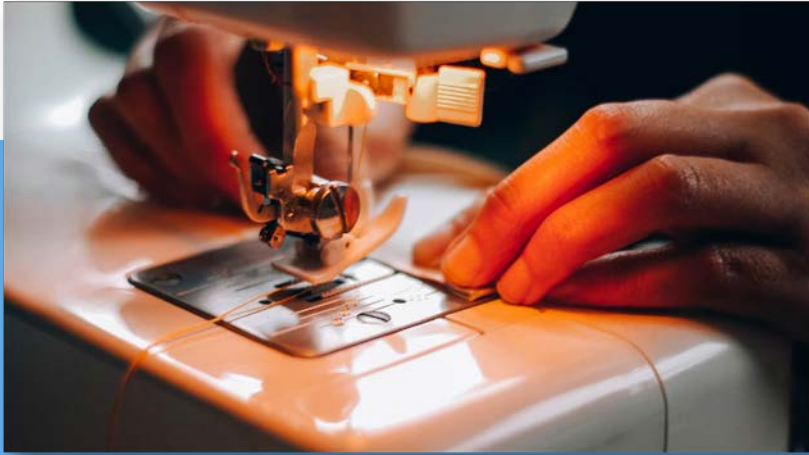


Heritage Arts: Fibers

4-H Project Manual



COLORADO STATE UNIVERSITY
EXTENSION

Acknowledgements

The revision of the original 1980/2000 (Colorado 4-H Macramé Member's Manual), 1999 4-H Heritage Arts Series (Ethnic Arts, Needle Arts, Macramé, Rug Making, Spinning, Weaving) was completed in September, 2026, by Tami Eggers, 4-H Specialist, Routt County, Faith Kroschel, 4-H Specialist, Boulder County, and Lisa Sholten, State 4-H Youth Development Specialist, Civic Engagement and Curriculum. Design by Sarah Sellers, CSU Extension Graphic Designer.

The Colorado State 4-H Heritage Arts committee prepared the 4-H Heritage Arts series of which the original manual was part. The committee included: Linda Carlson, curator and lecturer, Historic Costume and Textiles, Kathleen Williams, Extension specialist and lecturer, Design, Merchandising and Consumer Sciences Department, College of Applied Human Sciences; Carol Schneider, 4-H Extension agent, Weld County; and Sue Cummings, Extension specialist, 4-H Youth Development, Colorado State University.

Illustrations by Ruth Orton and some graphics courtesy of ClickArt9 125,000 Deluxe Image Pak™; 01991, T/Maker Co. were maintained in this edition from the original. Needlepoint stitch diagrams were provided by Denise Davis at Threadneedle Street, Issaquah, Washington. Other images come from Canva or Venngage professional accounts or are credited within the document.



COLORADO STATE UNIVERSITY
EXTENSION

Colorado State University, U.S. Department of Agriculture and Colorado counties cooperating. To simplify technical terminology, trade names or products and equipment occasionally will be used. No endorsement of product names is intended nor is criticism implied of products not mentioned.

Colorado State University Extension is an equal opportunity provider. Colorado State University does not discriminate on the basis of disability and is committed to providing reasonable accommodations. CSU's Office of Engagement and Extension ensures meaningful access and equal opportunities to participate to individuals whose first language is not English. <https://col.st/OWMJA>

Colorado State University Extension es un proveedor que ofrece igualdad de oportunidades. Colorado State University no discrimina por motivos de discapacidad y se compromete a proporcionar adaptaciones razonables. Office of Engagement and Extension de CSU garantiza acceso significativo e igualdad de oportunidades para participar a las personas quienes su primer idioma no es el inglés. <https://col.st/OWMJA>



Table of Contents

Acknowledgements	2
Table of Contents	3-6
Experiential Learning Process	7
Targeting Life Skills	8
Chapter 1 Introduction	9
Introduction	10
Project Objectives	11
Project Expectations	11
Textile Crafts	12
Creating a Design	12
Line	13
Shape	13
Space	13
Texture	14
Color	14
Evaluate Your Plan – Pattern to Follow	14
Principles of Design	15-16
Sources of Inspiration	17
Resources	18
Caution on using AI-generated patterns	19
Sharing What You Have Learned	20
Demonstrations	20
Evaluation of Judging	20
Community Service	20
Fair Exhibit	21

Table of Contents

Chapter 2 Ethnic Arts	22
Introduction to an Ethnic Arts Project	23
Choosing a Culture or Tradition	23
Research Expectations	24
Acceptable Research Sources	24
Sources to Use with Caution	24
Key Learning Elements	25
Important Considerations	25
Use of Technology and Artificial Intelligence or Generative AI	25
Helpful Resource List	26
 Chapter 3 Needle Arts (Decorative Stitching)	 27
Introduction to Needle Arts	28
Project Evaluation	29
History of Needle Arts (Decorative Stitching)	30
Types of Fancy Needlework	31
Embroidery and Cross-Stitch	33
Hints for Cross-Stitch or Embroidery	36
Needlepoint	38
Candlewicking	42
Crewel	45
Lacework	46
Appliqué	47
Stitching	51
Hand Stitching	51
Machine Stitching	51
 Chapter 4 Macramé	 52
Introduction to Macramé	53
Project Evaluation	54
History of Macramé	55
Macrame Basics	56
Materials and Tools	56
Cord	56
Scissors	57
Pins	57
Rubber Bands or Bobbins	58
Knotting Board	58

Table of Contents

Chapter 4 Macramé

Measuring Tape or Ruler	58
Glue	58
General Macramé Techniques	59
Abbreviations	58
Terms	60

Chapter 5 Rug Making 61

Introduction to a Rug Making Project	62
Project Evaluation	63
History of Rug Making	64
Hooked Rugs Basics	65
Materials	65
Transferring a Design	66
Hooks	66
Making a Latch Hooked Rug	67
Four-Step Method	68
Finishing	169
Braided Rug Basics	70
Materials	70
Equipment	70
Making a Braided Rug	72
Preparing Fabric	72
Braiding	73
Size	75
Lacing the Braids	75
References	76

Chapter 6 Spinning 77

Introduction to a Spinning Project	78
Project Evaluation	79
History of Spinning	80
Spinning Wool Using a Hand Spindle	81
Making Your Own Spindle	83
Preparing Fibers for Spinning	84
Standards for Judging Handspun Yarn	85
References	86

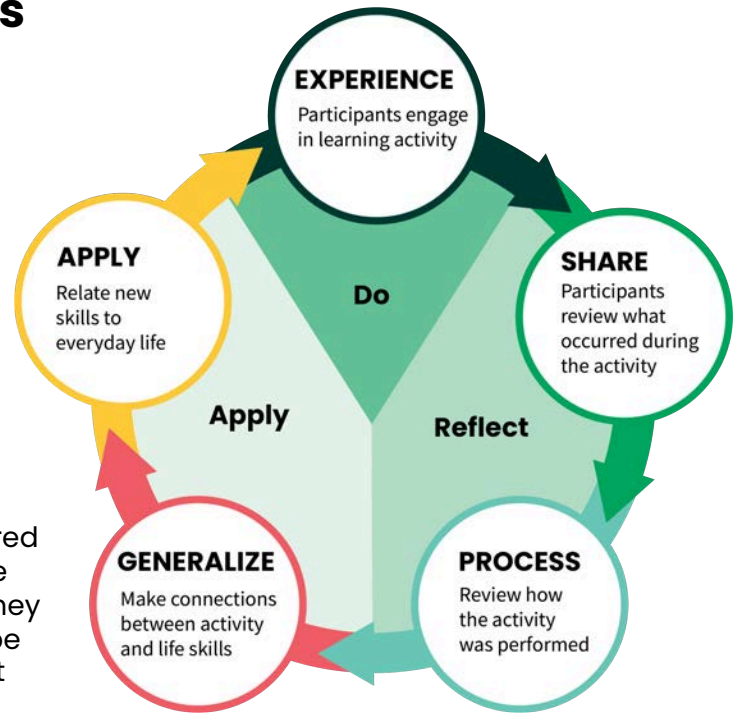
Table of Contents

Chapter 7 Weaving	87
Introduction to a Weaving Project	88
Project Evaluation	89
History of Weaving	89–90
Weaving Basics	91
The Weaving Process	92
Parts of the Loom	93
Deciding on a Project	94
Preparing the Loom	94
Figuring the Amount of Yarn	95
Filling or Weft Yarn	96
Basic Weaving Terminology	97
Building a Rigid Heddle Loom	98
Assemble Loom	99
Assembly	99

Experiential Learning Process

The 4-H program utilizes a process where adult leaders ask open-ended questions that challenge youth to think. Through this inquiry, youth can propose hypotheses and determine their own solutions. The Experiential Learning Model developed by Pfeiffer and Jones (1985) and modified by 4-H includes five specific steps that can be summarized into three main processes: Do, Reflect, and Apply.

The Experiential Learning Model encourages discovery with minimal guidance from others. A situation, project or activity is undertaken for individual thought and problem solving. Minimum outside assistance is provided, but support is offered to the individual by questioning at each stage. The youth participating in an activity reflect on what they did, and then assess how what they learned can be applied to a life situation. Below are questions that might help during each stage of learning.



1) Experience (Doing)

Questions: What sources of information are available? What is possible? What do you expect to see? How is it working? What else might you try?

2) Share (Reflecting on what occurred)

Questions: What was your goal for this project/activity when you began? What happened? What were the results? What was most difficult? How do you know? What did you learn? What surprised you? How did you share this project/activity with others?

3) Process (Reflecting on what's important)

Questions: What problems seemed to reoccur? How did you solve them? What similar experiences have you had? How was the experience like or unlike experiences others had? Would you do anything differently? What did you learn about making decisions? What suggestions would you have for someone else who wanted to do a similar project/activity? What life skills were you developing through your project? Why are life skills important? What new questions do you have about yourself, others, and future goals?

4) Generalize (So what?)

Questions: What did you learn about yourself or about the activity? What key points have you learned? How did you decide what to do? What else could you have done? How does this relate to something else in life? Where have you faced similar challenges in your life? Where might this situation occur in the future? Why is it important to have plenty of information before making decisions? What did you learn about your own skill in communicating with others?

5) Apply (Now what?)

Questions: How does this project/activity relate to your everyday life? Why is this project/activity important to you? Where else can this skill be used? How will you use this in the future? What will you do differently after this experience? How can I make an impact? What will I create next? In what ways do people help each other learn new things? What are qualities you think are important in a leader? If someone helped or mentored you in this project, what would you tell them you learned and what difference it has made in your life? How would you express your appreciation?

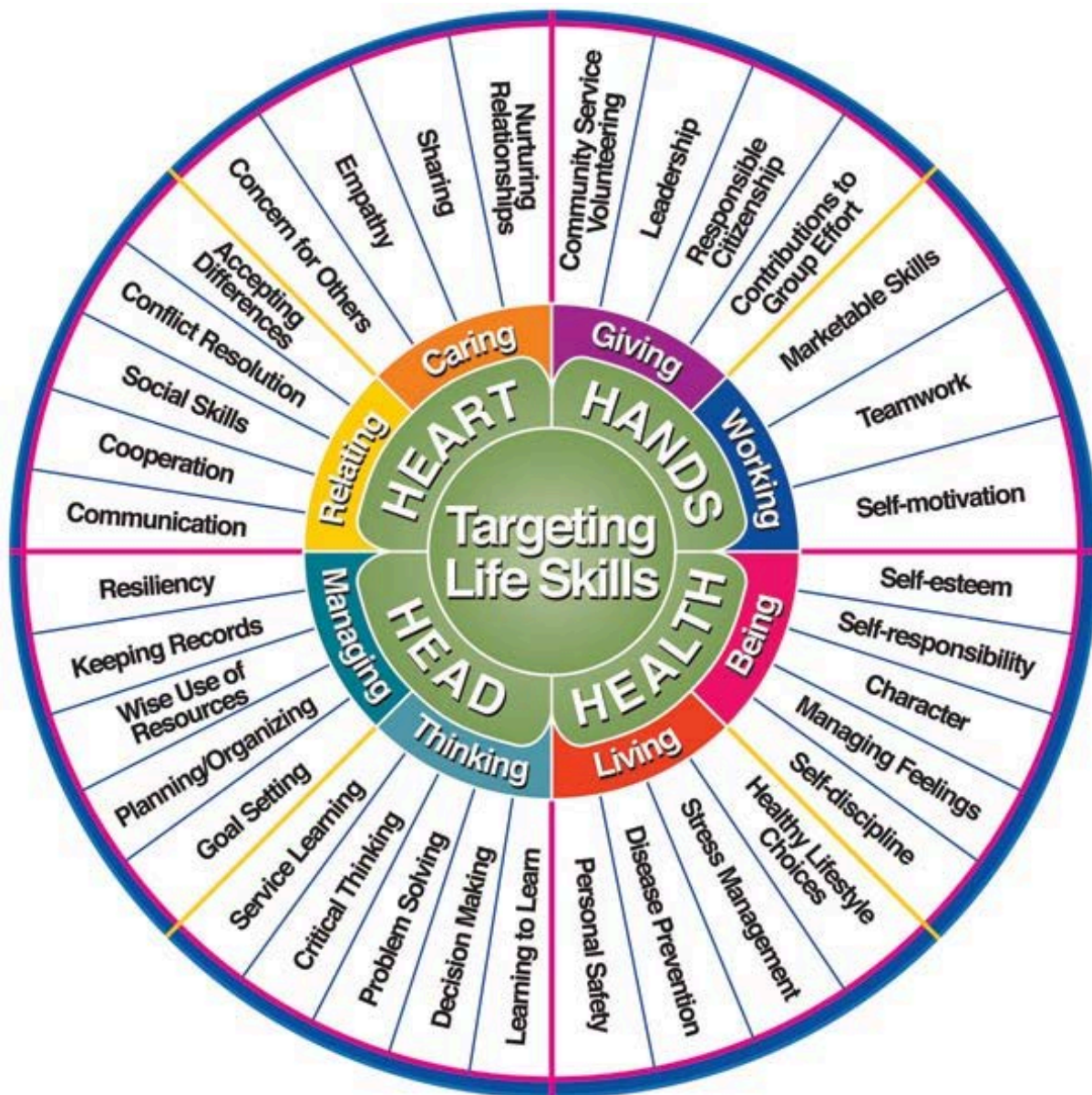


Image: Hendricks, P. (1998) "Developing Youth Curriculum Using the Targeting Life Skills Model" <http://www.extension.iastate.edu/4H/skls.eval.htm>

Targeting Life Skills

A skill is a learned ability. Life skills are those abilities that assist individuals to lead successful, productive, and satisfying lives. In 4-H, we use the Targeting Life Skills Model to help youth become competent and prepared for adulthood. The Targeting Life Skills Model categories are based on the four H's from the 4-H clover (Head, Heart, Hands, and Health). Under each of these main categories, there are four categories and eight subcategories listing specific skills youth learn in 4-H. The main goal in 4-H positive youth development is to provide developmentally appropriate opportunities for youth to experience life skills and to be able to use them throughout a lifetime. By understanding the importance of the 4-H framework and its structure, 4-H members, parents, professionals, and leaders will know the expectations and will be able to effectively use 4-H delivery methods to help youth learn these life skills.

Chapter One



Introduction

Introduction

Welcome to the 4-H Heritage Arts project. Without interested individuals, such as yourself, many historic arts and crafts would be lost with the passing of generations.

You will be given the opportunity through the Heritage Arts project to choose from a variety of fiber, fabric, yarn arts, and crafts. The projects and activities you experience depend upon your enthusiasm and the availability of resources within your home and community.

Heritage Arts is defined as the practical skills passed down from preceding generations that were developed to provide basic family needs, such as apparel, home furnishings, or decorations. It also is defined as a traditional craft and the methods that have been maintained throughout history and passed on to others, often by observation and example.

Classes on traditional crafts are available in many communities, taught by skilled local artisans. The techniques taught often incorporate new techniques and materials with the old, traditional methods to enhance the craft.





Project Objectives

The Heritage Arts project is designed to help you:

- Learn about a variety of historic arts and crafts.
- Create a craft that connects you to the past.
- Learn about historic influences on arts and crafts.
- Have fun learning.
- Gain skills that might lead to a home-based business.

Project Expectations

Members are encouraged to learn about and try a variety of different historic crafts. Think of fun places in your community where you can learn more. Ask about interesting, creative artisans who are willing to share their skills with you. Take a field trip to local museums that feature historic fabric and yarn displays. Take a trip to the library and look up interesting facts about a craft that is of particular interest to you. Evaluate or judge fabric and yarn crafts and do a demonstration to share your skills with others. The more activities you do, the more you learn.

To complete your project, respond to all questions on the Heritage Arts e-Record. Check with your Extension office for county fair requirements if you want to exhibit your project.

Creating a Design

Once you decide on a heritage craft, it's time to think about the design. Many books show how to create a pleasing design. There also are many printed patterns that can be purchased. There's no better way to enjoy and understand design than to try it. Designing, like most activities, can come naturally once you understand what you are doing.

A design is really a plan – a plan for using all materials so they look good together. To begin planning the design, examine your materials – yarns or fabrics or some other material – in a special way. For example, regardless of what materials are used, these basic components of design are:

- Line
- Shape
- Space
- Texture
- Color

These components are called the elements of design. They are important to your plan because they are the visible details of a design. Without a design plan, these elements may seem haphazard or clash. Let's take a closer look at each of these elements of design.

Textile Crafts

What is a textile craft? It is defined as any method of creating a unique design with fiber, fabric or yarn.

Patchwork and applique quilting are examples of textile crafts that use fabric as the main design ingredient.

Macrame, needlepoint, embroidery, crochet and weaving are textile crafts that use yarns. All textile crafts have one thing in common--they use fibers, fabric or yarn to create a design.

Some textile crafts focus on making fabric, such as weaving, crochet or needlepoint. Other textile crafts change an already existing fabric into something different. Quilting and embroidery create a design that changes the appearance of fabric.



Line

Line is an element that's found everywhere around us. In a garment, lines are created by a seamline, a hem, a dart, a row of trim, a plaid or stripe. A row of embroidery stitches creates a line, as does a row of crochet stitches or the pattern in a quilt square. Some lines are straight and angular, others are curved. Some are thick and sturdy, others fine and delicate. The kind of lines used in a design will affect the character of that design.



Shape

When lines are connected and overlapped, they create shapes: squares, circles, triangles, any shape imaginable. The outline of an applique is a shape, the pieces in a patchwork quilt are shapes, the outline of a garment is a shape, and so on. Just as lines create feelings, so can shapes.



Space

When we talk of space, we mean the actual space an object or a design occupies. When we design, we work within a specific space; so not only must the design itself be well thought out but so must the space around it. That space might be an individual quilt square or entire quilt.



Texture

Texture is the surface characteristic of an object; it may be smooth, fuzzy, soft, pebbly, scratchy, or one of many other textures. Sometimes we don't have to touch an object to know its texture – we can see the texture. In planning a design, texture adds character or feeling, just as lines and shapes do.

Color

When we think of colors, we usually think of color names (or hues) such as red, green, yellow or blue. We can create different feelings in a design by the colors we use. For instance, a design in yellow and green will give you a different feeling from the same design in purple and blue.

But, there are other ways we use colors to give a design the feeling we want. The way we use color values also can affect a design. Value is the lightness or darkness of a hue. The same hue can have many different values. For example, think about the different kinds of blue—baby blue, light-blue, sky blue, peacock blue, navy blue and royal blue. Visualize a design in all light colors, such as lime green, pink, light-blue and lemon-yellow. Now visualize that same design in dark green, navy blue, dark red and gold. Does it seem different? How about the same design in lime green and navy blue? Does it seem different in style? The intensity of the hues we use in a design also affects the feeling we get from it. Intensity refers to the brightness or dullness of a color.

Imagine a design in all bright colors. Usually, a design made of bright colors is more than our eyes can take. So, use bright colors sparingly.



Evaluate Your Plan – Pattern to Follow

Take a look at the fibers, yarns, fabrics or threads you plan to work with. What kind of feeling do you want to create with your design? Do the materials create that feeling in their textures and colors? Can you create the kinds of lines and shapes you want with your materials? Are the materials suitable for the space in which you've chosen to create? If you can say yes to these questions, you're on your way to a well-designed piece. But it doesn't stop there. Because even with all the right materials together, designers still need some guidelines on how to use them together. You can think of these guidelines as a recipe for deciding just how much of each ingredient (colors, textures, lines, and other elements) to use and where to add them. These guidelines are called the principles of design.

Principles of Design

Proportion:

Proportion is the relationship of all the parts of a design to each other and to the whole garment or article. Each part needs to be in proportion to the rest of the design. No part should overpower the others. If a garment does not have proportion:

- One part of the design might be too big for the rest of the design
- The design may be too big or too small to look good on the garment
- There may be too much bright, shiny color that overpowers the other colors
- The design is too overpowering for the person wearing it or the decor in which it will be used.



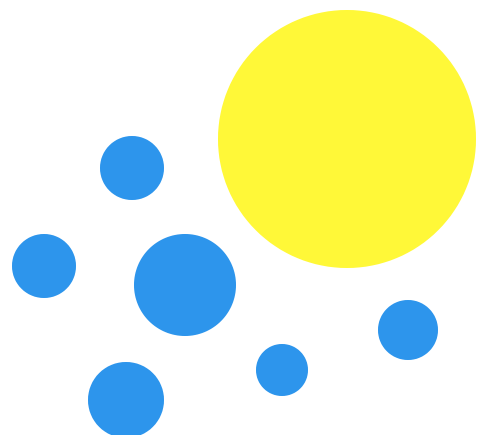
Balance:

Balance is a feeling of steadiness, of everything in the design looking like it belongs. Balance can be formal when each side of the center is identical, or informal when the sides are different, but weigh the same.



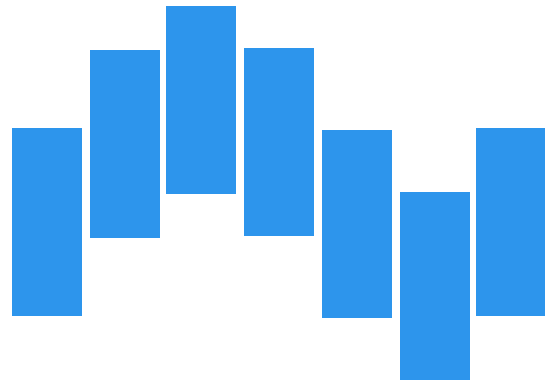
Emphasis:

Emphasis is the creation of a center of interest. Without the center of interest, a design may seem cluttered and busy, or boring and uninteresting. If a design is not well planned and is missing emphasis, it may be cluttered with too many colors, different textures, different lines, shapes or sizes. Or there may not be sufficient contrast to attract attention. The center of interest doesn't have to be centered in the design.

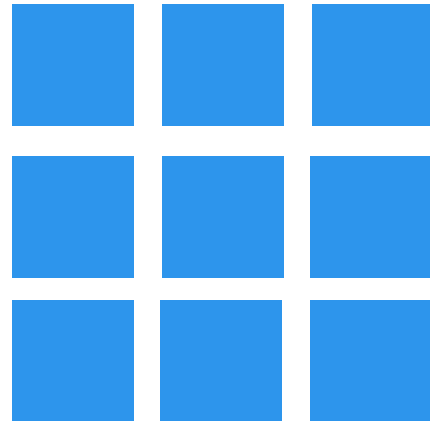


Rhythm:

When we look at a design, the eye follows a certain route around the design. It notices differences in lines, shapes, textures, colors and spaces. The route the eye follows is known as rhythm. In a well-planned design, the eye is led from one to another to the point of emphasis. That rhythm is created in a design by repeating something throughout the design color, texture, shape or size. If an item misses rhythm, it may have too many unrelated colors, textures, shapes, lines or sizes. Or the design may be placed so that it is spotty or scattered and doesn't seem to fit together.

**Unity:**

When we say that a design has unity, we mean that it is complete. Unity means all the materials together in a pleasing combination. If unity is missing, the colors, textures, lines, shapes and spaces are not compatible, or there may not be a central theme.



Sources of Inspiration

Now that you have learned something about a well-planned design, it's time to begin thinking about developing your own designs. How do you start? Actually, there are several ways to begin. One of them is to become aware of the design of the objects around us. Take a good look; there are examples everywhere! Look at the grain of the wood on a tabletop. What kind of lines or shapes are created? How does the rhythm in the grain move your eye over the design? Can you create a similar design—perhaps with weaving or needlepoint or with embroidery?

There are many places to get ideas. Look outside at the patches of grass for ideas on shapes and colors. Look at the sunsets and clouds for shapes and colors, or the cracks in sidewalks, the frost on windows, the bark on trees. Everywhere you look, there are ideas for color and textures, shapes and lines. Design examples aren't limited to nature. Look at designs in things around the house like baskets or pictures. Perhaps there's a design on pottery that you'd like to try in embroidery, or the shape of an old bottle gives you an idea for an applique. You can find ideas in magazines, wallpaper and comic books. There are ideas everywhere if you'll just use a little imagination!

Doodle on paper to develop and crystallize a design or try arranging yarns or scraps of fabric. Try cutting out shapes from construction paper to experiment with a design. It does not matter how, but it is important to plan a design first!

The designer whose work shows fine quality adapts and stylizes a design to suit the materials used. A designer does not attempt to imitate real objects, such as flowers using thread. Instead, if a flower idea is chosen as a theme for the design, the designer alters it to suit the shape of the article, its purpose and the limitations of materials and tools.



Resources

There are many good sources to help you with the "How-to's" of textile crafts. Your Extension specialist can help you locate information available for 4-H members on specific textile crafts. Beyond this manual, the Internet contains a wealth of information on a variety of arts. Be sure to have an adult assist you with any online search to be sure you can find the items needed to replicate or adapt what you learn from those sharing ideas or projects on their websites or in YouTube videos. Heritage Crafts, a charity for traditional heritage crafts based out of the United Kingdom, has a craft inventory that may be a helpful starting place for your research.

Your talents are an excellent resource for your 4-H club. Share your know-how and special interests to help others. Bring the tools and let everyone experiment. Bring in others from the community to share their craft knowledge. A local craft or fabric store may work with you or help you contact someone with an interest in a specific textile craft. Members may decide to make a sampler, shawl, handkerchiefs, or monograms utilizing the various techniques.

Libraries can be an excellent source of information. You can broaden your knowledge of why and how heritage crafts began by reading through historic publications. Magazines are also a terrific source of ideas.

As mentioned, Internet web pages provide interesting information as well. Perhaps you will want to clip or save and file ideas to share and talk about. There also are many craft magazines and pattern books that can be good sources too. Craft organizations and councils often provide specific information that may be helpful. Check with your county Extension office, library or craft store for contact information.

<https://heritagecrafts.org.uk/skills/crafts/>



Caution on using Artificial Intelligence-generated patterns!

4-H Heritage Arts project members should be cautious when using AI-generated information or patterns because these tools may produce designs or instructions that are inaccurate, unsafe, or disconnected from the cultural and historical traditions that give heritage crafts their meaning.

Generative AI systems can make up steps, materials, or techniques that do not work in real practice, which may lead to wasted materials, structural failure, or even injury when using tools or fibers. In ethnic and heritage arts, AI-generated patterns may unintentionally misrepresent, oversimplify, or appropriate culturally significant designs, undermining respect for the communities and traditions behind them. Additionally, AI will reuse copyrighted or proprietary patterns without disclosure, raising ethical and fair-use concerns for 4-H members.

Because 4-H emphasizes learning, skill-building, and authentic craftsmanship, members should rely on trusted instructors, primary sources, and hands-on experience, using AI only as a limited supplement rather than a replacement for traditional knowledge and careful practice.



Sharing What You Have Learned

Now that you have learned many new things about a heritage craft, why not share? This helps you learn more about the topic and become more comfortable teaching others. Making an exhibit to show at the county fair is another way to share with others. You also may share your knowledge by giving a demonstration and showing how to do something.

Demonstrations

Select a topic that relates to something you learned about your project and plan a demonstration. Some ideas include:

- Use of design principles and elements
- Selecting fabric or yarn for a project
- Sharing the history of a craft
- Purchasing supplies
- Steps to complete a craft item
- Can you think of others?



Evaluation of Judging

Learn the standards of quality for your craft. The exhibit item will be compared to these standards at a fair or during craft competitions. Standards are printed in the 4-H judging guidelines or judging score sheets available through your county Extension office. Some craft organizations also publish judging standards. When you apply the standards to a craft item, you judge or evaluate that item against the standard of quality. Evaluating your project yourself will enable you to see how well you applied the skills you learned. How well did your item compare to the standards? What did you do well? Where can you improve? Answers to these questions will help you do a better job next time.

Community Service

You can learn a great deal about your community when you get involved to help others. You can:

- Make lap robes for elderly people.
- Make quilts for a homeless shelter.
- Work on a fund raiser for a local cause.
- Go to a local nursing home and visit residents.
- Help an elderly or lonely neighbor with household chores.
- Help younger members with their projects.
- Can you think of others?

Fair Exhibit

Remember to record all of your activities during this year. It's easier to write them down as soon as you do them rather than wait until the end of the year and try to remember them. Be sure to include in your story not only the things you made, but the experiences you had, special things you learned and how you felt about them.

You must complete the History of the Heritage Art Selected section of the 4-H Heritage Arts Page of the record book. Plan early to begin your search for historic information. You have several options as to what you can learn about and share.

You can find historic information on:

- The craft itself
- What tools are used to make it
- New techniques that have been developed
- Special uses of the finished items
- Influences of wars on trade
- Interesting artisans within the community
- Or any other related topic

The key is providing information directly related to the craft you are exhibiting.

A minimum of four pictures with a descriptive caption are required in your record book. It is suggested to include at least one photo of the finished product. However, photos of Heritage Arts exhibits enable judges to see progress you made during construction of the exhibit and how well the items fit your intended use.

If you used a pattern, please securely attach a clear copy to your record, to help judges evaluate the project.

Projects will be divided into three age categories for exhibit based on the age of the exhibitor as of December 31 of the current 4-H year.

Age categories are:

Junior – 8 to 10 years old

Intermediate – 11 to 13 years old

Senior – 14 to 18 years old

When researching your project for the Heritage Arts Page in the e-Record, list references used:

- a. Juniors list one or two references
- b. Intermediates list two or three
- c. Seniors list three or more

Most Heritage Arts projects discussed in this manual are fiber-, fabric- or yarn-based arts and crafts, which should be shown in Miscellaneous Heritage Arts – Fiber classes. Non-fiber arts and crafts (silver smithing, wood carvings, paper scrolling, beading, etc.) should be shown in Miscellaneous Heritage Arts Non-Fiber classes. Crafts exhibited must be those traditional crafts which have been passed down through generations.

Chapter Two



Ethnic Arts



Introduction to an Ethnic Arts Project

The 4-H Ethnic Arts project is designed to help members explore, understand, and respectfully represent the artistic traditions of specific cultures, countries, or regions through hands-on fiber or non-fiber art. Projects may include fiber arts (such as felting, batik, embroidery, etc.) or non-fiber arts (such as Native American beading, silversmithing, Ukrainian eggs, paper quilling, or wood carving). This project emphasizes learning cultural context, developing technical skill, and honoring tradition, not just creating an attractive object.

Choosing a Culture or Tradition

Before beginning a project, members should clearly identify the culture, country, or region their craft represents.

Consider:

- What group or community traditionally practices this art form?
- Is the design connected to history, ceremony, daily life, or storytelling?
- Are certain symbols, colors, or materials culturally significant or restricted culturally?

You are encouraged to narrow your focus rather than combining unrelated motifs (a recurring element—such as an image, object, sound, or phrase—that holds symbolic significance in a story, artwork, or design) from multiple cultures. Depth of understanding is more important than variety.

Research Expectations

Strong Ethnic Arts projects are grounded in reliable research.

Acceptable Research Sources

- Museums and cultural institutions (e.g., Smithsonian, the Denver Art Museum, National Museum of the American Indian, National Museum of African American History and Culture)
- Tribal, cultural, or community organization websites
- Books, exhibition catalogs, and peer-reviewed articles
- Interviews with artists, elders, or cultural educators (with permission)
- Extension publications and university resources



Possibly Otoe Artist, Bag, about 1880. Leather, beadwork; 15 x 4 5/8 in. Denver Art Museum: Native Arts Acquisition Funds, 1970.423.
<https://www.denverartmuseum.org/en/object/1970.423>

Sources to Use with Caution

- AI-generated patterns or instructions
- Social media tutorials without citations
- Pattern marketplaces that do not credit cultural origins

Members should be prepared to explain where their information came from and why it is trustworthy.



<https://shelburnemuseum.org/collection/textiles/>

Key Learning Elements

You should clearly explain how your project reflects traditional methods, even if modern tools or materials are used.

Some things to consider or look for in your research include:

- Traditional materials vs. modern substitutes
- Color symbolism
- Pattern structure and repetition
- Historical or functional use of the finished piece
- How the art form changed over time

Important Considerations

Avoid sacred or ceremonial designs unless explicit permission and understanding are present. Learn proper terminology for materials, techniques, and symbols. Be sure to follow safety guidelines, especially for metalwork and carving or when power tools are used.

In your research and in creation of your exhibit piece be sure to:

- Credit the culture and sources that informed your work.
- Avoid stereotypes or mixing unrelated cultural elements.
- Understand that not all designs or techniques are meant for general use.
- Be ready to explain the cultural meaning behind your design choices.
- When in doubt, choose designs intended for everyday or educational use rather than ceremonial or sacred contexts.

Use of Technology and Artificial Intelligence or Generative AI

Technology can support research, but it should not replace authentic learning. Here are some guidelines to follow. Do not rely solely on AI-generated patterns or explanations. Cross-check all digital information with reputable sources. Remember that AI may produce inaccurate, copyrighted, or culturally inappropriate content. 4-H values skill development, critical thinking, and ethical learning—you should be able to demonstrate your own understanding, not just reproduce a digital output.

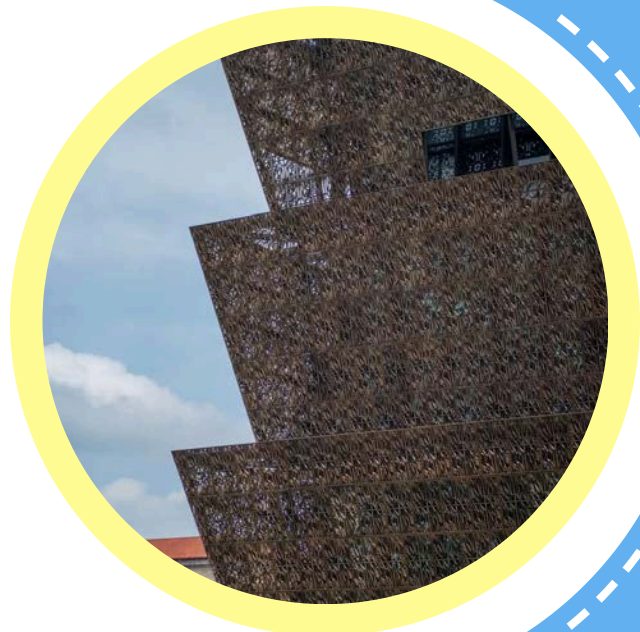


Helpful Resource List

4-H leaders and families may find some helpful lessons at some of these websites to use with 4-H members in this project.

- [Smithsonian Libraries Art and Design Resources](#) - Links to many arts related websites.
- [National Museum of the American Indian](#) - Go to the Education tab, then Lessons & Resources
- [The J. Paul Getty Museum Curricula and Teaching Guides](#) - Links to many art-related lessons and activities
- Local cultural centers and heritage museums
- University publications on arts and culture
- Library collections (folk art, anthropology, textile history)
- Your county or state Extension office may also help connect members with cultural experts or additional learning materials.

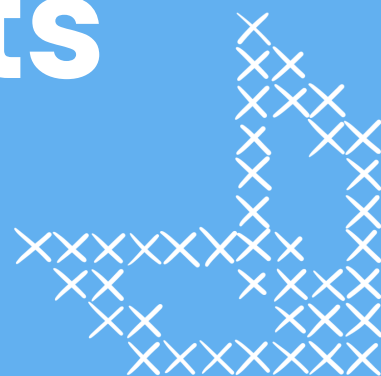
The Ethnic Arts project is an opportunity to learn with humility, curiosity, and respect. A successful project shows not only craftsmanship, but understanding of the people, history, and traditions that give the art its meaning.



Chapter Three



Needle Arts



Introduction to Needle Arts

Through needle arts you will learn to express your creativity in a constructive way while developing a skill that is relaxing and fun. You will also have the opportunity to learn more about the history of needle arts, when and where it originated, how it was passed down through the ages, new techniques and supplies, and much more.

You may want to experiment with different stitches as you learn the basics of needle arts. Visit with artisans in your community to discover how they learned to do needle work, what projects they have completed, and any suggestions they would have for you as a beginner. Check for additional resources in your local Extension office, the Internet, library, or yarn shops to get new ideas. Most importantly, have fun!





Project Evaluation

Your needle arts projects will be evaluated on:

Overall Appearance

- Clean and neat
- Suitability of materials for technique

Workmanship

- Construction-appropriate, well made, finishes, matching thread
- Decoration-even stitches, smooth, inconspicuous joining, no unnecessary knots
- Color, design and texture
 - even, harmonizing with background color, type and quality of materials
 - decoration follows general shape of article it decorates
 - one color predominates, all colors in harmony

Finishing and Presentation

- Pressed
- Blocked (if needed)
- Smooth and secure binding

Note: Your exhibit piece(s) may be mounted and/or framed at time of show. It is recommended that a judge be able to see the back of your piece to see how you worked your stitching.

History of Needle Arts (Decorative Stitching)

"The products of American needles have always been prized for their qualities of design, color and workmanship."

—JaneC. Nylander, "Flowers from the Needle,"

An American Folk Art from the
Shelbourne Museum, p. 42



Needle work is as old as history. For as long as people have attempted to cover themselves with hides and skins, they have somehow laced or bound them together, inventing needles along the way. Needle work as a form of decoration or embellishment is part of our desire to adorn ourselves.

Needle work of all sorts has generally taken two forms—plain and fancy. Plain needle work includes knitting and marking household linens for identification. It requires simple stitches, such as straight running stitches, used to hand sew the essentials—underwear, ordinary clothing, sheets, towels and

bed coverings—before the days of the sewing machine. Learning plain needle work is the first step in learning fancy needle work.

Fancy needle work can be both functional and non-utilitarian. Stitches may hold two pieces of cloth together in a very functional manner and be considered plain. At the same time, these stitches may add a decorative touch to those pieces of fabric. Fancy needle work is done to please the eye. In the days of Martha Washington in the 18th century, fancy needle work was viewed as an indication of a young lady's prospects of being a good wife. A good wife would need to be able to sew everything from underwear to suits for her family. At a time when it was not thought necessary for young women to know how to read and write, private schools were established to teach needle work to girls between the ages of 6 and 16.

By the 19th century, fancy needle work had become a stylish lady's most important accomplishment. It was evidence of her good upbringing and of her position or station in life. A lady of leisure could spend her day at her needlework.

Today, needle work is somewhat a lost art. Few people have time for stitching, and we run the risk of losing this knowledge. This is your opportunity to begin creating heirlooms of your own.

Types of Fancy Needlework

Embroidery and Cross-stitch:

The word embroidery comes from an Anglo-Saxon word meaning a border. It originally described the embellishment of garments. There are a number of traditional stitches used in embroidery. Cross-stitched work is made up of X-shaped stitches and generally uses special fabrics known as even weave.



Needlepoint:

Sometimes called canvas work, this hand stitching technique dates back to the Elizabethan era in the 16th century. The decorative fabrics created using needlepoint were used as table carpets, cupboard cloths, chair cushions and bed hangings. In the 19th century, needlepoint was a pastime for Victorian ladies and was known as Berlin work.



Candlewicking:

Candlewicking became popular early in the 19th century. The finished projects are generally an outline of an object or nature motifs (like pine trees or flowers) with Colonial knots, which are similar to French knots though sturdier. Colonial knots use less thread than French knots. This craft uses a special soft-spun candlewicking or roving yarn that has very little twist and may include other embroidery stitches.





Crewel:

The word crewel is thought to have originated from an Anglo-Saxon word meaning ball of thread. Crewel work has a rich history in Britain, dating back thousands of years. Crewel work is similar to embroidery, utilizing many of the same stitches, but worked in two-ply wool yarn. The subtleties of color shading are very important to successful crewel work.

Lacework:

Lacework projects include needle lace, tatting, filet netting, bobbinlace, lace weaves and hairpin lace. Often used as embellishment to clothing and home furnishing items, lace provides richness to the overall look of the selected project. Individual lacework projects may be used to decorate selected areas of a home as well.



Applique:

Applique is one of the oldest forms of decoration. It is a method of applying small pieces of material onto a background fabric. Initially, it was used to cover a worn piece of cloth. Quilts often have appliqued designs. Reverse applique involves the removal of fabric to form a design.



Embroidery and Cross-Stitch

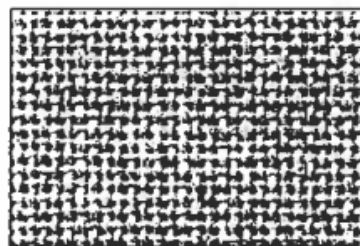
For your first project, select a book of cross-stitch patterns or a transfer embroidery design or a kit that includes all of the materials needed to complete the design.

Cross-Stitch

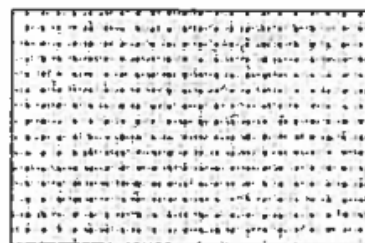
Materials:

1. Fabric (Aida or evenweave)

1. Aida cloth is the most popular blocked grid fabric for cross-stitch, typically woven in counts of 6, 8, 11, 14, 16, 18, 22, and 28. The counts represent the number of squares that can be stitched per inch. Sizes 11 and 14 are good for beginners.
2. Alternatively, Hardanger refers to both a traditional Norwegian embroidery technique and the specific type of fabric designed for it, which is a 100% cotton evenweave woven with pairs of threads (two warp threads woven over and under two weft threads). This double-thread weave gives it a distinct grid look and allows cut threads to pull out cleanly without unraveling the rest of the piece.
3. These fabrics are available at most craft and needlework stores.



Even weave fabric



Aida cloth

2. Six-strand embroidery floss. Depending on the fabric and pattern, use one, two or three strands of floss.
3. For cross-stitch, use a blunt-pointed tapestry needle in proper size for the holes in the fabric and for the number of strands of floss to be used. The needle is inserted between the threads and does not pierce the threads of the fabric. The most common tapestry needles used for cross stitch are sizes 24 and 26, although needles are available in sizes 20, 22, 24, 26 and 28.
4. Oval or round embroidery hoop of wood or metal to hold the fabric taut. Fabric is placed over the smaller hoop; the larger hoop is fit over the smaller hoop and the fabric.

The size of the finished project will vary according to the thread count of the fabric. To calculate the size of a project, divide the number of squares in the width of your design chart by the count of your fabric (the number of threads per inch). This equals the height of your design in inches. Many cross-stitch patterns will list dimensions for various cross-stitch fabrics.

Repeat this process counting from one side of the design to the other side; this gives you the vertical center. Then count out the horizontal and vertical center number to begin your design. You can find the center of your fabric by folding it in half and folding it again into quarters. Mark the center point with a thread of contrasting color.

Always locate the center of the chart and fabric. Begin stitching at this point. Many crossstitch patterns indicate the center point of the design. If it is not shown, locate the center point of the design by counting from the top of your design down to the bottom and divide in half; this gives you the horizontal center.

Recommended Floss and needle Determined by Fabric Count

Fabric	Tread per Inch	Strands of Floss for Cross-Stitch	Strands of Floss for backstitch	Tapestry Needle Size
Aida	8	3 to 6	3	20 or 22
Aida	12	3	2	22 or 24
Aida	14	2 or 3	1 or 2	22/24/26
Aida	16	2	1	24/26
Aida	18	1 or 2	1	24 or 26
Hardanger	22	1	1	24 or 26

Embroidery

Materials:

1. A light-weight to medium, tightly-woven, 100 percent cotton fabric. Polyester/cotton blend fabrics are acceptable but are more difficult to stitch through.
2. Six strands of embroidery floss. Depending on the fabric and pattern, use one, two or three strands of floss.
3. A crewel or embroidery needle. It is important that the needle has a long eye to accommodate several strands of floss.
4. Oval or round embroidery hoop of wood or metal to hold the fabric taut. Fabric is placed over the smaller hoop; the larger hoop is fit over the smaller hoop and the fabric.

You can either purchase a kit with a pre-printed design, supplies and stitch instructions needed to complete a design. You can also create your own design, selecting the thread and fabric from craft or yarn stores. Use hot-iron transfers or use dressmaker's carbon with a tracing wheel, pencil or knitting needle to transfer the embroidery design onto your fabric.

Embroidery is composed of one or several stitches that all belong to a basic family stitch groups. The groups are:

- backstitch
- blanket stitch
- chain stitch
- couching stitch
- cross stitch
- Featherstitch
- detached filling stitch
- laid filling stitch
- running stitch
- satin stitch
- weaving stitch

The Royal School of Needlework at <https://rsnstitchbank.org/> lists over 500 embroidery stitches. You can search stitches by technique, stitch uses, and stitch structures. It is a great resource to learn new stitches! You can also find videos online or embroidery books at your local yarn/craft store or library to see illustrations of embroidery techniques. One great online resource can be found at Embroidery Stitches, Patterns & How-Tos from The Spruce Crafts, a craft and hobby website covering helpful tips and step-by-step tutorials.

Hints for Cross-Stitch or Embroidery

- Wrap the raw edges of fabric with masking tape or zig zag the edges with a sewing machine to prevent it from unraveling.
- Separate strands of floss carefully, allowing them to untwist. Stitching with two strands is generally appropriate for medium sized fabric. Separate these two strands and allow them to untwist before placing them back together and threading the needle.
- Floss becomes twisted while you are stitching; allow it to hang freely and it will untwist.
- Remove the hoop when not stitching to prevent hoop marks on the fabric.
- Traditionally, knots are not used in embroidery. The stitcher buries the end of the thread in the work. Consider the use of your embroidered or cross-stitched item. If it is a garment that will be washed, it may be a good idea to knot the floss. If the piece is to be framed, knots should be unnecessary.
- Always sign and date your work. You have worked hard to create a unique piece of stitchery. Put your initials and the date in the corner or on the back.
- Use a thimble. While it may seem awkward at first, a thimble will help you stitch by pushing the needle through the fabric. A thimble is worn on the middle finger of your dominant hand.
- Be prepared to block your finished work. The threads in the fabric or canvas will often get off-grain as you stitch.
- **One of three methods is suggested:**
 - Method One – Block textile, after it has been fully immersed in cold water, by pinning it to the desired shape on a blocking board or any flat surface that is covered with absorbent bath towels. Let the textile dry thoroughly.
 - Method Two – Pin dry textile on blocking surface to desired shape. Then spray the textile with clear, cold water until damp. Allow to dry thoroughly.
 - Method Three – Pin dry textile to desired shape on the ironing board. Using a press cloth and a steam iron, steam press the textile, **never touching the iron to the textile**. Leave the textile pinned to the ironing board to cool and dry for several hours.

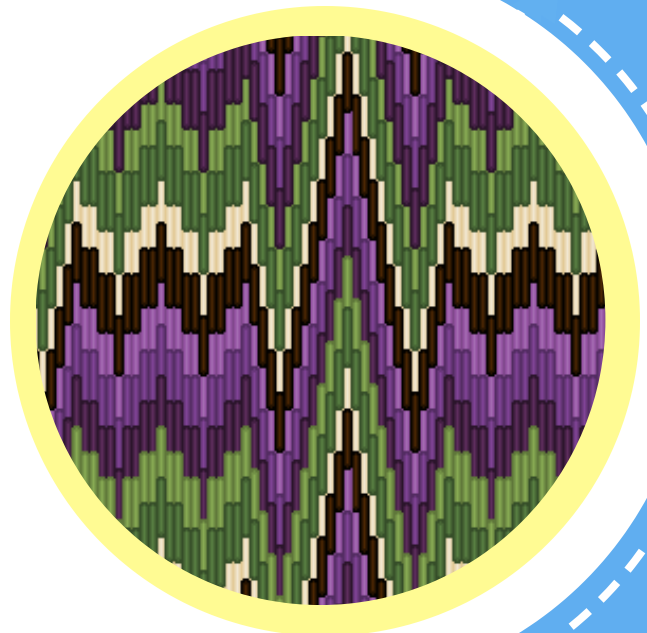
Needlepoint

Needlepoint is a type of embroidery in which stitches are formed on an open-weave canvas using yarn or embroidery floss and a blunt needle. The different types of needlepoint are usually classified by the size of the canvas or the number of stitches per inch.

Three common types of needlepoint are:

- Quick point – 3 ½ to 7 inches per inch
- Gros point – 8 to 15 stitches per inch
- Petit point – 16 or more stitches per inch

Bargello is another type of needlepoint. It is frequently characterized by long upright stitches and flame-like designs that require exact counting of squares. It is also sometimes called Florentine work or flame stitch embroidery, because this style of stitching is based on a flame-like design on some chairs in the Bargello Palace in Florence, Italy.



Stitches

There are literally hundreds of stitches in needlepoint. Each stitch has a different texture and gives a different effect. After you decide on a design or picture, experiment with different stitches to determine which one gives which effects. Doing fancier stitches in the design and planer ones on the background will place emphasis on the design.

You may wish to do a sampler containing five to 10 different stitches to practice a variety of stitching techniques. Your sampler can serve as a reference piece later. A sampler can be made into many projects, such as a wall hanging or a pillow. It is suggested you use a heavy three strand yarn, a size 18 tapestry needle, and a canvas with 10 holes per inch for the sampler. The Spruce Crafts is a craft and hobby website covering helpful tips and step-by-step tutorials. The website lists a wide variety of stitch types that you can use to select stitches for your sampler. The list can be found at [54 Popular Needlepoint Stitches](#).

Tent stitches are the most commonly used stitches in needlepoint. All tent stitches appear the same from the fabric's right side, but differ in appearance on the wrong side. Two commonly used tent stitches are continental stitch and half-cross stitch.

Here is a diagram of the correct way to stitch a horizontal continental stitch, stitched from right to left:

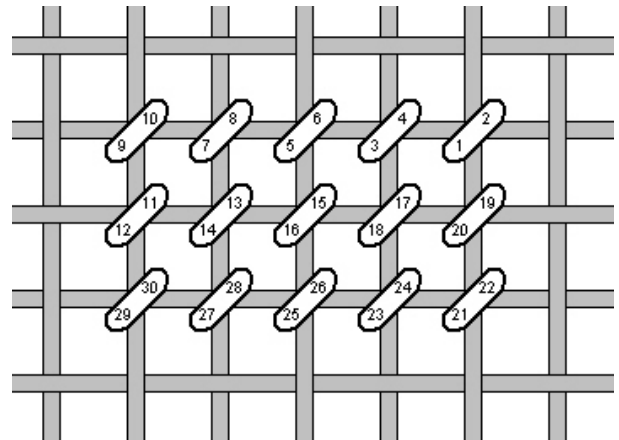


Image courtesy of Threadneedle Street.

Here is a diagram of what several rows of continental stitch will look like on the back of the canvas.

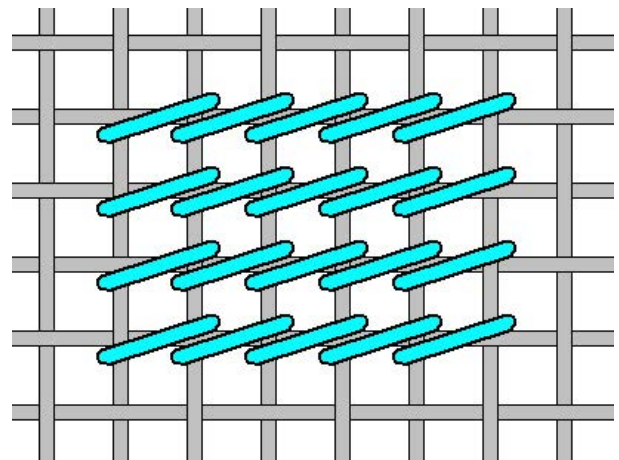


Image courtesy of Threadneedle Street.



Here is a diagram of the correct way to stitch a half cross stitch from left to right:

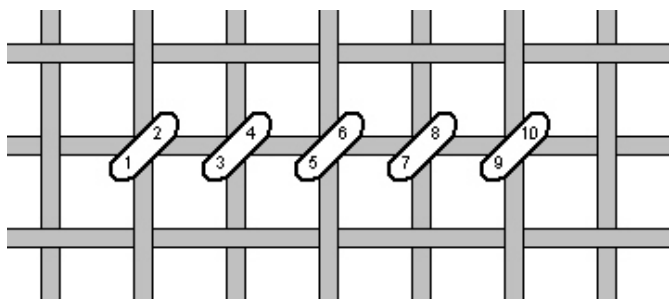


Image courtesy of Threadneedle Street.

Here is a diagram of what several rows of half cross stitch will look like on the back of the canvas. These stitches do not totally cover the back of the canvas and some of the canvas threads will still show.

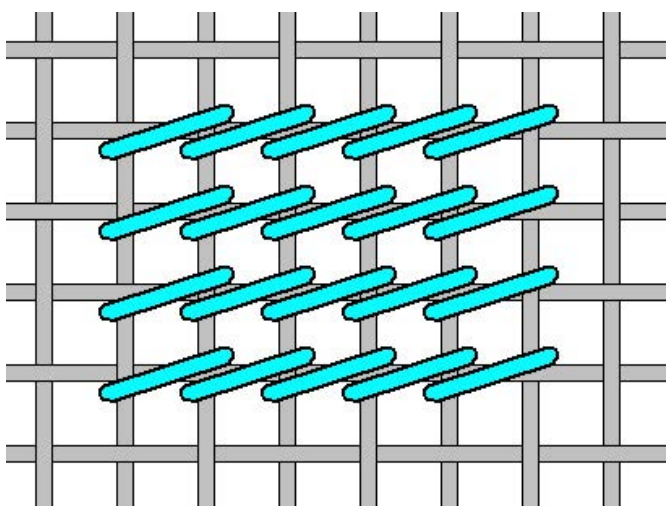


Image courtesy of Threadneedle Street.

The continental stitch uses more yarn than the half cross stitch, but covers the canvas better. Because there is quite a bit of yarn on the wrong side, the continental stitch is suitable for items that receive hard wear, such as upholstery and rugs.

The half cross stitch does not cover the canvas as well. Because there is little yarn on the wrong side of the canvas, the half cross stitch is suitable for items that receive minimal wear.

It is best practice to use one type of stitch on a project rather than mixing the stitches. One of the cardinal rules of good stitching is that work generally needs to be done consistently for good results.

Canvas

There are several different types of canvas used in needlepoint.

- Plain canvas is a single-mesh structure formed by the intersection of a single crosswise thread and a single lengthwise thread.

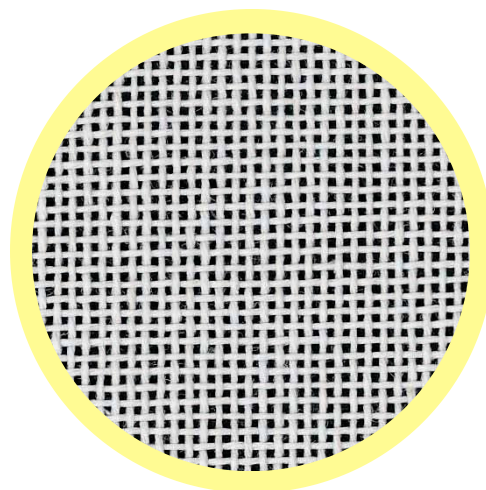


Image Credit: Blank Canvas - Needlepoint Joint

- Like the plain canvas, interlock Mono canvas is a single-mesh canvas with the single lengthwise thread woven between two slender intertwined horizontal threads. The "locked" construction of the interlock mono provides a stabler working canvas than the plain canvas.



Image Credit: <https://a.co/d/0ib4GicC>

- Penelope canvas is a double-mesh construction formed by the intersection of pairs of crosswise and lengthwise threads.

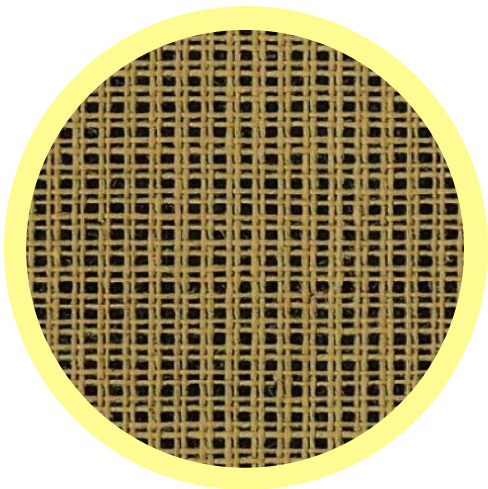


Image Credit: Blank Canvas - Needlepoint Joint

- Rug Canvas has a pair of crosswise threads interlocked by two twisted lengthwise threads.

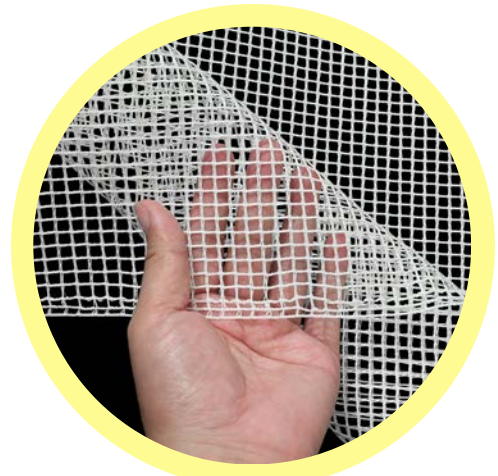


Image Source: <https://a.co/d/0h0NNzjX>

- Patterned Canvas has the design printed directly on the canvas.



Image Credit: <https://a.co/d/05l13jBr>

- Plastic Canvas is a molded plastic single-mesh canvas.

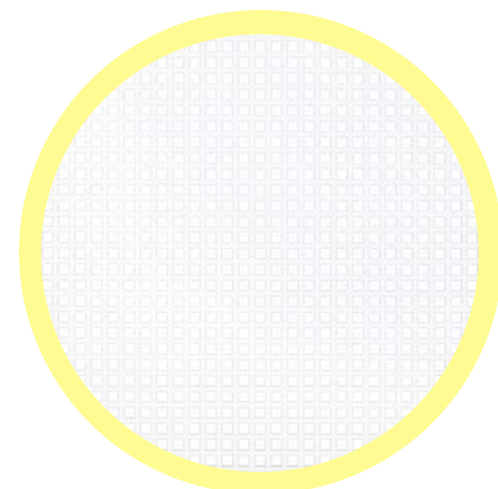


Image Credit: <https://a.co/d/0f6lBfQS>

Thread

Needlepoint threads come in several different sizes, weights and textures.

- Rug yarn is thick, three-ply, single-strand yarn.
- Persian yarn is a two-ply, three-strand yarn made of wool or acrylic. The yarn can be separated into strands or used as one yarn.
- Tapestry yarn is a fine four-ply, single-strand yarn made of wool or acrylic. The plies are difficult to separate into strands.
- Crewel yarn is a two-ply, single-strand yarn made of wool or acrylic.
- Embroidery floss is a multiple-strand thread made of silk, cotton or rayon. The number of strands vary but can be separated
- Pearl cotton is a two-ply, single-strand cotton thread that comes in three thicknesses: heavy (no. 3), medium (no. 5) and fine (no. 8).

Basic Rules for Stitches

- Never knot the yarn. Hold it behind the canvas and catch it as you work.
- Use yarn pieces only 12 inches to 18 inches long at a time.
- When coming to the end of a piece of yarn, take it to the back of the canvas and run it under four or five stitches to lock it in. To start new yarn, also run it under four or five stitches on the back to lock it in. Then bring the yarn to the front.
- Learn to read the graphs and you will be able to do any stitch given to you.

Needlepoint Project Evaluation

Look at your project or sampler. How does it compare to the following standards for quality needlepoint, gros point or petit point items?

- Canvas is squarely blocked.
- Canvas, yarn and stitches chosen to complement design.
- Stitches all cross in the same direction.
- Stitches completely cover the canvas.
- Ends are woven in.
- Yarns are not twisted, kinked, knotted or pulled thin.
- All stitches lie smooth.
- Uniform tension was used throughout.

Remember

Have fun and be creative with your needlepoint projects. You are limited only by your willingness to experiment and try new stitches. If you want a special effect and cannot find a stitch which does what you want, invent your own. Be sure to graph your new stitch to help you remember it.

Candlewicking

Candlewicking is rather unique embroidery. Women who traveled westward in early America developed the techniques when thread and sewing materials were scarce for settlers. They used unbleached cotton wick thread (used in candlemaking) to embroider raised designs on unbleached muslin. Candlewicking is sometimes called whitework because it frequently uses white or cream thread on white fabric.

In its most basic form, it outlines an object with Colonial knots. These are similar to French knots but stronger to endure frequent washing of items like bedspreads or linens. Candlewicking can be made more elaborate by emphasizing details within the main outline with other embroidery stitches. You can use your finished candlewick creation in many ways such as a pillow, a pincushion, a wall-hanging, a pocket on your Decorate Your Duds project to name just a few.

Your creation can be a statement of elegance by using white thread on a white background. Or you can use colored thread on white or colored backgrounds. You can buy special candlewicking thread or you can use regular embroidery floss divided using two or more strands, depending upon pattern size and look you want to achieve. Acrylic yarn may also be used for another look.



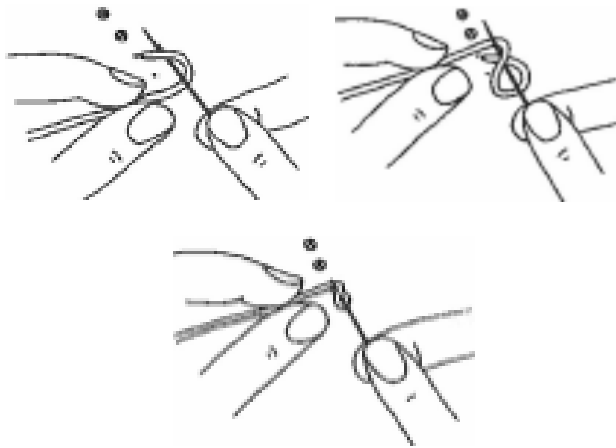
Image Credit: <https://www.needlepointers.com/main/showarticles.aspx?navid=3927>



Stitches

Candlewicking Knots

Bring the needle up through fabric in the center of the pattern dot. Wrap thread clockwise around the needle once; lay the needle point on top of the thread before inserting the needle into pattern dot. To finish, gently pull on the thread to form a small, uniform knot. Repeat knots in an evenly-spaced arrangement to form the design.



Other embroidery stitches used in candlewicking to dress up outlines include:

- satin stitch—often used to fill in shaded pattern areas.
- daisy stitch—makes a nice leaf or petal (see Dove pattern)
- back stitch or split stitch—to outline a part of the design, including areas filled with satin stitching (see goldfish fins, butterfly antenna, daisy stem, leaf and center)

Find an embroidery book at your local yarn/craft store or library to see illustrations of these techniques.

Patterns

Basic embroidery patterns and simple coloring books might also offer ideas and patterns for you to try. Any basic motif (floral, heart, square, diamond, nature, or snowflake shapes to name a few) can be adapted to be used in candlewicking. The 4-H Clover logo could be modified to be used in candlewicking! Candlewicking books and kits also are available commercially. You can also find free patterns on various needleworking websites online.

Fabric

You can use almost any type of fabric. Usually a plain fabric without a print will work best, but you can experiment with printed fabrics, too. Cotton or a cotton blend works well. Traditionally, medium to heavy-weight unbleached or white cotton muslin was used. Very light-weight fabrics are harder to work with, and thread between knots on the back might show through on the front. Heavier knit fabrics are another option after you are familiar with the needed skills.

Other Tools

You will need an embroidery hoop and a needle—size 14 tapestry works well.

Smaller or larger needles may be needed depending upon the size of the thread or yarn you are using. Use a transfer or dressmaker's carbon paper to transfer the pattern dots to fabric or you can punch the pattern onto a piece of poster board and trace it on the fabric with a sharp pencil. It is not recommended that you use a pen or marker that wouldn't wash out because stitching doesn't cover all pattern lines exactly. Candlewicking knots should be well-formed, uniform and evenly spaced. Don't hesitate to adjust the spacing on a pattern if it seems uneven, and pay attention to spacing when making your own patterns.

This is a creative type of needlework, and you should have lots of fun trying different things.



Crewel

Crewel is one of the oldest forms of English embroidery that uses a firm, two-ply wool thread known as crewel which gives the needlework its name.

Traditionally, crewel was used for home furnishings because it is highly durable, textured, and often very colorful. The best way to get started in crewel is to either purchase a kit with a pre-printed design, supplies and stitch instructions needed to complete a design, or work a sampler that uses a variety of crewel stitches.

Patterns

Embroidery patterns can be used for crewel because they are similar in design. You can also create your own design, selecting the thread and fabric from craft or yarn stores. Use hot-iron transfers or use dressmaker's carbon with a tracing wheel, pencil or knitting needle to transfer the embroidery design onto your fabric.

Stitches

Crewel stitches are many of the same as those used in regular embroidery, such as a chain or stem stitch. Crewel embroidery usually "fills in" the entire design using a variety of stitches. Many of the basic stitches used in crewel to solidly fill a design are:

- Chain
- Stem
- Split
- Satin
- Long and short
- Laid
- Roumanian

Some crewel stitches used for openwork design are:

- French knots
- Bullion knots
- Herringbone
- Wave
- Seed
- Squared
- Burden
- cloud

Find an embroidery or crewel book at your local yarn/craft store or library to see illustrations and techniques. You can also search online with parent/guardian permission for resources and videos that demonstrate the stitches.



Fabric

Like the fabric used in embroidery, the background fabric used in crewel can be almost any closely-woven fabric that is not variegated and has a smooth surface. Linen and wool have been traditionally used, although cottons and other blends could be used.

Other Supplies

Crewel needles should be of medium length with long eyes that are usually labeled crewel or embroidery. The needle should always be slightly thicker than the thread to create an open passage for the thread to pass through easily. This prevents the thread from wearing and breaking. Hoops and frames are used to hold the work taut and ensure neat and even stitches. Fabric is placed over the smaller hoop; the larger hoop is fit over the smaller hoop and the fabric.

Blocking

When your crewel project is completed, be sure to block it. The threads in the fabric or canvas often get off-grain as you stitch and blocking will help to straighten them. Follow blocking instructions given on page 13 in the Cross Stitch and Embroidery section.

Lacework

Below is a description of various types of lacework. You may need to research which form you would like to try to find instructions for that technique. Ask your 4-H leader to help you find resources to guide you in your project.

Needle Lace

Needle lace is what the name suggests: lace made with a needle and thread. The structure of needle lace is built entirely of thread, with fabric used only as an anchoring device. The lace is constructed by hundreds of tiny, looped, and knotted stitches built over a drawn pattern. It is one of the most time-consuming textile arts due to it being made freehand with countless tiny stitches. Several styles of needle lace exist, but the most familiar is Battenberg or Renaissance Lace. This lace is made of a variation of the buttonhole stitch worked between sections of narrow bias tape in the outline of the design attached to a backing. When the work is done, the backing is removed leaving just the lace surface. The Encyclopedia of needlework by Thérèse de Dillmont (1846-1890) is one helpful resource with stitch samples and directions you can find online.



Image Credit: <https://www.taixtile.com/needle-lace-first-steps/>

Tatting

Tatting may have originated with fishermen using large shuttles to weave string into special knots for making fishing nets. Knotting was also used to decorate clothing by ancient Egyptians. The Chinese also used knotting techniques to embroider decorative items. Tatting is a form of lacework that consists of one knot called a double stitch worked in groups over a single thread. This thread is pulled to draw stitches into curved formations called rings and chains. These rings and chains are then joined to form larger groupings or motifs. Primarily tatting is used to make edgings for items like handkerchiefs, garments, placemats or doilies. It is also frequently used to make items such as earrings, ornaments, bookmarks and even larger items like a tablecloth. Tatting is usually worked using a fine cotton thread, so it is delicate looking but very strong.

Tatting is done by using a continuous thread wound on a small shuttle. A loop of thread is held in the left hand while the shuttle, held in the right hand, is maneuvered around it; double stitches form over the shuttle thread. Basic supplies include a tatting shuttle or a tatting needle (depending on the technique you choose to use), fine cotton thread (like size 10 or 20), small scissors, and a tiny crochet hook (for joining pieces). It is best to select your needle size after you select your yarn size for a particular project. The size of the design is also affected by the thread size.



Image Credit: <https://www.taixtile.com/finding-a-beginner-friendly-tatting-projekt/>

Filet Netting

Filet netting involves darning, embroidering, or weaving on netting to create designs. You can either make your own net or purchase machine-made netting to do your work on. Usually, only one knot is used but it can assume a variety of forms. The mesh or net, also sometimes called Lacis, is made of diamonds or squares onto which a design is embroidered or woven. This mesh technique is the same one used for making fish nets, basketball nets, and net bags; the only difference is the use of heavier cords.

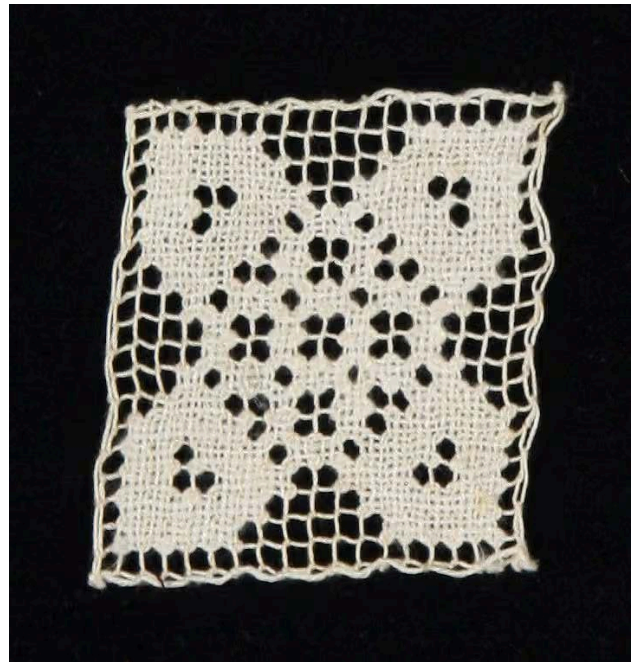


Image Credit: Lace square, 1800s, maker unknown. Gift of Mrs Helen Watson, 2008. Museum of New Zealand Te Papa (GH016278)

Mesh knots should look crisp and be nearly invisible. Filet netting uses a smooth, tightly-twisted cord such as a crochet cotton thread for the best results. A helpful resource for techniques and designs is *Priscilla Netting Book* (1914) available online.

Bobbin Lace

Bobbin lace is a lace woven of pairs of threads wound on bobbins. The threads are plaited, twisted and interwoven over a paper pattern mounted on a pillow or padded board to form a design or motif. Pins are inserted through the pattern into the pillow to hold threads in place; the pattern is called a pricking. The pillow accounts for another name, pillow lace, by which this lace is also known.

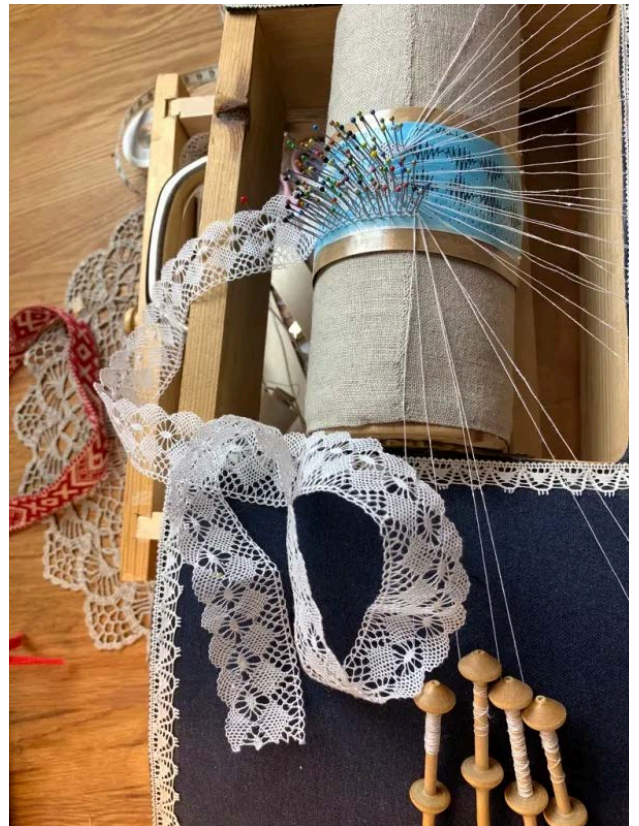


Image Credit: <https://withmyhandsdream.com/2023/01/27/the-secrets-of-bobbin-lace/> (from Pinterest)

Lace Weaves

The lace is created by the technique of weaving, which is the interlacing of two sets of threads to form a textile. In lace weaving, warp and weft threads are diverted somewhat from their parallel course to form spaces or raised areas in the weave. The resulting textile is open and airy, characteristic of lace. Some helpful books that include information on lace weaving are:

- Huck Lace Weaving Patterns with Color and Weave Effects: 576 Drafts and Samples plus 5 Practice Projects by Tom Knisley, Stackpole Books, 2019.
- Handwoven Laces by Donna Muller, Interweave Press, 1991
- Mastering Weave Structures by Sharon Alderman, Interweave Press, 2004.
- The Handweaver's Pattern Directory by Anne Dixon, Interweave Press, 2007.



Image Credit: <https://www.gist yarn.com/blogs/how-to-weave/lace-weaving-part-three-huck-spot-bronson>

Hairpin Lace

Hairpin lace is a type of crochet worked with a two-pronged fork or hairpin and a crochet hook. Yarn is wound around the hairpin loom to form a series of large loops, held together by a row of crochet stitches worked in the center. Hairpin lace can vary due to the width of strips and yarn weight used. The lace-like effect occurs when the strips are stitched together in various ways off the hairpin loom. You can then attach the loops to other loops, leave them alone as a fringe, or edge them. A good tutorial on hairpin lace is available at:

<https://stitchdiva.com/pages/hairpin-lace>.

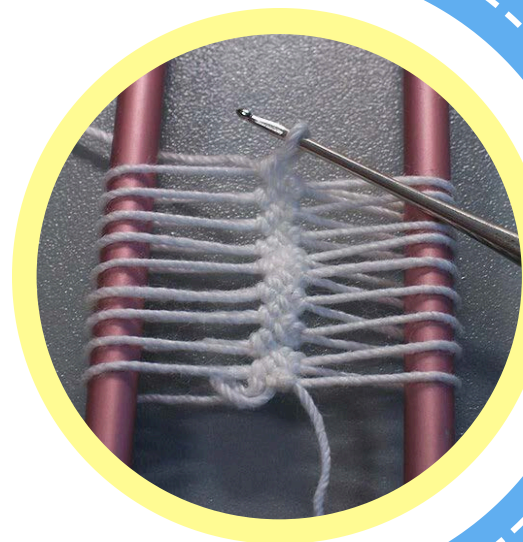


Image Credit: By E.Zajdel - Own work, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=8644102>

Appliqué

Appliqué is stitching or fusing fabric shapes to a background fabric. Shapes can be as simple as a single shape or as complex as a landscape scene. If doing a layered design, work from the background to foreground, and stop stitching before two lines of stitching cross. Colors used in appliqué can be bold or subtle and contribute to the overall effect. Appliqué is often used in quilts, garments, and home décor. Depending on the method you choose, edges can be turned under for a smooth finish, stitched raw for a rustic look, or fused in place for quick and easy projects.

Fabric

- **Background Fabric** – Select a stable fabric, such as broadcloth or denim. Knit fabrics can also be used; however, more skill will be required to deal with the special fabric properties.
- **Appliqué Fabric** – Select a fabric compatible in care and weight to the background fabric. Light or medium-weight woven fabrics, such as calicos and gingham, are recommended for beginners.
- **Stabilizer Fabric** – Use a fabric, such as interfacing, or tissue paper to stabilize the background and to prevent puckering when machine stitching. Iron-on interfacing helps prevent raveling of applique fabric.

Preshrink interfacing, if used, and background and applique fabrics before cutting and stitching.

Pattern

Appliqué designs can be adapted from many sources such as coloring books or greeting cards. Like candlewicking, designs should be composed of simple shapes and geometric designs.

Other Materials

For most designs, use an all-purpose thread which matches the color of the applique fabric. A contrasting or complimentary color can create a special effect.

For hand-appliquing, use sharps, a medium-length needle. Straight pins for holding appliqués in place are needed, as well as a pair of small, sharp-pointed embroidery scissors for trimming.

Purchased fusible webs can be used to hold the appliqué in place when stitching. Secure the appliqué by fusing it to your background fabric with an iron. Follow manufacturer's instructions that come with the web carefully.

Stitching

Appliqué may be stitched by hand or machine. Decorative stitches in either can enhance or accent the design. Turn edges under depending on characteristics of appliqué fabrics and the closeness of decorative stitches.

Hand Stitching

A fine slip-stitch is used to secure the appliqué in place. It should hold the appliqué securely in place and remain invisible. An overhand stitch can be used in small areas that tend to fray; these little straight stitches can keep fabric threads from popping out. Other decorative embroidery stitches such as the cross stitch and running stitch can be used to fasten down the appliqué. Remember, since these stitches will be seen, they will become part of the overall design.



Hand stitched appliqué Image Credit: <https://amylovestosew.com/how-to-do-hand-applique/>

Machine Stitching

Two methods of machine stitching are used in appliqué. One method uses only straight stitching when applying the appliqué; the other method uses a combination of straight stitching and zigzag stitching.

You may add stuffing or padding under the appliqué prior to finishing the decorative stitching and create a three-dimensional effect. This process is referred to as relief appliqué. Reverse appliqué is cutting out background material to expose one or more fabrics underneath.



Machine stitched appliqué Image Credit: <https://swpea.com/blogs/sewing-tutorials/what-is-applique-and-applique-techniques?srsltid=AfmBOoq5n06KVvC14Qum2lJr9iwSKe-q92EKhvsXH4Jgw51gM3dRo87C>

Chapter Four



Macramé

Introduction to Macramé

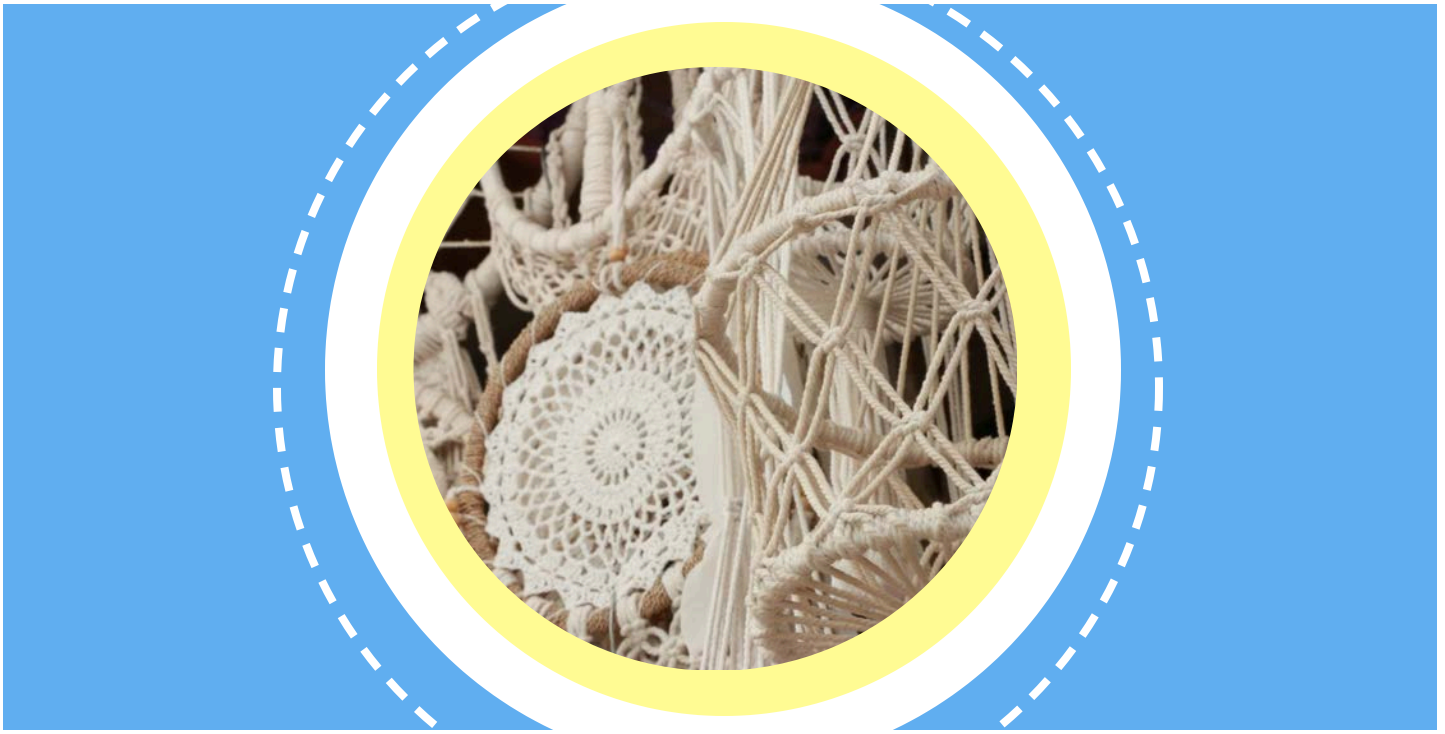
Through macramé, the art of ornamental knotting, you can express your creativity in a constructive way while developing a skill that is relaxing and fun. You will also have the opportunity to learn more about the history of macramé, when and where it originated, how it has been passed down through the ages and more.

You may want to experiment with different yarns and decorations to make unusual articles for yourself, others and your home. Visit with others who do macramé in your community to discover how they learned to macramé, what projects they have made and any suggestions they may have for a beginner. Locate resources through your local Colorado State Extension office, the Internet, library and yarn or craft shops to get new ideas. Most importantly, have fun!

Two good resources to consider using are:

- [Kansas 4-H Fiber Arts Challenge: Macramé](#)
- [Oregon State University Macramé Knots and Projects](#)





Project Evaluation

Members are encouraged to develop new skills each year in the macramé project. Check the following list to see what skills would-be best for you.

Junior – 8 to 10 years old

Suggested techniques for this age group: lark's head knot, reverse lark's head knot, double half hitches, horizontal, vertical and diagonal half hitch, square knot sinnet, half cast sinnet, square knot button, alternating square knot, and/or gathering knot; measuring and bundling long cords, and preventing ends from raveling.

Intermediate – 11 to 13 years old

Suggested techniques are: Chinese crown knot, Josephine knot, Turk's head knot, monkey's fist, berry knot, coil knot, wrapping a ring, scorpion knot; adding additional cords and reverse typing cords.

Senior – 14 to 18 years old

Suggested techniques: combining a variety of basic and ornamental knots from the lists above.

Macramé exhibits will be evaluated on:

- Overall appearance
- Clean and neat
- Construction appropriate, design balanced
- Compatibility with ethnic group (if applicable)
- Use of texture, colors, and materials
- Cord choice – right for project

Quality Workmanship

- Correct knots used for project
- Tightness of knots (appropriate to use)
- Finish (including ends)

History of Macramé

Macramé originated as a decorative way of securing the ends of a piece of woven fabric, creating a lacy edge as far back as the ancient Babylonians and Assyrians. Later macramé was worked separately and attached to both household items and garments as a trim in Arab and African countries. By the Victorian era, entire items were made of macramé. The word macramé is thought to be of Arabic origin from the word *miqrama*, meaning fringe or from the word *makramiyya*, meaning striped towel, ornamental fringe or embroidered veil.

Many cultures have a history of knot-tying. The Incas in Peru had no written language but developed a method of knot-tying called *quipu* to send messages and to record history. Knotted items in Egyptian tombs have been discovered and dated to be 3,500 years old. British and American sailors knotted to fill long hours at sea and then used the belts, hammocks and bottle covers they had made for bartering when they went ashore. In the 1970s, macramé became a popular craft for use in apparel and household items.



Courtiers facing Sargon, from the citadel of Sargon II, Throne Room, Khorsabad, Neo-Assyrian, c. 720-705 BCE
Image Credit: <https://tatter.org/a-brief-history-of-macrame/>

Macramé Basics

Materials and Tools

Basic tools and materials are needed for macramé. They are generally available from variety stores, craft shops, supermarkets or hardware stores.

You will need:

- Cord
- Scissors
- T-pins or U-pins
- Rubber bands or bobbins
- A working surface such as a knotting board
- Measuring tape or ruler
- Household glue



Cord

Fiber Content

Cords for macramé can be classified as natural and man-made.

- Natural cords are made from plants such as cotton, flax, hemp, jute, sisal, raffia, manila, linen, wool and silk.
- Man-made cords include the following synthetic materials: rayon, nylon, plastic, polypropylene, polyethylene, fiber-wrapped wire, etc.

Cord Construction

- Cords that are twisted from two or more pieces of fiber are said to be a specific ply. A cord made by twisting three lengths of fiber together is three-ply. A five-ply cord will have five pieces of fiber twisted together. The number of plies to a cord has no bearing on its size.
- Some cords are braided. Polypropylene is often found as a solid braid or with a hollow center. Venetian blind cord is an example of a braided cord.

Diameter and Weight

Cords are measured according to diameter and weight. Diameters vary from three-thirty seconds of an inch and smaller to three-fourths inch and larger. Cords may be sold by the foot, yard or pound, depending upon the supplier.

Proper Use

Take care to select the right cord for each item to be made.

- Cords that are very slippery will not hold knots.
- Items to be used outdoors should be made of materials that can withstand the elements.
- If the item is to be washed, everything used on it also should be washable.
- Weight bearing items such as pot slings, plant hangers, hammocks, etc., should use cord that will not stretch out of shape when weight is added.

Precautions

Some cords, such as baling twine, can have a rough texture and be hard on bare hands. When working with such material, gloves should be worn.

Persons with allergies sometimes have been sensitive to jute cord fibers, dyes or chemical treatments. Eye irritations may be caused by some cords as they fray. Working outside may help. If allergy symptoms occur, an alternate cord type should be used. If irritations continue, consult a physician.

Scissors

Utility shears or heavy-duty scissors should be used to cut heavy cord. If plied cords are very difficult to cut, they can be untwisted at the cutting point and one ply cut at a time.

Pins

T-pins are used to hold cords in place on working surfaces. They are heavier and larger than regular pins or dress pins and do not bend easily. U-pins are good for holding heavy cords and bars or sticks that hold the working cords in place. They are available where upholstery materials are sold.

Rubber Bands or Bobbins

Rubber bands are used to bundle long lengths of cords for easier handling. A thick, pure rubber band will withstand repeated use.

Bobbins hold long lengths of cord and keep the excess cord easier to contain. They can be made from a heavy weight cardboard or from wood. Commercial bobbins are available at weaving supply stores in plastic and wood.



Image Credit: <https://www.fiberartistsupply.com/bobbins-for-weaving/>

Knotting Board

A knotting board has to be thick enough to support work but porous enough to have pins inserted in it. Some suitable boards are insulating material, fiberboard, cork board or a thick slab of foam rubber. Cover the board with paper marked off in one-inch squares to help keep the cords and knots even. Knotting boards also are sold commercially at craft supply stores.

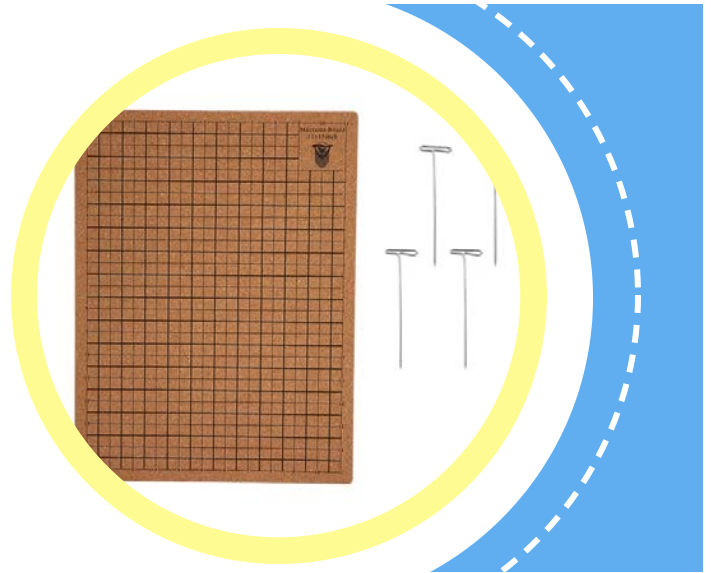
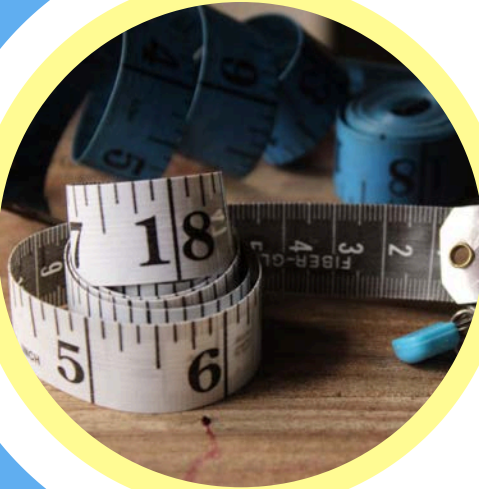


Image Credit: <https://www.walmart.com/ip/DIY-Knitting-Craft-Large-Macrame-Board-Set-for-Knitting-Binding-and-String-Art-for-Handmade-Accessories-and-Home/2021650712?wmlspartner=wlpa&selectedSellerId=102665566>



Measuring Tape or Ruler

Use a measuring tape or ruler to measure the specific lengths of cord needed and the length or size of the item as it is being tied.

Glue

Glue is used to prevent fraying of the cord ends and to secure various knots in completed items. White glue that dries clear and pliable is recommended.

Abbreviations

Abbreviations are used in patterns so that individual knot names do not need to be repeated. Here are some abbreviations:

ask.....alternating square knot
ddhh.....diagonal double half hitch
dhh.....double half hitch
hdhh.....horizontal double half hitch
hk.....half knot
hc.....holding cord

jk.....Josephine knot
lh.....lark's head knot
ok.....overhand knot
rlh.....reverse lark's head knot
sk.....square knot
vdhh.....vertical double half hitch

General Macramé Techniques

Some techniques are used whether you are making a very simple or a difficult item.

Measuring Cords

- Decide what the length of the finished product will be.
- Multiply this length by eight. (NOTE: For belts or items where the working cords are not folded in half; multiply the desired length by four.)
- Cut the required number of cords this length.

Bundling Long Cords

Easy-pull bundle:

- Hold the cord about twelve inches down from top, with the cord laying flat across the palm of your hand.
- Slide the bundle off of your hand and rubber band it in the middle.

Butterflies:

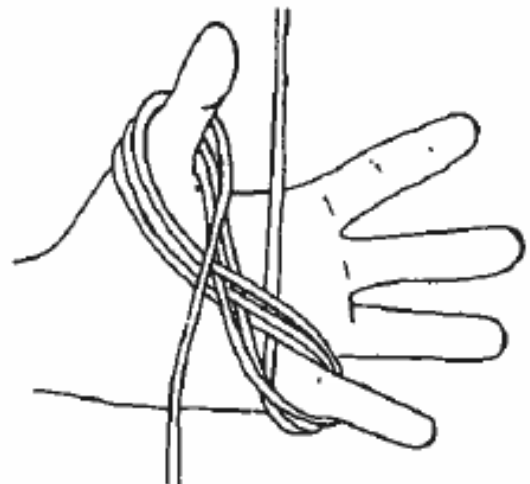
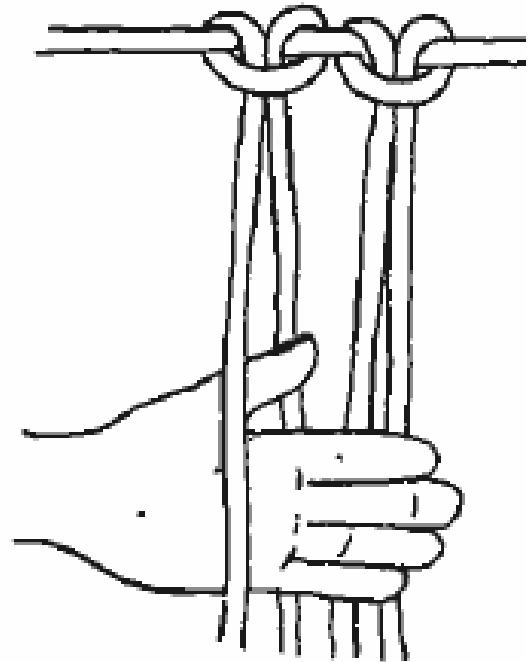
- Wrap a cord around your thumb and little finger in a figure-eight pattern.
- Remove the butterfly from your fingers and wrap it in the middle with a rubber band.

Bobbins:

- Wrap bobbins from the end of each cord up toward the point of attachment.

Finishing Ends

Ends of cords may be treated when you begin the project to prevent them from unraveling or fraying. You also may treat the ends when you have completed your project. Ends may be treated by dipping them into lacquer, glue, varnish or nail polish.



Terms

Terms used relate to the function of the cord being worked.

Mounting cord

Support on which the other cords are tied. It may not always be a cord. It may also be a ring, dowel or a buckle.

Knotting cord

Cords that are actually tied into a given knot.

Anchor cord

Cords that run through a knot that are not tied.

Holding cord or knotbearing cord

A cord on which other cords are tied.

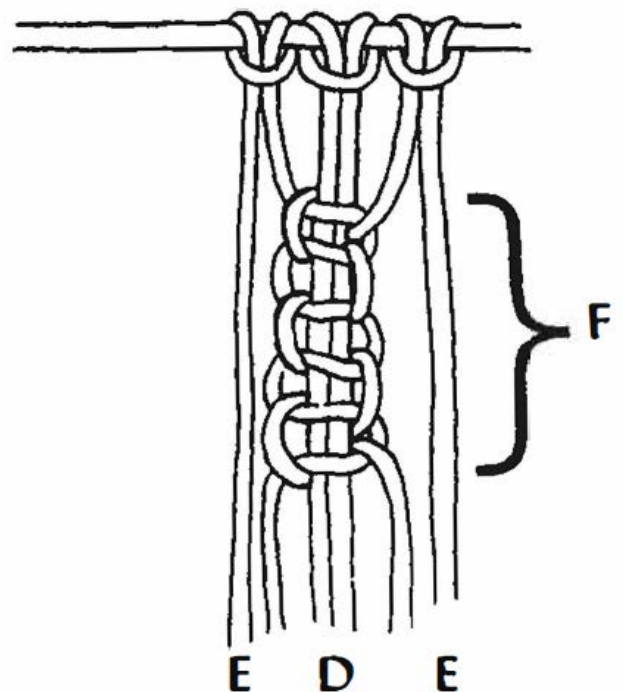
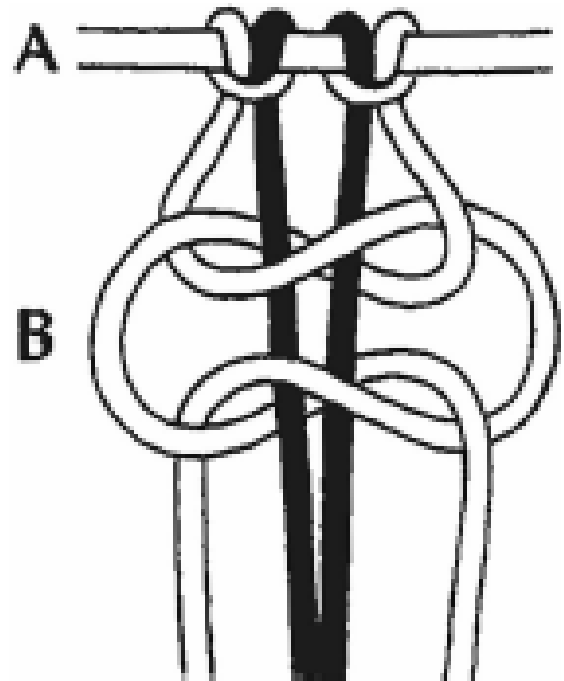
Floating cords

Any cord within a design that are not knotted.

Sennit

A chain made up of a series of one kind of knot.

There are Online tutorials and YouTube videos that will help you learn how to tie the various knots in macramé. Make sure you have permission from your parent/guardian before searching the Internet for resources or before doing research on your Macramé project. Your 4-H leader can also help you find reliable websites with knot tying tutorials. The variety of projects you can make with macramé are only limited by the materials you have and your imagination!



Chapter Five



Rug Making

Introduction to a Rug Making Project

Making rugs enables you to learn to express your creativity in a constructive way while developing a skill that is relaxing and fun. You will also have the opportunity to learn more about the history of rugs, when and where they originated, and how skills have passed through the ages.

You may want to experiment with different techniques as well as different materials to make rugs for your home. Visit with others within your community who make rugs to learn about the projects they have made and what suggestions they have for a beginner. Locate resources in your local Extension office, the Internet, library and yarn shops as well as on the Internet. Most importantly, have fun!





Project Evaluation

Rugs will be evaluated on:

Overall Appearance

- Clean and neat
- Lies flat
- Color and design are appropriate for a rug
- Blocked and finished

Materials

- Suitable for intended use
- Durable
- Fabrics of harmonizing nature

Design

- Use of texture, colors and materials
- Shape and weight in proportion to size

Workmanship

- Compatibility with the ethnic group where the craft originated (if applicable)
- Method and stitches, both well done and even
- Quality or mastery of techniques
- Durable and secure edges

There are other techniques for making rugs besides latch hook and braiding that are covered in this manual. Your research may help you find other types of heritage rugs to make. Rugs can be woven on a loom using heavier yarns than blankets. Rush weaving was used to make mats and chair seats as well as to finish mattresses. Rug tufting is a newer method first introduced with the development of the tufting gun in the 1960s-70s. Whatever method you choose for making rugs, they will provide enjoyment in your own living space or as gifts for friends and family.

History of Rug Making

Rugmaking is an ancient craft shrouded in mystery. As our ancestors moved indoors, the desire to create a warmer, more comfortable atmosphere emerged. Early house dwellers used animal skins to cover stone floors and crude wall hangings to keep wind from coming in between the stones in their walls. Eventually, dyes were made from plants and berries to add the beauty of color to early rugs.

The Near East was the center of rug making during the time of the prophets. The basic method of producing these ancient rugs was used for many centuries and some of the knots used to tie tufts of wool into a woven backing are still in use today. The best-known knots are the even Ghiordes (Turkish) Knot, which is symmetrical, and the one-sided Sehna (Persian) Knot, which is asymmetrical and allows for finer detail in the rug.

As early as 6000 B.C., rush fabrics were plaited, or braided like basket work, one of the most ancient of arts. Rush is a stiff marsh plant. The plaited mats became popular, and in medieval times in the Near East, they were dyed and commanded high prices. Even today in South India, floor and sleeping mats are plaited from rush in beautiful colors. They also are found in Mexico and South America. In the United States, plaited mats made of cornhusks are made and still used.

Rug making was a country housewife's work and pride in parts of the world where bare floors would have meant a dull environment. The nomadic people of the Steppes, groups including the Scythians, Huns, and Mongols, who moved herds across the vast Eurasian grasslands made rugs for their tents which now bring high prices as antiques. The pioneering families of Africa, America and Australia made rugs for their cabins and huts. This part of history is proudly displayed in museums around the world.

Early American settlers first followed the English designs, but when they had difficulty in obtaining materials from Europe, they created their own style to suit their needs and surroundings. Bundles of clean, usable cloth, salvaged from old clothes, were transformed into warm lap robes, rugs and coverlets. The rugs often were sturdy and withstood constant use for a hundred years or more, passing from one generation to the next virtually unaltered.

The people who made rugs did not think of themselves as artists, but they created designs and color effects like a professional artist using whatever ideas and materials were available. While women originally made rugs to cover bare floors, later rug makers created pieces specifically to sell. (Family histories in cloth and wool have been beautifully pieced into rugs.)

Hooked Rugs Basics

Materials

Yarns

For latch hooking, yarns like acrylic or wool are often pre-cut into consistent lengths (3–5 inches), with acrylic being budget-friendly. Acrylic yarn holds up well to regular use and is resistant to mold and mildew. It is machine washable and holds color well. The smooth feel can be slightly stiff, but is plush when hooked. The more expensive wool yarn offers a classic, bulkier feel. It is durable and wears well over time, but it can pill or fray more easily than acrylic. Wool requires more care, like hand washing, to avoid shrinkage. It is a soft and luxurious natural fiber.

Alternatively, even old fabric strips work for a rustic look. Worsted weight may also be used in double strands or in single strands to accent designs. Rug- or bulky-weight yarns are preferred for rugs because they are durable and resilient. Lighter weight yarns may be used in rugs that will be used as wall hangings since they will not be walked on.

Yarn for latch hooking may be purchased in packages of pre-cut pieces. Yarn may also be purchased in skeins and cut into desired lengths of 3 to 5 inches. When cutting yarn, make a large supply to avoid stopping frequently to cut more strands.

Small amounts of old yarn and fabric may be washed and worked into designs to create character in latch hooking. Latch hook kits are available which include a patterned canvas and pre-cut yarn.



Canvas

A latch hook is worked on canvas, also referred to as rug net. The best materials are durable, gridded canvas (like burlap, monks cloth, or carpet warp) as a base. The canvas should have durable fibers that form a series of open spaces or squares. Canvas made with doubleweight strands is preferred because it is stronger than single-stranded canvas. The ideal canvas has 16 square spaces to the square inch. Canvas widths vary from 14 to 45 inches. Very large projects may require that two or more pieces of canvas be joined together.

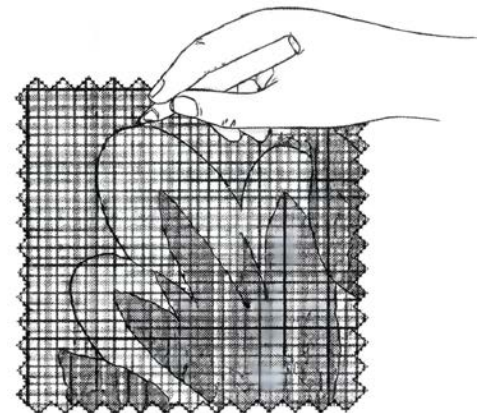
It is important that the selvage edges (closely woven and smooth) are used as the right and left sides of the work, rather than as the top and bottom. If the canvas piece is cut from a large roll, the selvage edges will be smooth, while the top and bottom edges will be rough and uneven. Canvas size for a project is determined by adding four inches beyond the design on all sides. This edge will be folded under for finishing.

Transferring a Design

To transfer a design, use waterproof felt-tip pens or waterproof non-staining ink. Water-proof ink will not run onto the yarn or discolor it. If tracing an intricate pattern, find the exact center strand, vertically and horizontally, on the canvas. Mark this point with a straight line to correspond and mark the design center to match them up. Looking through the spaces in the canvas, carefully trace the pattern outline onto the net.

If you draw a curved line on the netting, when it is hooked it will make steps diagonally on the canvas. It is sometimes easier to follow the line if you draw it as a series of steps. When the outline has been traced, darken it if necessary. Compare the net to the design to see if they look the same.

The canvas can be shaded with the appropriate colors. Acrylic paints work well, especially when the design is intricate. Acrylics are used with water but are waterproof when dry. Permanent felt-tip markers may also be used. Allow the canvas to dry completely before hooking.



Hooks

The hook end of the latch hook has a hinged bar or latch that closes over the point of the hood, enabling the yarn to slip smoothly into place. The hook handle may be plastic or wood and is rounded to fit the hand. A straight or bent-shank hook can be used.



Making a Latch Hooked Rug

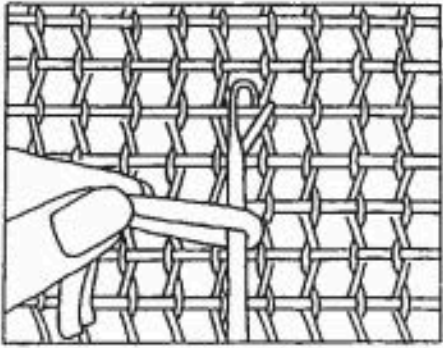
After determining the size of canvas and amount of yarn needed or purchasing a kit, prepare the canvas backing, leaving at least four inches on all sides for the hem. To prevent the edges from fraying, cover them with masking tape.

Work from left to right through every hole across the canvas, beginning in the lower left corner. If you are left-handed, start in the lower right corner and work from right to left. Check your progress by looking at the back of the canvas to see if you missed any holes. Always work complete horizontal rows, changing the color of yarn as the design indicates. Do not try to work one color at a time on the entire rug, because it is difficult to fill in the small areas as the work nears completion.

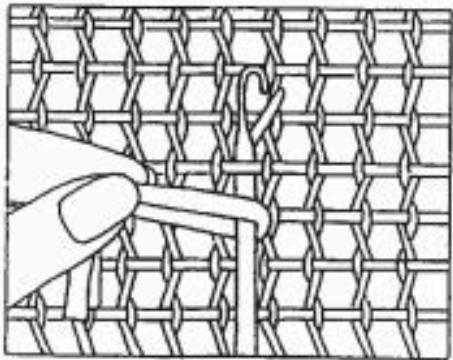
While there is more than one method to do latch hooking, the Four-Step Method is suggested, as follows.

Four-Step Method

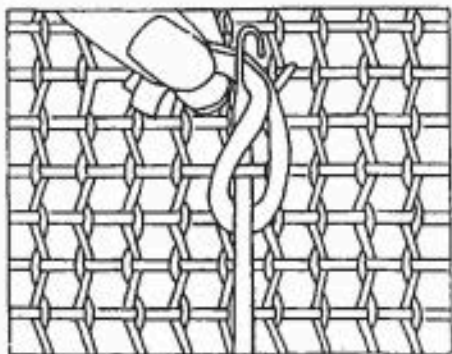
1. Fold yarn exactly in half and loop it around the shank of the hook.



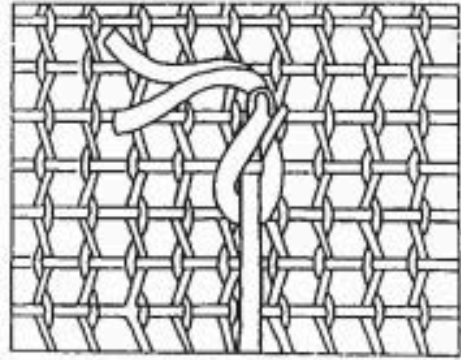
2. Push the hook under the lower thread of the first square with the latch open.



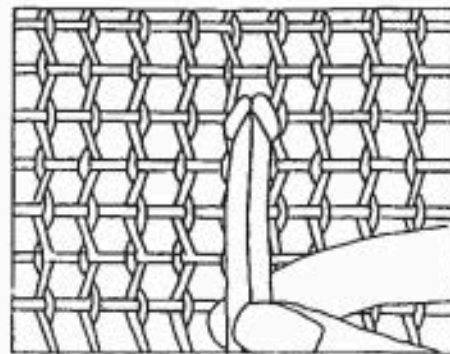
3. Twist the hook slightly to the right. Place the cut ends of the yarn into the open hook and let the latch close.



4. Pull the hook through the loop of yarn wound around the shank and push the hook forward to release it.



4. Pull the ends of the yarn tightly to make the knot firm.



Finishing

Because latch hooked rugs are not worked on a frame, the rug can pull out of shape and may need to be straightened before finishing. The rug may need to be blocked to bring it back into the correct shape. Cover a board that is six to eight inches larger than the rug with towels. Lay the rug face down on the towels. Thoroughly moisten the back of the rug, but be sure not to get it soaking wet. Nail or staple the rug to the board, with the edges straight and the canvas stretched tightly. Leave the rug on the board until it is completely dry.

After blocking and drying, the rug is ready to bind and finish. The hooked rug can be finished in several ways, with binding or backing suggested for beginners

For binding, a heavy needle and strong thread are needed in addition to rug binding. Select a rug binding tape one to two inches wide, long enough to go around all sides of the rug, plus about six inches.

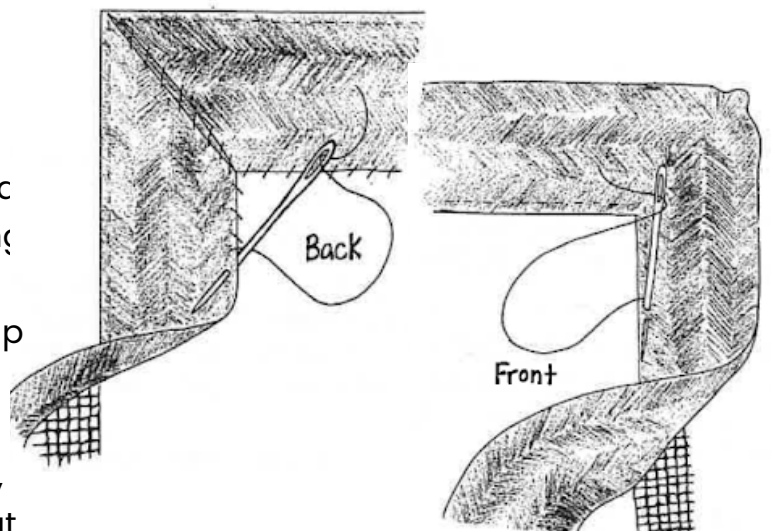
Fold in the selvage edges on the left and right sides of the rug, leaving a one-inch border of canvas. Fold in top and bottom edges in the same manner. The edges may be hand stitched under for easier handling.

Place the rug on a flat surface right side up with the one-inch wide edges extended out. Beginning in the middle of one side, hand stitch the binding type to the edges, working from the outside of the rug so that the stitches will be hidden when finished.

Stitch as closely as possible to the hooked knots. Stitch all the binding in place around the rug in one piece, overlapping one to two inches where the ends meet.

Turn the rug top side down, and fold in the sewn binding to touch the back of the rug. The binding should cover the canvas allowance completely. Hand stitch the binding to the canvas backing. When reaching a corner, miter it by folding the center of the binding corner in toward the rug. Fold down the flap that is sticking up and sew in place.

The rug may also be finished with a backing made from a durable non slippery fabric, such as burlap. Backing may be used in addition to the binding or without a binding. Cut the backing fabric one inch wider than the rug on all sides. Press the edges under to fit the rug and hand sew in place, using a heavy needle and strong thread.



Braided Rug Basics

Materials

Note: Because of the difficulty in finding resources on how to make braided rugs, instructions are included in this section.

The most economical materials are fabrics from recycled clothing and household goods. Other fabric may be purchased depending upon the intended use of the braided rug, the resources available, and the experience of the braider. The amount of material needed depends on the desired size of the rug. Durable carpet thread is recommended for the most pleasing effect and extensive use.

Wool is preferred by many rug braiders but is not as readily available in recycled clothing as it once was. Men's and women's suits, military uniforms and wool blankets are good sources. Heavy cotton fabric also makes durable long-wearing rugs. While any type of fabric went into Colonial rugs, it is not recommended to mix fabrics because the rug will wear unevenly. A rule of thumb to determine the correct weight of fabric is to weigh it and select those that weigh 14 to 16 ounces per yard.

When old materials are used, remove all seams, buttons, worn areas and other trim. Wash the material in warm sudsy water and rinse in clear warm water. Hang in fresh air, if possible, to remove wrinkles and avoid pressing.

Equipment

A blunt-pointed needle is necessary to form the braids into rugs. This was the only tool used in Colonial times, but today, numerous gadgets are available to help produce an attractive rug in less time.

During the Civil War period, the sewing bird made braiding easier and faster. It was made of metal and about the size of a small bird. It had a velvet pincushion on its back, a spring in its beak to hold the braid, and a clamp on its feet which could be attached to a table. The bird, or its updated version, is still available and used today.

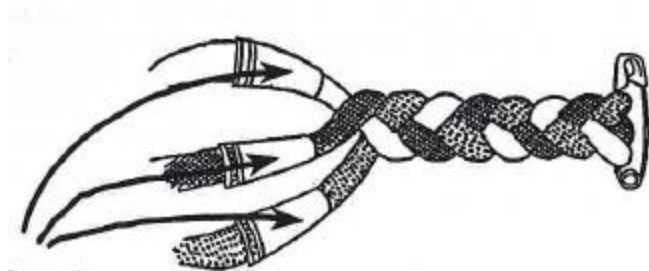


Image Credit: <https://missmustardseed.com/the-victorian-sewing-bird/>

Other Equipment Useful for Rug Braiding

- Medium-sized scissors
- Heavy lacing or carpet thread
- Thimble
- Braid holder
- Small pointed pliers
- Clip-type clothespins
- Metal cones (braid-aids)
- Color guide
- Medium safety pins
- Blunt straight or curved carpet needles
- Tape measure or guide of Vari-folder tool

A braid-aid is a metal, cone or flat shape and is used to fold under raw edges and turn strips of material into tubular strands.



It can be useful for individuals with weak hands or wrists and for beginners. There is a newer Redi-Braid, a plastic holder that turns under raw edges and unwinds the rolls without tangling. You can also find Vari-Folders made by Braid-Aid.



Image Credit: <https://www.ebay.com/itm/164126962154>

A braid holder is a clamp that holds the braid taut on a table or arm chair. It reels to keep the strands from tangling. It is made of wood, metal or a combination of both. There also is an upright model that stands on the floor and can be used from an easy chair.

You can make a measuring guide cardboard to aid in marking the width of the strips.

Making a Braided Rug

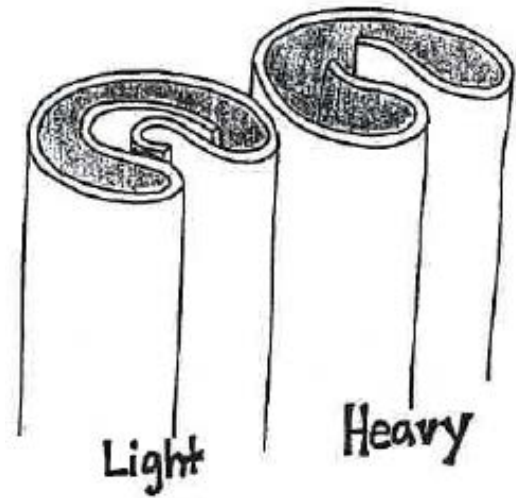
Rug braiding is not an exact craft because there is more than one way to do it. In talking to ten different braiders, one may hear ten different ideas on the proper method. A firm and evenly braided rug is preferred over a loosely braided irregular one. It not only looks neater and more appealing but lasts longer.

Preparing Fabric

A multicolored undesigned rug is traditional and is the easiest and most economical to make. You will need about one pound of heavy, tightly-woven fabric per square foot of the finished size of the rug. Collect a variety of colors: bright, dull, neutral, in patterned and solid colors. Fabrics may be used or new, or a combination of both. Pre-wash all fabrics prior to working. For used fabrics, remove linings, buttons, etc., and cut apart along the seams.

To fold fabric for rug braiding, cut or tear your fabric into long strips, then fold the raw edges inward towards the center and fold the whole strip in half lengthwise, creating a flat, neat band where raw edges are hidden. To determine the correct width, tear a test strip about one to two inches wide. The folded strip should form a plump, round cable used for braiding. If the strip is wide and flat, try forming a narrower strip.

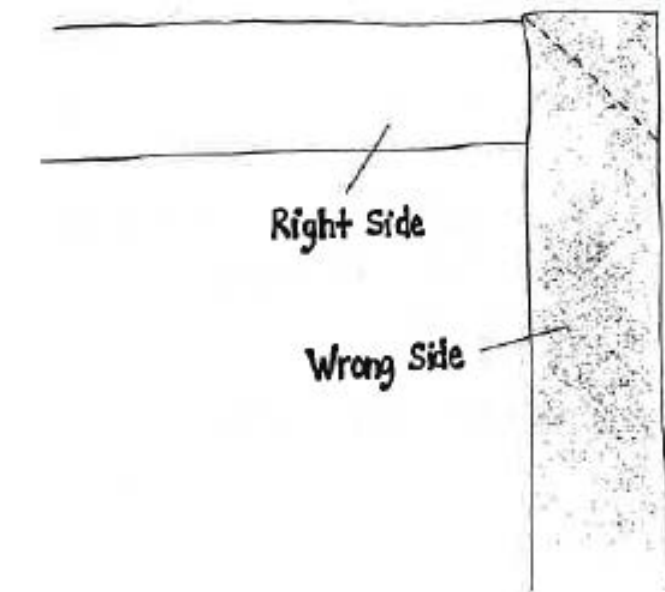
Once the correct width has been determined, use the cable it forms as a model. Quality depends upon the plumpness and uniformity of the cables.



Fabrics that are lighter in weight will need to be torn into proportionately wider strips and their edges overlapped to form cables of the proper thickness. Fold strips so that edges meet and then in half again to form the cable.

When tearing the strips, start each rip with scissors, then tear the rest of the way along the fabric grain with your hands. Weave a test braid with a few strips before tearing all the fabric to be sure that the final strips make a firm and full braid.

To join the strips, place them at 90 degree angles with right sides together. Stitch on a diagonal with matching thread, then cut off outer corners.

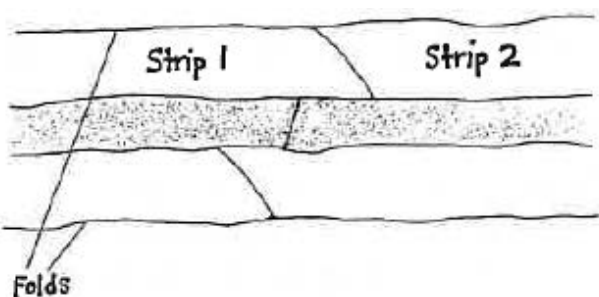


The joined pieces open into straight strips.

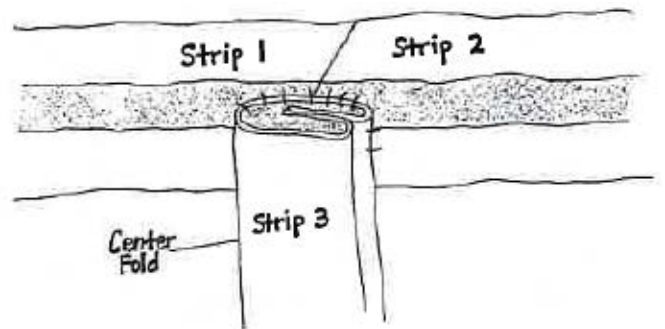
After the strips are torn and joined, wind them into five-inch rolls. Tie the rolls with string until ready to use to keep them from unwinding.

Braiding

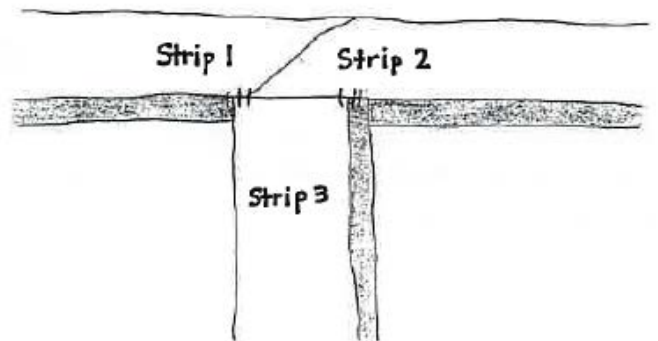
When ready to begin braiding, use the bias seam method to join the ends of the two different-colored strips. Fold edges inward so that they meet at the center of the strip.



Fold a third strip into a cable. With the center fold to the left, place the third strip on the center of the seamline of the first two attached strips to form a "T" and stitch in place.

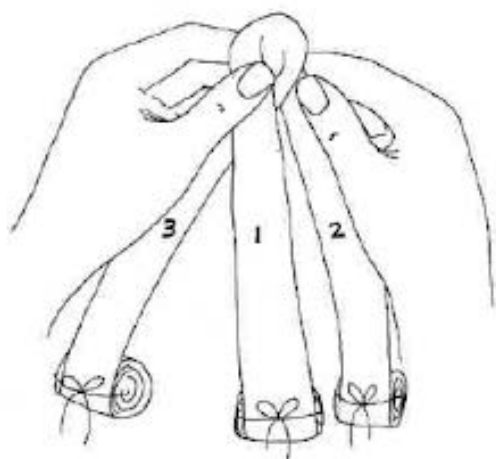
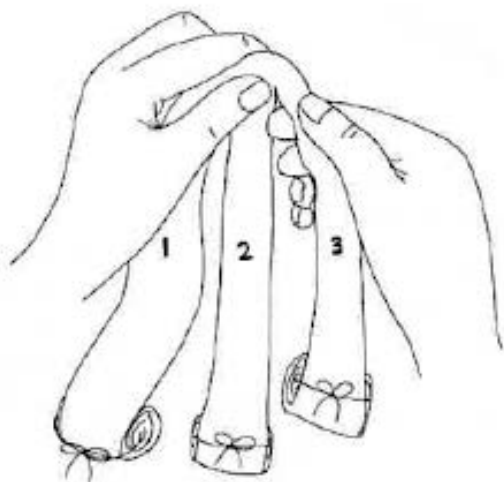


Fold the crossbar strip in half lengthwise to enclose the end of the third strip and stitch at inner corners of the "T".



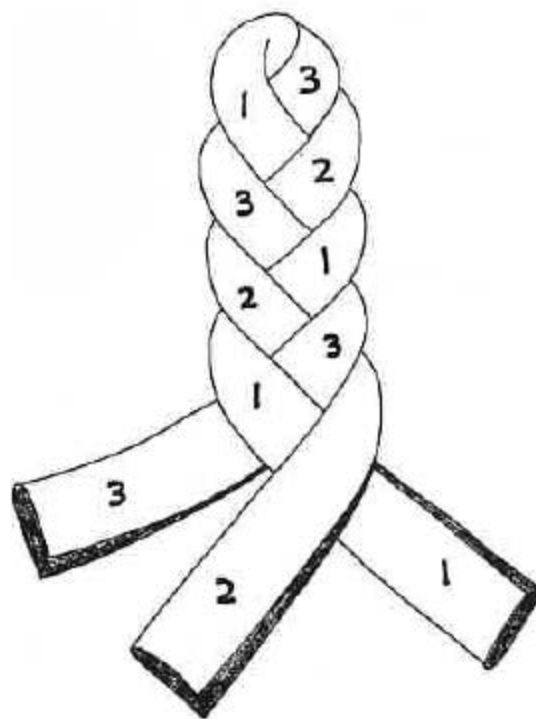
Fold the right arm of the crossbar down and to the left, so that it lies between the other two strips and its center fold faces left. If braid-aids are used, they may be placed on the three strips at this point.

Hold the start of the braid in the left hand, keeping the center folds facing left. Fold the righthand strip to make a cable. Note that strips are folded as they are braided. Bring the right-hand cable (3) over the center cable (2), twisting it so that the center fold stays to the left. Push the cable snugly against the one above.



Shift the already-braided cables to the right hand and use the right little finger to help fold edges inward on the left strip, forming more cable.

Bring the left-hand cable over the one in the center, twisting it to keep the center fold on the left. Continue bringing cables over, pushing each against the completed braid.



Additional strips may be added as needed during the braiding process.

The above braiding instructions are for right-handed people. If lefthanded individuals find the directions awkward, the directional instructions may be reversed. Keep the center folds to the right and lace from left to right around the rug.

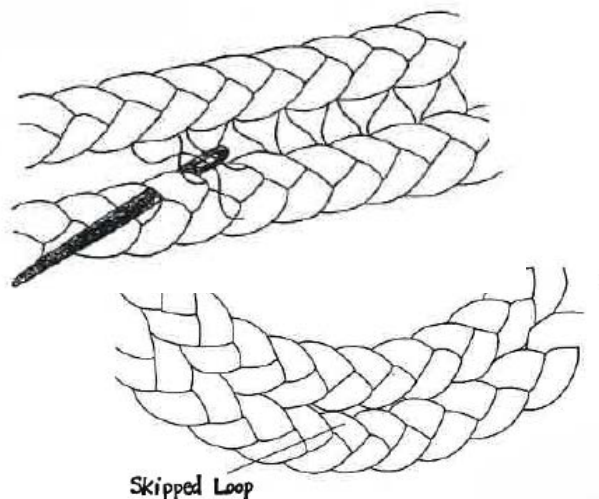
Size

The length of the middle cable of the rug determines the finished size of the rug. Once the desired size is decided, subtract the width from the length to decide how long to make the center braid. For example, if the finished size is to be four feet by six feet, subtract four from six to determine that the middle cable should be two feet long.

Lacing the Braids

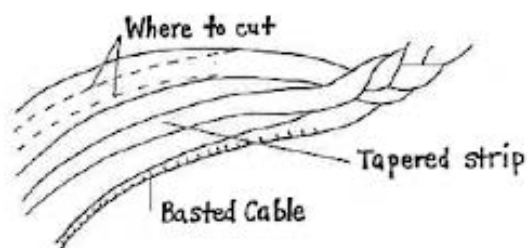
Together Lacing may be started after several strips are braided together. Additional braids can be added at any point to increase the size of the finished rug.

Always lace on what will be the back of the rug, because the lacing will create a slightly flattened look. Join the braids by lacing with heavy carpet thread using a blunt or curved carpet needle, whichever is most comfortable. Insert the needle under the braid loop and draw the thread between the loops and out the top of the braid. Work back and forth between the loose braid and the core of the rug, lacing through each loop and pulling each stitch down into the crevice of the braid.



An occasional loop on the braid being laced must be skipped because each successive round is longer than the preceding one. When a loop of the braid being added falls opposite another braid loop instead of in a notch between two loops, do not lace the outer loop. Skip it and lace the next loop instead. Skip only on shoulders where the rug curves and only one loop at a time. Mark the skips with pins to avoid skipping at the same point in following rounds. If the rug edge ripples, too many skips have been made. If the rug edge turns up, not enough skips were made.

The final step is to taper the last braid around a shoulder. Start by cutting off strips so they are 1 1/2 times as long as the distance around the shoulder. Use scissors to taper the strips along each side. The strips should be barely wide enough to fold at their ends, widening gradually to full width at the top of the shoulder. Fold and baste tapered strips into cables, then braid and lace. Pull braid ends through loops on the rug edge, sew into place and trim the excess.



References

Back to Basics: How to Learn and Enjoy
Traditional American Skills, Readers
Digest: New York (1981).

The Complete Book of Rug Braiding by
Helen Howard Feeley; Coward-McCann
Inc.: New York (1957).

Hooked Rugs: An American Folk Art by
Leslie Linsley; Clarkson Potter,
Publishers: New York (1992).

Hooked Rugs and Ryas by Xenia Ley
Parker; Henry Regnery Company:
Chicago (1973).

How to Make Braided Rugs by Sally
Clarke Carty; McGraw-Hill Book
Company: New York
(1977).

Making Rugs by Marion Koenig and Gill
Speirs; Arco Publishing Inc.: New York
(1980).

Reader's Digest Complete Guide to
Needlework; Reader's Digest
Association, Inc.: New York (1992).

Chapter Six

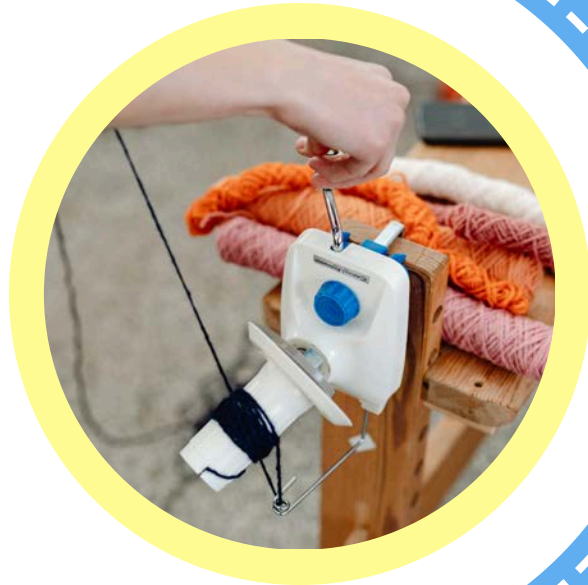


Spinning

Introduction to a Spinning Project

Through spinning you will learn to express your creativity in a constructive way while developing a skill that is relaxing and fun. You will also have the opportunity to learn more about the history of spinning, when and where it originated, how it has passed down through the ages, and other information you may discover through your research of spinning as an art form.

You may want to experiment with different fibers and techniques as you learn the basics of spinning. Visit with spinners in your community to discover how they learned to spin, what projects they have made and what suggestions they would give to a beginner. Check for additional sources in your local Extension office, the Internet, library or yarn shops to get new ideas. Most importantly, have fun!





Project Evaluation

Skeins of yarn should be evaluated on:

Overall Appearance

- Suitability of materials
- Construction appropriate, balanced design
- Fleece is clean
- Skein is tied evenly
- Skein is balanced

Workmanship

- Twist is even and consistent
- Fleece is properly carded
- Fleece is appropriate for yarn type
- Yarn is appropriate for intended use
- Joins are strong and even

History of Spinning

Spinning fiber into yarn is an ancient process. No one really knows when spinning began, but fragments of fabrics from as early as 6300 BC show that early spinners possessed remarkable skill. Ancient cultures used animal and plant fibers to make yarn for weaving cloth and twining sandals. The spinning process consisted of drawing out fibers, which were held on a stick called a distaff, and twisting them with a spindle, which could be spun like a top, to make yarn. The yarn was wound onto the spindle. The spinning wheel, which increased the speed and efficiency of yarn production, was invented in India and was introduced into Europe in the 14th century.

In order for fibers to be spun into yarn, they must be strong, flexible enough to be twisted and long enough to stay together when spun. Fibers used for hand spinning usually come from animals, or protein, or plants called cellulosic fibers. Wool, alpaca, mohair, dog or rabbit are examples of protein fibers. Cotton and flax are common plant fibers used for spinning.

Yarn is made when fibers are twisted together under tension. The function of the hand spindle and spinning wheel is to twist prepared fibers while the spinner holds the fibers under tension. This chapter will give you instructions for spinning fibers only on a hand spindle, not a spinning wheel. Hand spindles are easy to make or can be purchased for a low cost from a yarn or weaving store. Spinning wheels are expensive and are not as available as spindles. If you want to spin with a spinning wheel, it is recommended to learn from an experienced spinner.



Spinning Wool Using a Hand Spindle

The basic parts of the hand spindle are the shaft and the whorl. Spun yarn is stored on the shaft. The whorl weights the spindle and provides tension for spinning. Some hand spindles have a small hook on the unweighted end of the shaft to control the yarn while spinning. There are two main types of hand spindles, suspended (or drop) spindles and supported spindles. With suspended or drop spindles, the spindle is supported by the length of yarn that is being spun. The location of the whorl (weight) is a personal preference. It can be at either the top, middle, or the bottom of the shaft. Popular bottom shaft spindles are Peruvian and Turkish. Supported spindles are a little more difficult to learn and are generally used for spinning shorter or finer fibers using a bowl within which the spindle is held in place as it spins. Common supported spindles are Russian, Tibetan, Navajo and Takhli.

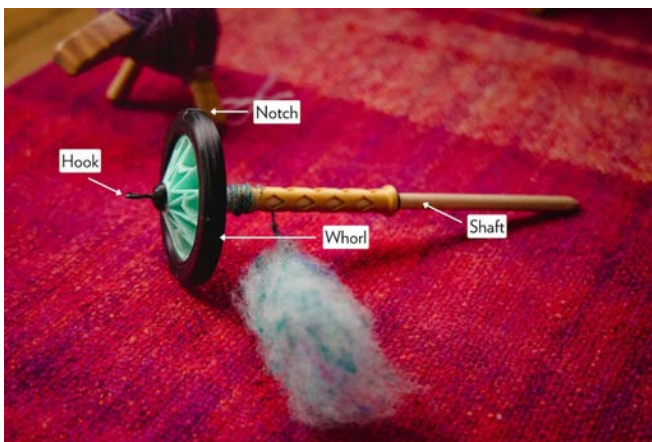


Image Credit: The anatomy of a suspended spindle.
<https://sweetgeorgiayarns.com/the-taxonomy-of-spindles-spindle-styles-their-best-uses/>



Image Credit: The anatomy of a supported spindle.
<https://sweetgeorgiayarns.com/the-taxonomy-of-spindles-spindle-styles-their-best-uses/>

Turkish spindles are a type of drop spindle that have a unique cross-arm design. As you spin, the yarn winds around the arms, forming a ball that's ready for pulling straight off the spindle. This design is practical, and the yarn builds up in neat, geometric layers.



Image Credit: Turkish spindle.
Pschemp, CC BY-SA 3.0 <<https://creativecommons.org/licenses/by-sa/3.0/>>, via Wikimedia Commons

Takhli spindles are a type of supported spindle that is small, heavier, and usually made of metal. Their fast, smooth spin makes them ideal for short, cotton, or slippery fibers.

Takhli spindles are a type of supported spindle that is small, heavier, and usually made of metal. Their fast, smooth spin makes them ideal for short, cotton, or slippery fibers.



Image Credit: <https://www.cottonacres.com/shop/spin/takhli-spindle/>

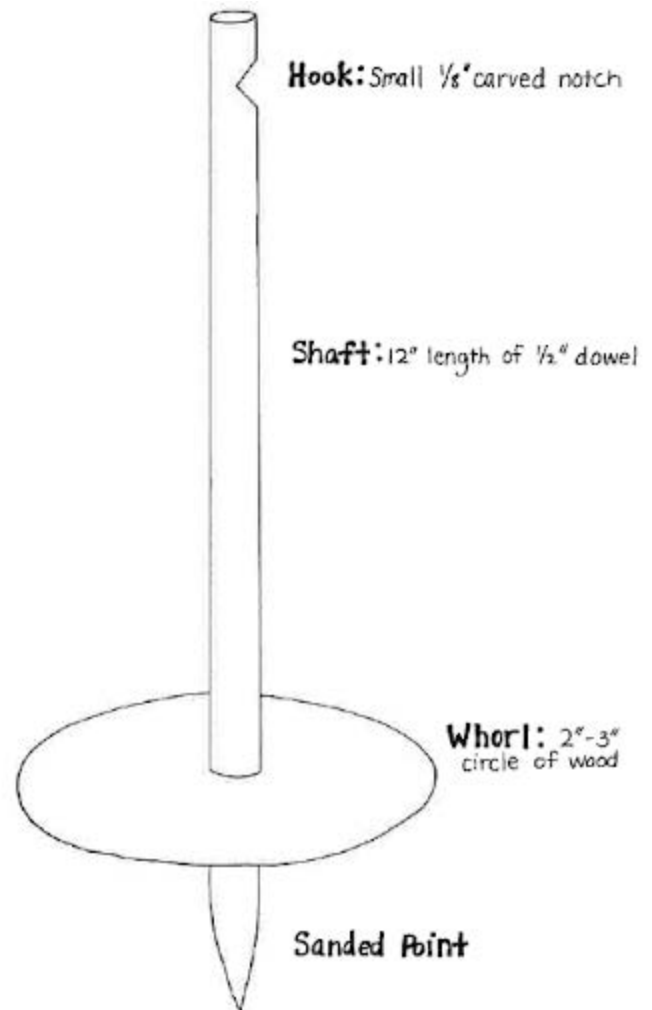


Image Credit: Wand spindle.
grizzlymountainarts, CC BY 2.0 <<https://creativecommons.org/licenses/by/2.0>>,
via Wikimedia Commons

Making Your Own Spindle

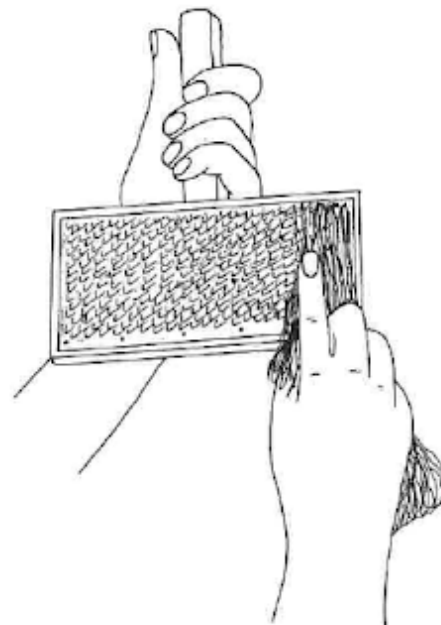
You can make your own spindle using materials available at hardware, hobby or craft shops. Use a 12-inch long, one-half inch diameter dowel for the shaft. Sand one end to a point. Carve a small notch, about one-eighth inch, in the shaft one inch from the blunt end to make a hook.

The whorl can be made from a two- to three-inch circle of solid wood, such as a coaster or wheel from a hobby shop. Drill a hole in the exact center of the wooden circle and insert the shaft so that the whorl is about 1 1/2 inches from the pointed end. The shaft needs to fit tightly, so apply wood glue to secure the whorl. Test the balance and rotation of your spindle by spinning it on the pointed end like a top. If the whorl is not centered the spindle will wobble and making yarn will be more difficult. This picture shows a bottom whorl spindle.

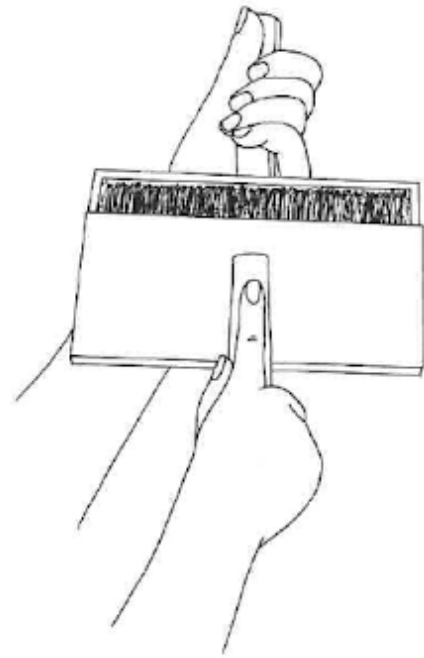


Preparing Fibers for Spinning

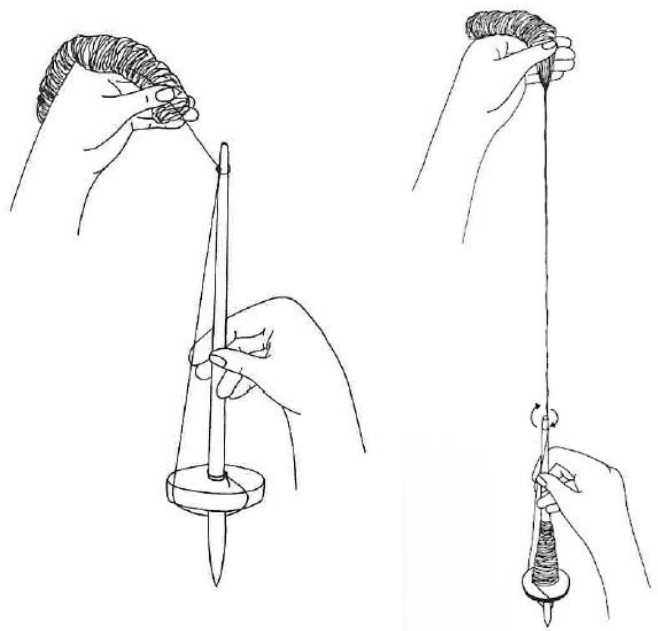
Choose a clean, unmatted fleece. You may spin the fleece in its natural grease or wash it first. To wash fleece, run warm water into a tub and add a small amount of mild dishwashing detergent. Gently place several ounces of wet fleece into the tub and let it soak for about half an hour. Do not agitate the fleece or it will felt. Lift the fleece from the now cooled water and place it in clean water of the same temperature to rinse. Rinse several times if necessary.



To prepare fibers for spinning they must be carded or combed. Carding involves a set of wooden paddles with rows of nails or thin wires through which the wool is combed together. Carding separates and fluffs the fibers using a brush-like tool with metal bristles. It aligns the fibers, removes tangles, and makes the fibers easier to spin. It helps improve the quality of the wool yarn by making it smoother and more even. Carded yarns, called woolen yarns, are usually soft and fuzzy. Combed fibers produce smoother, more tightly twisted worsted yarn. Combing with a metal dog comb can straighten the fibers. If you do not have hand cards to open and separate the fibers, tease them apart with your fingers.



To make spinning easier, tie an 18-inch piece of commercial yarn to the spindle next to the whorl and wind it onto the shaft. Loop the yarn over the top of the spindle in a half-hitch at the hook and take a handful of teased or carded fiber and place it next to the yarn. Twist the spindle away from you with your right hand while holding onto the fiber and yarn with the left hand. You should see and feel the fibers twisting together in your fingers. The small triangular area between the yarn and fiber is the drafting triangle or the drafting zone. It is where the drafted fibers meet the twist, and is the place where yarn is made.



Place the spindle on the floor or your leg so that the twist does not unwind, hold the twist with your left hand and pull slightly on the fleece with your right hand to open and align the fibers. This movement is called drawing out the fibers. Let the twist move into the fleece. Release the half-hitch at the top of the spindle and wind the yarn onto the shaft of the spindle.

If drawing out or drafting seems difficult, you may be adding too much twist to the yarn, or you may not have teased the fibers enough. Loose, open fibers will draft easily. The yarn will fall apart when you try to wind it on the spindle if you have not added enough twist.

When you have spun enough yarn to fill the spindle, make the yarn into a skein. Wind yarn from the spindle around a straight chair back. Be sure to tie the skein in at least four places with a small loop of extra yarn to keep it from becoming tangled.

To set the twist in yarn, soak the skein in warm water for about twenty minutes. Lift the skein out of the water and gently squeeze the yarn to remove excess water. Hang the yarn in a warm dry place with a weight on the end to straighten the yarn and allow the twist to be evenly distributed along the yarn. When the yarn is dry it will be ready to use.

After the skein is finished, hold it up to see if it drifts to the left or the right. A skein that hangs straight is called a balanced yarn.

Standards for Judging Handspun Yarn

General Appearance

- Yarn should be clean
- Properly skeined and tied
- Skein should hang straight (balanced)

Characteristics of the Yarn

- Uniform diameter (except in the case of fancy yarns).
- Evenly distributed twists
- Adequate strength for intended use
- Appropriate fiber selection and processing method for intended use



Image credit: <https://theknittingtimes.com/wp-content/uploads/2021/10/knitting-with-handspun-yarn-8.jpg?w=750>

Standards for Judging Handspun Yarn

General Appearance

- Yarn should be clean
- Properly skeined and tied
- Skein should hang straight (balanced)

Characteristics of the Yarn

- Uniform diameter (except in the case of fancy yarns).
- Evenly distributed twists
- Adequate strength for intended use
- Appropriate fiber selection and processing method for intended use

References

Interweave Press

(<https://www.interweave.com/>) is an art and craft media company originally founded in Loveland, Colorado.

Some of helpful spinning resources from Spinning Daily include:

Wool Combing and Carding: How to Use Hand Carders, WoolCombs, and Drum Carders
https://www.interweave.com/wp-content/uploads/1012-_SO_Carding_Combing.pdf

DIY Spinning Equipment

<https://www.interweave.com/wp-content/uploads/DIY-spinning-equipment.pdf>

Interweave Press

(<https://www.interweave.com/>) is an art and craft media company originally founded in Loveland, Colorado.

Some of helpful spinning resources from Spinning Daily include:

Wool Combing and Carding: How to Use Hand Carders, WoolCombs, and Drum Carders

https://www.interweave.com/wp-content/uploads/1012-_SO_Carding_Combing.pdf

DIY Spinning Equipment

<https://www.interweave.com/wp-content/uploads/DIY-spinning-equipment.pdf>

How to Make Yarn: Spinning for Beginners

<https://www.interweave.com/wp-content/uploads/How-to-Make-Yarn-for-Beginners.pdf>

An Introduction to Spinning Wheels: How to Use and How to Choose a Spinning Wheel

https://www.interweave.com/wp-content/uploads/1013_An_Intro_Spinning_Wheels_Great_Spinning_Roundup.pdf

Chapter Seven



Weaving

Introduction to a Weaving Project

Through weaving you will learn to express your creativity in a constructive way while developing a skill that is relaxing and fun. You will also have the opportunity to learn more about the history of weaving, when and where it originated, how it has passed down through the ages, and other information you may discover in your research on weaving as an art form.

Weaving is a process of making fabric from two sets of yarn that interlace at right angles to each other. The lengthwise or vertical yarns are referred to as the warp and the crosswise or horizontal yarns are called the filling or weft. Weaving is done on a loom, which allows the interlacing yarns to create a pre-arranged pattern.

You may want to experiment with different yarns to make unusual articles for yourself, others and your home. Visit with weavers in your community to discover how they learned to weave, what projects they have made and what suggestions they would give to a beginner. Check for additional resources in your local Extension office, the Internet, library or yarn shops to get new ideas. Most importantly, have fun!





Project Evaluation

Hand woven garments or articles should be evaluated on:

Overall Appearance

- Clean and neat
- Design elements and principals utilized
- Color, design, texture are harmonious, uniform

Workmanship

- Even and consistent tension
- Even and consistent weaving
- Straight yarn
- Joining and raw edges hidden
- Straight, even selvages
- No broken yarn
- Consistent pattern
- Ends finished securely

History of Weaving

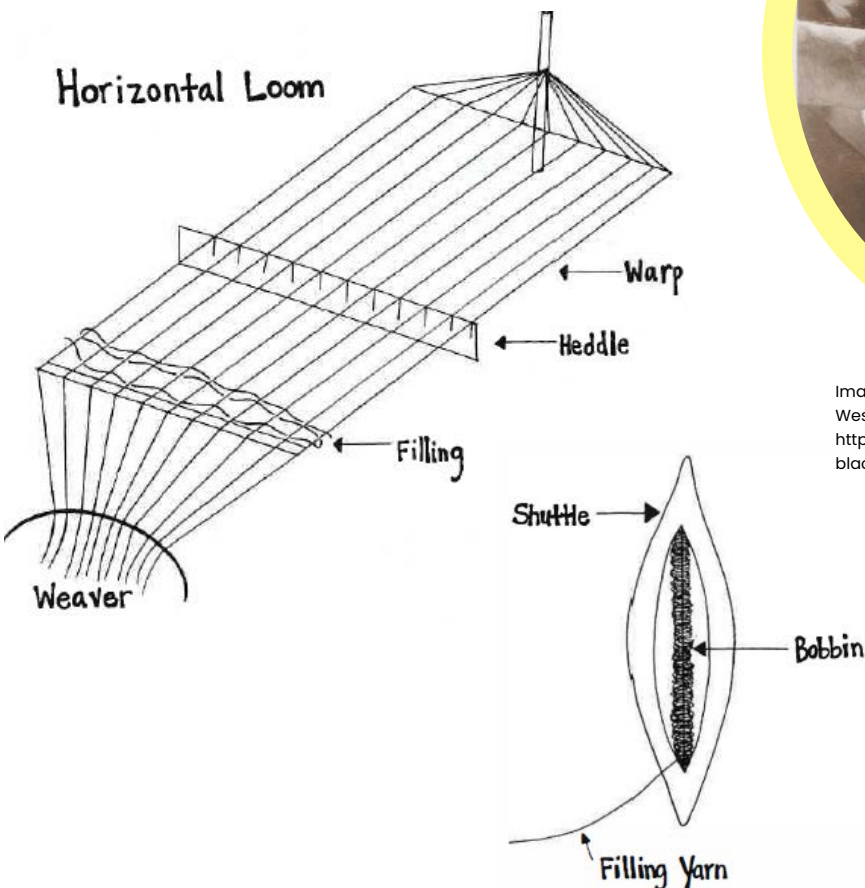
The earliest looms consisted of warp yarns hung vertically from a beam. The weaver interlaced the filling yarns, manipulating them in an over-under movement. The first improvements on this system consisted of attaching stones or metal weights to the ends of the warp yarn to provide tension and improve the quality of the woven cloth.



Image Credit: <https://www.dreamstime.com/stone-age-loom-exposed-alba-ilia-museum-ancient-vertical-wooden-weaving-weights-history-image368787439>

History of Weaving

Horizontal looms were used by the early Egyptians nearly 7,000 years ago. In its simplest form, this type of loom had a bar holding the warp yarns that was anchored to the ground. A bar at the opposite end of the warp was attached to the weaver who used the weight of her body as a source of tension for the warp. The filling yarns were inserted by the weaver in an over-under motion from a sitting position. Primitive weavers improvised a device called a heddle that enabled alternate warp threads to be raised together. This created a shed, or an opening between the groups of raised and lowered warp yarns, through which the weft yarn could be passed more efficiently.



At some time before the Middle Ages, tribes in what is now Great Britain constructed a frame for weaving that included a warp beam to hold warp yarns and a cloth beam to hold the woven cloth. The weft yarn, which had been moved through the shed as a ball of yarn or wound around a stick, was placed in a spool. This boat-shaped device was known as a shuttle, and it allowed the weaver to control the weft as it passed from side to side during the weaving process.



Image Credit: Alex Reed's hands and loom, n.d. Photograph by Claude Stoller
Western Regional Archives, State Archives of North Carolina
<https://yalebooks.yale.edu/2024/02/28/ep-131-the-history-of-weaving-at-black-mountain-college/>

Weaving Basics

The Weaving Process

A simplified explanation of the weaving process involves the following steps:

1. Preparation. The warp yarn is wound on a beam. All the yarns are arranged parallel to each other.
2. Warping. From the warp beam, the yarn is led over a whip-roll, through the eyes of the needles in the harness, and then through the splits or dents of the reed. This makes it possible to manipulate the various warp yarn according to a pre-arranged plan to create a pattern.
3. Shedding. By using the harness and heddles, the warp yarns are separated into two layers, creating an opening called a shed.
4. Picking. The shuttle and bobbin, containing the filling yarn, is passed through the shed.
5. Beating-in. The filling yarn is beaten into place in the cloth by the reed.
6. Take-up. As the fabric is woven, it is wound around the cloth roller at the front of the loom.



Image Credit: User:Javier Carro, CC BY-SA 3.0
<<http://creativecommons.org/licenses/by-sa/3.0/>>, via Wikimedia Commons,
https://commons.wikimedia.org/wiki/File:Webmaschine_in_Tirolervolkstunstmuseum.JPG

It was not until 1733, during the Industrial Revolution, that the first modern improvements on the hand loom were made. Weaving became faster and more efficient with the introduction of the fly shuttle and innovations that made it possible for one weaver to manipulate several shuttles at a time.

Parts of the Loom

1. Warp Beam

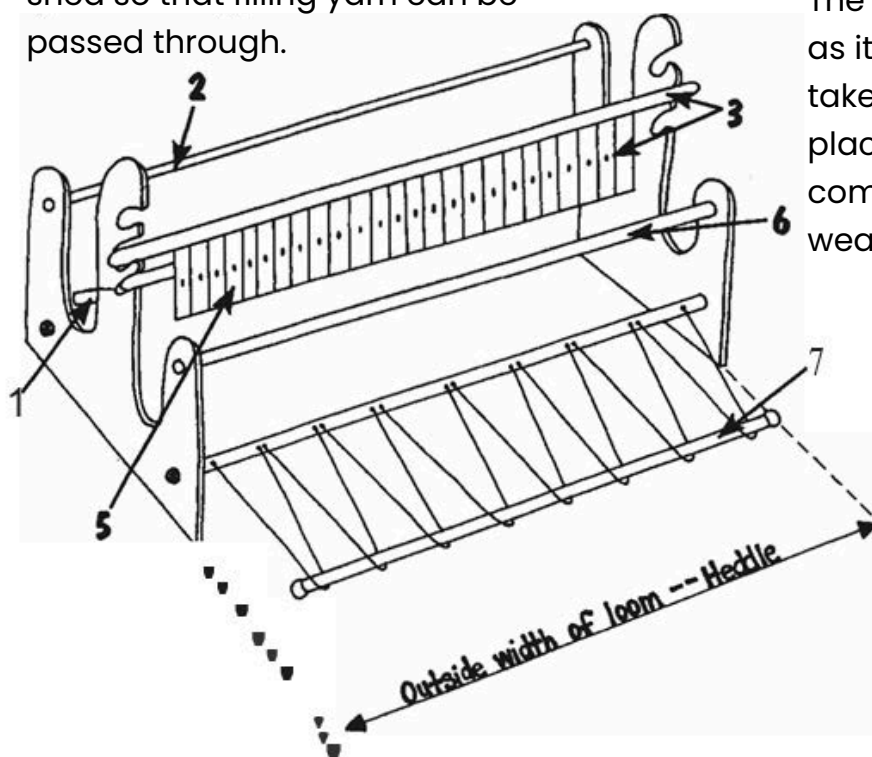
The roll or cylinder around which the warp yarns are wound in a uniform and parallel arrangement.

2. Whip Roll

This is a guide roller which directs the warp yarns on their way to the heddles.

3. Heddles and Harnesses

The heddles are short vertical steel wires or plastic bars that control the warp yarn. Each heddle bar controls one warp yarn that is threaded through an eye in the center of the heddle. The heddles are set into a harness, or rectangular wooden frame, that allows groups of warp yarn to be raised and lowered together. As the harness frames are raised and lowered, they produce a shed so that filling yarn can be passed through.



5. Bobbin and Shuttle

The filling yarn is wound on a bobbin, which sets into a boat-like shuttle or bobbin container. As the shuttle passes back and forth through the warp shed, it releases yarn from the bobbin and forms the cloth.

6. Reed

This is essentially a comb made up of steel wire rods set vertically into a frame. The spaces between the wires are called splits or dents. The warp yarns pass through these reed dents and are kept even and parallel. The reed also beats the filling yarn into place in the cloth.

7. Breast Beam

This is a bar at the front of the loom over which the cloth passes on its way to the cloth beam.

8. Cloth Beam

The roller on which the cloth is wound as it is woven. It is controlled by a take-up gear that holds the beam in place until the weaver moves it and completes the final stage of the weaving process.



Deciding on a Project

Answering the following questions will help you decide what type of project you want to make:

What type of loom do you have?

Rigid heddle and four-harness table looms are most frequently used by beginners. On a rigid heddle loom, the needle is also the reed. This means that the slots and holes in the heddle separate the yarn and form the shed, and the heddle is also moved forward on the weaving to beat in the filling yarn. A plain weave fabric can be created on a rigid needle loom.

A four-harness stable loom has four separate harnesses, each with heddles that separate the yarns. On this type of loom, each yarn is threaded through a heddle eye in one of the harnesses. The harnesses are raised and lowered with a series of levers on the side of the loom to create the shed. The reed at the front of the loom moves forward to beat in the filling yarn. On this type of loom, you can produce a plain or twill weave fabric.

The weaving instructions in this project are for a rigid heddle loom. Page 18 contains instructions for making this type of loom. If you are using a four-harness stable loom, you will need to consult one of the books in the reference section for specific warping instructions.

What do you want to make and how will it be used?

The type of fiber, yarn and weave structure that you choose will be very important for your project. For example, household items such as table runners or place mats must lie flat on the table and be washable. A plain weave fabric made from a medium weight cotton yarn would make a good table runner or place mat. A scarf or muffler that will be worn must be comfortable and drape or hang well. Soft wools spin into fluffier yarns and loosely woven cloth are good choices for such a project.

Warp yarn, for any project, must be firmer, stronger and smoother than the filling yarn so it will not break during weaving. Yarns with a lot of surface variation, such as designer or fancy yarns, are not strong enough to use them only in the filling direction.

Preparing the Loom

There are several necessary steps in preparing your loom before weaving. These steps include:

- figuring the amount of yarn needed for your project,
- measuring the warp and securing the cross that will separate the yarns so that the shed can be formed during weaving, and
- attaching the warp yarn to the loom, a process that is generally called warping the loom.

Figuring the Amount of Yarn

The sett or dent on a rigid heddle loom is the number of slots or dents and eyes or holes in one inch of the reed. Reeds come in a variety of setts. A twelve-dent reed means that each woven inch of fabric would contain 12 warp yarns. The dent or sett may also be called the ends per inch or e.p.i..

A twelve-dent heddle would make a fairly tightly woven fabric suitable for the placemats or table runners that we talked about in our last example. An eight- or six-dent reed would make a more loosely woven fabric and be appropriate for a muffler or scarf, especially if you use designer yarns in the filling.

The amount of warp yarn needed for your project equals the total length of your item, plus extra yarn that is used to tie onto the loom. This extra yarn is usually called the wastage, and it is generally about 12 inches — six inches in front and six in back. You will also need to include extra warp yarn to account for the weaving process. This amount is referred to as the weaving take-up and is generally about 10 inches on a small project. Also include any yarn you need to separate projects if you warp your loom for more than one item. Here is an example of how to figure the warp for a project.

- 1 Calculate the total number of warp yarns in the width of your project:
 $(\text{number of dents per inch on the heddle}) \times (\text{width in inches of project}) = \text{Total number of warp Yarn}$
- 2 Calculate the total length of the warp in inches:
First compute the length of the project:
 $(\text{length of the item}) + (\text{amount of Yarn separating items}) + (12 \text{ inches for tie-ups}) + (10 \text{ inches for weaving take-up}) = \text{total length of the project in inches}$
 $(\text{total number of warp yarns, from step 1}) \times (\text{length of project in inches}) = \text{total length of warp in inches}$
- 3 Since most yarn is sold by the yard, not the inch, calculate the number of yards of yarn needed:
 $(\text{total length of warp in inches from step 2}) + (35 \text{ inches per yard})$
- 4 Determine how many skeins of yarn you will need:
 $(\text{total number of yards}) + (\text{number of yarns in a skein}) = \text{number of skeins of yarn}$

Example

Suppose you want to make two 10 inch by 16 inch placemats, and your reed has 12 dents per inch.

- 1 Calculate the total number of warp yarn:
 $(12 \text{ dents per inch}) \times (10 \text{ inch width of place mats}) = 120 \text{ total number of warp yarns}$
- 2 Calculate the total length of the warp in inches:
Compute the length of the project:
32 inches for place mats (16 inches for each place mat) $\times 2 + (4 \text{ inches between place mats}) + (12 \text{ inches for tie-ups front and back}) + (10 \text{ inches for weaving take-up}) = 58 \text{ total inches in length}$
 $(120 \text{ total warp yarns}) \times (58 \text{ total inches in length}) = 6,960 \text{ inches, total length of warp}$
- 3 Convert inches to yards:
 $(6,960 \text{ inches total warp}) \div (36 \text{ inches per yard}) = 193.34 \text{ yards of warp yarn, rounded up to 194 yards.}$
- 4 Determine how many skeins of yarn you will need:
 $(194 \text{ yards of warp}) \div (150 \text{ yards per skein}) = 1.2 \text{ skeins}$

Note: You will have to buy two skeins because a portion of a skein is usually not available.

Filling or Weft Yarn

As a rule of thumb, approximately the same amount of filling yarn is needed as warp yarn. Finer yarns require more yardage, so if you use a different yarn for the filling than the warp, be sure to pay attention to the size of the yarn you choose. In the placemat example, you would need two skeins of yarn for the filling making a total of four skeins of yarn for the project.



Basic Weaving Terminology

Arc

A weft yarn laid in an open shed in a bow-like manner. Thicker yarns require more yarn to go over and under the warp, therefore a wider or higher arc is necessary. If the weft comes down tight and draws in, the arc isn't high enough. If there is a loop at the selvage, the arc is too big.

Beam

Front and back stationary loom support. The warp beam carries the warp at the back of the loom and the cloth beam carries the cloth at the front.

Bobbin

Carries the weft yarn in the shuttle.

Dents

Holes and slots in the heddle between the reed wires.

e.p.i. or Sett

Ends per inch, also referred to as sett.

Gamp or Swatch

A weaving sample.

Heddle

Looped cord of varnished string with an eye in the center through which a warp end is threaded in the shafts. Also used as a beater to secure weft yarns and as a reed to keep them properly spaced.

Ratchet

Gears to secure roller tension bars in place on looms.

Reed. Beater or Batten

Used to secure weft in place and also keeps warp properly spaced.

Selvage

The firmly woven edge of a cloth; finished sides or edge of weaving.

Sett

Equals one inch on a heddle. On a rigid heddle, this is predetermined.

Shed

The opening between the upper and lower warp yarns when separated (in which the shuttle is inserted).

Shuttle

Implement used to carry the weft through the shed. Weft yarn is wound on a bobbin in the shuttle.

Square Knot

Made when crossing two ends. Cross left over right, then right over left. This knot is used in front and back warp tie-ups. A reef knot or weaver's knot is also used.

Tie-up

Warp thread ends are tied in groups of four or six warp yarns in a square knot. They are tied to the warp rod secured to the roller tension bar.

Basic Weaving Terminology

Warp

Yarns running vertical or lengthwise of the cloth. Warp yarns should be strong enough to be pulled and tied firmly on the loom. There is much friction, so use a firm, smooth yarn for the warp.

Warp rods (front and back)

Warp yams secured to the rod with square knot.

Warp Roller (tension bars)

Warp yam is rolled on the back roller; woven fabrics rolled on the front roller.

Weft or Filling

Threads that run from selvage to selvage across the cloth; horizontal or crosswise yarn. Weft yarn can be just about any type depending on the project.

Building a Rigid Heddle Loom

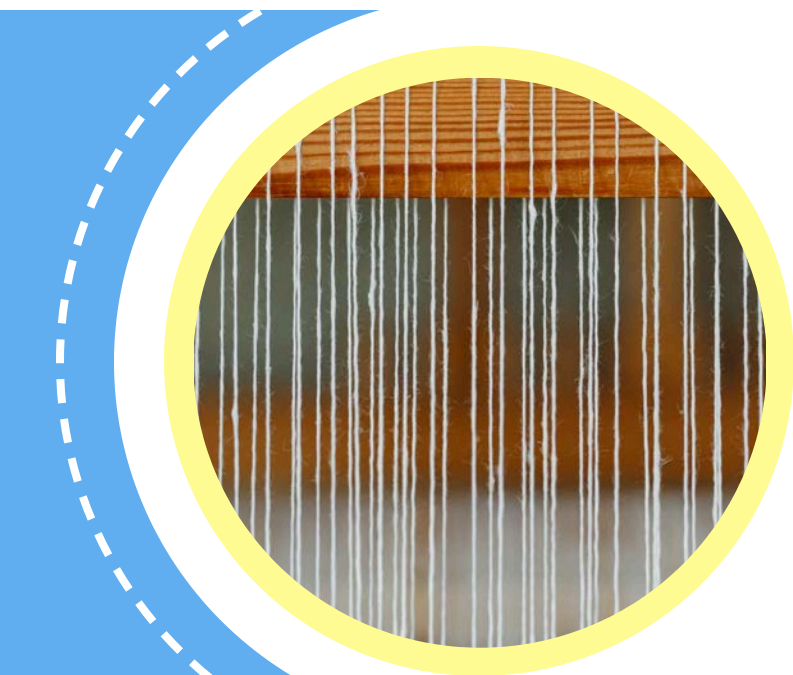
1. Loom Supply List

1. high grade of three-quarter inch plywood, 24 feet by 32 inches to make sides of loom.
2. 1-inch dowels, the width of the heddle plus 2 inches for frontend back stationary beams.
2. 1-inch dowels the width of heddle plus 2 inches for front and back roller tension bars.
3. ratchets to hold tension bars in place.
4. Strong rods the size of the inside width of the loom (width of heddle times one inch) for front and back warp rods, and at least two small shed sticks (shed sticks should be two inches wide, one-quarter inch thick and the length of the width of the loom; sand until smooth and tapered at each end).
5. yards of chalk marking cord or similar strong cord to secure warp rod to roller tension bar.
 1. heddle in one of the standard widths available from a weaving supply store.

Shed sticks, two inches wide, one-quarter inch thick and the length of the outside width of loom.

Several shuttles, two inches wide, less than a quarter-inch thick and one foot long of any fine grain wood. Cut out and sand.

Reinforcement board, one inch wide by eight inches long and as wide as the inside of the loom.



Building a Rigid Heddle Loom

Assemble Loom

If planning to make a loom, purchase the heddle first. The heddle comes in various widths. The width of the heddle determines the width of the loom. It must be smooth so yarn does not snag as it passes through its eyes and slots.

After obtaining supplies, assemble the loom.

Prepare Sides of Loom

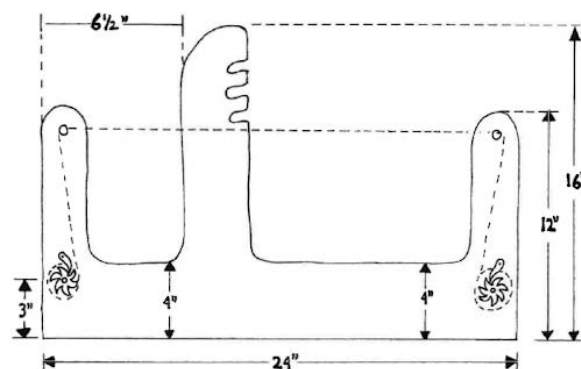
Draw the pattern on newspaper, cut it out and trace it onto the plywood. Cut two sides of the plywood. Sand to very smooth so yarn will not snag.

Drill Holes for Dowels

Dowels may not be a true inch wide, so check their width before drilling. Drill four holes on each side. Insert the dowels in the holes for the beams. Front and backbeams should be snug but warp roller tension bars should turn freely.

Drill one-eighth inch wide holes about four inches apart through the dowels for the roller tension bars. Drill through the dowel from front to back. Make sure your holes are large enough to allow cord to pass through.

Insert four dowels on one side of the loom, then connect the other side.

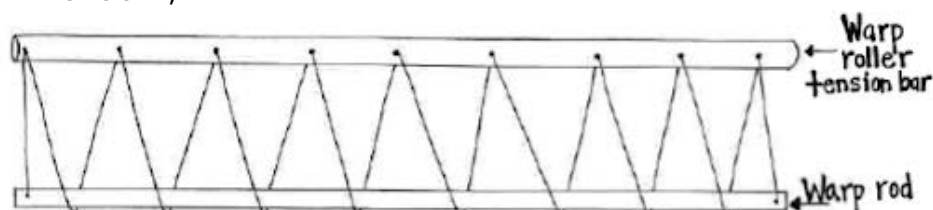


Assembly

Front and back beam. Glue in the beams in place and secure them with a screw.

Warp roller tension bars. Attach four ratchets, clockwise, according to the directions received with them at each end of dowels. Ratchets with square inserts work best.

Warprods. Drill one-eighth inch holes an inch in from either end. Divide five yards of cord in half. Use 2 1/2 yards for front warp rod and 2 1/2 yards for back warp rod. Secure at one end of the rod, thread through bar, around rod, through bar, and continue across ending with the hole in the rod. Secure with a square knot. The warp rod should be approximately eight inches from the warp roller tension bar. The rod hangs loosely until the warp yarn is secured to it. Reinforcement may be put across the bottom center from side to side. Screw the reinforcement board in place. Screws are better than nails because nails work loose.



Colorado 4-H Mission

Colorado 4-H Mission

4-H empowers youth to reach their full potential by working and learning in partnership with caring adults.

Colorado 4-H Vision

A world in which youth and adults learn, grow and work together

4-H Pledge

I pledge.....

My head to clearer thinking,
My heart to greater loyalty,
My hands to larger service,
My health to better living
for my club, my community, my country
and my world.

Promesa 4-H

Prometo usar mi mente para pensar con
más claridad,
mi corazón para ser más leal,
mis manos para ser más servicial,
mi salud para cuidarme más, por mi club,
mi comunidad, mi país y mi mundo.

4-H Motto

"To Make the Best Better."



COLORADO STATE UNIVERSITY
EXTENSION