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For more knot knowledge from author Glenn Dickey, including links to helpful websites, please visit morethanknots.com.

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Tim Bowman: pages 13, 16, 18, 20, 22, 24, 28, 30, 32, 34, 36, 40, 42, 44, 46.
National 4-H: page 52 (boy with goat).
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Congratulations! A 4-H member has asked you to serve as a project helper. You may be a parent, relative, project leader, friend, club advisor, or another person important in the 4-H member’s life. Your duties begin with helping the youth create and carry out a project plan, as outlined in the Member Project Guide. This is followed by helping the youth focus on each activity, providing support and feedback, and determining what was done well, what could have been done differently, and where to go next.

As a project helper, it is up to you to encourage, guide, and assist the 4-H member. How you choose to be involved helps to shape the 4-H member’s life skills and knowledge of the importance of cordage and knot-tying.

YOUR ROLE AS PROJECT HELPER

Your contributions are critical to delivery of the 4-H program, which is committed to providing experiences that strengthen a young person’s sense of belonging, generosity, independence, and mastery. Your interactions should support positive youth development within the framework of the Eight Essential Elements:

1. A positive relationship with a caring adult
2. An inclusive environment
3. A safe emotional and physical environment
4. Opportunity for mastery
5. Engagement in learning
6. Opportunity to see oneself as an active participant in the future
7. Opportunity for self-determination
8. Opportunity to value and practice service to others

For more information on the Eight Essential Elements, please refer to the Volunteer Handbook available online at ohio4h.org. In addition, on a practical level, your role as a project helper means you will . . .

WHAT YOU CAN DO

• Review the Learning Outcomes (project skill, life skill, educational standard, and success indicator) for each activity to understand the learning taking place. See the inside back cover for the Summary of Learning Outcomes.
• Become familiar with each activity and the related background information. Stay ahead of the learner by trying out activities beforehand.
• Begin the project by helping the learner establish a plan. This is accomplished by reviewing the Member Project Guide.
• After each project area is completed, conduct a debriefing session that allows the learner to answer the review questions and share results. This important step improves understanding from an experiential learning perspective.
• Help the learner celebrate what was done well and to see what could be done differently. Allow the learner to become better at assessing his or her own work.
• In the Member Project Guide, date and initial the activities that have been completed. Each knot-tying activity asks the member to mark the activity as completed only when he or she can tie the knot without looking at the step-by-step directions. It is likely the 4-H member will be asked to demonstrate this ability during judging.

WHAT YOU SHOULD KNOW ABOUT EXPERIENTIAL LEARNING

The information and activities in this book are arranged in a unique, experiential fashion (see model). In this way, a youth is introduced to a particular practice, idea, or piece of information through an opening (1) experience. The results of the activity are recorded on the accompanying pages. The youth then takes the opportunity to (2) share what he or she did with his or her project helper, (3) processes the experience through a series of questions that allows him or her to (4) generalize, and (5) apply the new knowledge and skill.

Learning to tie knots requires patience and practice. You can help by acknowledging your 4-H member’s efforts and by providing lots of encouragement.
Welcome to *Not Just Knots*! You are about to learn 14 basic knots, bends, and hitches that can be used in many activities and situations, from sailing and climbing, to working with animals and decorating. This is going to be a lot of fun, and we’re *knot* kidding!

Each year the *Not Just Knots* project is taken, you can choose a final, or capstone, project to demonstrate your new tying skills. If you take *Not Just Knots* more than once, be sure to select a new capstone project that demonstrates new and different knowledge and skills.

*Not Just Knots* is designed for 4-H members of all ages and skill levels. This project can easily be completed in one year, although younger members may decide to do it in two. Youth with more experience can repeat this project as long as they can demonstrate new knowledge and skills.

As you complete the activities in this book, you will notice that some knots are known by many names. It is helpful to know a knot’s various names so that, when you run across them in other books and other situations, you know the knot being talked about. The various names are included for your reference, not because you are required to memorize them.

Check your county’s project guidelines (if any) for completion requirements in addition to the ones below, especially if you plan to prepare an exhibit for the fair.

Making each knot and learning about it will take from 30 minutes to an hour, depending on how easy it is for you to follow the steps. The secret to really learning them—to memorizing them—is to practice. Every time you start a new knot, see if it helps to start by tying all the ones that have come before. Good luck!

This is the ______________________ (first, second, third, etc.) time I have taken this project.

**SAFETY PLEDGE**

Handling rope can be dangerous. Rope that is incorrectly handled or tied can burn, injure, or even kill people and animals. Read the paragraph below. After discussing rope safety with your project helper, sign and date where indicated.

I pledge to handle rope and other cordage carefully, never using it to tie a person in any way. I will be especially careful of limbs, including arms and fingers, which can easily become caught in coils and small loops. When working with rope that is under great tension, I will use gloves and avoid wrapping a rope around my hand for a better grip. I will seek the appropriate training, equipment, and expertise before using any of the knots, bends, or hitches in this book for caving, climbing, sailing, or other activities with potential risk. In other words, I agree to use the knowledge and skills gained through completing the *Not Just Knots* project to make the best better.

Signature of 4-H Member: ________________________________ Date: ________________

Signature of Project Helper: ________________________________ Date: ________________
PROJECT GUIDELINES

Step 1: Complete all 17 activities, and all of the Talking It Over questions.

Step 2: Take part in at least two learning experiences.

Step 3: Become involved in at least two leadership/citizenship activities.

Step 4: Complete a project review.

STEP 1: PROJECT ACTIVITIES

Complete all 17 activities and all of the Talking It Over questions. The More Challenges activities are optional. As you finish activities, review your work with your project helper. Then ask your project helper to initial and date your accomplishments.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Date Completed</th>
<th>Project Helper Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project Area: Knot Basics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Types of Cordage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Parts of Cordage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Talking It Over</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Project Area: Simple Knots</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Overhand Knot</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Square Knot</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Bowline Knot</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Figure 8 Knot</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Alpine Butterfly Knot</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Talking It Over</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Project Area: Bends</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Sheet Bend</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Sheepshank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Anchor Bend</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Carrick Bend</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Fisherman’s Knot</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Talking It Over</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Project Area: Hitches

13. Half Hitch

14. Round Turn and Two Half Hitches

15. Clove Hitch

16. Rolling Hitch

### Talking It Over

### Project Area: Capstone Project

17. What I’ve Learned

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**STEP 2: LEARNING EXPERIENCES**

Learning experiences are meant to complement project activities, providing the opportunity for you to do more in subject areas that interest you. What are some learning experiences you could do to show the interesting things you are learning about? Here are some ideas:

- Attend a clinic, workshop, demonstration, or speech related to knot-tying and rope.
- Help organize a club meeting based on this project.
- Go on a related field trip or tour.
- Prepare your own demonstration, illustrated talk, or project exhibit.
- Participate in county judging.

Once you have a few ideas, record them here. Complete at least two learning experiences. Then, describe what you did in more detail. Ask your project helper to date and initial in the appropriate spaces below.

<table>
<thead>
<tr>
<th>Plan to Do</th>
<th>What I Did</th>
<th>Date Completed</th>
<th>Project Helper Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstration</td>
<td>Showed club members how to tie five simple knots.</td>
<td>5/5/YR</td>
<td>J.D.</td>
</tr>
</tbody>
</table>

---

**Plan to Do:**

- Attend a clinic, workshop, demonstration, or speech related to knot-tying and rope.
- Help organize a club meeting based on this project.
- Go on a related field trip or tour.
- Prepare your own demonstration, illustrated talk, or project exhibit.
- Participate in county judging.

**What I Did:**

- Showed club members how to tie five simple knots.

**Date Completed:**

- 5/5/YR

**Project Helper Initials:**

- J.D.
STEP 3: LEADERSHIP AND CITIZENSHIP ACTIVITIES

Choose at least two leadership/citizenship activities from the following list (or create your own) and write them in the table below. Record your progress by asking your project helper to initial next to the date each one is completed. You may add to or change these activities at any time. Here are some examples of leadership/citizenship activities:

• Teach someone about knot-tying and rope.
• Help another member prepare for his or her project judging.
• Host a workshop to share tips about knot-tying and rope.
• Encourage someone to enroll in the knot project.
• Arrange for a rope and knot-tying speaker to visit your club.
• Plan your own leadership/citizenship activity.

<table>
<thead>
<tr>
<th>Leadership/Citizenship Activity</th>
<th>Date Completed</th>
<th>Project Helper Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organized a club field trip to a rock climbing gym. Learned about the types of rope and knots climbers use to stay safe.</strong></td>
<td>6/12/YR</td>
<td>J.D.</td>
</tr>
</tbody>
</table>
STEP 4: PROJECT REVIEW

All finished? Congratulations! After you've completed the activities in this book you are ready for a project review. This process will help assess your personal growth and evaluate what you have learned.

Use this space to write a brief summary of your project experience. Be sure to include a statement about the skills you have learned and how they may be valuable to you in the future.

___________________________________________________________________________________
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___________________________________________________________________________________

Now, set up a project evaluation. You can do this with your project helper, club leader, or another knowledgeable adult. It can be part of a club evaluation or it can be part of your county’s project judging.
Nowadays, instead of using the word *rope*, people who *knot* say *cordage*. You’ll soon discover that cordage is made of a wide variety of materials. *Natural* fibers used for cordage include *cotton, sisal, jute, coir*, and *hemp*. Man-made, or *synthetic*, materials are also popular. Let’s take a look.

**WHAT TO DO**

Visit a hardware store and compare four different kinds of cordage. Find four that seem really different. As you examine each one, fill out the chart below. Some information you are looking for may appear on the cordage label.

<table>
<thead>
<tr>
<th>Cordage material</th>
<th>Natural or synthetic?</th>
<th>How is it made?</th>
<th>What does it feel like? What is the texture?</th>
<th>Does it stretch? (Y/N)</th>
<th>Would it be good for this project?</th>
</tr>
</thead>
<tbody>
<tr>
<td>paracord</td>
<td>synthetic</td>
<td>braided with inside cord</td>
<td>smooth</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

**LEARNING OUTCOMES**

*Project Skill:* Identifying different types of cordage  
*Life Skill:* Processing information  
*Educational Standard:* NT.K-12.1, Basic Operations and Concepts: Students demonstrate a sound understanding of the nature and operation of technology systems.  
*Success Indicator:* Identifies different types of cordage
Cordage materials have evolved over time. Natural fibers have been used in cordage for thousands of years. Man-made synthetic fibers are relatively recent.

<table>
<thead>
<tr>
<th>Natural</th>
<th>Synthetic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cotton</strong></td>
<td>A soft, usually white, fluffy material that is made from the hairs around the seeds of a tall plant related to mallows; in knotting, cotton cordage is typically easy to handle and knots very well.</td>
</tr>
<tr>
<td><strong>Jute</strong></td>
<td>A glossy fiber made from either of two Asian plants that is used mainly for making sacks and twine; knots very well, but because of its short fibers it is not very strong.</td>
</tr>
<tr>
<td><strong>Sisal</strong></td>
<td>A strong, white durable fiber produced from the leaves of the agave plant and used as cordage and twine; a good choice for general-purpose twine.</td>
</tr>
<tr>
<td><strong>Polypropylene/polyethylene</strong></td>
<td>A flexible and lightweight man-made fiber that is very economical for general-purpose rope. Polypropylene/polyethylene typically floats and is resistant to rot, oil, water, gasoline, and most chemicals.</td>
</tr>
<tr>
<td><strong>Polyester</strong></td>
<td>A strong, man-made fiber made from polymers that are popular in marine and other industries where stretch is not desired. Polyester cordage is typically resistant to wear, sun damage, rot, oil, gasoline, and most chemicals.</td>
</tr>
<tr>
<td><strong>Nylon</strong></td>
<td>A strong, man-made fiber known for its flexibility and ability to absorb shock. It lasts four to five times longer than natural fibers. Nylon cordage is typically resistant to wear, sun damage, rot, oil, gasoline, and most chemicals. SAFETY NOTE: When used under tension, such as a tow rope or mooring line, nylon cordage stretches and snaps back when the tension is released. Take extra precaution when using nylon cordage under tension, or consider using another material.</td>
</tr>
</tbody>
</table>

**MORE CHALLENGES**

A way to test whether a cord is synthetic or natural is to burn the end. Purchase a small piece of each cordage you wrote about in your chart. *With your helper*, burn one end of each to see what happens. Cordage made from natural fibers burns easily. Cordage made from synthetic fibers melts and even fuses. Are any of them a combination? Document and share what you learn.
HOW CORDAGE IS MADE

Spun or twisted strands of fiber create cordage. Why? This is important: Combining the strands helps to increase the strength of the cord. There are four ways this is done.

1. **Laid.** Three or more strands are twisted in the direction opposite the direction of the twist in the strands. In other words, it is twisted and counter-twisted.
   - **Hard laid:** Greater tension is applied during twisting, making a stiff, less flexible rope that wears better.
   - **Soft laid:** Little tension is applied during twisting, making a floppy and flexible rope that is preferable for tying knots.

2. **Braided.** Single strands braided together. An eight- or 16-braid is more flexible and stretches less than laid rope. Braided rope does not kink or twist. Most braided cordage is part of a sheath and core construction. Braid-on-braid rope is known to be the strongest rope.

3. **Plaited.** Twisted strands braided together. Combines eight or 16 strands, normally of nylon material and woven in pairs.

4. **Sheath and core.** Climbing ropes are also called sheath and core.
   - **Sheath:** Protector of the core; the thicker the sheath, the more protection it provides to the core. It provides a small amount of strength.
   - **Core:** Individual pieces of yarn or rope bundled to form the core. The core is where the rope gets the majority of its strength and ability to absorb shock.

WHAT CORDAGE DO I NEED FOR THIS PROJECT?

All you need to complete the activities in this project are two pieces of clothesline-type cordage, each about 3 feet long and ¼ inch (6 mm) in diameter. You can use other cordage, but cotton or synthetic clothesline is especially easy to handle and control. It is also inexpensive and readily available.
**HOW DO I KEEP MY CORDAGE FROM UNRAVELING?**

No matter what kind of cordage you use, it will last longer and your knots will look better if you finish the ends. The method you use depends on the material, as shown in the table below. If you decide to use heat to finish the end of your cordage, do so only with your project helper.

<table>
<thead>
<tr>
<th>Method</th>
<th>Material</th>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WHIPPING</strong></td>
<td>Sisal with an end whipped with cotton string.</td>
<td>Wrapping and securing small cordage like string, twine, or whipping cord around an end of larger cordage.</td>
</tr>
<tr>
<td><strong>FUSING</strong></td>
<td>Paracord with a fused end.</td>
<td>Using either a flame or tool like a hot soldering iron, gently heat the end of the cordage until it melts.</td>
</tr>
<tr>
<td><strong>GLUING</strong></td>
<td>Cotton clothesline with a glued end.</td>
<td>Before cutting the cordage, either dip the area you wish to cut in glue or apply glue to the area. Let dry, then cut. The glued spot will prevent the cord from unraveling.</td>
</tr>
<tr>
<td><strong>TAPING</strong></td>
<td>Three-stranded cotton with a taped end.</td>
<td>Using a strong tape, such as electrical tape, wrap both sides of the area you wish to cut with several turns of the tape. Cut the cordage in the middle of the area. Using this method, you can finish two ends of cordage with one taping.</td>
</tr>
</tbody>
</table>

**DID YOU KNOW?**

As a general rule, a cord that is twice the diameter of another is four times stronger.
## SUMMARY OF LEARNING OUTCOMES

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>PROJECT SKILL</th>
<th>LIFE SKILL</th>
<th>EDUCATIONAL STANDARD*</th>
<th>SUCCESS INDICATOR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project Area: Knot Basics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Types of Cordage</td>
<td>Identifying different types of cordage</td>
<td>Processing information</td>
<td>NT.K-12.1, Basic Operations and Concepts: Students demonstrate a sound understanding of the nature and operation of technology systems.</td>
<td>Identifies different types of cordage</td>
</tr>
<tr>
<td>2. Parts of Cordage</td>
<td>Uses correct terminology to identify basic cordage parts</td>
<td>Visualizing information</td>
<td>NT.K-12.1, Basic Operations and Concepts: Students demonstrate a sound understanding of the nature and operation of technology systems.</td>
<td>Uses correct terminology to identify basic cordage parts</td>
</tr>
<tr>
<td><strong>Project Area: Simple Knots</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Overhand Knot</td>
<td>Tying and understanding the use of an overhand knot</td>
<td>Mastering technology</td>
<td>NT.K-12.1, Basic Operations and Concepts: Students are proficient in the use of technology.</td>
<td>Ties an overhand knot</td>
</tr>
<tr>
<td>4. Square Knot</td>
<td>Tying and understanding the use of a square knot</td>
<td>Mastering technology</td>
<td>NT.K-12.1, Basic Operations and Concepts: Students are proficient in the use of technology.</td>
<td>Ties a square knot</td>
</tr>
<tr>
<td>5. Bowline Knot</td>
<td>Tying and understanding the use of a bowline knot</td>
<td>Mastering technology</td>
<td>NT.K-12.1, Basic Operations and Concepts: Students are proficient in the use of technology.</td>
<td>Ties a bowline knot</td>
</tr>
<tr>
<td>6. Figure 8 Knot</td>
<td>Tying and understanding the use of a figure 8 knot</td>
<td>Mastering technology</td>
<td>NT.K-12.1, Basic Operations and Concepts: Students are proficient in the use of technology.</td>
<td>Ties a figure 8 knot</td>
</tr>
<tr>
<td>7. Alpine Butterfly Knot</td>
<td>Tying and understanding the use of an alpine butterfly knot</td>
<td>Mastering technology</td>
<td>NT.K-12.1, Basic Operations and Concepts: Students are proficient in the use of technology.</td>
<td>Ties an alpine butterfly knot</td>
</tr>
<tr>
<td><strong>Project Area: Bends</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Sheet Bend</td>
<td>Tying and understanding the use of a sheet bend</td>
<td>Mastering technology</td>
<td>NT.K-12.1, Basic Operations and Concepts: Students are proficient in the use of technology.</td>
<td>Ties a sheet bend</td>
</tr>
<tr>
<td>9. Sheepshank</td>
<td>Tying and understanding the use of a sheepshank</td>
<td>Mastering technology</td>
<td>NT.K-12.1, Basic Operations and Concepts: Students are proficient in the use of technology.</td>
<td>Ties a sheepshank</td>
</tr>
<tr>
<td>10. Anchor Bend</td>
<td>Tying and understanding the use of an anchor bend</td>
<td>Mastering technology</td>
<td>NT.K-12.1, Basic Operations and Concepts: Students are proficient in the use of technology.</td>
<td>Ties an anchor bend</td>
</tr>
<tr>
<td>11. Carrick Bend</td>
<td>Tying and understanding the use of a carrick bend</td>
<td>Mastering technology</td>
<td>NT.K-12.1, Basic Operations and Concepts: Students are proficient in the use of technology.</td>
<td>Ties a carrick bend</td>
</tr>
<tr>
<td>12. Fisherman’s Knot</td>
<td>Tying and understanding the use of a fisherman’s knot</td>
<td>Mastering technology</td>
<td>NT.K-12.1, Basic Operations and Concepts: Students are proficient in the use of technology.</td>
<td>Ties a fisherman’s knot</td>
</tr>
<tr>
<td><strong>Project Area: Hitches</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Half Hitch</td>
<td>Tying and understanding the use of a half hitch</td>
<td>Mastering technology</td>
<td>NT.K-12.1, Basic Operations and Concepts: Students are proficient in the use of technology.</td>
<td>Ties a half hitch</td>
</tr>
<tr>
<td>14. Round Turn and Two Half Hitches</td>
<td>Tying and understanding the use of a round turn and two half hitches</td>
<td>Mastering technology</td>
<td>NT.K-12.1, Basic Operations and Concepts: Students are proficient in the use of technology.</td>
<td>Ties a round turn and two half hitches</td>
</tr>
<tr>
<td>15. Clove Hitch</td>
<td>Tying and understanding the use of a clove hitch</td>
<td>Mastering technology</td>
<td>NT.K-12.1, Basic Operations and Concepts: Students are proficient in the use of technology.</td>
<td>Ties a clove hitch</td>
</tr>
<tr>
<td>16. Rolling Hitch</td>
<td>Tying and understanding the use of a rolling hitch</td>
<td>Mastering technology</td>
<td>NT.K-12.1, Basic Operations and Concepts: Students are proficient in the use of technology.</td>
<td>Ties a rolling hitch</td>
</tr>
<tr>
<td><strong>Project Area: Capstone Project</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. What I’ve Learned</td>
<td>Planning and completing a capstone project</td>
<td>Planning and organizing</td>
<td>NT.K-12.1, Basic Operations and Concepts: Students demonstrate a sound understanding of the nature and operation of technology systems.</td>
<td>Plans and completes a capstone project</td>
</tr>
</tbody>
</table>

*The educational standards cited here are from the Standards for Students from the International Society for Technology in Education (2007). These are available in their entirety by clicking on Standards at iste.org/resources.