

Unit Title: “Looking for Pythagoras”

Course: Middle School Mathematics

Subject Area: Mathematics

Time Frame: 20 days

Standards

Middle School Mathematics Standards	Sunshine State Standards Benchmarks	NCEE New Standards
<p>The student will:</p> <p>18.1 Extend understanding of number systems to include irrational numbers.</p> <p>18.2 Locate irrational numbers on the number line.</p> <p>18.3 Represent decimals as fractions and fractions as decimals.</p> <p>18.4 Use the Pythagorean Theorem to solve problems.</p> <p>18.5 Use slope to solve problems.</p>	<p>MA.A.1.3.1 The student associates verbal names, written word names, and standard numerals with integers, fractions, decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratio.</p> <p><i>Expectations</i> The student:</p> <ul style="list-style-type: none">• Knows word names and standard numerals for integers, fractions, decimals, numbers expressed as percents, numbers with exponents, numbers expressed in scientific notation, absolute value radicals, and ratios. <p>MA.A.1.3.2 The student understands the relative size of integers, fractions, and decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation;</p>	<p>The student:</p> <p>M7a Uses mathematical language and representations with appropriate accuracy, including numerical tables and equations, simple algebraic equations and formulas, charts, graphs, and diagrams.</p>

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	<p>radicals; absolute value; and ratios.</p> <p><i>Expectations</i> The student:</p> <ul style="list-style-type: none"> • Compares and orders fractions, decimals, integers, and radicals using graphic models, number lines, and symbols. • Compares and orders numbers expressed in absolute value, scientific notation, fraction, decimals, radicals, and ratios. <p>MA.A.1.3.3 The student understands concrete and symbolic representations of rational numbers and irrational numbers in real-world situations.</p> <p><i>Expectations</i> The student:</p> <ul style="list-style-type: none"> • Knows examples of rational and irrational numbers in real world situations. • Describes the meaning of rational and irrational numbers using physical or graphical displays. • Constructs models to represent rational and irrational numbers. <p>MA.A.1.3.4 The student understands that numbers, can be represented in a variety of equivalent forms, including integers, fractions, decimals,</p>	

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	<p>percents, scientific notation, exponents, radicals, and absolute value.</p> <p>Expectations The student:</p> <ul style="list-style-type: none"> • Knows the relationships among fractions, decimals, and percents given a real-world context. • Simplifies expressions using integers, exponents, and radicals. • Knows equivalent forms of large and small numbers in scientific and standard notation. • Identifies and explains the absolute value of a number. 	

Desired Results

Enduring Understanding	Essential Questions	Knowledge and Skills
<p>Students will understand</p> <ul style="list-style-type: none"> The Pythagorean Theorem develops a fundamentally important relationship connecting geometry and algebra. New number systems are created when a problem arises that cannot be answered within the system currently in use, or when inconsistencies arise that can be taken care of only by expanding the domain of numbers in the system. 	<ul style="list-style-type: none"> What is the length of a side of a square of a certain area? What is the relationship among the lengths of the sides of a right triangle? How can the Pythagorean Theorem be used to solve problems? 	<p>Students will know</p> <ul style="list-style-type: none"> Key terms (e.g., hypotenuse, irrational number, perpendicular, Pythagorean Theorem, rational number, real number, repeating decimal, square root, terminating decimal). <p>Students will be able to</p> <ul style="list-style-type: none"> Develop strategies for finding the distance between two points on a coordinate grid. Use the Pythagorean Theorem to solve problems. Locate irrational numbers on the number line. Represent fractions as decimals and decimals as fractions. Determine whether the decimal representation for a fraction terminates or repeats.

Acceptable Evidence

Performance Tasks	Quizzes, Test, and Work Samples	Observations and Dialogues
<ul style="list-style-type: none"> Locating Points Students are introduced to finding the distance between pairs of points on a grid. They also investigate geometric figures and their properties: given two vertices, they find other vertices that would define a square, a nonsquare rectangle, a right triangle, and a nonrectangular parallelogram. 	<p>Check-Up 1 Quiz A Check-Up 2 Quiz B Unit Test</p>	<p>Teacher observations of students during work on performance tasks. Accountable talk during work on performance tasks.</p>

Performance Tasks	Quizzes, Test, and Work Samples	Observations and Dialogues
<ul style="list-style-type: none"> • Finding Area and Lengths Students explore the relationship between the area of a square and the length of its side. They are introduced to the concept of square root through development of the relationship between the area of a square and the length of its side. • The Pythagorean Theorem Students collect information about the areas of the squares on the sides of right triangles and conjecture that the sum of the area. They apply the theorem to find the distance between two dots on a dot grid. The converse of the theorem is used to determine whether a triangle is a right triangle. • Using the Pythagorean Theorem Students use the Pythagorean Theorem to explore a variety of applications. They find distances on a baseball diamond; investigate the properties of some special right triangles, including a 30-60-90 triangles and an isosceles right triangle; and find missing lengths and angles in a group of triangles. • Irrational Numbers Students take a closer look at square roots. They write fractions as terminating or repeating decimals and find fraction equivalents for terminating and repeating decimals. They are introduced to the concept of rational numbers and irrational numbers. • Rational and Irrational Slopes Students explore an interesting application of irrational numbers in the context of a video game in which the main character is trying to escape from a forest of trees planted in rows. 		

