EXTENSION

4H2250

STEAM Clothing
Activity Manual

Beyond the Needle

YOUTH REVIEWED

UNIVERSITY OF Nebraska Lincoln

Acknowledgments

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The Nebraska 4-H Statewide Youth Curriculum Committee was formed in 2007 to provide a youth perspective to all aspects of the curriculum development and promotion process. When you see the "Youth Reviewed" logo on the cover of a Nebraska 4-H curriculum, you are reading a publication that has included youth input from this specially selected team of 4-H members.

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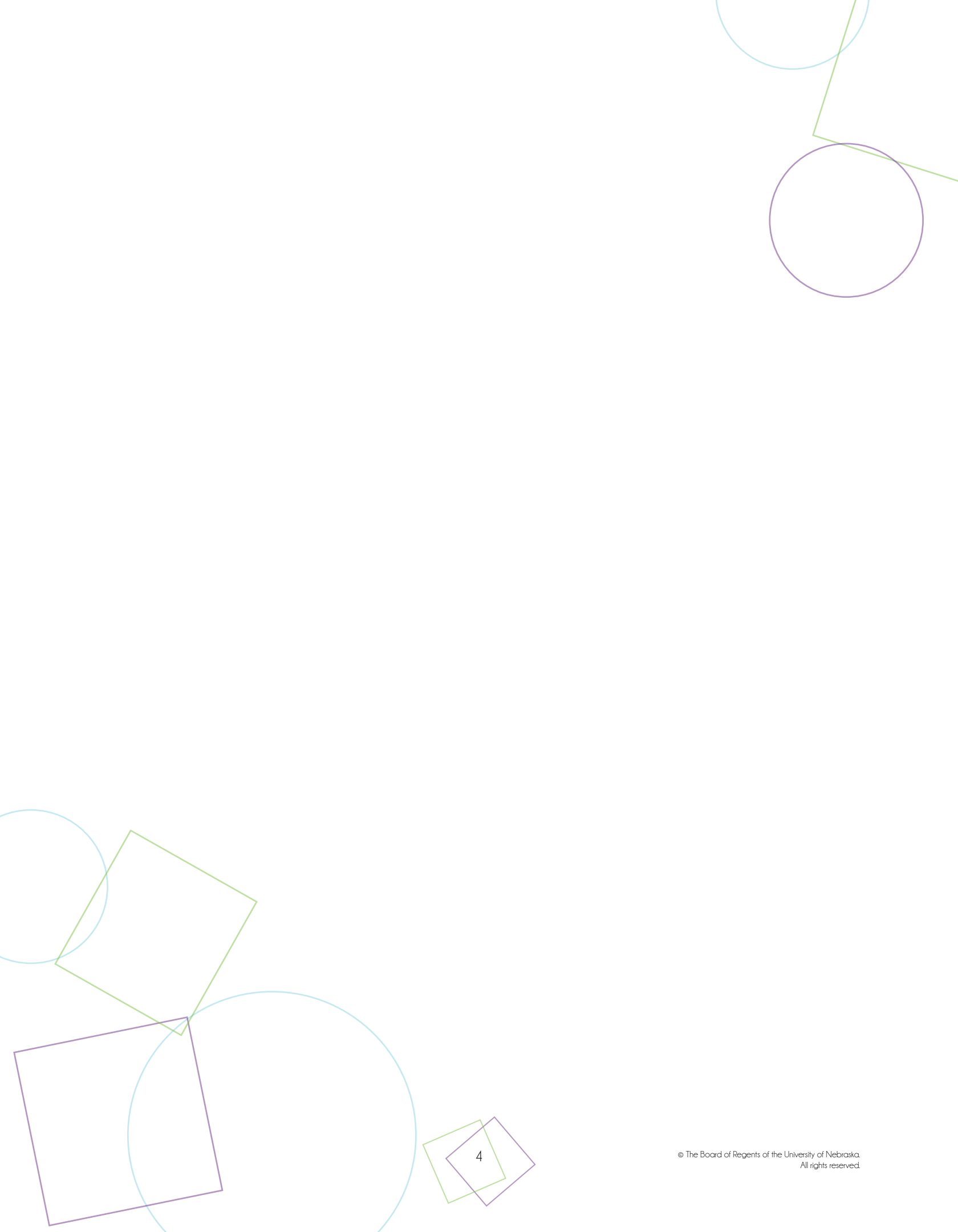
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Inside This Manual
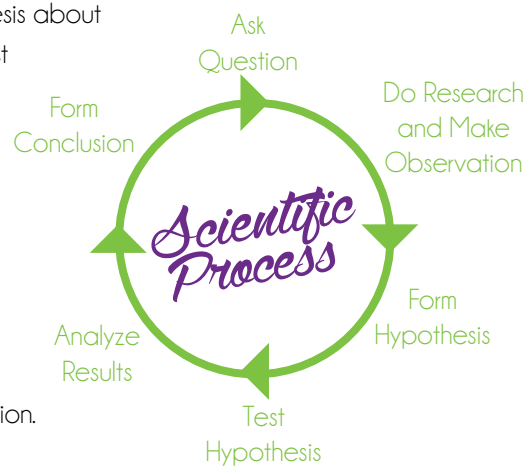
Welcome to
STEAM Clothing

Sewing is a skill, and it is a lot of fun to learn how to do it. Sewing involves creativity, good technique, and patience. There is a lot more to sewing than you might think! In this new 4-H project, STEAM Clothing, you will learn how Science, Technology, Engineering, Art, and Math are required to create clothing and other textile products. Even if you just wrap a piece of fabric around yourself without sewing a stitch, you're still engineering a garment to solve a problem (clothing your body). As you begin to find out more about sewing, you'll discover why it is important to understand a bit of the science behind textiles. You need to know which type of fiber will be best suited to the type of clothing you want to create. If you make the wrong choice, the garment might not perform the way you thought it would.

Besides Science, Technology, Engineering, Art, and Math, you will also consider the possibility of creating a business from the products you sew. You will think about ways other businesses sell similar products, and how you might put a price on your products to be competitive.

As you can probably already see, the STEAM Clothing series has a lot to offer. We're excited that you're going to learn to sew with STEAM Clothing!

SCIENCE

It will be fun and interesting to experience the process of Science as you 1) Try to answer a question, 2) Do some research about ways others may have answered the question, 3) Form a hypothesis about what you expect the answer will be, 4) Test your hypothesis by doing an experiment, 5) Analyze the results of your experiment; and 6) Form your conclusions – understand more about the answer to your question. Science is about discovering answers about the natural world. The scientific process can be cyclical – in other words, the answer to one question might lead to another question.

Scientific Process: Ask Question → Do Research and Make Observation → Form Hypothesis → Test Hypothesis → Analyze Results → Form Conclusion

TECHNOLOGY

There is a lot of Technology involved in sewing. Long ago, before Elias Howe invented the sewing machine (1846 – US Patent 4,760 – the first patent for a lock stitching sewing machine) all garments were constructed by hand. Think what it must have been like before needles and pins were available! Early man had needles made of bone as early as 61,000 years ago. Pins didn't come on to the scene until about 4,000 years ago. Although spring scissors have also been around for nearly 4,000 years, the pivot-type scissors we use today didn't exist until about 1,761 AD. How do you suppose anyone cut out fabric to sew garments before there were scissors? As you proceed through the pages of this curriculum, you'll discover even more technology used to make sewing possible. We will also use a lot of Information Technology as we get video instruction from the Internet.

ENGINEERING

Engineering is the application of scientific, economic, social, and practical knowledge, to design, build, and maintain products. As you learn about techniques for sewing clothing, you will learn about the process of engineering that includes 1) Definition of the problem (what do you want to do); 2) Background research 3) Planning; 4) Creating solutions; 5) Building the solution using processes and technology; and 6) Fine-tuning or improving the solution through critical analysis.
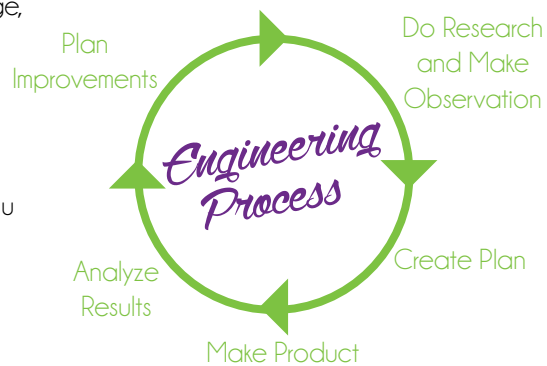
"Scientists discover the world that exists; Engineers create the world that never was." –Theodore Von Karmen, Aerospace engineer.

ART

Many of the decisions you make as you plan a sewing project have to do with the elements and principles of art. You consider line, shape, and form as you think about what type of garment you'd like to make. The next decisions you need to make revolve around color and the texture of the fabric you'll choose. Design principles that make some patterns appealing and others unappealing include harmony, variety, emphasis, rhythm, balance, proportion, and scale.

Define Problem

Collect Information

Improve Design

Design Process

Brainstorm Ideas

Get Feedback

Develop Solutions and Build a Test or Model
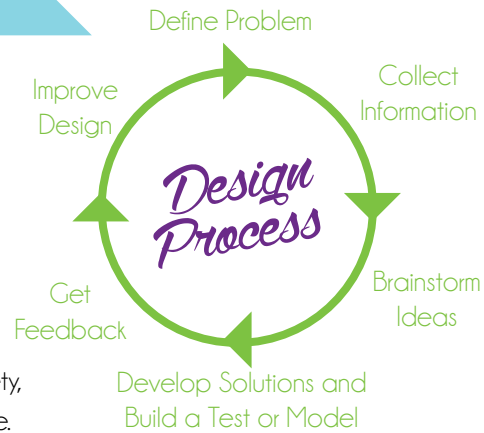
The design process looks very similar to the Scientific and Engineering processes. It is also a cyclical process.

MATH

It would be impossible to determine how much fabric to use to create a garment without Math. In this curricula series, you'll discover how a project might be affected if seam allowances are increased or decreased. You'll use your math skills to calculate adjustments to patterns based on your body measurements. Precision is important for successful sewing projects, and you'll use math as you go along to help measure and keep your garment precise.

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How to Use This Manual

You might have already noticed that this manual, *Beyond the Needle* has a different "look" than the others in the STEAM Clothing series. The main reason for this difference is that this manual is all about the ART of clothing. Art is what makes us really love our clothes – designers work hard to give us garments to wear that are appealing to our various senses. Art is what drives us to have unique clothing that will help us tell the world who we are and how we fit into it.

One of the first things you will notice is that you'll be making a lot of samples in *Beyond the Needle*. Fabrics and garments that you may want to redesign are too precious to dye, cut up, or paint without planning and trying the new techniques first on small swatches of cloth. That is why nearly every activity in this book asks you to create a sample rather than work directly on a garment. When you have perfected a technique, you'll be ready to apply the technique to your fabrics and ready-made garments with confidence. You will begin a process to make your clothing into "wearable art".

DESIGN ELEMENTS

We will begin our study of Art and how it relates to sewing by thinking for a few minutes about the elements and principles of art and design. The Elements of Art include tools that we will work with to create our designs. These tools include the following:

Point

This element has no dimensions. A point marks a place in space, but has no height, width, or length. Point is often used in art to guide the eye, to add texture, or to embellish.

Line

Line has one dimension – length. A line can be straight, curved, or angular, and can be very thin or very thick. There are also implied lines that are created when two contrasting surfaces come together like this:

We can all see a line between the blue and purple triangles, but the artist didn't actually draw a line; therefore, this line is implied. Often, the line you'll use in apparel construction is an implied line. Fashion designers call the technique that uses contrasting colors to create implied lines "color blocking".
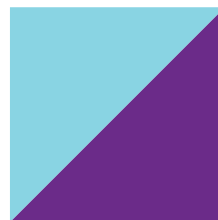
Shape

Shape has two dimensions – length and width. Shapes can be based on nature and these are called organic shapes. Shapes can also be based on geometry. Geometric shapes include circles, squares, rectangles, triangles, and many others.
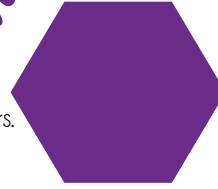
Form

Form has three dimensions – height, width, and depth. Garments themselves are three-dimensional forms. Sometimes, designers add three-dimensional forms to garments for added interest.

Space

Space can be the area that a shape or form occupies, or the background against which we see the form or shape.

Color

Color is the element you'll use most. Color is such a big topic that we have devoted two activities to it in *STEAM Clothing 1: FUNdamentals* and in this manual.

Texture

Texture can be both tactile (you can feel the texture) and visual (you can see the texture). As you think about tactile texture with clothing, you consider fabrics that have interesting surfaces such as satin (smooth and shiny), crepe (soft, drapey, and almost nubby), velvet (fuzzy, elegant), terry cloth (fuzzy, cozy), denim (heavy, diagonal lines, often blotchy dye), and so forth. With visual texture, the fabric doesn't necessarily feel different to the touch, but has differences you can see. Printed textiles are where visual design comes into play. Designers use texture to add variety in their designs.

DESIGN PRINCIPLES

The Principles of Art and Design help us to know how to work with the elements to create aesthetically pleasing clothing.

Balance

Balance creates a feeling of equilibrium where nothing seems to weigh too much and everything seems like it belongs. We will look at two types of balance: symmetrical balance and asymmetrical balance. With asymmetrical balance, it is easier to create interesting compositions because humans naturally expect and even anticipate symmetrical balance. This is because our bodies are symmetrically balanced – for example, the left side of our face is more or less a mirror image of the right side of our face.

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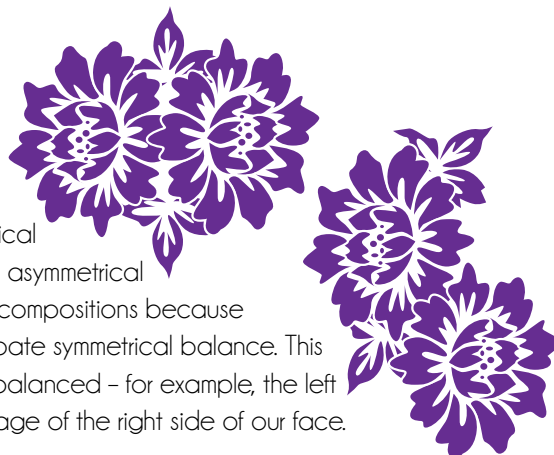
Emphasis

Emphasis draws the eye to the most important feature of the garment. Many times, added features such as applique are applied to garments to emphasize a certain area of the garment.

Rhythm

Rhythm helps add interest and connectedness in a garment. Rhythm can be metric, like the beat of a drum. When things are evenly spaced on a garment like buttons down a cardigan, the eye sees a metric rhythm. Rhythm can also be flowing like the melody in a song. This can be seen on garments in prints and embellishments that flow over the garment from one side to another, from front to back, or top to bottom.

Harmony

Harmony is the goal for creating pleasing garments. If a garment has harmony, similar and different elements are combined to create a pleasing design. Harmony will be the result if unity and variety are used effectively.

Unity highly contributes to harmony. With unity, a garment feels like all the parts belong. Unity can be boring if taken to the extreme, for example; a knit T-shirt in blue. The T-shirt can be a perfectly fine garment to wear with accessories, but by itself, it might not be particularly exciting.

Variety makes things a bit more interesting. In the previous T-shirt example, the accessories add variety to the ensemble.

Proportion

Proportion makes clothing look like it fits the human form. It can be one of the main reasons that clothing doesn't look like it fits the body. Hemlines that are too long, sleeves that are too short, and hiplines that don't fit the hips are all examples of ways proportion can affect the wearability of clothing. When a garment has good proportion, all the parts fit well into the whole and are aligned with the human form.

Scale is related to proportion but deals with size. An infant's garment is much smaller than that of a teenager. When related to embellishments, scale can be an interesting way to enhance a garment. Designers often play with scale when they choose motifs to add to a garment's appearance.

As you work through the *Beyond the Needle* curriculum, notice how the elements and principles of art and design can help you make it your own. Be sure to do a lot of sketching for your portfolio, and try small samples of various techniques before you decide to work on a wearable garment. One of the main things to do when you are creating art is to HAVE FUN!

Getting Prepared

Chapter One

Tips and Tricks

Before you start embellishing or treating your garment and fabric, review the following sections. To create your final designs using the techniques presented in *Beyond the Needle,* you will need to follow the steps below to prepare your garment or fabric for the embellishment or treatment. There are also various methods to transfer your designs to your garment or fabric. You can practice these methods as you practice the embellishment techniques and create your samples. Be sure to refer back to these "Tips and Tricks" when you create your fabulous designs!

PREPARATION

1. Prewash fabric yardage. It recommended that you launder your fabric as you would launder the garment after construction to eliminate shrinkage, which could affect the appearance of your embellishment or fabric treatment.

2. Determine if your design will be an all-over embellishment or treatment, or if it will appear on specific areas of the garment. Determine what you are trying to accomplish with your design. If you want to develop an area of emphasis, you may want to apply your embellishment or treatment to only the most important area of the garment.

3. Determine at what stage in garment construction you will complete your embellishment or fabric treatment.

4. Samples should be completed prior to applying the actual embellishment or treatment. Determine what designs will work best for the embellishment or treatment. Sampling helps you perfect your technique so your final outcome will be flawless and your results will be consistent.

TRANSFERRING YOUR DESIGN TO FABRIC

Explore the following options and chose the most suitable for your project.

1. Draw a design directly onto the fabric. Make sure your pencil or pen markings will be completely covered if you are marking on the top of the fabric surface.

2. Fabric marking pens that feature disappearing or washable ink may be available from your local sewing supplies store.

3. Use a tracing wheel and transfer paper to apply designs that have been created on paper. Follow transfer paper directions and experiment with paint and transfer markings to make sure they are compatible before completing your final project.

4. Apply designs to the reverse side of the fabric if you are concerned about the visibility of your markings after completion. This will involve flipping your fabric back and forth while working on your design and requires extra time and care to achieve great results. This is not recommended for painted and bleached designs.

5. Handstitch your design outline prior to applying the design technique. Take into consideration that you will remove the stitches after completion. When painting or bleaching, apply stitches slightly outside the actual design line so that when you remove your stitched markings they do not interfere with the final design.

Collect It

Sometimes the best part of creating something is showing it off. Throughout this book and series, you will be able to show off what you have learned and created in the portfolio you will make in this activity. A **Portfolio** is a great way to display your creations along with reviewing your work and reflecting on your progress.

1. Gather your materials and create a cover page that illustrates your personality and the purpose of the portfolio. This will go in the front pocket of your portfolio. Be sure to include a title such as "4-H Beyond the Needle Portfolio", and your name because remember: This portfolio is all about you!

2. Create dividers that will help you organize your work so that it is easy to find. Label each of the dividers with the sections listed below such as "Project Samples". As you collect your work, put it in order by date in each section.

3. It is very important to make sure your portfolio is neat, and be sure to check your spelling.

4. As you collect your work, put it in clear plastic sleeves and place it in the correct section of your portfolio.

WHAT GOES INSIDE?

Project Samples
Put all of the project samples in your portfolio to show your progress and refer back to them when you have questions.

Worksheets
Add in any observation and design process sheets you have completed from *Beyond the Needle* to present your knowledge of the design process.

Other Activities
Include other activities that you feel are important.

Awards and Judges' Comment Sheets
Make sure to include any awards and comment sheets from judges that you have received from competitions such as the 4-H Fashion Show.

Fashion Illustrations and Sketches

You can show off you drawing abilities and creativity by creating a final fashion illustration or drawing of your embellished garments on a white sheet of paper with the title of the project and year. A **Fashion Illustration** is a drawing that presents a garment in an artistic form. Have fun with this drawing and include color if you wish. Include any preliminary sketches you create during the design process.

Photos

It would be pretty difficult to fit each of your garments in this portfolio, so the next best thing is to take pictures of your work. When photographing your work, have someone take a picture of you in your embellished garment against a background that does not distract from your amazing design. The best place to start is against a white wall. You may want a couple views of your garment, such as front and back. If there is a special detail you want to show off, take a close-up. Paste these pictures on a sheet of card stock paper. Title the page with the project and year.

Reflections

A great way to track your progress is to reflect on your work as you go along. For each of the garments you create for a competition, write a reflection of the process of embellishing your garment. Describe what you enjoyed, what problems you ran into, and how you solved them. Discuss the strengths of your garment and what skills you can improve upon in the future. Also, think about your judges' comments and describe how these will be helpful in your future projects. Title the page with the project and year.

SEW YOU KNOW

A portfolio is a collection of work that represents a person's skills and knowledge. By creating this portfolio you are making a portable album to go anywhere with you to show anyone what you are capable of doing. Later on in life when you are looking for a job, this will be a great way to show an employer all of your abilities. The portfolio you are creating in *Beyond the Needle* shows your knowledge of design and garment embellishment. Many types of careers use portfolios, such as artists, journalists, teachers, and architects. Portfolios are not only for the workforce. During school, you will be making various portfolios in class to show what you have learned. With the portfolio that you are creating now, it is important that you plan how you are going to complete each of the activities and entries. Set goals and make a timeline for when you are going to complete each activity.

SHARE WHAT YOU DID

1. What did you put on your cover page to make it special for you?

2. How do you plan on completing the samples that will go in your portfolio?

3. What was your favorite part of creating your portfolio?

PROCESS WHAT'S IMPORTANT

1. When you finished your portfolio for this manual, how did you feel looking through it?

2. What was your favorite project?

GENERALIZE TO YOUR LIFE

1. Who would you show this portfolio to?

2. How many times have you looked at your portfolio for help?

APPLY WHAT YOU LEARNED

1. When are some other times you may want to make a portfolio?

2. Do you think a portfolio of schoolwork might be helpful as you move to higher grades?

MORE CHALLENGES

- Present your portfolio to someone else. It could be a parent or friend, or you can enter it in a competition. Practice what you want to say about your portfolio and how you will present it.