

# Understanding Area and Perimeter



AMERICA'S  
CHOICE.

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**Online Resources**

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## Introduction to Math Navigator

Dear Parent/Guardian,

\_\_\_\_\_ has been selected to participate in Math Navigator! Math Navigator is one of the ways that our school is working to help all students succeed in mathematics. The program gives students the additional time and instruction they need to improve their performance in this important subject.

Your child will be participating in the *Understanding Area and Perimeter* module. The main goal of this module is to help students recognize, understand, and solve measurement problems in context. The module exposes students to a variety of contexts that require finding measurements, particularly measurements of perimeter and area. At the beginning of the module, students will measure lengths accurately and compare lengths, using both English and metric rulers. Then they will find perimeters of rectangles, squares, and compound shapes and solve word problems involving perimeter. Next, students will find areas of rectangles, squares, and compound shapes and solve word problems involving area. They will break an area into equal parts. At the end of the module, students will investigate the relationship between area and perimeter.

There are a variety of materials students will use with this module: one of them is a set of Study Cards. These cards include mathematical ideas for students to master, game cards, and blank cards that students can customize with concepts that they need to work on. Students are encouraged to use these cards during the lessons, as well as during free time and at home. Please encourage your child to share them with you.

The more enthusiastic you can be about Math Navigator, the more it will help your child. Ask questions each day about what your child learned and how the Math Navigator class was different from your child's regular math class. It is important for you to acknowledge what your child has accomplished both on a day-to-day basis and after completing the Math Navigator module.

We are excited about using Math Navigator with students. Learn more about this special program and how it works by reading the short description that follows. If you have any questions about the program, please do not hesitate to contact us here at school.

### How Math Navigator Works

#### Structure of a Module

Each module contains 20 days of 30- or 45-minute lessons, including a pre-test and post-test. During the 20 days, students have two or three checkpoint lessons that assess their understanding of the concepts in the module.

#### Frequent Skills Practice

Most lessons include a Show Me session in which students practice and reinforce skills. It is also a time for students to learn strategies and techniques that make computation easier.

#### Emphasis on Understanding

The lessons are carefully designed to uncover mistakes that result from students misunderstanding something. We call such mistakes *misconceptions*. Misconceptions need to be corrected because they can interfere with new learning. Math Navigator modules do not attempt to reteach everything that students have learned about a topic. Instead, they help students understand the mathematics of the procedures and concepts that they have already learned so that they can correct the misconceptions that are getting in the way of their progress.

#### Learning to Think Mathematically

Lessons are structured to teach students to think like mathematicians. Students will learn how to ask themselves questions before beginning a problem; to use diagrams, tables, and other methods of representing problems; and to estimate as a way of determining whether their answers are reasonable. Most importantly, they will come to see that mistakes are opportunities for learning, rather than something to hide.

## Misconceptions and Errors

<b>M7</b>	Confuses area and perimeter
<b>M17</b>	Does not know how to find area and perimeter
<b>NL2</b>	Counts the number of tick marks instead of the number of intervals
<b>NL4</b>	Measures from the end of ruler or 1 not from 0

### M7 Confuses area and perimeter

The student interprets all “fence” problems as perimeter, even if the problem talks about the size of the garden that the fence encloses or the student interprets all “wall painting” problems as area, even if the problem talks about the length of a striped border that is painted around the room.

**example**

Find the area of a rectangle with dimensions of 12 centimeters  $\times$  4 centimeters.

$$12 + 4 + 12 + 4 = 32 \text{ centimeters}$$

**example**

Find the perimeter of a rectangle with dimensions of 8 inches  $\times$  7 inches.

$$8 \times 7 = 56 \text{ inches}$$

### M17 Does not know how to find area and perimeter

**example**

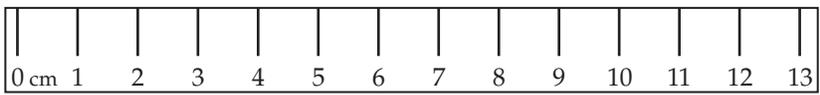
Sue wants to build 2 different rectangular gardens, each having an area of 12 square meters. Write a set of dimensions Sue could use to build her two gardens.

$$6 \text{ meters by } 6 \text{ meters and } 12 \text{ meters by } 1 \text{ meter.}$$

**NL2 Counts the number of tick marks instead of the number of intervals**

The student does not understand how to read a ruler or a number line and counts the tick marks (the lines), not the number of intervals.

**example**

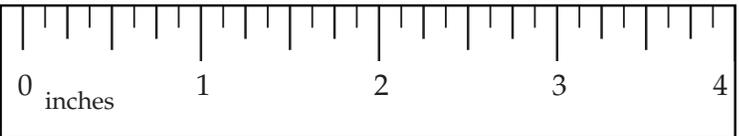


The line segment is 6 centimeters in length.

**NL4 Measures from the end of ruler or 1 not from 0**

Student begins measuring at the end of the ruler instead of at 0.

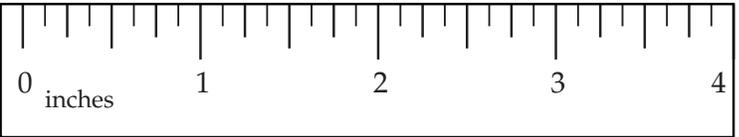
**example**



The line segment is  $2\frac{7}{8}$  inches in length.

Student begins measuring at the number 1 instead of at 0 and does not compensate.

**example**



The line segment is 3 inches in length.

## Class Profile Instructions

### About the Class Profile

Completing an analysis of student work gives you a clear picture of the strategies an individual student is applying to a particular problem or topic in mathematics. Such an analysis is even more powerful when it is applied to the Math Navigator class as a whole.

The Class Profile gives you both. By reading the Class Profile across a row, you can see where each student stands at any point in time. Reading down the columns allows you to see the strengths and needs of the entire class at a glance. By reviewing the Class Profile, you will be able to make decisions that target appropriate instruction to individuals, small groups, and the whole Math Navigator class.

The first pages of the Class Profile provide assessment items related to the content of the module. The last page is based on the mathematical practices from the Common Core State Standards for Mathematics.<sup>1</sup> On this page, record evidence of students using these practices.

### Recording Data on the Class Profile

When you see—either through discussion, analysis of student work, or direct observation—that a student understands a concept, still has a misconception, or engages in a mathematical practice, make a note on your Class Profile. As the student’s understanding increases, update the Class Profile.

### Using the Class Profile

Review the Class Profile periodically during the lesson to help you decide which topics would be most beneficial for your students to focus on during the class discussion. Address topics that most of the students in the Math Navigator group need to learn during the show me, work time, or probing for understanding parts of the lesson. Address topics that only some students are struggling with during partner work or in conferences. If only one or two students need help with a topic, address the topic in an individual conference.

Give a copy of the completed Class Profile to each student’s classroom teacher at the end of the module.

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<sup>1</sup>Common Core State Standards Initiative. 2010. “Common Core State Standards for Mathematics”: 6–8. Accessed July 1, 2011. [http://www.corestandards.org/assets/CCSSI\\_Math%20Standards.pdf](http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf).

# CLASS PROFILE (1 OF 3)

		<b>Concepts</b>								
10	9	8	7	6	5	4	3	2	1	<b>Student Name</b>
										<b>C2:</b> Interprets measurements accurately from diagrams
										<b>C3:</b> Represents measurement situations using visual representations
										<b>C4:</b> Recognizes perimeter situations
										<b>C5:</b> Recognizes area situations
										<b>C6:</b> Understands relationships between the dimensions of shapes and their perimeters
										<b>C7:</b> Understands relationships between the dimensions of shapes and their areas
										<b>C8:</b> Understands the relationship between the measurement and the units used to label the measurement
										<b>C9:</b> Understands that rectangular arrays can be decomposed into identical rows or columns
										<b>Observed Errors</b>



<b>Mathematical Practice Standards</b>	
<p><b>MP1:</b> Make sense of problems and persevere in solving them.</p> <p><b>MP2:</b> Reason abstractly and quantitatively.</p> <p><b>MP3:</b> Construct viable arguments and critique the reasoning of others.</p> <p><b>MP4:</b> Model with mathematics.</p>	<p><b>MP5:</b> Use appropriate tools strategically.</p> <p><b>MP6:</b> Attend to precision.</p> <p><b>MP7:</b> Look for and make use of structure.</p> <p><b>MP8:</b> Look for and express regularity in repeated reasoning.</p>
<b>Student Name</b>	<b>Observations</b>
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	



# A Complete Solution to a Word Problem

includes all of the following ...



A written estimate



All work that you do



An equation (even if you solved it using column form)



A diagram, number line, table, or other representation



The answer to the question in a complete sentence



# What to Do If You Get Stuck



Look at past work times



Look at the charts that are posted



Model the problem using counters or other materials



Sketch a diagram or other representation



Change the numbers to make the problem simpler



Write what you do know



Write down questions to ask later



Check other resources