



## Knots + Lashings = Fun

When you were younger, did you ever build a fort out of cardboard boxes or a spaceship out of plastic building bricks? Have you ever built a tree house or playhouse in your backyard? Have you ever built a survival shelter or quinzee (snow shelter)? If so, you know how much fun building things can be.

Pioneering is a special Scouting way of building things from nothing but wooden poles, stakes, and rope. With a little ingenuity, you can use those basic ingredients to build everything from campsite gateways, camp chairs, and patrol tables to monkey bridges. Along the way, you will have the chance to practice skills like planning, problem solving, and teamwork—and to put into use basic knot-tying skills.

Pioneering requires plenty of poles and rope, so you will need to make sure you have access to both. Some troops and camps keep pioneering materials on hand, or you may be able to find a landowner who wants a wooded lot thinned out. (In keeping with the BSA's outdoor ethics, that is the only situation in which you should cut trees for pioneering projects.) Another option is to make scale models of pioneering projects using dowels and cord.

### Objectives

This month's activities should:

- Teach basic knot and lashing skills.
- Let Scouts put those skills to use.
- Introduce principles of engineering as Scouts build pioneering projects.
- Offer opportunities to practice planning, problem solving, and teamwork.
- Build self-confidence.

### RELATED ADVANCEMENT AND AWARDS

- Tenderfoot requirements 2, 4a, 4b, and 4c
- Second Class requirement 3a, 3b
- First Class requirements 3, 7a, 7b, 8a, and 10
- Pioneering merit badge
- Totin' Chip
- Paul Bunyan Woodsman
- Frontiersman Varsity Scout activity pin
- Ranger: Outdoor Living History elective



## Leadership Planning

As a leadership team, you may want to discuss the following items when choosing pioneering as your program feature during your planning meetings.

1. What will our main event be?
2. Where will we do our main event?
3. Do we have enough rope to teach knot tying?
4. Do we have access to pioneering poles?
5. Do we need to transport pioneering poles and other equipment to the site of our main event? If so, how will we do that?
6. How proficient are our Scouts and leaders in pioneering skills?
7. How can we involve parents?
8. What parts of the Pioneering merit badge can we focus on?
9. How can we use pioneering activities to promote team building?
10. To meet our needs, what should we change in the sample meeting plans?

## PARENTS CAN HELP WITH THE PIONEERING PROGRAM FEATURE BY:

1. Sharing their expertise
2. Providing transportation to and from the main event for Scouts and equipment
3. Supplying pioneering materials and equipment (poles, stakes, ropes, mallets, etc.)
4. Providing storage for pioneering materials

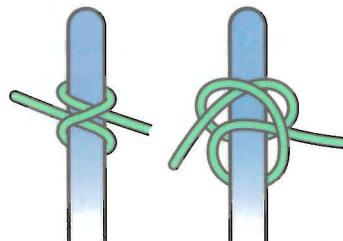


Projects that exceed the 6-foot height limitation can be done in a Scout camp setting as long as each project has the proper safety features and fall protection, such as belay lines. Consult the *Guide to Safe Scouting*. All pioneering projects are temporary in nature. Towers, bridges, and other structures that have been lashed together must be dismantled when they are no longer being used. This is both a matter of safety and a part of the BSA's "no trace" ethic.

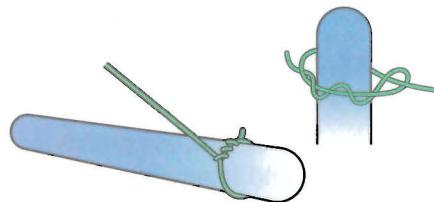
## PIONEERING PRINCIPLES

To build pioneering projects, you need to master a few basic skills.

**Clove hitch:** used to begin and end most lashings

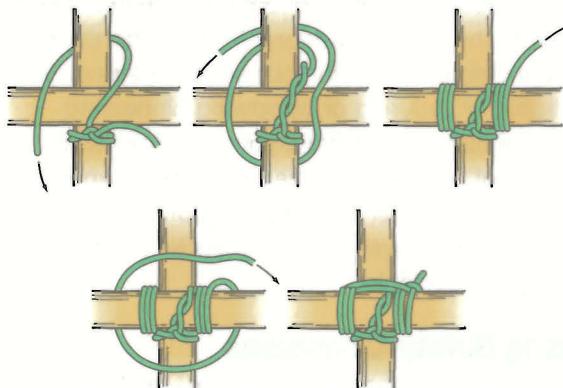


**Timber hitch:** used to begin the diagonal lashing





**Square lashing:** used to connect two poles at right angles



**Step 1—**Place the spars in position.

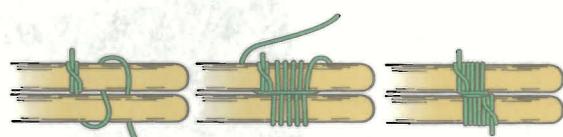
**Step 2—**Tie a clove hitch around the bottom spar near the crosspiece.

**Step 3—**Make three tight wraps around both spars, securing the end of the clove hitch as you would a timber hitch. As you form the wraps, lay the rope on the outside of each previous turn around the top spar, and on the inside of each previous turn around the bottom spar.

**Step 4—**Make two fraps around the wraps, pulling the rope very tight.

**Step 5—**Finish with a clove hitch around the top spar.

**Shear lashing:** used to connect two poles to create an A-frame

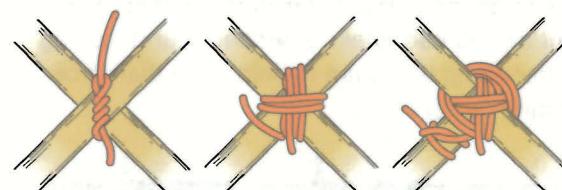


**Step 1—**Lay two spars side by side and tie a clove hitch to one of them.

**Step 2—**Make three or four loose wraps around the spars, and then put two loose fraps between them.

**Step 3—**Finish with a clove hitch around the other spar, then spread the ends of the spars to form the shape you need. Redo the lashing if it is too tight or too loose.

**Diagonal lashing:** used to connect two poles at angles other than right angles



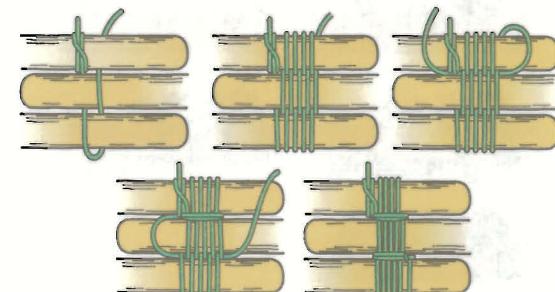
**Step 1—**Tie a timber hitch around both spars and pull in snug

**Step 2—**Make three tight vertical wraps around the spars, laying the wraps neatly alongside the timber hitch, then make three horizontal wraps across the spars.

**Step 3—**Cinch down the wraps with two fraps around the lashing, pulling the rope tight.

**Step 4—**Tie off the rope with a clove hitch.

**Tripod lashing:** used to create a tripod out of three poles



**Step 1—**Lay three poles alongside each other with the top of the center pole pointing the direction opposite that of the outside poles.

**Step 2—**Tie a clove hitch around one outside pole.

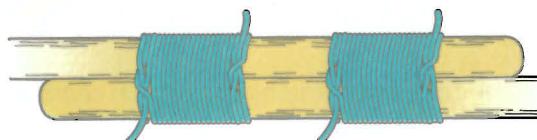
**Step 3—**Loosely wrap the poles five or six times, laying the turns of rope neatly alongside one another.

**Step 4—**Make two loose fraps on both sides of the center pole.

**Step 5—**End with a clove hitch around an outside pole. Spread the legs of the tripod into position. If you have made the wraps or fraps too tight, you may need to start over.

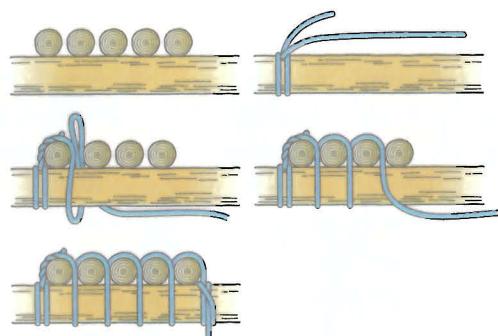


**Round lashing:** Used to connect two poles to make a longer pole, a round lashing has no fraps. The wraps must do all the work, so pull them as tight as you can. Make a second round lashing farther along the spars to help keep them from twisting out of line.



- Step 1**—Position the spars alongside each other and tie them together with a clove hitch.
- Step 2**—Make seven or eight very tight, neat wraps around the spars.
- Step 3**—Finish the lashing with another clove hitch around both spars.

**Floor lashing:** used to create a floor, tabletop or raft deck.



- Step 1**—Lay the poles side by side on top of the stringers—the logs or poles on which your platform will rest.
- Step 2**—Tie a clove hitch around one stringer.
- Step 3**—Bend the standing part of the rope over the first pole. Pull the bend of rope under the stringer and cast it over the second pole. You may need to lift the end of the pole to get the rope over it.
- Step 4**—Pull the rope tight, then bend it over the third pole. Continue until all the poles are bound to the stringer.
- Step 5**—Finish with a clove hitch, then repeat the procedure to lash the other ends of the poles to the other stringer.

## Being Conservation-Minded

Decades ago, Scouts would cut down small trees on campouts to build pioneering projects. In keeping with the BSA's outdoor ethics, we don't do that anymore. Talk with your adult leaders about options for securing or borrowing pioneering poles. If none is available, you can make scale models of pioneering projects or use downed branches for small projects that don't need to bear significant weight. Hiking sticks can be used for smaller projects.

## Being Safety-Conscious

Building pioneering projects is fun—as long as no one gets hurt. The Guide to Safe Scouting requires that pioneering projects have a maximum height of 6 feet. The poles may extend higher, but 6 feet is as high as Scouts can climb. Even then, be sure spotters are in place.

See the Pioneering merit badge pamphlet for additional safety information.

**Note:** Construct pioneering projects only with rope that is safe to use. Before using rope for pioneering projects, someone who is knowledgeable about rope should inspect it to make sure it is safe to use. The Pioneering merit badge pamphlet has more information about the breaking strength and safe working load of rope. See also Scouting Safely online at <http://www.scouting.org/scoutsource/HealthandSafety.aspx>.





## PIONEERING GAMES

### Crossing the Alligator Pit

**Equipment:** For each team, three spars 6 to 8 feet long, three 6-foot lashing ropes, four guy ropes

**How to play:** Mark the "alligator pit" on the ground, 20 feet across and as wide as necessary to accommodate your teams. Teams line up on one side of the pit. On signal, they lash together a triangular "walker," using a shear lashing at the top and diagonal lashings for the crossbar. Near the top, they attach four guy lines, using two half hitches. The team then stands the walker upright and one member climbs on the crossbar. One or two Scouts guide each guy line and "walk" the walker across the pit by tipping it from side to side and moving it forward.

**Scoring:** The first team to finish wins.

**Note:** This can be a timed contest if there aren't enough spars for all teams.

### Heave the Lightweight

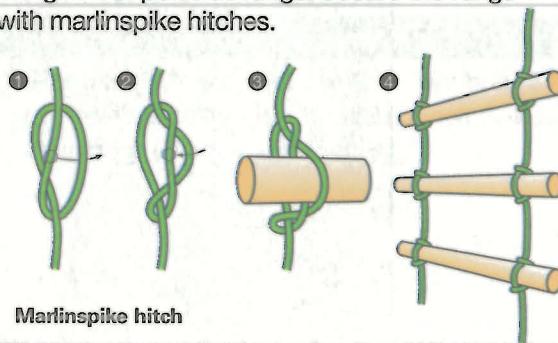
**Equipment:** For each team, three poles, 10 feet long; one lashing rope, 20 feet long; ½-inch heaving rope, 30 feet long

**How to play:** Each team assembles a tripod 9 to 10 feet high using a tripod lashing. The team then heaves a half-inch rope over the top and makes a bowline on a bight in the end hanging from the tripod. The team's lightest member stands in the bowline and the other members raise him 3 feet off the ground. The first team achieving this wins.

### Fireman, Save That Child!

**Equipment:** Two ½-inch ropes, 20 feet long; four or five 4-foot poles with ½-to 2-inch butts; two 2-foot stakes

**How to play:** Each team makes a rope ladder using 4-foot poles as rungs. Secure the rungs with marlinspike hitches.



Marlinspike hitch

Rungs should be 1 foot apart. The team then secures the ladder to a tree limb not more than 10 feet above the ground. If desired, the team can stake the bottom to the ground. When the ladder is secure, all members climb, one by one, and touch the tree limb. The team with all members up and down the ladder in the fastest time wins.

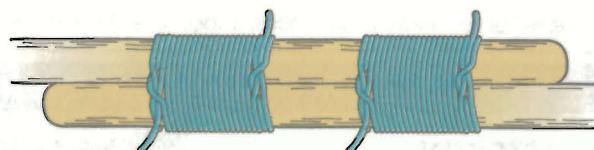
### Move the Weight

If the campsite has a very heavy weight on the ground that a team can't lift (a huge log, perhaps), have a timed contest in which teams try to move it using rope tackle, as shown in the Pioneering merit badge pamphlet. The first team to move the weight 6 feet is the winner.

### Flagpole Raising

**Equipment:** For each team, five Scout staves (or hoe handles), one flag, eight pieces of sash cord, three wooden stakes, one mallet for driving stakes, and three guylines about 18 feet long

**How to play:** The teams line up, each with four staves and their flag attached to the fifth stave. On signal, the Scouts use the sash cord to lash their five staves together using round lashes. Next, they attach the three guy lines about two-thirds of the way to the top, raise the pole, and stake down the guy lines so the pole stands vertically. When finished, the team forms a single line at the base of the pole and stands at attention.



Round lashing

**Scoring:** The first team to finish wins. In the event of a tie, the team with the tallest pole wins.

For other good games and contests, see the Games section of *Troop Program Resources* for Knot Hoop Relay, Knot-Tying Relay, Bow-Saw Relay, and Remote Clove-Hitch Tying.



## E.D.G.E. Ideas

**E**xplain how it is done—Tell them.

**D**emonstrate the steps—Show them.

**G**uide learners as they practice—Watch them do it.

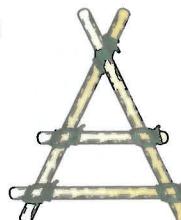
**E**nable them to succeed on their own—Have them practice/teach it.

### EXPLAIN

- Show pictures and videos of pioneering projects.
- Explain the steps in building pioneering projects.
- Discuss project safety requirements.
- Explain how to do pioneering projects while following Leave No Trace principles.
- Teach the mnemonic device “Wrap thrice, frap twice.”

### DEMONSTRATE

- Demonstrate knot-tying by using large ropes of different colors.
- Demonstrate how to whip rope by whipping a large log with nylon cord.
- Build an A-trestle while other Scouts watch.
- Show techniques for coiling and throwing rope.



A-trestle

### GUIDE

- Work one-on-one with Scouts as they learn knots and lashings. (Stand beside them rather than facing them.)
- Have Scouts build simple pioneering projects while you watch.
- Give feedback as Scouts tie knots and make lashings.
- After Scouts complete a pioneering project, encourage them to evaluate their own work. Are the lashings tight? Is the project sufficiently anchored? How much does it look like the model?

### ENABLE

- Distribute diagrams or models of pioneering projects and have Scouts replicate them.
- Challenge Scouts to invent their own projects.
- Pair learners with new Scouts so that they can practice the EDGE method to teach the skills they've just learned.
- Play games that let Scouts put the skills they've learned into practice.

### MAIN EVENT SUMMARIES

● ESSENTIAL	■ CHALLENGING	◆ ADVANCED
<b>Day Activity</b> Pioneering boot camp—Spend a morning practicing pioneering skills, then test those skills in a catapult competition.	<b>Day Activity</b> Pioneering field day—Spend the day building one or more major pioneering projects.	<b>Weekend Activity</b> “Pionengineering” weekend—Spend the weekend creating innovative pioneering projects.



# PIONEERING

## Meeting Plan: Knots and Trestles



Week 1 Date May 18, 2018

ACTIVITY	DESCRIPTION	RUN BY	TIME*
Preopening 15 minutes before meeting	Require each participant to tie a square knot in order to enter the meeting room. Teach the knot to those who don't know it.		
Opening Ceremony 10 minutes	Flag presentation Oath and Law Uniform inspection		7 p.m.
Group Instruction 10 minutes	Explain what pioneering is, and brainstorm types of pioneering projects.		7:10 p.m.
Skills Instruction 45 minutes	<ul style="list-style-type: none"><li>• Practice tying the square knot, clove hitch, two half hitches, and taut-line hitch.</li><li>• Practice setting up a tarp using two half hitches and taut-line hitches.</li><li>• Practice square and diagonal lashings.</li><li>• Build a trestle frame (a square frame with two diagonal supports, all lashed with square lashings except for a diagonal lashing in the center.)</li><li>• Inventory the unit's supply of pioneering poles and ropes.</li><li>• Sort ropes by size and whip the ends of any that are fraying.</li></ul>		7:20 p.m.
Breakout Groups 10 minutes	<ul style="list-style-type: none"><li>• Discuss plans for the main event.</li><li>• Review what personal and group equipment will be needed.</li></ul>		8:05 p.m.
Game 10 minutes	Play Knot Trail. (See <i>Troop Program Resources</i> .)		8:15 p.m.
Closing 5 minutes	Announcements Leader's minute Closing		8:25 p.m.
Total 90 minutes of meeting			
After the Meeting 15 minutes	Leadership team reviews plans for the next meeting and for the main event.		

\*All times are suggested.



# PIONEERING

## Meeting Plan: Tripods and Towers



Week 2 Date \_\_\_\_\_

ACTIVITY	DESCRIPTION	RUN BY	TIME*
<b>Preopening</b> 15 minutes before meeting	Using the EDGE method, demonstrate how to whip a piece of rope.		
<b>Opening Ceremony</b> 10 minutes	Flag presentation Oath and Law Uniform inspection		7 p.m.
<b>Group Instruction</b> 10 minutes	Show YouTube videos of one or two impressive pioneering projects.		7:10 p.m.
<b>Skills Instruction</b> 40 minutes	<ul style="list-style-type: none"><li>• Practice tying the timber hitch, bowline, and sheet bend.</li><li>• Do Rescue-Carry Relay from <i>Troop Program Resources</i>.</li><li>• Practice shear, tripod, and round lashings.</li><li>• Form teams and see which one can build a tripod fastest.</li><li>• Divide into teams and give each team an equal number of dowels and string.</li><li>• See which team can build the tallest tower.</li></ul>		7:20 p.m.
<b>Breakout Groups</b> 15 minutes	<ul style="list-style-type: none"><li>• Begin meal planning and create a duty roster for the main event.</li><li>• Practice for the game.</li></ul>		8 p.m.
<b>Game</b> 10 minutes	Play Log-Raising Relay. (See <i>Troop Program Resources</i> .)		8:15 p.m.
<b>Closing</b> 5 minutes	Announcements Leader's minute Closing		8:25 p.m.
<b>Total 90 minutes of meeting</b>			
<b>After the Meeting</b> 15 minutes	Leadership team reviews plans for the next meeting and for the main event.		

\*All times are suggested.



# PIONEERING

## Meeting Plan: Advanced Lashing, Part 1



Week 3 Date \_\_\_\_\_

ACTIVITY	DESCRIPTION	RUN BY	TIME*
<b>Preopening</b> 15 minutes before meeting	Challenge each arriving Scout to tie any three knots behind his back.		
<b>Opening Ceremony</b> 10 minutes	Flag presentation Oath and Law Uniform inspection		7 p.m.
<b>Group Instruction</b> 5 minutes	Have the group vote on which pioneering project(s) to build during the main event.		7:10 p.m.
<b>Skills Instruction</b> 45 minutes	<ul style="list-style-type: none"><li>• Learn how to do square lashings and diagonal lashings.</li><li>• Experiment to discover how tight frapping and triangular shapes make structures stronger.</li><li>• Practice floor lashing.</li><li>• Plan and begin building a camp table using floor lashing as the tabletop.</li><li>• Determine what pioneering materials will be needed for the main event. (See the <i>Pioneering</i> merit badge pamphlet.)</li><li>• Make plans to secure the materials you don't have.</li></ul>		7:15 p.m.
<b>Breakout Groups</b> 15 minutes	<ul style="list-style-type: none"><li>• Finalize meal planning for the main event.</li><li>• Practice for the game.</li></ul>		8 p.m.
<b>Game</b> 10 minutes	Play Knot Step Relay. Scouts line up against one wall of the meeting room. Leader calls out a knot, and Scouts try to tie it. Those who are successful move two steps forward. Continue until one Scout reaches the far wall.		8:15 p.m.
<b>Closing</b> 5 minutes	Announcements Leader's minute Closing		8:25 p.m.
<b>Total 90 minutes of meeting</b>			
<b>After the Meeting</b> 15 minutes	Leadership team reviews plans for the next meeting and for the main event.		

\*All times are suggested.



# PIONEERING

## Meeting Plan: Advanced Lashing, Part 2



Week 4 Date \_\_\_\_\_

ACTIVITY	DESCRIPTION	RUN BY	TIME*
<b>Preopening</b> 15 minutes before meeting	Challenge each arriving Scout to tie a one-handed bowline.		
<b>Opening Ceremony</b> 10 minutes	Flag presentation Oath and Law Uniform inspection		7 p.m.
<b>Group Instruction</b> 15 minutes	<ul style="list-style-type: none"><li>• Demonstrate how to make rope. (See the <i>Pioneering</i> merit badge pamphlet.)</li><li>• Brainstorm types of pioneering projects.</li></ul>		7:10 p.m.
<b>Skills Instruction</b> 35 minutes	<ul style="list-style-type: none"><li>• Learn shear, tripod, and round lashings.</li><li>• Make a simple camp gadget such as a hand washing station.</li></ul> <ul style="list-style-type: none"><li>Finish building the camp table begun last week.</li></ul> <ul style="list-style-type: none"><li>• Using dowel rods and string, build a scale model pioneering merry-go-round.</li><li>• Check the Internet for ideas.</li></ul>		7:25 p.m.
<b>Breakout Groups</b> 15 minutes	<ul style="list-style-type: none"><li>• Review plans for the main event.</li><li>• Build trestle frames for the game.</li></ul>		8 p.m.
<b>Game</b> 10 minutes	Play Roman Chariot Race. (See <i>Troop Program Resources</i> .)		8:15 p.m.
<b>Closing</b> 5 minutes	Announcements Leader's minute Closing		8:25 p.m.
<b>Total 90 minutes of meeting</b>			
<b>After the Meeting</b> 5 minutes	Leadership team reviews plans for the next meeting and for the main event.		

\*All times are suggested.



# PIONEERING

## Main Event: Pioneering Boot Camp



Date \_\_\_\_\_

### Logistics

Location: \_\_\_\_\_  
\_\_\_\_\_

Departure time: \_\_\_\_\_

Return time: \_\_\_\_\_

Duration of activity: 4 hours

Budget: Completed \_\_\_\_\_ Approved \_\_\_\_\_

Camping: Duty roster \_\_\_\_\_ Menu \_\_\_\_\_

Transportation: Group \_\_\_\_\_ Self \_\_\_\_\_

Tour and activity plan: Completed \_\_\_\_\_ Submitted \_\_\_\_\_

### Essential (Tier I)

Spend a morning practicing pioneering skills, then test those skills in a catapult competition.

### Equipment List

- Pioneering poles and rope
- Plans for catapults
- Water balloons
- Buckets to hold water balloons
- Work gloves
- Lunch (decide on individual or group)
- Water
- Scout Basic Essentials (Review the list and take what you need.)

### Activity

- Find and reserve a location with plenty of open space.
- Plan round-robin stations to review knots, lashings, and construction techniques.
- Form teams or divide into patrols.  
Morning: Conduct round-robin to review skills.  
Afternoon: Build catapults and compete to see which team's catapult can send water balloons the longest distance.
- Hold a reflection to discuss what went right, when went wrong, and what the Scouts learned.

### Safety

Cell phones are a good idea as appropriate, and have a first-aid kit handy. Use the buddy system. Special concerns in pioneering include avoiding blisters and being careful carrying heavy poles.

### Notes



# PIONEERING

## Main Event: Pioneering Field Day



Date \_\_\_\_\_

### Logistics

Location: \_\_\_\_\_

Departure time: \_\_\_\_\_

Return time: \_\_\_\_\_

Duration of activity: 4 hours

Budget: Completed \_\_\_\_\_ Approved \_\_\_\_\_

Camping: Duty roster \_\_\_\_\_ Menu \_\_\_\_\_

Transportation: Group \_\_\_\_\_ Self \_\_\_\_\_

Tour and activity plan: Completed \_\_\_\_\_ Submitted \_\_\_\_\_

### Challenging (Tier II)

Spend the day building one or more major pioneering projects.

### Equipment List

- Pioneering poles and rope
- Plans for one or more pioneering projects
- Work gloves
- Lunch (decide on individual or group)
- Water
- Scout Basic Essentials (Review the list and take what you need.)

### Activity

- Find and reserve a location with plenty of open space.
- Research plans for various pioneering projects (e.g., monkey bridge, signal tower, hourglass tower) and decide which one(s) to build.
- Spend the day building the project(s) you chose.
- Hold a reflection to discuss what went right, when went wrong, and what the Scouts learned.

### Safety

Cell phones are a good idea as appropriate, and have a first-aid kit handy. Use the buddy system. Special concerns in pioneering include avoiding blisters and being careful carrying heavy poles.

### Notes



# PIONEERING

## Main Event: "Pionengineering" Weekend



Date \_\_\_\_\_

### Logistics

Location: \_\_\_\_\_

Departure time: \_\_\_\_\_

Return time: \_\_\_\_\_

Duration of activity: Weekend

Budget: Completed \_\_\_\_\_ Approved \_\_\_\_\_

Camping: Duty roster \_\_\_\_\_ Menu \_\_\_\_\_

Transportation: Group \_\_\_\_\_ Self \_\_\_\_\_

Tour and activity plan: Completed \_\_\_\_\_ Submitted \_\_\_\_\_

### Advanced (Tier III)

Spend the weekend creating innovative pioneering projects.

### Equipment List

- Pioneering poles and rope
- Work gloves
- Camping gear (individual and group)
- Food
- Water
- Scout Basic Essentials (Review the list and take what you need.)

### Activity

- Find and reserve a location with plenty of open space.
- Form teams or divide into patrols
- To practice pioneering skills, build camp gadgets (e.g., wash stands, shoe racks, gateways).
- Provide teams a set amount of time to build the most creative pioneering project they can with the materials provided.
- Hold reflection to discuss what went right, when went wrong, and what the Scouts learned.

### Safety

Cell phones are a good idea as appropriate, and have a first-aid kit handy. Use the buddy system. Special concerns in pioneering include avoiding blisters and being careful carrying heavy poles.

### Notes



## RESOURCES AND REFERENCES

### Books

*Climbing and Rappelling* and *Pioneering* merit badge pamphlets

*Boy Scout Handbook*

*Troop Program Resources*

*Knots and How to Tie Them*

### Websites

**PioneeringProjects.org**

Website: [www.pioneeringprojects.org](http://www.pioneeringprojects.org)

**Scout Pioneering**

Website: [scoutpioneering.com](http://scoutpioneering.com)

**Pioneering Made Easy**

Website: [www.pioneeringmadeeasy.co.uk](http://www.pioneeringmadeeasy.co.uk)

### Related Program Features

Climbing and Rappelling, Engineering, and Project COPE