

Percents



AMERICA'S
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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 *Percents* module. The main goal of this module is to strengthen students' understanding of the meaning of percents and their ability to relate percents to decimals and fractions, use percents with data, relate percent increases to decreases, and solve word problems involving percents.

The problems are designed to lead students through a series of tasks that draw out their misconceptions. For example, students will use diagrams to give meaning to percents, decimals, and fractions and formulate rules for converting between percents, decimals, and fractions. Card-matching activities draw students' attention to the different ways a concept can be represented and help them connect concepts. Students work collaboratively on posters to summarize mathematical rules and concepts. They also create problems for each other to solve.

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, 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

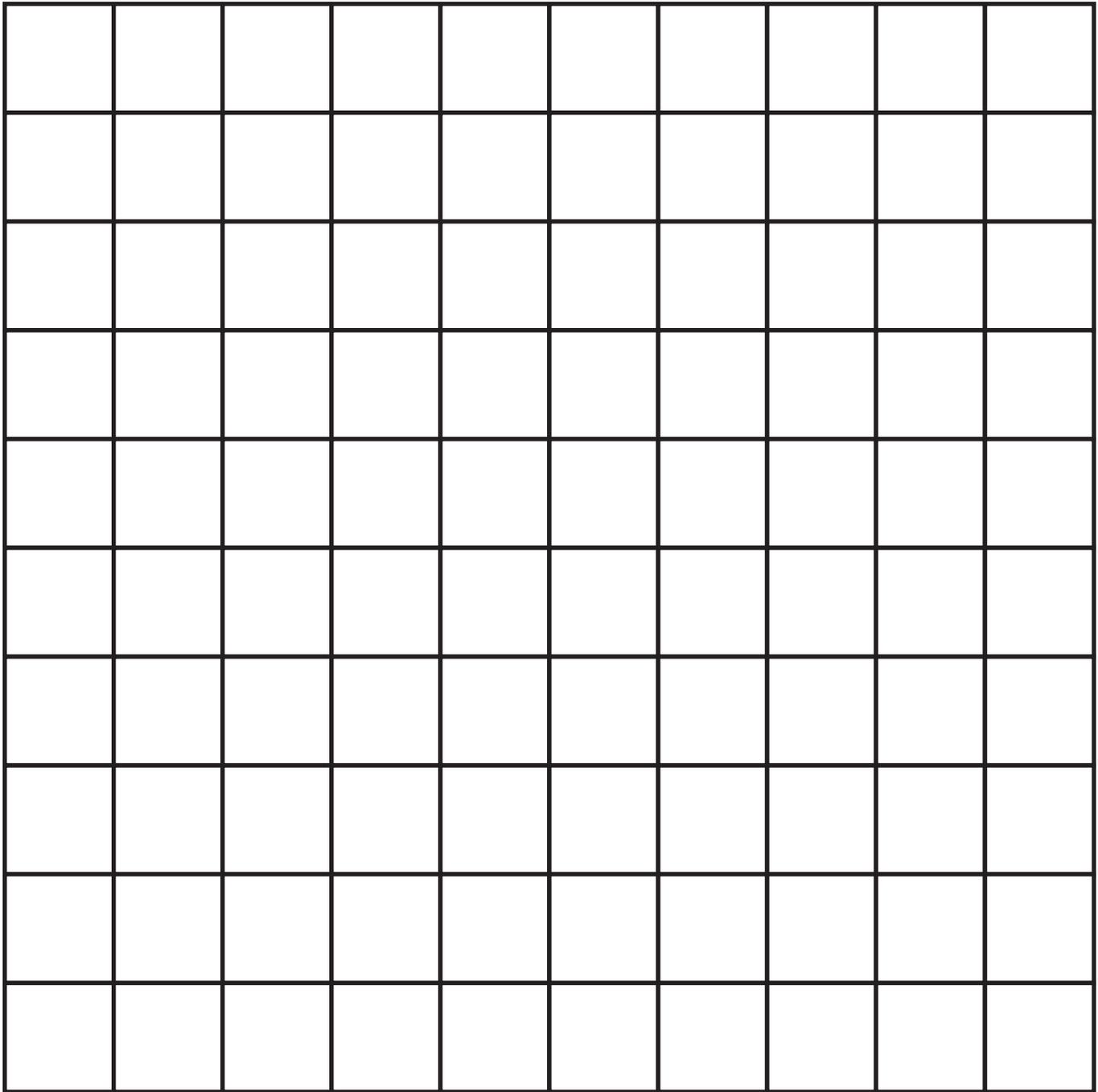
Most lessons include a Show Me session in which students practice and reinforce skills. It is also a time for students to learn strategies and techniques that make computation easier.

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.



100% is

50% is

10% is

25% is

70% is

75% is

30% is

12.5% is

5% is

2.5% is

1% is

$33\frac{1}{3}\%$ is



$66\frac{2}{3}\%$ is

Misconceptions and Errors

PCT1	Writes the percent as a decimal or fraction with a percent sign, or writes a decimal the same and adds a percent sign
PCT2	Does not understand that percents refer to hundredths
PCT3	Does not understand percents—treats them as though they are just ordinary numbers
PCT4	Uses the wrong part/percent or the wrong whole when calculating a percent
PCT5	Thinks that the largest or smallest discount percent or amount results in the largest or smallest discount amount or percent
PCT6	When calculating percent increase or decrease, does not add or subtract the increased or decreased amount back to the original amount
PCT7	Confuses percent increase with percent decrease
PCT8	Thinks that percents cannot be greater than one hundred
D3	Reads decimals as whole numbers without designating the place value
D16	Compares decimals by examining lengths—thinks that longer lengths mean larger numbers (as with whole numbers)
F3	Does not understand how fractions or percents are represented in diagrams/models
G1	Reads the question incorrectly or does not know how to approach the problem
O5	Does not recognize a multiplication situation

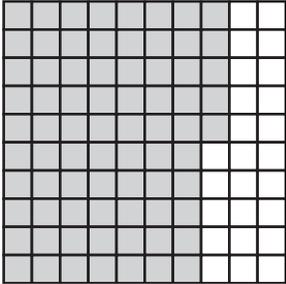
PCT1 Writes the percent as a decimal or fraction with a percent sign, or writes a decimal the same and adds a percent sign

example	Write 25% as a decimal
	0.25%
	Write 0.35 as a percent.
	0.35%

PCT2 Does not understand that percents refer to hundredths

example

What percent of the whole square is shaded?



750%

Change this decimal to a percent.

0.253%

PCT3 Does not understand percents—treats them as though they are just ordinary numbers

example

Pablo buys two shirts on sale. Each shirt is labeled “25% off.”
What percent does he save if he buys both shirts?

50%

PCT4 Uses the wrong part/percent or the wrong whole when calculating a percent

example

In a basketball game, Jeremy scored 24 points. His team scored 80 total points. What percent of the team’s total points did Jeremy score?

70%

PCT5 Thinks that the largest or smallest discount percent or amount results in the largest or smallest discount amount or percent

example

For this problem, refer to the following sale sign from a clothing store:

Summer Sale!	
Swimsuits	were \$35, now reduced by 25%
Ties	were \$24, now reduced by 40%
Shorts	were \$31, now reduced by 10%
Coats	were \$72, now reduced by 30%

Which discounted item saves the customer the most money?

When the customer buys ties they receive the most money back because it is the biggest discount.

PCT6 When calculating percent increase or decrease, does not add or subtract the increased or decreased amount back to the original amount

example

55 is decreased by 30%. Find the new amount.

16.50

Isabel works at a store that sells furniture. She earns \$1,750 a month plus 2.5% commission on every sale she makes. How much did she make last month if she sold \$30,650 worth of furniture?

Isabel earned \$766.25

PCT7 Confuses percent increase with percent decrease

example

A bicycle originally priced at \$300 is reduced by 40% in a sale.
What is the sale price?

\$420

PCT8 Thinks that percents cannot be greater than one hundred

example

Write $\frac{13}{10}$ as a percent.

30%

Write 1.45 as a percent

0.145%

D3 Reads decimals as whole numbers without designating the place value

example

Write 0.125 as a percent.

0.125 is point one hundred twenty-five so it equals 125%.

D16 Compares decimals by examining lengths—thinks that longer lengths mean larger numbers (as with whole numbers)

example

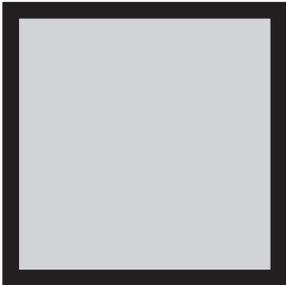
Write 40% and 12% as decimals and put them in order from least to greatest.

0.4 > 0.12

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

example

What percent of this square is shaded?



50%

G1 Reads the question incorrectly or does not know how to approach the problem

example

Jin takes two math tests. Each test contains the same number of questions. On the first test she scores 30%. On the second test she scores 50%. What percent does she score if both tests are combined?

She scored 50% on both tests.

O5 Does not recognize a multiplication situation

example

Lena sees a dress on sale. The normal price of the dress is \$74.80. On sale, the price is reduced by 35%.

Which expression should she use to figure out the sale price of the dress?

$74.80 - 35$

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 (3 OF 3)

Mathematical Practice Standards

- MP1:** Make sense of problems and persevere in solving them.
- MP2:** Reason abstractly and quantitatively.
- MP3:** Construct viable arguments and critique the reasoning of others.
- MP4:** Model with mathematics.
- MP5:** Use appropriate tools strategically.
- MP6:** Attend to precision.
- MP7:** Look for and make use of structure.
- MP8:** Look for and express regularity in repeated reasoning.

Student Name

Observations

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