The last or end of a rope or cable. Reaching the "bitter end" meant you had nothing left to work with.
Braid	To interweave cord or rope.
Coil	A spiral rope or to lay a rope down in a circular fashion.
Cord	A small line made of several yarns, under 1 inch in diameter. Also called "small stuff."
Cordage	A general term for all rope, cord, and line.
Cow's Tail	The frayed end of a rope.
Fiber	The smallest threads used to make the yarns for cords and ropes.
Hemp	A plant from the Cannabis family (yes, marijuana) that produces a soft fiber. Once widely used in the United States for ropemaking, it is now illegal to grow in the U.S. It was also grown to make a cloth similar to linen.



Jute	A plant with a soft fiber used for ropes, cords, burlap, and clothing. Grown mostly in India.
Line	A common name (especially aboard ship) for various types of cordage.
Manila	Rope made from abaca fiber.
Mecate	A Mexican hair rope.
Paddle	Wood tool used in making rope (see last page).
Rope	Any line of more than 1 inch in circumference.
Rope Machine	A mechanical device used to manufacture rope.
Sisal	The fibrous material from the leaves of the agave plant. Commonly used to make rope.
Strand	Two or more yarns twisted together in the opposite direction to that of the yarn itself.
Whip	To lash the end of a rope to prevent it from unraveling or fraying.
With the Sun	In the clockwise or right-handed direction. The opposite of turning a rope "against the sun."
Yarn	Any number of individual threads or fibers twisted together.

VIII. MATERIALS AND EQUIPMENT:

- A. Rope Machine (2 machines are available at the Fort)
- B. Twine
- C. Gloves (any inexpensive cotton type gloves)
- D. Scissors or knife
- E. Yam Paddle

IX. RESOURCES:

Ace Hardware, Home Depot, Lowe's etc. (will have or can order) "binder twine." This is a single strand twine you will use to make triple strand rope. One large spool (<\$20) will make about 60 individual jump rope size rope pieces.



THE ROPEWALK

By Henry Wadsworth Longfellow

In that building, long and low,
With its windows all a-row,
Like the port-holes of a hulk,
Human spiders spin and spin,
Backward down their threads so thin
Dropping, each a hempen bulk.

At the end, an open door;
Squares of sunshine on the floor
light the long and dusky lane;
And the whirring of a wheel,
Dull and drowsy, makes me feel
All its spokes are in my brain.

Two fair maidens in a swing,
Like white doves upon the wing,
First before my vision pass;
Laughing, as their gentle hands
Closely clasp the twisted strands,
At their shadow on the grass.

Then a booth of mountebanks,
with its smell of tan and planks,
And a girl poised high in air
On a cord, in spangled dress,
With a faded loveliness,
And a weary look of care.

Then a homestead among farms,
And a woman with bare arms
Drawing water from a well;
As the bucket mounts apace,
With it mounts her own fair face,
As at some magician's spell.

Then an old man in a tower,
Ringing loud the noontide hour,
While the rope coils round
Like a serpent at his feet,
And again, in swift retreat,
Nearly lifts him from the ground.

Then within a prison-yard,
Faces fixed, and stem, and hard,
Laughter and indecent mirth;
Ah! it is the gallows-tree!
Breath of Christian charity
Blow, and sweep it from the earth!

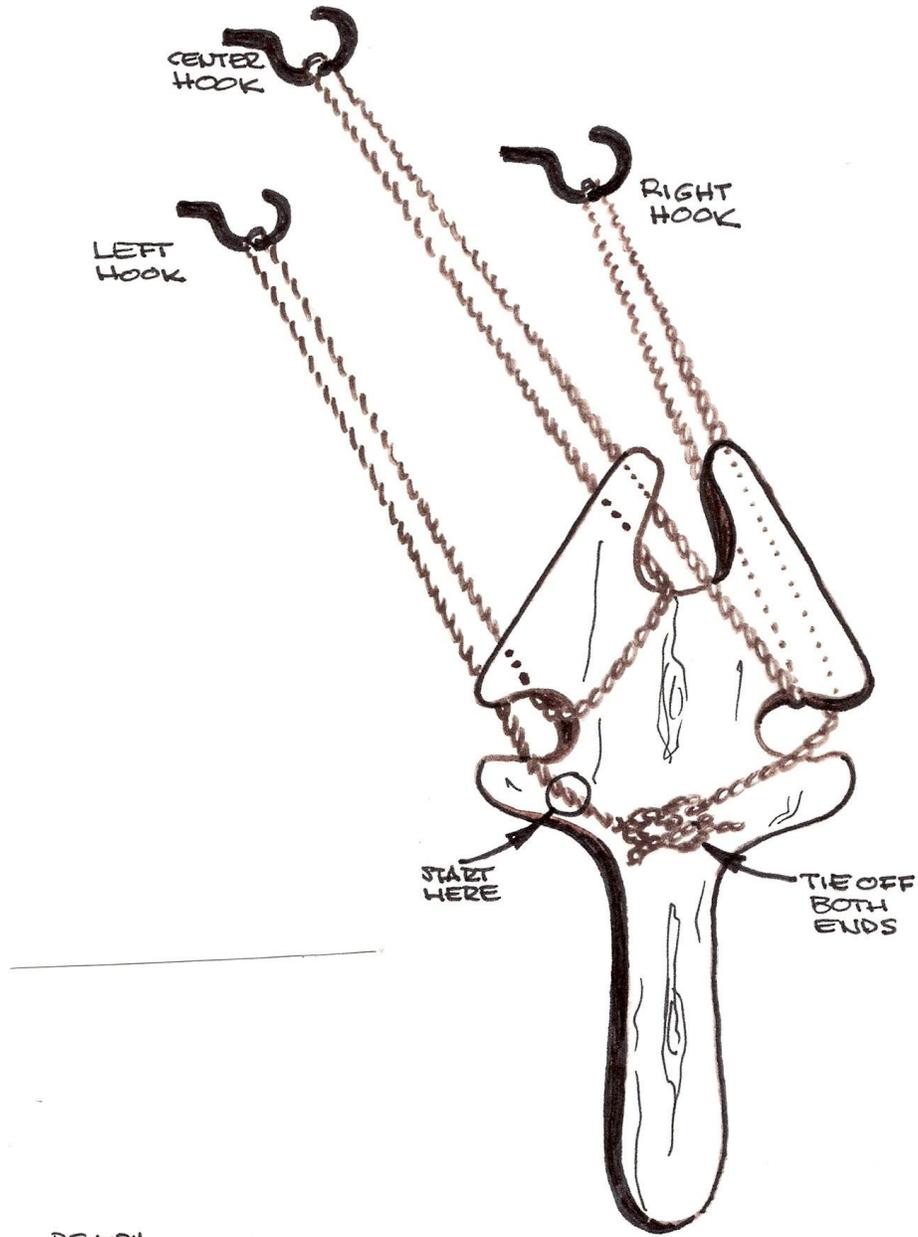
Then a school-boy, with his kite
Gleaming in a sky of light,
And an eager, upward look;
Steeds pursued through lane and field;
Fowlers with their snares concealed;
And an angler by a brook.

Ships rejoicing in the breeze,
Wrecks that float o'er unknown seas,
Anchors dragged through faithless sand;
Sea-fog drifting overhead,
And, with lessening line and lead,
Sailors feeling for the land.

All these scenes do I behold,
These, and many left untold
In that building long and low;
While the wheel goes round and round;
With a drowsy, dreamy sound,
And the spinners backward go.



THREADING DIAGRAM



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