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INTRODUCTION

Did you panic when you heard that your state was adopting the Common Core Standards?

If you are anything like us, you probably found yourself moving through the stages of panic, fear, curiosity, and, eventually, acceptance. At first we thought we were going to have to completely overhaul our entire curriculum and instruction. However, after exploring the Common Core Standards through professional development provided by our district, as well as on our own initiative, we came to the realization that we already had all of the tools needed to become a Common Core classroom.

After a few planning periods and lunch chats, we finally experienced our "aha" moment. What we would need to do is change the way we think about math instruction. The shift would come in the presentation of our lessons and in the way we ask our students to respond to math. The Common Core Standards mention shifts in the direction in which math is approached, so we needed to rethink the way in which we incorporated these standards into our math lessons and the level in which we allowed students to experience the content. The Common Core Standards take a constructivist approach to math learning. Therefore, students should be using their math knowledge to solve novel, real-world problems.

What we would need to do is change the way we think about math instruction.

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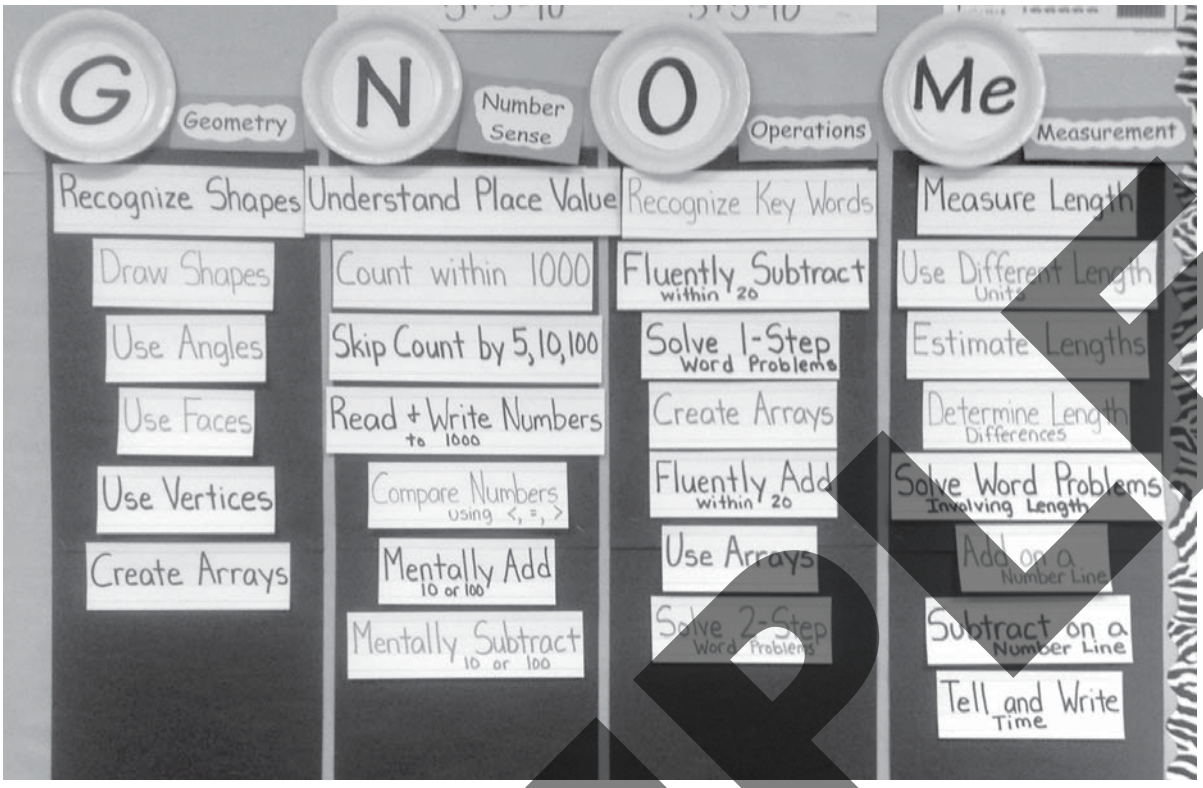

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We really wanted our students to take ownership of their learning and be aware of the high expectations that are placed on them. In order to do this in a student-friendly way, we came up with the acronym GNOMe, which stands for geometry, number sense, operations, and measurement. These are the domains that the Common Core Standards use in organizing the standards. We then rewrote the standards in short, student-friendly phrases by highlighting the core math concepts addressed.

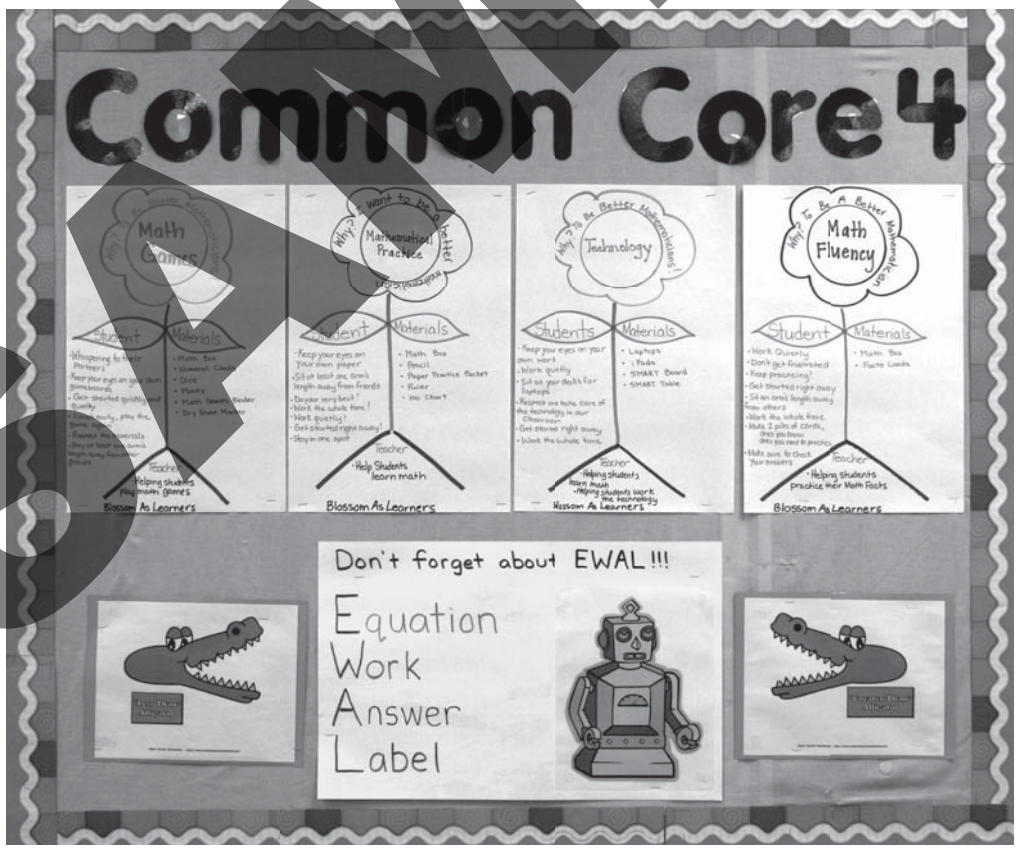
We couldn't think of a better way for students to grasp what they were expected to learn than by displaying the concepts to refer to throughout the day. Throughout the school year, as we introduce and teach the standards, we place each of the standard's core concepts under the corresponding domain (see Chapter 1 for more details). This is also a great way for us to make sure we are consistently teaching to the standards and are able to refer back to standards that were previously taught.

Next, we turned our attention to the setup of our math time. With the current emphasis on differentiation and individualized learning plans, we wanted to make sure our math block allowed us to work both one-on-one with individual students and in small groups with students who are

all working on the same math skills. We decided that a mini-lesson followed by independent practice would work best. Marzano, Pickering, and Pollock (2001) discuss the importance of helping students set high expectations and objectives for themselves as well as having teachers provide immediate feedback. The independent practice time allows teachers to conduct a conference and provide meaningful feedback to individual students while the rest of the class is working on a task.

How do we meet with students individually and not lose meaningful instruction time with those working independently?

This format posed another obstacle. How do we meet with students individually and not lose meaningful instruction time with those working independently? We did not want to assign "busy work" to our students. We want our students to be engaged in meaningful activities that support their learning. We also want to spend most of our time working with students, not making copies and grading papers. This led to the birth of the Common Core 4, which is based on the Common Core State Standards for Mathematical Practice (page 76).



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We decided that there are four main activities that students should experience on a regular, consistent basis in order to support their math learning and growth. The Common Core 4 is composed of four kinds of activities: math fluency, math games, mathematical practice, and technology. (See Chapter 2 for more details.)

We also agreed that student choice needed to play a role in our math instruction. There is much research that shows students are more invested in their learning when they are interested in it. Katz and Assor (2007) discuss the impact that student choice can have on motivation, well-being, and achievement. What better way to appeal to the interest of students than by giving them choice when it comes to their learning. We decided to give students the opportunity to choose which one of the Common Core 4 they would like to work on and when.

Putting it all together, our math day eventually ended up looking like this: We teach a mini-lesson about a concept on the GNOMe board. That is followed by students choosing which one of the Common Core 4 activities they would like to work on independently. While students work independently, we meet with individuals or small groups to reinforce skills. We repeat this two to three times within our math block, resulting in two to three mini-lessons and two to three rounds of the Common Core 4 every day.

The Common Core 4 is composed of math fluency, math games, mathematical practice, and technology.

While we chose for the Common Core 4 to be the independent practice part of our math block, there are many other great math programs out there that would work equally as well in its place. If your school has a math series that you are required to use, the activities and lessons found in your series could take the place of the independent practice. Chapter 4 provides details and examples of how to set up your math block using the Math GNOMe with the Common Core 4, as well as with a variety of other options in place of the Common Core 4.

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The Math GNOMe and Common Core 4 helped to align our instruction to the Common Core Standards with a simple shift in how we think about and present math. It is evident to anyone who walks into our classroom what standards we have taught and what standards students are working on. Our students are able to discuss math concepts and explain why they are learning a particular skill. We, as well as students, are able to refer back to the Math GNOMe board throughout the school year. The Math GNOMe has focused our attention on the expectations the standards place on our students, while the Common Core 4 allows us time to work with students individually in areas where they are struggling. It is amazing to be able to find the time to work one-on-one with students on a regular basis. Because of this individualized attention and ongoing formative assessment, students' growth is astounding.

The Math GNOMe and Common Core 4 work in conjunction with one another to allow you to have a truly Common Core classroom that addresses the six shifts in mathematics instruction—focus, coherence, fluency, deep understanding, application, and dual intensity. Through the Math GNOMe mini-lessons, teachers are able to provide instruction that has focus, coherence, and depth for greater understanding, while the Common Core 4 provides students with the opportunity to achieve fluency, application, and dual intensity. Your students will participate in independent, self-selected math activities while allowing you to provide individual and small-group instruction and assessment through conferences.

The Math GNOMe and Common Core 4 helped to align our instruction to the Common Core Standards with a simple shift in how we think about and present math.

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Geometry *I Can...* Statements

STANDARD NUMBER	BULLETIN BOARD PHRASE(S)	I CAN STATEMENT(S)
2.G.A.1	Recognize shapes	I can recognize shapes based on their attributes (e.g., number of faces, angles, vertices).
		I can identify triangles, quadrilaterals, pentagons, and hexagons.
	Draw shapes	I can draw shapes based on their attributes (e.g., number of faces, angles, vertices).
2.G.A.2	Create arrays	I can divide a rectangle into rows and columns of same-size squares and count them to find the total.
2.G.A.3	Understand halves	I can partition circles and rectangles into two equal shares.
		I can describe the equal shares using *halves*, and *half of*.
	Understand thirds	I can partion circles and rectangles into three equal shares.
		I can describe the equal shares using *thirds*, and *a third of*.
	Understand fourths	I can partition circles and rectangles into four equal shares.
		I can describe the equal shares using *fourths*, and *a fourth of*.
	Recognize equal shares of identical wholes may not have the same shape	I know that equal shares of identical wholes may not have the same shape.

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Number Sense *I Can...* Statements

STANDARD NUMBER	BULLETIN BOARD PHRASE(S)	I CAN STATEMENT(S)
2.NBT.A.1	Understand place value	I can understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones.
2.NBT.A.1a		I can understand that the number 100 is the same as a bundle of 10 tens—called a "hundred."
2.NBT.A.1b		I can tell how many groups of hundreds are in the numbers said when skip counting by 100.
2.NBT.A.2	Count within 1,000	I can count within 1,000 starting from any number.
	Skip count by 5, 10, 100	I can skip count within 1,000 by 5s, 10s, and 100s.
2.NBT.A.3	Read and write numbers to 1,000	I can read and write numbers to 1,000 using base-ten numerals (e.g., 576).
		I can read and write numbers to 1,000 using number names (e.g., five hundred seventy-six).
		I can read and write numbers to 1,000 using expanded form (e.g., 500 + 70 + 6).
2.NBT.A.4	Compare numbers using <, =, >	I can use the hundreds, tens, and ones digits to compare two three-digit numbers.
		I can use the <, =, and > symbols to record the results of comparisons.
2.NBT.B.5	Fluently add within 100	I can use a variety of strategies to fluently add within 100 (place value, properties of operations, and/or the relationship between addition and subtraction).
	Fluently subtract within 100	I can use a variety of strategies to fluently subtract within 100 (place value, properties of operations, and/or the relationship between addition and subtraction).
2.NBT.B.6	Add up to four two-digit numbers	I can use place value and properties of operations to add up to four two-digit numbers.
2.NBT.B.7	Add within 1,000	I can use a variety of strategies to add within 1,000 (models, drawing, place value, operations, and/or relationship between addition and subtraction).
		I can relate strategies to a written method.
		I can understand that you add numbers with the same place value.
		I can understand that in adding three-digit numbers it is sometimes necessary to compose tens or hundreds.
	Subtract within 1,000	I can use a variety of strategies to subtract within 1,000 (models, drawing, place value, operations, and/or relationship between addition and subtraction).
		I can relate strategies to a written method.
		I can understand that you subtract numbers with the same place value.
		I can understand that in subtracting three-digit numbers it is sometimes necessary to decompose tens or hundreds.
2.NBT.B.8	Mentally add 10 or 100	I can mentally add 10 or 100 to a given number from 100 to 900.
	Mentally subtract 10 or 100	I can mentally subtract 10 or 100 from a given number from 100 to 900.
2.NBT.B.9	Explain why addition strategies work	I can use place value and the properties of operations to explain why addition strategies work.
	Explain why subtraction strategies work	I can use place value and the properties of operations to explain why subtraction strategies work.

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Operations *I Can...* Statements

STANDARD NUMBER	BULLETIN BOARD PHRASE(S)	I CAN STATEMENT(S)
2.OA.A.1	Solve one-step word problems	I can solve one-step word problems using an unknown in all positions within 100.
	Solve two-step word problems	I can solve two-step word problems using an unknown in all positions within 100.
	Recognize key words in word problems	I know when to add or subtract when solving a word problem.
		I can use drawings and equations with a symbol for the unknown number to represent a word problem.
2.OA.B.2	Fluently add within 20	I can use mental strategies to fluently add numbers within 20.
		I can recall sums of two one-digit numbers from memory.
	Fluently subtract within 20	I can use mental strategies to fluently subtract numbers within 20.
2.OA.C.3	Determine odd or even numbers	I can pair up or count objects by 2s to determine if a group of up to 20 objects has an odd or even number of members.
		I can write an equation which shows adding the same two numbers will result in an even number.
2.OA.C.4	Use arrays	I can add to find the total number of objects arranged in a rectangular array with up to 5 rows and 5 columns.
		I can write an equation to represent the total number of objects as a sum of equal addends.

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Measurement *I Can...* Statements

STANDARD NUMBER	BULLETIN BOARD PHRASE(S)	I CAN STATEMENT(S)
2.MD.A.1	Measure length	I can measure the length of an object using appropriate tools (rulers, yardsticks, meter sticks, measuring tapes).
2.MD.A.2	Measure using different length units	I can measure an object using two units of different length. I can explain how the size of the unit length affects the measurement.
2.MD.A.3	Estimate lengths	I can estimate the length of an object in inches and/or feet. I can estimate the length of an object in centimeters and/or meters.
2.MD.A.4	Determine length differences	I can measure to determine the difference in length between two objects. I can write the length difference in standard length unit.
2.MD.B.5	Solve word problems involving length	I can use strategies (drawing and equations) and add within 100 to solve word problems involving lengths of the same unit. I can use strategies (drawing and equations) and subtract within 100 to solve word problems involving lengths of the same unit.
2.MD.B.6	Create a number line	I can represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2,…
	Add on a number line	I can use number lines to solve addition problems to 100.
	Subtract on a number line	I can use number lines to solve subtraction problems to 100.
2.MD.C.7	Tell and write time	I can tell and write time from an analog clock to the nearest five minutes. I can tell and write time from a digital clock to the nearest five minutes. I can tell time and write time using a.m. and p.m.
2.MD.C.8	Solve word problems involving money	I can solve word problems involving dollar bills, quarters, dimes, nickels, and pennies. I can use the $ and ¢ symbols appropriately.
2.MD.D.9	Create line plots	I can measure the lengths of several objects to the nearest whole unit and record them on a line plot.
2.MD.D.10	Create pictographs	I can draw a picture graph to represent data of up to four categories.
	Create bar graphs	I can draw a bar graph to represent data of up to four categories. I can answer addition and subtraction problems using the data in the graphs.

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COMMON CORE STATE STANDARDS

for Second Grade

Operations & Algebraic Thinking

REPRESENT AND SOLVE PROBLEMS INVOLVING ADDITION AND SUBTRACTION.

CCSS.Math.Content.2.OA.A.1
Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.[1]

ADD AND SUBTRACT WITHIN 20.

CCSS.Math.Content.2.OA.B.2
Fluently add and subtract within 20 using mental strategies.[2] By end of Grade 2, know from memory all sums of two one-digit numbers.

WORK WITH EQUAL GROUPS OF OBJECTS TO GAIN FOUNDATIONS FOR MULTIPLICATION.

CCSS.Math.Content.2.OA.C.3
Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.

CCSS.Math.Content.2.OA.C.4
Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

1 See Common Core Standards Glossary, Table 1.

2 See standard 1.OA.C.6 for a list of mental strategies.

Number & Operations in Base Ten

UNDERSTAND PLACE VALUE.

CCSS.Math.Content.2.NBT.A.1
Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:

CCSS.Math.Content.2.NBT.A.1a
100 can be thought of as a bundle of ten tens—called a "hundred."

CCSS.Math.Content.2.NBT.A.1b
The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).

CCSS.Math.Content.2.NBT.A.2
Count within 1000; skip-count by 5s, 10s, and 100s.

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CCSS.Math.Content.2.NBT.A.3
Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.

CCSS.Math.Content.2.NBT.A.4
Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.

USE PLACE VALUE UNDERSTANDING AND PROPERTIES OF OPERATIONS TO ADD AND SUBTRACT.

CCSS.Math.Content.2.NBT.B.5
Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

CCSS.Math.Content.2.NBT.B.6
Add up to four two-digit numbers using strategies based on place value and properties of operations.

CCSS.Math.Content.2.NBT.B.7
Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.

CCSS.Math.Content.2.NBT.B.8
Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.

CCSS.Math.Content.2.NBT.B.9
Explain why addition and subtraction strategies work, using place value and the properties of operations.[1]

1 Explanations may be supported by drawings or objects

Measurement & Data

MEASURE AND ESTIMATE LENGTHS IN STANDARD UNITS.

CCSS.Math.Content.2.MD.A.1
Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.

CCSS.Math.Content.2.MD.A.2
Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.

CCSS.Math.Content.2.MD.A.3
Estimate lengths using units of inches, feet, centimeters, and meters.

CCSS.Math.Content.2.MD.A.4
Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

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RELATE ADDITION AND SUBTRACTION TO LENGTH.

CCSS.Math.Content.2.MD.B.5
Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.

CCSS.Math.Content.2.MD.B.6
Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.

WORK WITH TIME AND MONEY.

CCSS.Math.Content.2.MD.C.7
Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.

CCSS.Math.Content.2.MD.C.8
Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?

REPRESENT AND INTERPRET DATA.

CCSS.Math.Content.2.MD.D.9
Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.

CCSS.Math.Content.2.MD.D.10
Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems[1] using information presented in a bar graph.

1 Common Core State Standards website for Glossary, Table 1.

Geometry

REASON WITH SHAPES AND THEIR ATTRIBUTES.

CCSS.Math.Content.2.G.A.1
Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.[1] Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.

CCSS.Math.Content.2.G.A.2
Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.

CCSS.Math.Content.2.G.A.3
Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

1 Sizes are compared directly or visually, not compared by measuring.

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