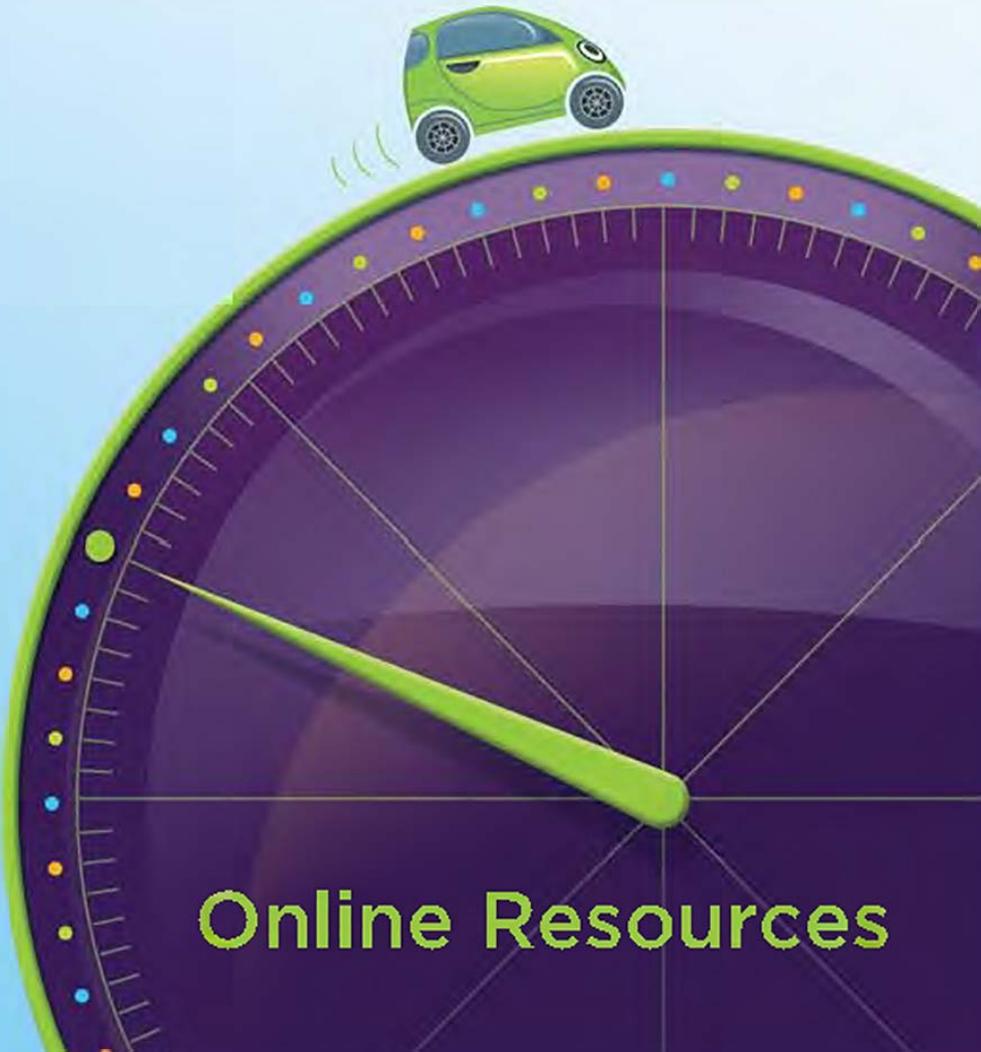


Fractions as Numbers



AMERICA'S
CHOICE.

SAVVAS
LEARNING COMPANY

Boston, Massachusetts

Chandler, Arizona

Glenview, Illinois

Upper Saddle River, New Jersey

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 *Fractions as Numbers* module. The main goal of this module is to help students understand and model fractions. Students will explore the relationship between fractions and dividing an amount into equal parts as they divide sets of objects, lengths, and rectangular regions. Students will name fractions using symbols and words, and label equal parts with fractions. Students will find fractions of measurements on a ruler, and then learn to identify fractions on a number line. Students will identify unit fractions (fractions that have 1 as the numerator) and build other fractions by combining unit fractions. Students will also learn that the size of a fractional part depends on the size of the whole. Students will find equivalent fractions in both number line models and area models. They will gain experience in comparing and ordering fractions. Throughout the module, students will model and draw pictures, building mental models to help them think about what fractions represent.

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

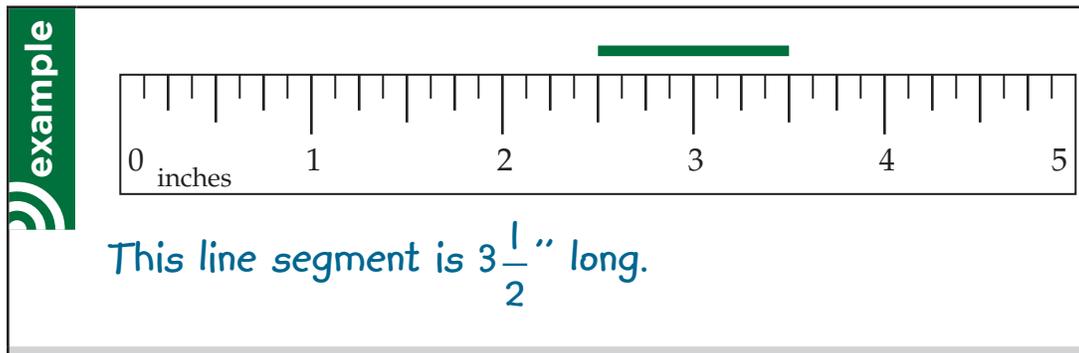
Lessons are structured to teach students to think like mathematicians. Students will learn how to ask themselves questions before beginning a problem; to use diagrams, tables, and other methods of representing problems; and to estimate as a way of determining whether their answers are reasonable. Most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

Misconceptions and Errors

F3	Does not understand how fractions or percents are represented in diagrams/models
F4	Writes a fraction or a probability as whole-to-part not part-to-whole
F20	Incorrectly converts to equivalent fractions or mixed numbers
F25	Thinks that whole numbers or decimals are either greater or less than fractions
F29	Does not understand that fractions are numbers as well as portions of a whole
F34	Ignores size of the whole when comparing fractional parts of two different-sized objects
F36	Incorrectly identifies the number of parts or the amount of the whole
F37	When interpreting a fraction model, thinks the fraction is part-to-part or whole-to-part
F46	When writing a unit fraction uses the wrong denominator

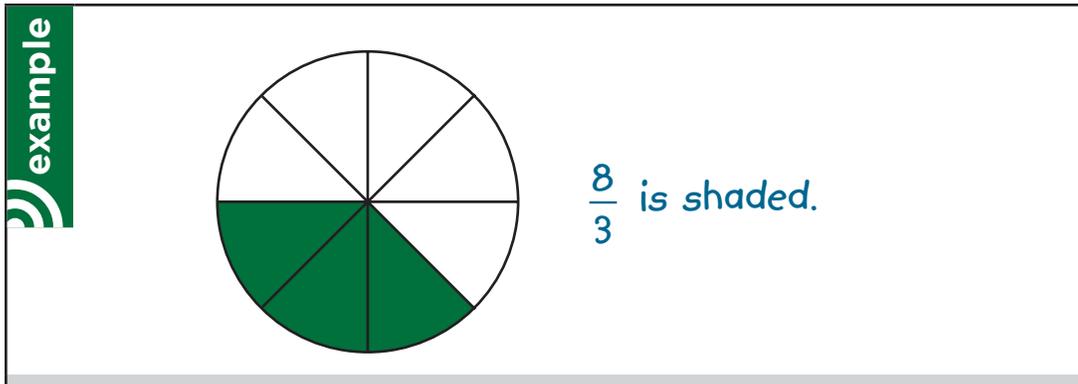
F3 Does not understand how fractions or percents are represented in diagrams/models

The student cannot represent or read fractions when present in diagrams—including number lines, area models, and separate figures. Student does not recognize fractions as points on a number line or as division calculations.



F4 Writes a fraction or a probability as whole-to-part not part-to-whole

The student counts the number of parts of the whole and uses the whole as the numerator.

**F20 Incorrectly converts to equivalent fractions or mixed numbers**

example

$$\frac{2}{5} + \frac{4}{9} = \frac{6}{45} + \frac{20}{45} = \frac{26}{45}$$

F25 Thinks that whole numbers or decimals are either greater or less than fractions

The student thinks that mixed numbers are greater than improper fractions because mixed numbers contain a whole-number part, and whole numbers are greater than fractions. The student thinks that decimals are greater than fractions because fractions are “really small things.” The student might also think that a fraction is greater because its numerator or denominator is larger. Or, the student might think that you cannot convert a fraction to a decimal—that the two cannot be compared.

example

$$1\frac{2}{5} > \frac{7}{5} \text{ because whole numbers are greater than fractions.}$$

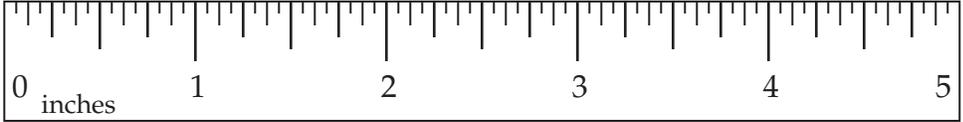
$$1\frac{2}{5} < \frac{7}{5} \text{ because 7 is greater than 2.}$$

F29 Does not understand that fractions are numbers as well as portions of a whole

The student recognizes a fraction when shown as part of an area of a number of shaded objects, but cannot locate a number on the number line.

example

What is the length of this line?



The line is 10 inches long.

F34 Ignores size of the whole when comparing fractional parts of two different-sized objects

The student does not understand the concept of whole when asked a question about the fractional part of a whole.

example

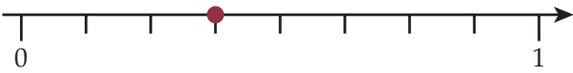
Which is longer, $\frac{5}{6}$ of a foot or $\frac{1}{3}$ of a yard?

$\frac{5}{6}$ is greater

F36 Incorrectly identifies the number of parts or the amount of the whole

example

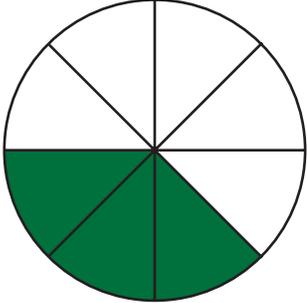
What fraction is shown by the marked point on this number line?



$\frac{4}{9}$

F37 When interpreting a fraction model, thinks the fraction is part-to-part or whole-to-part

example

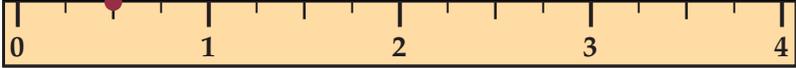


$\frac{3}{5}$ is shaded.

F46 When writing a unit fraction uses the wrong denominator

example

Write a unit fraction for the point *A* shown on the ruler.



Point *A* is at $\frac{1}{4}$.

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.¹ 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.

¹Common 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.

CLASS PROFILE (2 OF 3)

		Procedures							
Student Name	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								
Observed Errors									

CLASS PROFILE (3 OF 3)

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



A Complete Solution to a Math Story

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