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The Nebraska 4-H Statewide Youth Curriculum Committee was formed in 2007 to provide 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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Welcome,

How would you feel if someone said about you, "That gal (or guy) really has style!"? Like most people paid such a compliment, you'd likely feel flattered. You'd have been recognized for your aesthetic sense, for your ability to put together a "look", or for your awareness of trends and your ability to combine them in a way that's uniquely yours.

Having style is more than what appears on the surface – it's more than skin deep. Someone with style knows how to navigate the world with awareness and caring. Awareness is especially important: knowing what's going on around you, knowing what quality is, whether it's in the clothing you construct or the relationships you invest in and nourish, and knowing how all of your choices and decisions impact others. In some ways, these qualities are all part of what we think of as "lifestyle". Your personal lifestyle reflects how you put it all together: the fabrics you purchase and use, the relationships you develop and grow, the plans you hatch and the goals you aspire to. Style extends to just about every part of you – it's part of your identity and it's part of what makes you unique.

We faculty, staff and students who work in the Department of Textiles, Merchandising & Fashion Design at the University of Nebraska–Lincoln are committed to making a difference in the lives of individuals, families and communities. In our textile science program we are heavily involved in research into and development of new fibers with novel applications. For example, we are engineering new fibers from agricultural byproducts such as cornhusks. We are also engineering unique drug delivery methods using nanofibers, which are extremely small fibers that can be produced using a number of processes, including electrospinning.

Math figures critically in both our textile science and our merchandising programs. Faculty and students explore product development, sourcing and distribution systems that demand precise and up-to-the-minute accounting of all of the quantifiable variables that are at play in the lifecycle of a pair of jeans or a T-shirt or a set of bed linens or any of the many hundreds of thousands of products that we group under the heading of "soft goods".

To appeal to consumers and their senses, those soft goods need to be as pleasing to the eye as they are satisfying to our sense of touch. Not only must they feel good, they must also look good. This is where a well-developed and critical design eye comes into play. Our textile and fashion design faculty and students apply their own unique problem-solving strategies to this challenge of bringing a measure of artfulness to the products that they create.

So, we work in an integrative collaboration in which science, technology, engineering, art and math form the scaffold for all of the creativity and innovation for which our program's teams are responsible. Clearly, there are wonderful synergies at work in the world of textiles and fashion, and this *STEAM Clothing 2: Simply Sewing* curriculum will introduce you to some of them. I hope they ignite your passion! One look could change everything!

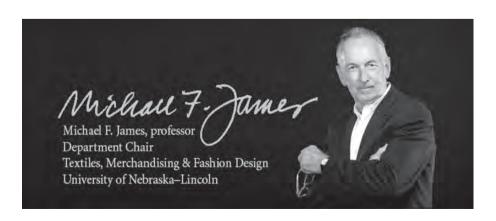




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Welcome to

Clothing

Sewing is a skill, and it is lots 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 sewing, you will learn about 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.

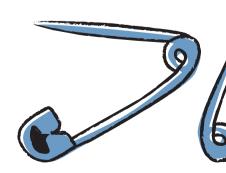
Science

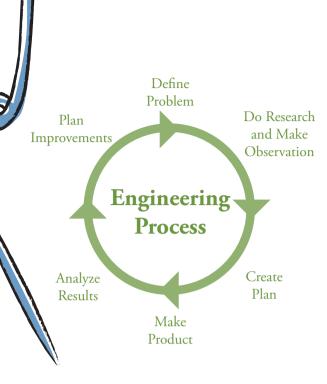
It will be fun and interesting to experience the process of Science as you 1.) Try to answer a question, 2.) Do some research about ways others may have answered the question, 3.) Form a hypothesis about what you expect the answer will be, 4.) Test your hypothesis by doing an experiment, 5.) Analyze 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.

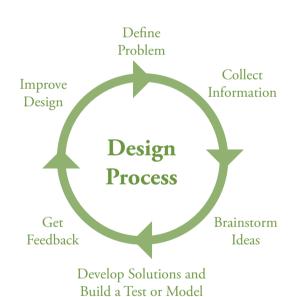
Technology

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.

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 curriculum, 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.

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, *STEAM Clothing 2: Simply Sewing* has a lot to offer. We're excited that you're going to learn to sew with STEAM Clothing!

Dear Leader,

You are about to embark on a new adventure teaching young people about how to construct clothing from textiles. This new STEAM Clothing curriculum looks at clothing in a whole new way – from the points of view of Science, Technology, Engineering, Art, and Math. In other words, as processes all dedicated to one end – garment construction.

In the introduction to the manual, please take some time to familiarize yourself with the various STEAM processes. The manual is organized into four chapters that focus on traditional topics for any beginning sewing manual.

- **Chapter 1** helps youth prepare for more advanced sewing techniques and projects.
- **Chapter 2** builds upon the textile properties presented in *STEAM Clothing 1: FUNdamentals* with more advanced science experiments.
- **Chapter 3** is focused on more advanced engineering techniques that garment engineers need to make clothes that fit a human form. Remember, textiles are two-dimensional, and the human form is three-dimensional.
- Chapter 4 teaches youth how to add the finishing touches and style to garments.
- **Chapter 5** goes beyond construction to end results teaching youth to use social media to get products noticed and calculating the correct price point to sell unique creations.

Please note the blue corner on some of the pages. These pages are designed to be printed out for youth to complete the activity. These printable pages consist of data collection sheets, informational handouts, quizzes, and patterns. Youth can then include these pages in their portfolio to document their progress in clothing construction. The first activity, *Sew & Tell*, provides instructions on creating a portfolio.

Vocabulary words are included in most of the activities to introduce youth to the proper terminology in the science of textiles and clothing construction. These words are colored green in the manual's text and can be located in the margins under "Words to Know" or in the Glossary at the end of the manual.

Finally, this, like any 4-H curriculum teaches youth by letting them do activities as the first step of the learning process. The manual was written to youth, but is designed to be led by you, the leader. Be sure to help youth learn by including the "Share what you did," "Process what's important," "Generalize to your life," and "Apply what you learned" sections at the end of each activity. Youth can fill in answers on the printed sheets, or you can discuss the questions as a group following the activity.

I hope you enjoy teaching STEAM Clothing curricula! It will open your eyes to the complicated process we call clothing construction!

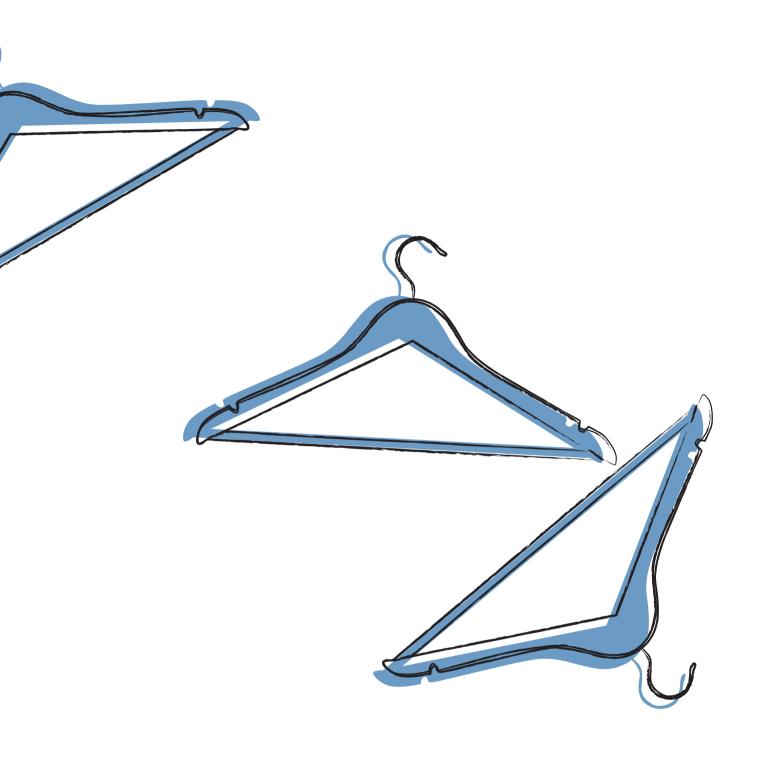
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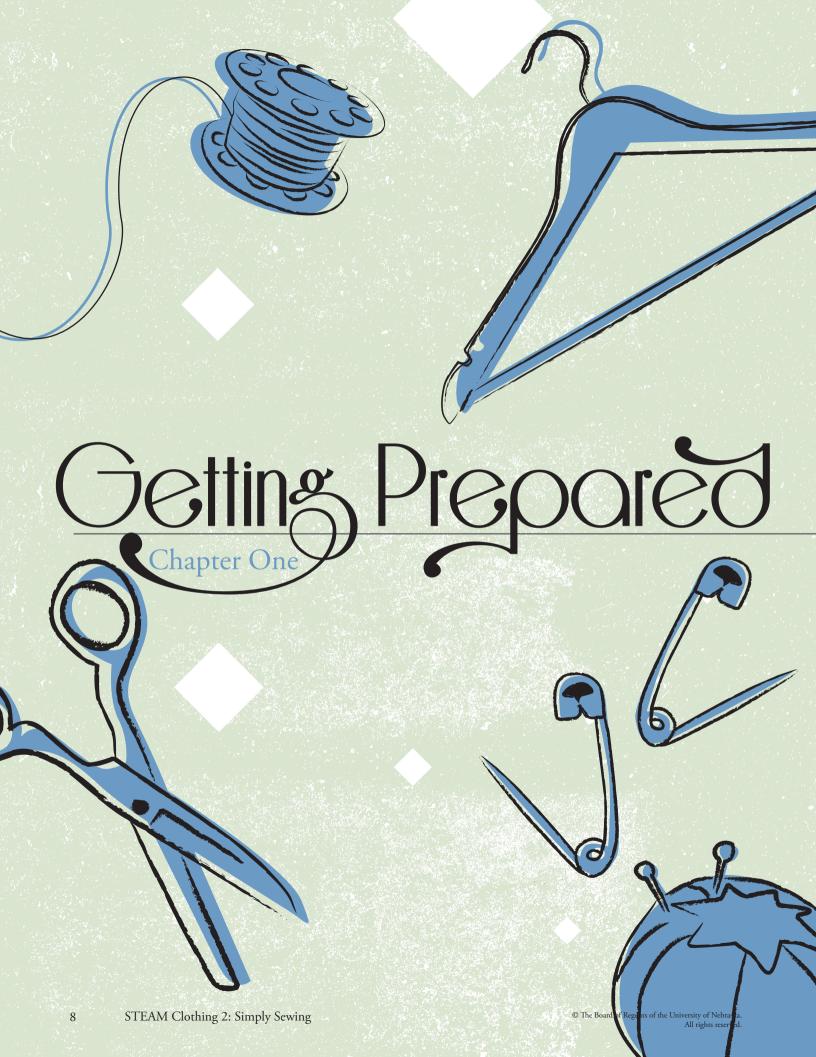
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Sew & Tell

Success Indicator

You will be able to build a portfolio that records your success.

Life Skills Practiced

Keeping Records, Planning/Organizing, Marketable Skills

Project Skill Practiced

Building a portfolio

What Youth Will Do

Create and learn about the importance of a portfolio

What You'll Need

- · 2" Binder with clear sleeve on front
- · Clear plastic sleeves
- Dividers
- Scissors
- Glue
- Paper
- Computer
- Creative embellishments to make it your own

We talked about creating a portfolio in *STEAM Clothing 1: FUNdamentals*, but in this manual we are going to take the portfolio to a more advanced level. The instructions for creating your portfolio are included in case you are starting one now. It is a great learning experience if you are able to go back to the previous book and finish the portfolio material for that level and move on. If that is not possible, just jump right in and begin your portfolio with *STEAM Clothing 2: Simply Sewing* as your first section.

- 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 Clothing Construction Portfolio", and your name because remember: this portfolio is all about you.
- 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 "Sewing Samples". As you collect your work, put them in order by date in each section. All of your STEAM Clothing 1: FUNdamentals sewing samples should be placed before the STEAM Clothing 2: Simply Sewing samples.
- It is very important to make sure your portfolio is neat, and be sure to check your spelling.
- As you collect your work, put it in clear plastic sleeves and place it in the correct section of your portfolio.

What goes inside?

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

Science Activities – Add in any science activities you have completed from this book to present your knowledge of textiles.

Other Activities – Include any other activities that you feel are important.

Technical Flats & Fashion Illustrations – Include a final **technical flat** or outline of each garment you have created for a competition, such as the 4-H Clothing Construction Contest, on a white sheet of paper with the title of the project and year. A technical flat is an outline of your garment's shape, like the ones shown in your pattern guide, of the front and back of each garment. The purpose of a technical flat is to show how the garment is constructed and how it functions. The technical flat should include where the seam lines are and the shape of the garment. Unlike fashion figures, technical flats need to be in proportion to the finished garments. They are used in the fashion industry by designers to help explain what they want a manufacturer or pattern maker to create.

Before you begin, research technical flats and look at what lines are important to draw. You should identify the outline of the basic shape of the garment and solid lines to show where the seams are. Darts are also important to show. If there are gathers in a garment, a series of varied lines are used. Top stitching can even be identified by using dashed lines. You may notice that a lot of technical flats are created using a computer. They can also be done by hand, which is what you will do in this activity. Sharpen up a pencil and practice a few before completing your final technical flat. Your lines on this drawing should be very clean with no shading.

Next, you can show off your drawing abilities and creativity by creating a final **fashion illustration** or drawing of your ensemble on a white sheet of paper with the title of the project and year. A fashion illustration is a drawing that shows a clothing ensemble in an artistic form. Before you begin, research fashion illustrators online and study the proportions and style of their fashion figures. Fashion figures tend to be elongated or stretched out. The proportions also depend on the age of the person who will wear the garment. Your drawing should reflect your age now. As the age goes up so does the exaggerated proportion of long legs and arms. For example, someone at age 7 to 10 should equal 6 ½ heads high, and age 11 to 14, 7 ½. When drawing fashion figures, the proportions are made by comparing the size of the head down to the rest of the body. You should take the head you draw and mark the designated amount of heads below it.

Practice sketching fashion figures. This is an art form that takes a lot of practice, just like learning to throw a ball takes practice. Keep a sketchbook to practice and to keep track of your improvement. When creating your final fashion illustration for your portfolio, carefully consider the pose. You want your illustration to show off the best parts of your garment. Usually, it is best to have the figure facing forward or slightly turned.

Words to Know

Technical Flat

A line drawing that communicates how the garment is constructed and how it functions by showing the placement of the seam lines and the shape of the garment.

Fashion Illustration

A drawing that shows a clothing ensemble in an artistic form.

Portfolio

A collection of work that represents a person's skills and knowledge.





Fashion Illustrations by Lindsay Ducey, M.A. University of Nebraska–Lincoln Textiles, Merchandising & Fashion Design

Awards & Judges' Comment Sheets – Make sure to include any awards and comment sheets from judges that you have received from competitions like the 4-H Clothing Construction Contest and Fashion Show.

Photos – It would be pretty difficult to fit each of your garments in this portfolio so the next best thing is to take a picture of your work. When photographing your work, have someone take a picture of you in your garment against a background that does not distract from how amazing your ensemble looks. The best place to start is against a white wall. If possible, natural lighting is best for photographs. You may want a couple views of your garment, for example, front and back. If there is a special detail you want to show off, take a closeup. You want to show off the best parts of the garment, so poses should not hide or fold areas of interest. Paste these pictures on a sheet of cardstock 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 on the process of making your garment. Describe what you enjoyed, the 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 the 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 that can go anywhere and show anyone in minutes what you are capable of doing. Later, 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 here shows your knowledge of textiles and clothing construction. Portfolios are used in many careers such as artist, journalist, teacher, and architect, to name a few. Portfolios are not only for the workforce. Throughout school, you will be making various portfolios in class to show what you learned. With this portfolio 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 entry.

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 items that will go in 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. To whom would you show this portfolio?
- 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 a parent or friend, or enter it in a competition. Practice what you
want to say about your portfolio and how you will present it.

CIA: Closet Investigation Activity

Success Indicator

You will analyze your style, what looks best on you, and an appropriate place to wear your outfit.

Life Skills Practiced

Self-Esteem, Social Skills

Project Skill Practiced

Analyzing style and fit

What Youth Will Do

Search through his/her wardrobe and analyze style and fit

What You'll Need

- · Masking tape
- Mirror
- · Shoes for performance

Clothing and fashion are used to express personality and interests. They make life more fun and boost our self-esteem. Do you know why there are so many different styles of clothes and color choices? It is because there are so many different types of people across the world who have different personalities, body types, and coloring. With all these choices, it is important to figure out what looks best on your own body. Let's do a closet investigation!

Every great detective needs a sidekick! This is a great activity to do with a parent or friend because she or he can provide a second opinion about what looks best on you. As you search through your closet, ask yourself these questions.

- What do you need? There is no use in going to all the work of making something or spending money if you are never going to wear it. Look through your closet and decide what items would be a great addition to your wardrobe. Would it be nice to have another pair of shorts or a fun new top?
- What is the best color for you? As you are sorting through your closet, pull out some different colors and hold them up to your face to see which ones work best with your skin, hair, and eye color. Some colors may make you look washed out. You may find that your favorite color is not your best color, but that does not mean you cannot wear it. Instead of wearing it next to your face, try just using it in an accessory or in a mixture of colors. The colors that look best on you will make you shine and your features stand out.
- 3 How will the lines affect you? Try on some of your clothes and study what they do to your shape. If you have a horizontally striped garment and a vertically striped one, this is a great experiment. As you look in the mirror you should see the vertical lines lengthen and slenderize your body, while the horizontal lines emphasize the width of your body.

These are optical illusions. The width of the stripes also creates an illusion. The closer the stripes are, the smaller the width of the body appears just like the illustrations on this page.

The lines on your clothes are not the only optical illusions. The outline of your clothes and the seam lines in them can have the same effect. The length of a pair of shorts or the length of a sleeve can play with the shape of your body.

How do you look in prints? – Prints are a fun touch to an outfit but they can be tricky. Try on a top and bottom that have two different prints. As you look in the mirror, this may be a little overwhelming to the eyes. Prints can be mixed sometimes but it has to be done carefully. If you wear a big, bright, colorful print, make sure your coordinate is a small print in colors that almost fade together from a distance. Walk across the room from the mirror in some different prints and see how this illusion works.

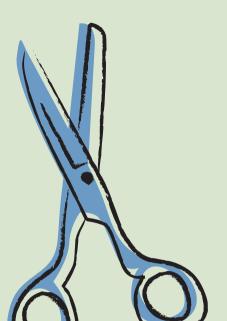
Also, prints need to be in proportion to your size and garments. Some large prints lose their design in smaller garments because there just is not enough space to show the whole picture.

7

What is appropriate? – Now, a variety of clothes is needed for all the fun things we do in life! As you search through your closet, pick outfits that are great for school, outdoors, sports, and special occasions. Certain occasions require more attention to appearance than what you are used to on a daily basis. When you want to make a good impression, your appearance is noticed first. What outfit would be appropriate for an interview with a judge at the 4-H Clothing Construction Contest? This is a good place to practice being professional for a job interview later in life. It is not as formal, but you still need to look like you are taking pride in the projects you have created. Even though you are the one wearing the clothes, other people see you in them and form impressions of you. It is a good rule of thumb to wear something that will make you and other people smile! Ask your sidekick what clothes fit certain occasions and discuss why.

Stripes – Optical Illusions





What kind of clothes do you like to wear? – As you dig through your closet, you may be seeing a common theme in your clothes. Do you like to wear a lot of sundresses or jeans? Do you have a favorite character or object on a lot of your clothes? These may be things that fit your personality and you are comfortable in. Overall, this theme may define your style. Styles in fashion change all the time but usually you will tend toward certain types of clothes because they fit who you are. Over time your style will change with age and lifestyle, which is great. Do not be afraid to try new things. Knowing what style you like is helpful when you go shopping or create a project because it gives you somewhere to start as you look at the variety of styles.

Sew You Know

Now that you have investigated your closet, how can you apply this to your sewing projects? The investigation questions from the activity are important when you are picking out a project to sew. Your project should be something that you will look forward to wearing. You are going to put a lot of time and effort into this project, and the finished project is a reward that you get to wear! The lines and shape of the outfit should be good for your body and size. When picking out fabrics, the colors should highlight your features and coordinate. The print should be appropriate for the garment and your body. Sometimes it is hard to imagine how a print will look on your garment when it is on a big bolt of fabric. You should section off the size of the garment you are going to make as you are considering it. Also, make careful considerations if you are mixing prints. Then, check to make sure the outfit is appropriate for the occasion you are making it for. If you are entering it in a competition, make sure that it meets all of the requirements. Finally, and most important, it should fit your style and wonderful personality!

Share What You Did

- 1. What are some new things that you discovered during your investigation?
- 2. Did you find that your closet is filled with a certain style of clothes?

Process What's Important

- 1. How will knowing what is in your closet help you when you are shopping?
- 2. Why are certain clothes appropriate for particular occasions?

Generalize to Your Life

- 1. Do you have clothes that you wear a lot or not at all?
- 2. Do you tend to like things you pick out for yourself or those chosen for you by someone else better?

Apply What You Learned

- 1. Where do you get inspiration for the types of clothes you like to wear?
- 2. Do you like to dress like others, or do you prefer to "stand out" in a room by being different?

More Challenges

• Create a style notebook for yourself. Search for images in magazines or online of outfits that you like and collect them in a notebook. Make sketches of ideas for clothes you would like to wear. You can even record what colors look best on you and collect swatches of fabrics.