

Geometry



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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 *Geometry* module. The main goal of this module is to help students deepen their understanding of two-dimensional geometric figures and their characteristics. Overall, this module provides students with practice in figure classification by having them examine angles and sides of polygons. In this module, students will classify angles as right, acute, or obtuse. They will identify types of triangles, including right triangles. Students will identify parallel and perpendicular lines and use that understanding to classify quadrilaterals, including rhombuses, rectangles, parallelograms, squares, and trapezoids. Students will compare figures in order to better understand what characteristics different figures may share and what characteristics may be unique to a particular figure. Students will name polygons in more than one way based on attributes associated with angles and sides. Also within this module, students will have the opportunity to find lines of symmetry and to draw lines of symmetry in regular and irregular polygons.

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

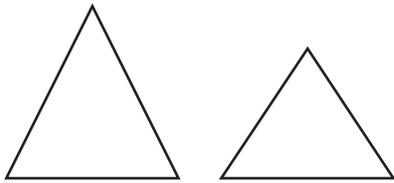
GE1	Does not understand or cannot apply the definition of a figure or thinks that each figure has only one name
GE3	Does not understand lines of symmetry
GE4	Thinks that a line of symmetry merely cuts a figure into two congruent figures
GE6	Thinks that the lengths of the rays determine the size of the angle
GE7	Does not understand the concept of intersecting, parallel, or perpendicular lines
GE9	Does not understand angle measurement and the terms used to describe angles
GE14	Thinks right angles always open to the right

GE1 Does not understand or cannot apply the definition of a figure or thinks that each figure has only one name

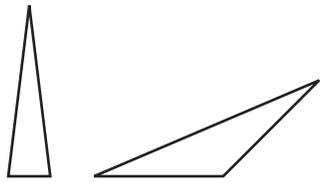
The student restricts the definition of a given polygon to include only examples that approach a certain norm, such as the shape of a regular polygon or rectangles with dimensions that approach a particular ratio.

example

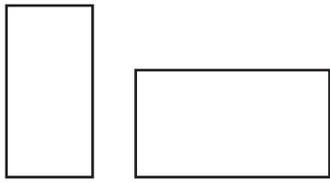
These are triangles:



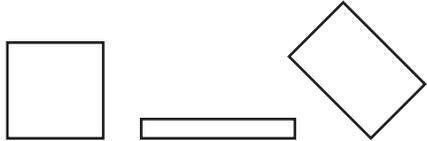
These are not triangles:



These are rectangles:



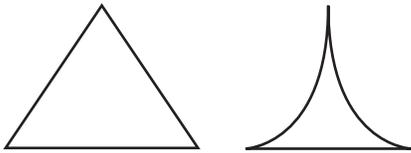
These are not rectangles:



The student ignores the curved sides.

example

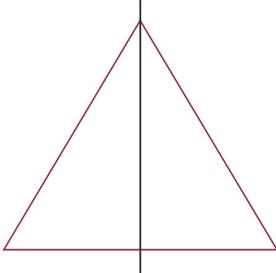
Both figures are triangles because both have three vertices.



GE3 Does not understand lines of symmetry

example

This triangle has one line of symmetry, which I drew in.

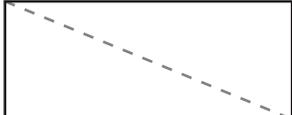


GE4 Thinks that a line of symmetry merely cuts a figure into two congruent figures

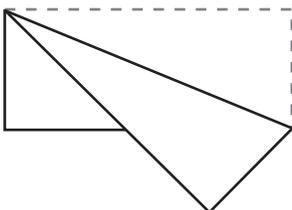
The student ignores the fact that the figures must match when reflected over that line of symmetry.

example

This diagonal is a line of symmetry because it divides the rectangle into two congruent figures.



It is a line of symmetry because you can fold on that line.



GE6 Thinks that the lengths of the sides determine the size of the angle

example

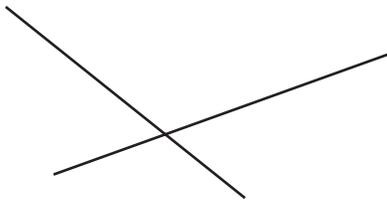
The angle on the left is larger.



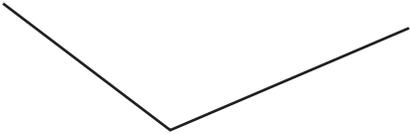
GE7 Does not understand the concept of intersecting, parallel, or perpendicular lines

example

These line segments intersect:



These line segments do not intersect:



example

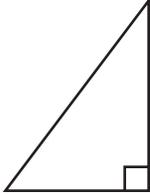
These are not parallel lines because they meet.



GE9 Does not understand angle measurement and the terms used to describe angles

example

Describe the angles in this triangle



Left angle and scalene angles.

GE14 Thinks right angles always open to the right

The student might call the second angle a left angle.

example

This is a right angle:



This is not a right angle:



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 (1 OF 3)

		Concepts					Observed Errors
		C1: Understands the concept of parallel	C2: Understands the concept of perpendicular	C3: Identifies different types of angles	C4: Classifies polygonal figures in more than one way	C5: Recognizes symmetry	
1	Student Name						
2							
3							
4							
5							
6							
7							
8							
9							
10							

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

- 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