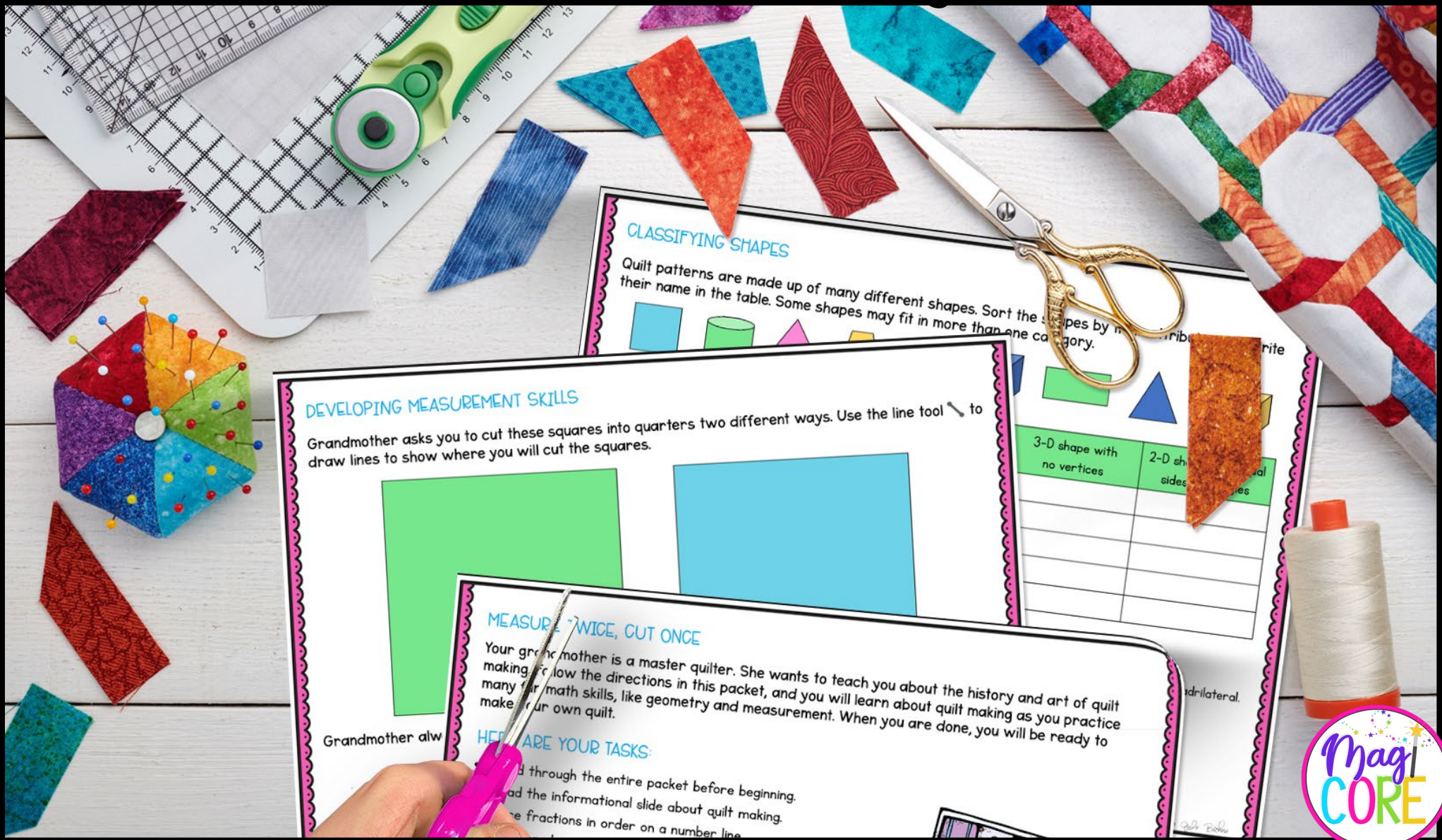
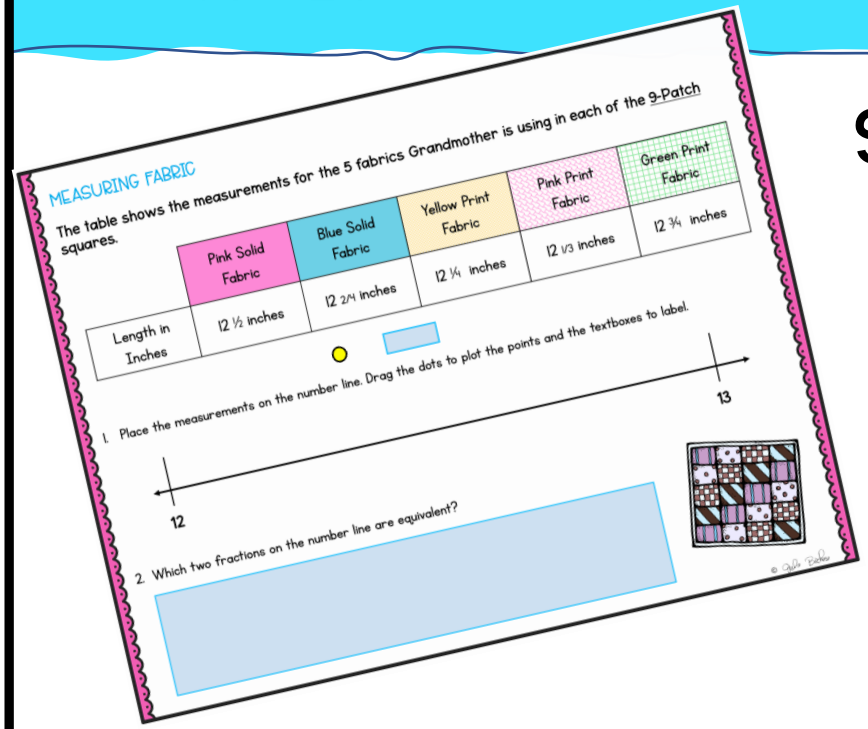
Measure Twice, Cut Once

Quilting Project Based Learning

3rd Grade Print & Google Slides



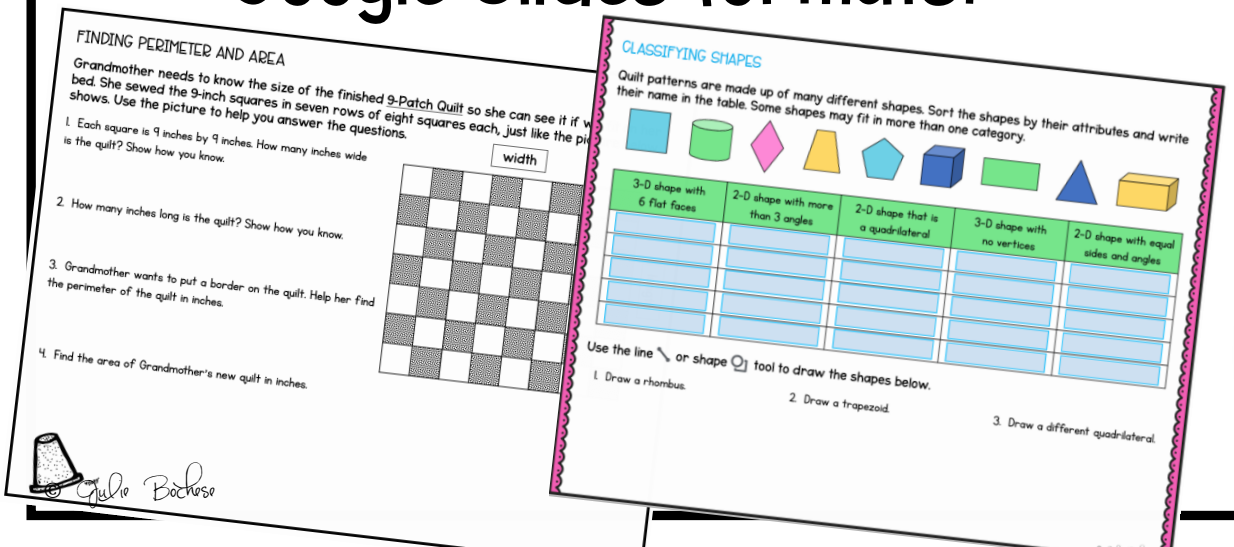
PRACTICE MEASUREMENT & GEOMETRY SKILLS!

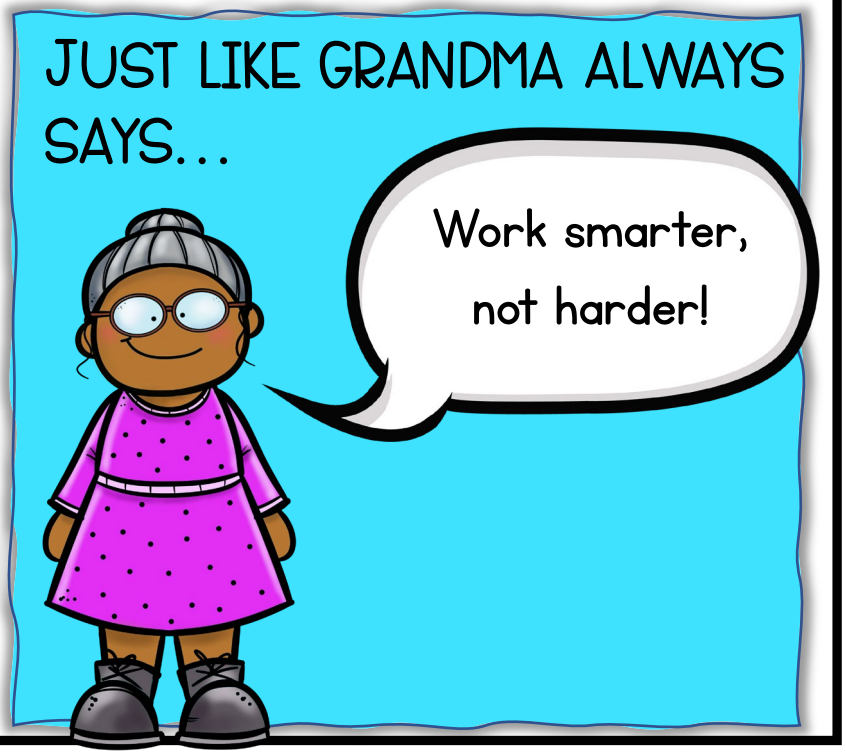


Students use their math skills to solve real life problems!

- Engaging back story
- Create a real-life (paper) quilt
- Easy to use
- Standard focused & developed specifically for 3rd grade

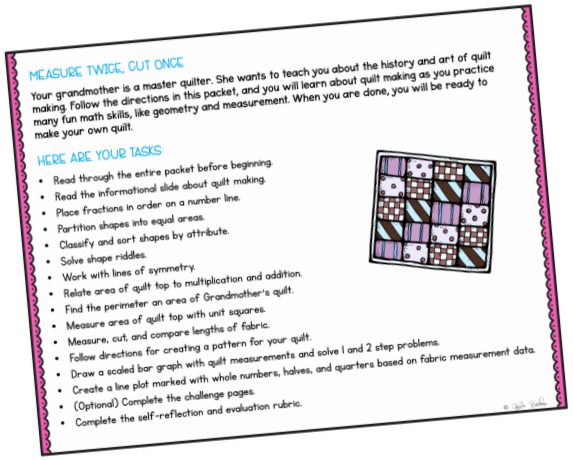
Easy no-prep print & go and Google Slides formats!





LET'S USE OR SKILLS TO MAKE A QUILT

Engaging Backstory


MEASURE TWICE, CUT ONCE

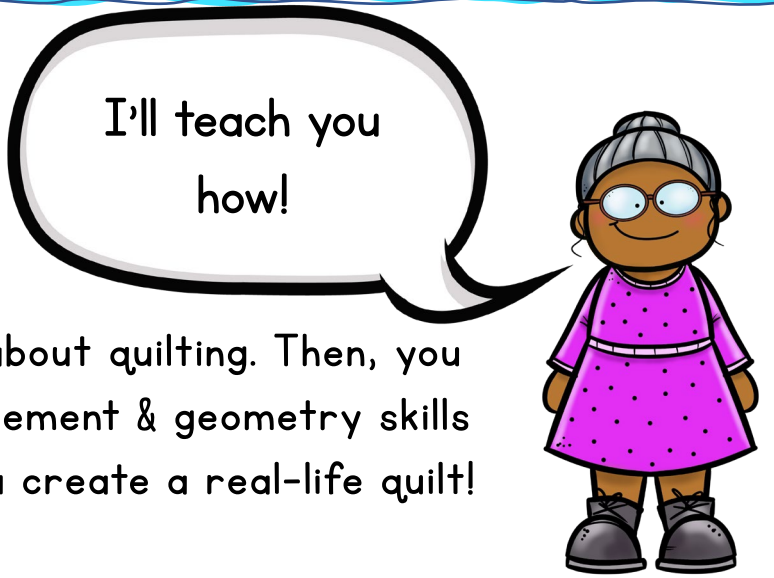
Your grandmother is a master quilter. She wants to teach you about the history and art of quilt making. Follow the directions in this packet, and you will learn about quilt making as you practice many fun math skills, like geometry and measurement. When you are done, you will be ready to make your own quilt.

HERE ARE YOUR TASKS

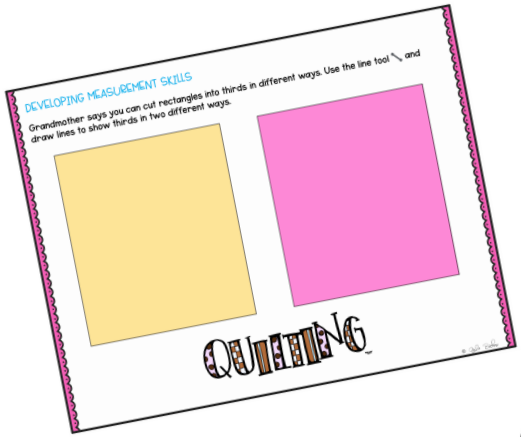
- Read through the entire packet before beginning.
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- Place fractions in order on a number line.
- Partition shapes into equal areas.
- Classify and sort shapes by attribute.
- Solve shape riddles.
- Work with lines of symmetry.
- Relate area of quilt top to multiplication and addition.
- Find the perimeter an area of Grandmother's quilt.
- Measure area of quilt top with unit squares.
- Measure, cut, and compare lengths of fabric.
- Follow directions for creating a pattern for your quilt.
- Draw a scaled bar graph with quilt measurements and solve 1 and 2 step problems.
- Create a line plot marked with whole numbers, halves, and quarters based on fabric measurement data.
- (Optional) Complete the challenge pages.
- Complete the self-reflection and evaluation rubric.

© Julia Bachrach

Grandma is a master quilter, and she wants to teach you how to make a quilt. First, let's learn a bit about quilting. Then, you will need to use your measurement & geometry skills to navigate challenges as you create a real-life quilt!



Easy to Follow Step-by-Step


DEVELOPING MEASUREMENT SKILLS

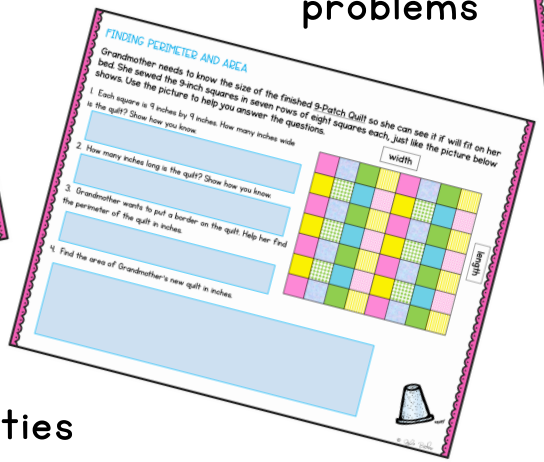
Grandmother says you can cut rectangles into thirds in different ways. Use the line tool ╲ and draw lines to show thirds in two different ways.

QUILTING

© Julia Bachrose

Start with simple measurement activities

Solve permitter & area problems


FINDING PERIMETER AND AREA

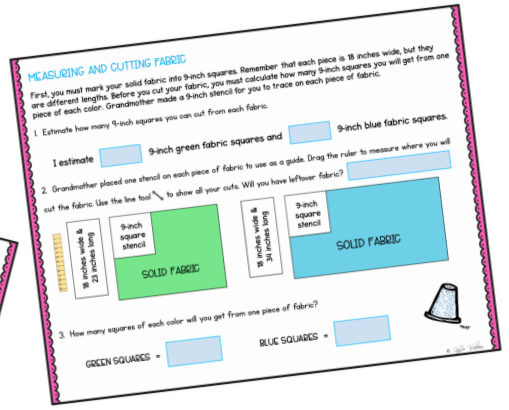
Grandmother needs to know the size of the finished 9-Patch Quilt so she can see it if will fit on her bed. She sewed the 9-inch squares in seven rows of eight squares each, just like the picture below shows. Use the picture to help you answer the questions.

1. Each square is 9 inches by 9 inches. How many inches wide is the quilt? Show how you know.
2. How many inches long is the quilt? Show how you know.
3. Grandmother wants to put a border on the quilt. Help her find the perimeter of the quilt in inches.
4. Find the area of Grandmother's new quilt in inches.

width

length

© Julia Bachrose


MEASURING AND CUTTING FABRIC

First, you must mark your solid fabric into 9-inch squares. Remember that each piece is 18 inches wide, but they are different lengths. Before you cut your fabric, you must calculate how many 9-inch squares you will get from one piece of each color. Grandmother made a 9-inch stencil for you to trace on each piece of fabric.

1. Estimate how many 9-inch squares you can cut from each fabric.

I estimate ____ 9-inch green fabric squares and ____ 9-inch blue fabric squares.

2. Grandmother placed one stencil on each piece of fabric to use as a guide. Drag the ruler to measure where you will cut the fabric. Use the line tool ╲ to show all your cuts. Will you have leftover fabric? ____

12 inches

9-inch square stencil

SOLID FABRIC

18 inches

9-inch square stencil

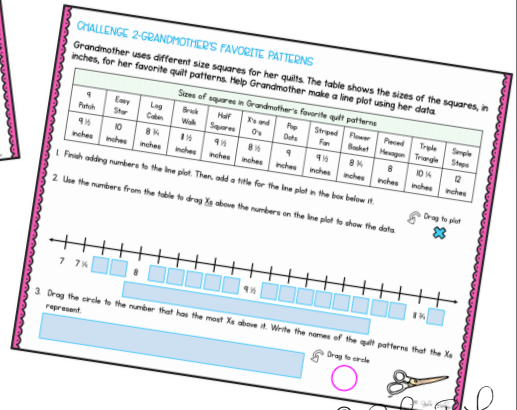
SOLID FABRIC

3. How many squares of each color will you get from one piece of fabric?

GREEN SQUARES = ____ BLUE SQUARES = ____

Time to measure twice & cut once!

Solve measurement & geometry challenges


CHALLENGE 2-GRANDMOTHER'S FAVORITE PATTERNS

Grandmother uses different size squares for her quilts. The table shows the sizes of the squares, in inches, for her favorite quilt patterns. Help Grandmother make a line plot using her data.

Sizes of squares in Grandmother's favorite quilt patterns											
9 Patch	Easy Star	Log Cabin	Brick Wall	Half Squares	X's and O's	Pop Dots	Striped Fan	Flower Basket	Pieced Hexagon	Triple Triangle	Simple Steps
9 ½ inches	10 inches	8 ¾ inches	8 ½ inches	9 ½ inches	8 ½ inches	9 inches	9 ½ inches	8 ¼ inches	8 inches	10 ¼ inches	12 inches

1. Finish adding numbers to the line plot. Then, add a title for the line plot in the box below it.
2. Use the numbers from the table to drag Xs above the numbers on the line plot to show the data.

Drag to plot

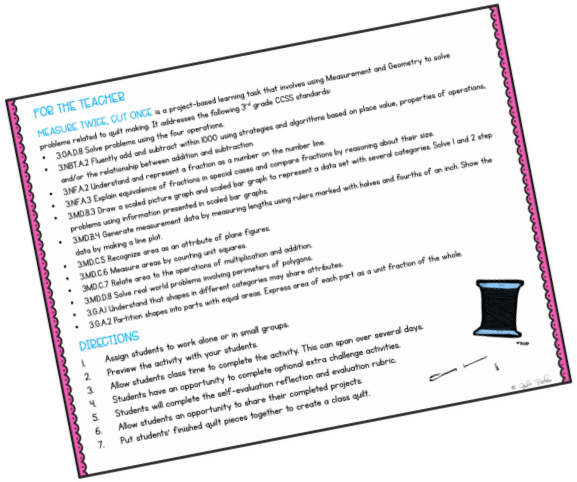
7 7¼ 8 9½ 8¼

3. Drag the circle to the number that has the most Xs above it. Write the names of the quilt patterns that the Xs represent.

Drag to circle

© Julia Bachrose

TEACHER RESOURCE PAGE INCLUDED



FOR THE TEACHER

MEASURE TWICE, CUT ONCE is a project-based learning task that involves using Measurement and Geometry to solve problems related to quilt making. It addresses the following 3rd grade CCSS standards:

- 3.OA.D.8 Solve problems using the four operations.
- 3.NBT.A.2 Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
- 3.NF.A.2 Understand and represent a fraction as a number on the number line.
- 3.NF.A.3 Explain equivalence of fractions in special cases and compare fractions by reasoning about their size.
- 3.MD.B.3 Draw a scaled picture graph and scaled bar graph to represent a data set with several categories. Solve 1 and 2 step problems using information presented in scaled bar graphs.
- 3.MD.B.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot.
- 3.MD.C.5 Recognize area as an attribute of plane figures.
- 3.MD.C.6 Measure areas by counting unit squares.
- 3.MD.C.7 Relate area to the operations of multiplication and addition.
- 3.MD.D.8 Solve real world problems involving perimeters of polygons.
- 3.G.A.1 Understand that shapes in different categories may share attributes.
- 3.G.A.2 Partition shapes into parts with equal areas. Express area of each part as a unit fraction of the whole.

DIRECTIONS

1. Assign students to work alone or in small groups.
2. Preview the activity with your students.
3. Allow students class time to complete the activity. This can span over several days.
4. Students have an opportunity to complete optional extra challenge activities.
5. Students will complete the self-evaluation reflection and evaluation rubric.
6. Allow students an opportunity to share their completed projects.
7. Put students' finished quilt pieces together to create a class quilt.

"For The Teacher" page provides background & easy to follow instructions



This activity integrates the following standards:

- 3.OA.D.8 Solve problems using the four operations.
- 3.NBT.A.2 Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
- 3.NF.A.2 Understand and represent a fraction as a number on the number line.
- 3.NF.A.3 Explain equivalence of fractions in special cases and compare fractions by reasoning about their size.
- 3.MD.B.3 Draw a scaled picture graph and scaled bar graph to represent a data set with several categories. Solve 1 and 2 step problems using information presented in scaled bar graphs.
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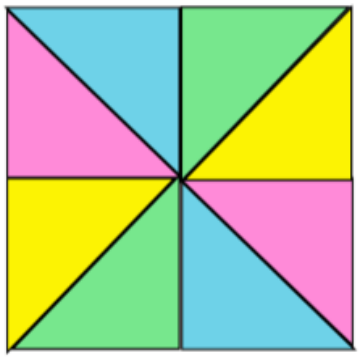
STUDENTS SHARE & CREATE A CLASS QUILT!

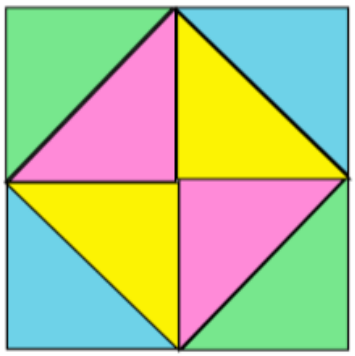
Students work in small groups.

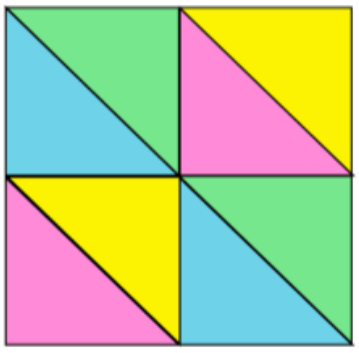
Students share their quilts with the class.

Student's can combine their finished quilt pieces together to create a class quilt.

HAVE FUN QUILTING!









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1. Teacher & Student Directions
2. "What Is Quilt Making?" Information Card
3. Developing Measurement Skills (quarters and thirds)
4. Classifying Shapes (sorting and drawing by attribute)
5. Shape Riddles (reading clues)
6. Symmetry (counting and drawing lines)
7. Finding Area (dividing into equal square units)
8. Measuring Fabric (ordering fraction on number line)
9. Creating Arrays (estimating/measuring equal square units)
10. Finding Perimeter and Area (2 ways and word problems)
11. Getting Started (rounding, feet/yard word problems)
12. Measuring and Cutting (estimating, measuring)
13. Cutting Triangles (cutting from squares, word problems)
14. Making 2 Patterns (arranging triangles to make patterns)
15. Challenge 1: Data on a Bar Graph
16. Challenge 2: Creating a Line Plot
17. Evaluation & Rubric



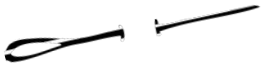
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EASY FOR TEACHERS TO USE!!

INSTRUCTIONS FOR TEACHERS:

1. Assign students to work alone or in small groups.
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3. Allow students class time to complete the activity. This can span over several days.
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6. Allow students an opportunity to share their completed projects.
7. Put students' finished quilt pieces together to create a class quilt.



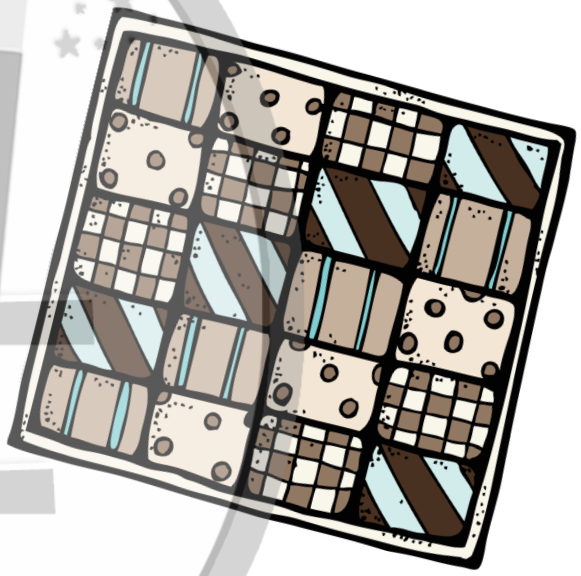


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MEASURE TWICE, CUT ONCE

Your grandmother is a master quilter. She wants to teach you about the history and art of quilt making. Follow the directions in this packet, and you will learn about quilt making as you practice many fun math skills, like geometry and measurement. When you are done, you will be ready to make your own quilt.

HERE ARE YOUR TASKS:



- Read through the entire packet before beginning.
- Read the informational slide about quilt making.
- Place fractions in order on a number line.
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- Classify and sort shapes by attribute.
- Solve shape riddles.
- Work with lines of symmetry.
- Relate area of quilt top to multiplication and addition.
- Find the perimeter an area of Grandmother's quilt.
- Measure area of quilt top with unit squares.
- Measure, cut, and compare lengths of fabric.
- Follow directions for creating a pattern for your quilt.
- Draw a scaled bar graph with quilt measurements and solve 1 and 2 step problems.
- Create a line plot marked with whole numbers, halves, and quarters based on fabric measurement data.
- (Optional) Complete the challenge pages.
- Complete the self-reflection and evaluation rubric.

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WHAT IS QUILT MAKING?

Do you have a special quilt or blanket? Most people have that one cozy blanket that they want to sleep with every night. If you are lucky, yours is a quilt that was made by someone special who loves you very much.

Quilt work has been discovered dating back to ancient times. In London, at the British Museum, an ivory carving shows the king of the First Egyptian Dynasty wearing a cloak that appears to be quilted. There is evidence of quilt work that has been found in Asia that dates to late BC and early AD years. Also, quilted garments worn by the Crusaders under their armor for warmth and protection were discovered dating to the 12th century.

More quilt works have been found in Europe throughout time. Many have been described as obviously beautiful works, but they were usually made to be used. One of the earliest decorative quilts made in the 14th century is the Tristan Quilt. It was made in Sicily, Italy and is one of the oldest surviving quilts in the world. Sections of the quilt are on display in the V&A Museum in London, England and in the Bargello Palace in Florence, Italy.

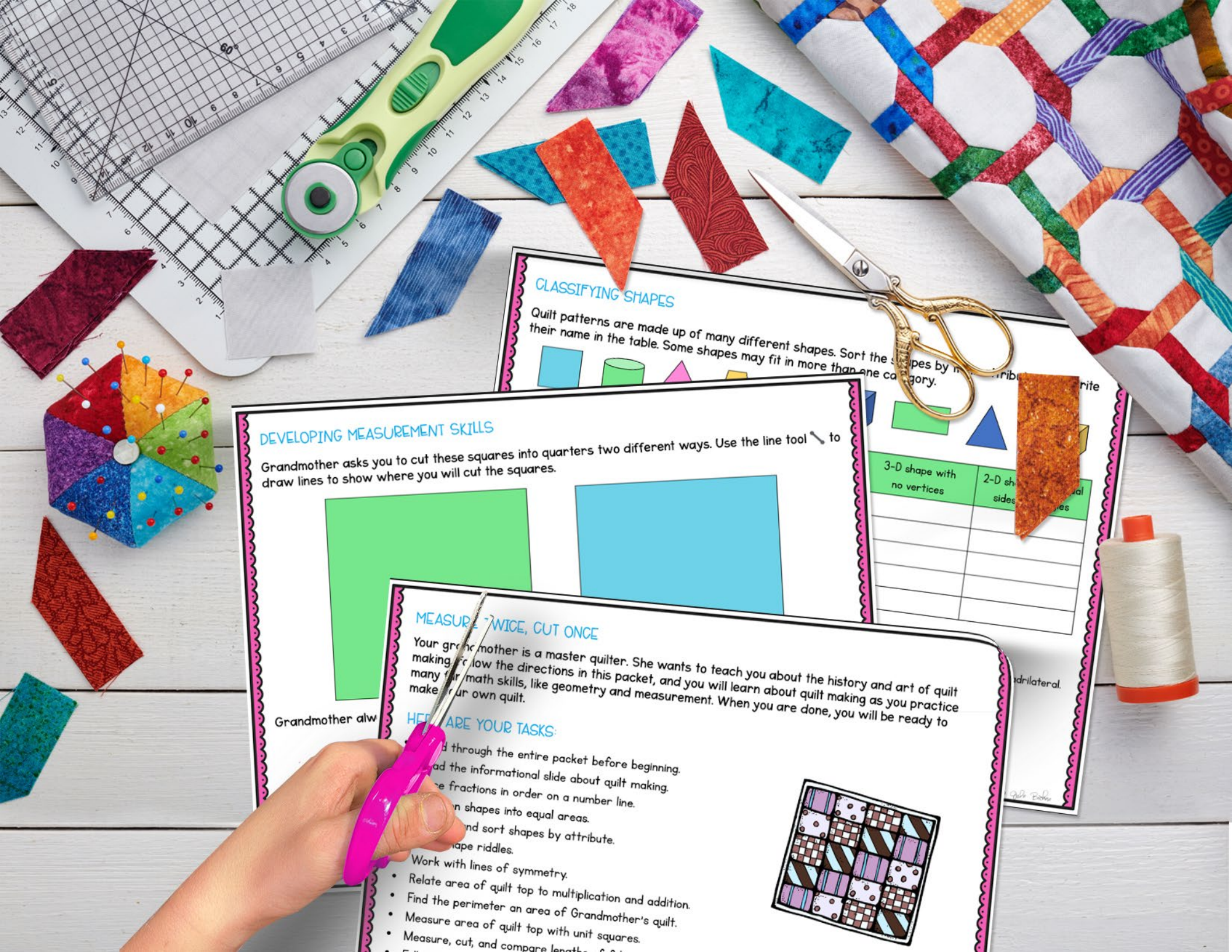
The craft came to America with the early settlers. Back then, quilts were made for only one purpose. They provided warmth. Families used them on beds and to cover their windows and doors to help keep out the cold. There was little money and few resources, so women used worn clothing to make their quilts. Women gathered in quilting bees to sew for new neighbors and to teach their daughters to quilt. Girls often made many quilts by the time they were grown.

Quilts were sewn together by hand until 1846 when the sewing machine was invented. Soon, more and more colorful fabrics became available. People started creating different patterns for their quilts and began using them to decorate their homes. Quilts were also made for soldiers and hospitals during wartime.

Quilt making has an important role in our country's history. Quilts tell a part of the American story. Quilting has taught generations of people practical sewing and measurement skills. Today, quilting is not done just as a necessity. It has become an artistic expression and creative hobby enjoyed by practitioners around the globe.



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CLASSIFYING SHAPES
Quilt patterns are made up of many different shapes. Sort the
their name in the table. Some shapes may fit in more than one ca
gory.
3-D shape with no vertices
DEVELOPING MEASUREMENT SKILLS
Grandmother asks you to cut these squares into quarters two different ways. Use the line tool to draw lines to show where you will cut the squares.
Grandmother alw
MEASURE TWICE, CUT ONCE
Your gr mother is a master quilter. She wants to teach you about the history and art of quilt making. ow the directions in this packet, and you will learn about quilt making as you practice many math skills, like geometry and measurement. When you are done, you will be ready to make ur own quilt.
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ape riddles.
Work with lines of symmetry.
Relate area of quilt top to multiplication and addition.
Find the perimeter an area of Grandmother's quilt.
Measure area of quilt top with unit squares.
Measure, cut, and compare


MEASURING AND CUTTING FABRIC
First, you must mark your solid fabric into 9-inch
are different lengths. Before you cut your fabric
piece of each color. Grandmother made a 9-inch
1. Estimate how many 9-inch squares you can cut
I estimate
9-inch green
2. Grandmother placed one stencil on each pie
cut the fabric. Use the line tool to show al
18 inches wide & 23 inches long
9-inch square stencil
SOLID FABRIC
3. How m
ares of each color wil
GREEN SQUARES =
CLASSIFYING SHAPES
Quilt patterns are made up of many different shapes. Sort the shapes by their attributes and write their name in the table. Some shapes may fit in more than one category.
3-D shape with 6 flat faces
MAKING TWO PATTERNS
Now that all your triangles are cut, it is time to arrange them into two different patterns. You must make two squares that are made with 8 triangles each. There are many ways you can place your triangles. Below are a few ideas to help you get started.
Once you have
You will glue them to white paper. Be sure each
you can trim away the extra white paper.
MAKING TWO PATTERNS
Now that all your triangles are cut, it is time to arrange them into four different patterns. You must make four squares using 8 triangles each. There are many ways you can place your triangles, but they must follow a pattern. Below are a few ideas to help you get started.
Once you have your four patterns arranged, glue them to pieces of white construction paper. Be sure each pattern makes a square. When the glue dries, you can trim away any extra white paper.
Have fun and be creative!
QUILTING

CREATING AN ARRAY

Grandmother cuts each piece of fabric to exactly 12 inches l
how many 3-inch squares she can cut from each 12-inch squ

1. Estimate how many 3-inch pieces Grandmother can cut from one 12
square.

2. Use the shape tool to draw

FINDING AREA

Grandmother shows you the new quilt she is making for her bed. It is called the 9-Patch Quilt. For each square, Grandmother will sew 9 smaller squares together.

1. Write the missing measurements in the spaces.

inches

inches

inches

FINDING LINES OF SYMMETRY

Quilters use lines of sym lp them create patterns for their quilts. Follow the directions as you explo

pes have? Draw the lines with the line tool and write the number under

bottom half at the line of symmetry. Use the scribble tool to
at is under the paper.

GETTING STARTED ON YOUR QUILT

Your grandmother helped you pick four different fabrics for your quilt. Each piece of fabric is 18 inches wide, but the lengths are different. The table shows the length of each fabric in inches. First, round the length of each fabric to the nearest foot. Then, convert the total inches to feet/inches. Lastly, name the best tool to measure the fabric pieces. You can use a ruler, yardstick, or tape measure.

	Green Solid Fabric	Blue Solid Fabric	Blue Print Fabric	Green Print Fabric
Length in Inches	23 inches	34 inches	32 inches	47 inches
Round to the Nearest Foot				
Convert Inches to Feet/Inches				
Best Tool to Measure With				

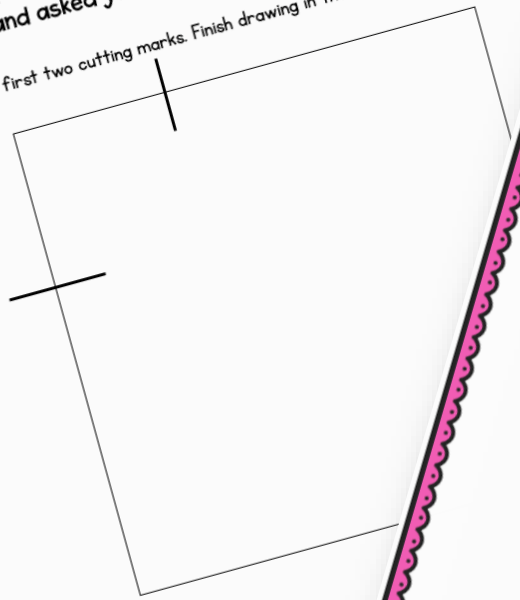
1. The pattern calls for 2 yards of print fabric that is 18 inches wide. If you combine the blue and the green print fabric lengths, do you have enough print fabric for the quilt? Explain.

2. You need a total of 5 feet of solid fabric. Grandmother knows you do not have enough green and blue solid fabric. Calculate how many more inches of solid fabric you need.

FINDING AREA

Before you get started on your own quilt, Grandmother will help you learn some measurement skills. She drew one pattern piece and asked you to divide it into 9 equal squares.

1. Grandmother helped by making the first two cutting marks. Finish drawing in the lines to divide the square into 9 equal squares.

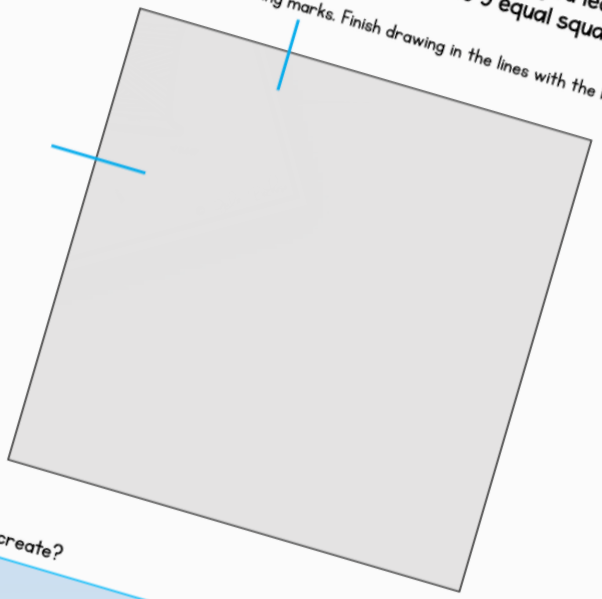


2. How many square units did you create?

FINDING AREA

Before you get started on your own quilt, Grandmother will help you learn some measurement skills. She drew one pattern piece and asked you to divide it into 9 equal squares.

1. Grandmother helped by making the first two cutting marks. Finish drawing in the lines with the line tool to divide the square into 9 equal squares.



2. How many square units did you create?



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MEASURING FABRIC

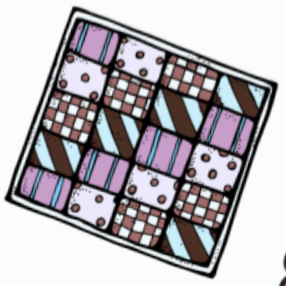
The table shows the measurements for the 5 fabrics Grandmother is using in each of the 9-Patch squares.

	Pink Solid Fabric	Blue Solid Fabric	Yellow Print Fabric	Pink Print Fabric	Green Print Fabric
Length in Inches	12 ½ inches	12 2/4 inches	12 ¼ inches	12 1/3 inches	12 ¾ inches

1. Place the measurements on the number line. Drag the dots to plot the points and the textboxes to label.

12 13

2. Which two fractions on the number line are equivalent?



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FINDING PERIMETER AND AREA

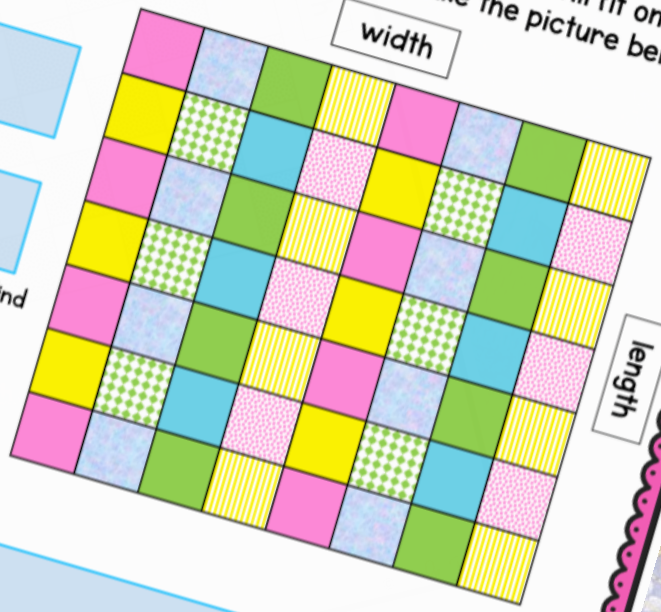
Grandmother needs to know the size of the finished 9-Patch Quilt so she can see it if will fit on her bed. She sewed the 9-inch squares in seven rows of eight squares each, just like the picture below shows. Use the picture to help you answer the questions.

1. Each square is 9 inches by 9 inches. How many inches wide is the quilt? Show how you know.

2. How many inches long is the quilt? Show how you know.

3. Grandmother wants to put a border on the quilt. Help her find the perimeter of the quilt in inches.

4. Find the area of Grandmother's new quilt in inches.







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© Julie Bochorse

MEASURING AND CUTTING FAB

First, you must mark your solid fabric
are different lengths. Before you cut
piece of each color. Grandmother

1. Estimate how many 9-inch squar

I estimate _____

2. Grandmother placed one
the fabric. Draw lines to sh

18 inches wide &
23 inches long

3. How many

GRE

that each piece is 18 inches wide, but they
9-inch squares you will get from one
of fabric.

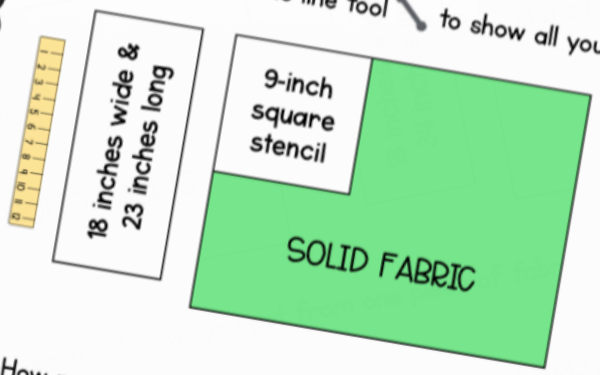
MEASURING AND CUTTING FABRIC

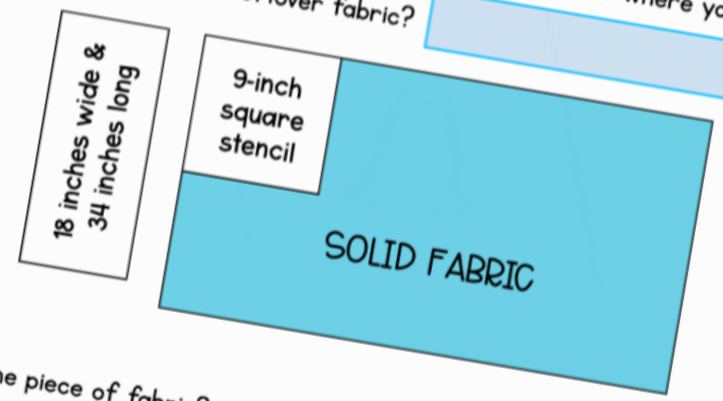
First, you must mark your solid fabric into 9-inch squares. Remember that each piece is 18 inches wide, but they are different lengths. Before you cut your fabric, you must calculate how many 9-inch squares you will get from one piece of each color. Grandmother made a 9-inch stencil for you to trace on each piece of fabric.

1. Estimate how many 9-inch squares you can cut from each fabric.

I estimate _____ 9-inch green fabric squares and _____ 9-inch blue fabric squares.

2. Grandmother placed one stencil on each piece of fabric to use as a guide. Drag the ruler to measure where you will cut the fabric. Use the line tool to show all your cuts. Will you have leftover fabric? _____





3. How many squares of each color will you get from one piece of fabric?

GREEN SQUARES = _____

BLUE SQUARES = _____

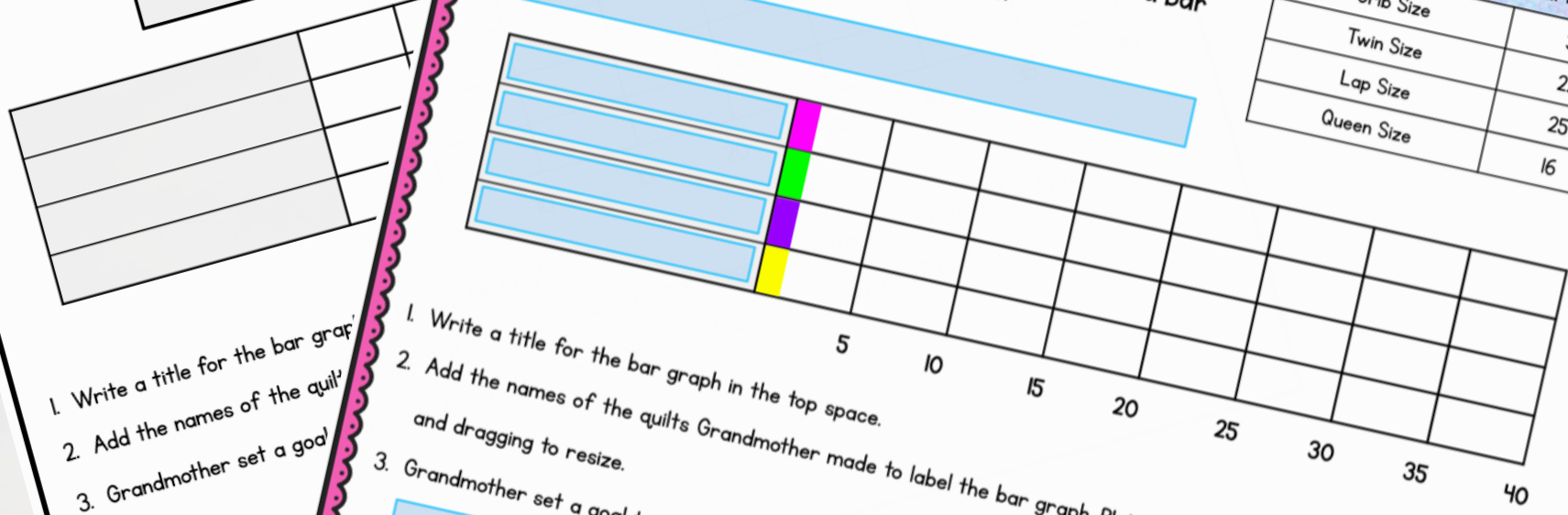


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CHALLENGE 1-GRANDMOTHER'S QUILTS

Grandmother makes quilts for charity. The table shows quilts of different sizes she made this year that she donated to hospitals and homeless shelters. Use the data to create a bar graph that shows how many quilts she made.

Quilts Made for Charity	
Crib Size	39
Twin Size	22
Lap Size	25
Queen Size	16



1. Write a title for the bar graph in the top space.
2. Add the names of the quilts Grandmother made to label the bar graph. Plot the data by clicking on each colored bar and dragging to resize.
3. Grandmother set a goal to make 100 quilts for charity this year. Did she meet her goal? Explain.



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MEASURE TWICE, CUT ONCE
SELF REFLECTION: Write a reflection of your experience with this project. How did you feel about the math problems and activities? Explain what you found easy to do and any difficulties you had while working on this project. Did you enjoy this activity? Why or why not?
Rate This Project
Drag the checkmark to the statement you most agree with.
I am ready for something harder.
It was just right.
I found this very challenging.
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RUBRIC

SELF-EVALUATION RUBRIC: **Highlight or shade the parts of the rubric that express how you rate yourself on this Project Based Learning Activity.**

		
I felt very confident about the math in this project.	I felt pretty good about my ability to complete the math in this project.	I felt a lot of the math in this project was too hard for me to do alone.
I understood all of the math and did not need help to complete the problems.	I understand most of the math but needed a little help to solve some of the problems.	I understood some of the math but needed help to complete most of the problems.
I easily used many strategies to solve the math problems efficiently.	I needed some help to determine the best strategies for solving the math problems.	I had trouble understanding the best way to solve many of the math problems.
I feel I am ready for a harder math project.	I feel I would like to spend more time practicing similar math problems.	I feel I need assistance to work on similar math problems.

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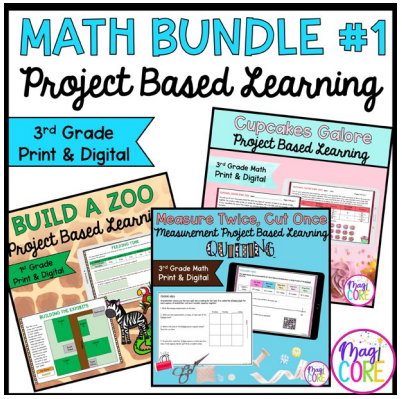
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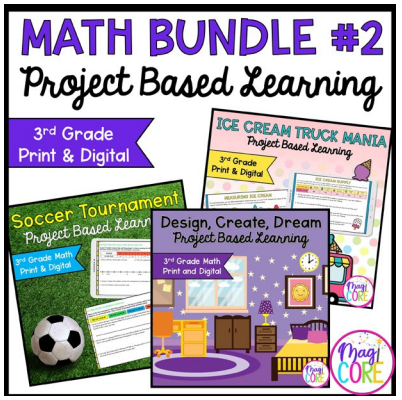
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