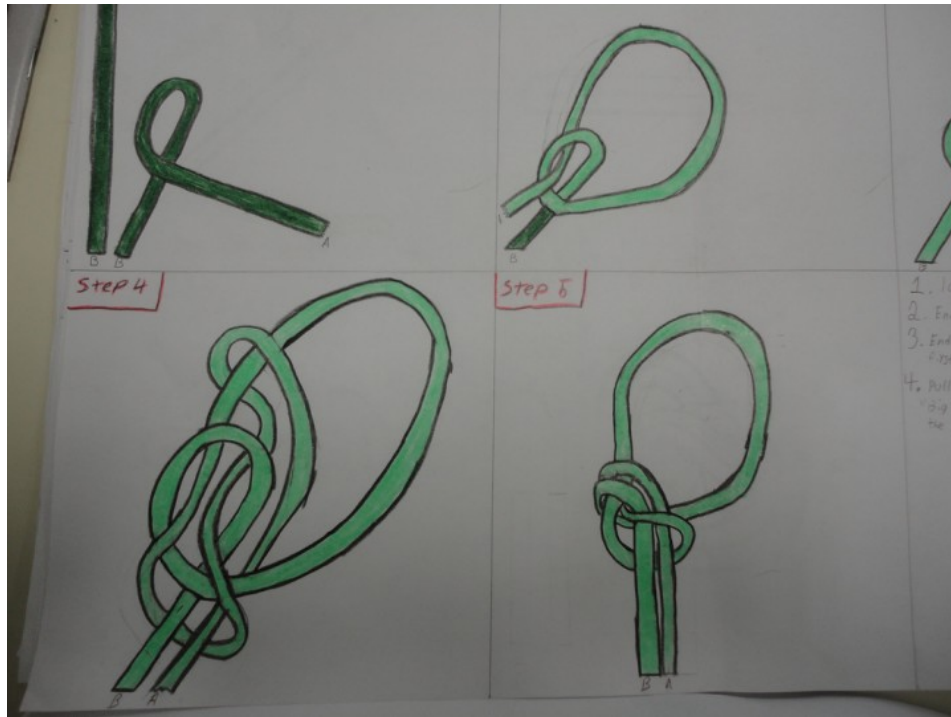


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Knots!

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Objective

Critical to understanding and solving any design problem is the designer's own ability to visually "see" the problem—resolve it in one's head and translate that to a physical representation. Through this lesson student's will have the opportunity to exercise their own mind/hand abilities using the utility and spacial complexities of classic knot configurations. Each student will receive one classic rope knot to study and produce a series of representations to aid in visually and verbally explaining the process of tying

the knot.

Best for: 7th-12th grade, individually

Concepts and Skills

Hand/eye coordination

Freehand drawing

Writing sequential directions

Collaborative problem solving

Materials

Each student will receive one or two lengths of 3/8" polyester rope. Lengths and number of pieces is determined by the knot they choose. See below.

The Knots

Square knot	2 lengths @ 2' each
Figure 8 loop	1 length @ 4'
Figure 8 bend	2 lengths @ 2' each
Bowline	1 length @ 4'
Bowline on a bite	1 length @ 4'
Yosemite Bowline	1 length @ 4'
Fisherman's	2 lengths @ 2' each
Double Fisherman's	2 lengths @ 2' each
Surgeon's bend	2 lengths @ 2' each

Surgeon's loop	1 length @ 4'
Butterfly loop	1 length @ 4'
Sheet bend	2 lengths @ 2' each
Perfection loop	1 length @ 4'

Time: Approximately 7 hours



Assignment:

Day One (3 hours):

Open with explanation of the problem and why it is relevant to the design process. Play the human knot game: 45-60 minutes (see below)

Pull names from hat to determine who gets first pick of available knots. Students may barter for trades at the end of the drawing.

Allow the rest of the period for practice understanding the knot and learning to tie it efficiently. Students should try to learn the knot by working backwards from a tied knot (no written or visual prompts)

should be given by the instructor until absolutely necessary.) Produce written instructions for tying the knot. Test your own instructions by giving your rope(s) and instructions to a classmate.

Homework: teach someone at home the knot and document their success as a pupil and you as an instructor.

Day Two: (3 hours):

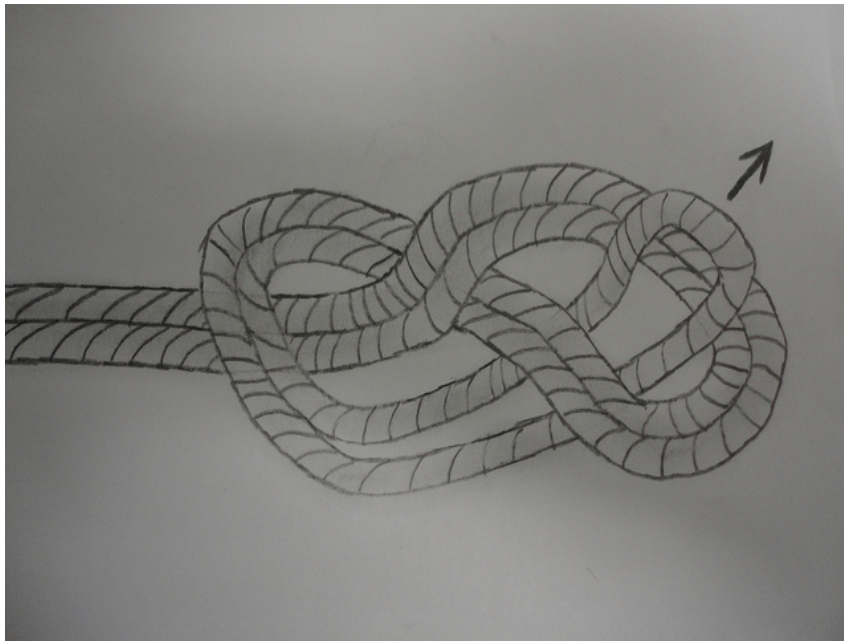
Produce a series of freehand drawings that take someone through the sequence of tying your knot. Initially, these should not be accompanied by any text. The first series of drawings should be very rough and sketchy. A final version in ink will include text for each drawn step.

Additional step for those who may finish early: Setup a point and shoot camera on a tripod above a desktop looking downward. Student will place the rope(s) in position for each sequence of the rope tying and shoot a still of that step. The series of photographed steps along with the drawings can be posted to blog with written instructions from the student.

Homework: finish drawings if not already. Try to use the knot situationally and document.

Day Three (1 hour):

Each student will briefly stand before the class and walk them through the steps (visually and verbally) of tying his/her knot.



Related exercises

The Human Knot: Designed for trust, leadership and collaboration skills the human knot is a great ice-breaker and 3D visualization game. How the game is played:

First break into small groups of 6-8 students. Students stand in a circle and begin by putting their right hand into the center and grasping the right hand of someone across from them (cannot be the person next to them.) Next they will put their left hand in and grasp the left hand of a different person (again, cannot be the person next to you.) To check contiguity, one person starts by squeezing their right hand. The student whose right hand was squeezed then squeezes their left hand and so on until the student who started has their left hand squeezed. If this works without interruption then it can be assumed a circle is complete.

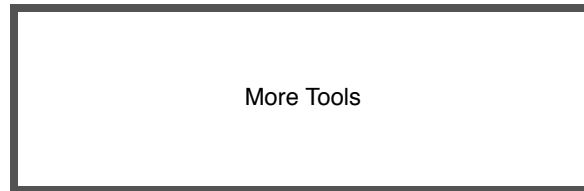
Now the task is to “unknot” the tangle without letting go. This will generally involve lots of ducking and crawling through neighbor’s arms. If the squeeze test was accurate students in the knot will be able to unknot themselves until they are standing in a perfect circle or sometimes a figure 8.

Assessment

Knot craft: 25%

Drawings and written documentation: 50%

Verbal presentation and participation: 25%



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