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| **Unit Title** | Trigonometry | **Length of Unit** | 7 days |
| **Focusing Lens(es)** | Students will understand that angles are the domain elements of the trigonometric functions and right triangles help to solve real-world problems. | **North Carolina State Standards** | ***Cluster:*** *Interpret the structure of expressions and write expressions in equivalent forms to solve problems***A-SSE.1, A-SSE.1a*****Cluster*:** *Create equations that describes numbers or relationships***A-CED.1*****Cluster:*** *Prove theorems involving similarity* **G-SRT.4*****Cluster:*** *Define trigonometric ratios and solve problems involving right triangles***G-SRT.6, G-SRT.8*****Cluster:*** *Apply trigonometry to general triangles***G-SRT.12*****Cluster:*** *Prove geometric theorems***G-CO.10** |
| **Inquiry Questions (Engaging- Debatable):**  | 1. What parts of a trigonometric ratio can change?
2. How can trigonometry model real world situations?
3. How are special right triangles the same? How are they different?
4. How can properties of triangles help you understand different real-world situations?
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| **Unit Strands** | Geometry |
| **Concepts** | Basic properties of triangles, special right triangles, and, trigonometry ratios |

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| **Generalizations****My students will Understand that…** | **Guiding Questions** **Factual Conceptual** |
| It is important to use theorems about triangles to prove relationships in geometric figures.**G-CO.10, G-SRT.4, G-SRT.6** | What are the interior angles of a triangle? How do they relate to Pythagorean theorem? Justify your reasoning. | What can you conclude about the Pythagorean theorem? |
| Special right triangles are used to model and solve problems.**G-SRT.12** | How can you determine if a triangle is a special right triangle? | How are solutions of special right triangles used? |
| Trigonometric ratios are used to solve real world application problems involving right triangles.**G-SRT.6, A-SSE.1a** | What are the key features of trigonometric ratios? | Compare and contrast sine and cosine. |

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| **Key Knowledge and Skills:****My students will…** | *What students will know and be able to do are so closely linked in the concept-based discipline of mathematics. Therefore, in the mathematics samples what students should know and do are combined.* |
| * Interpret expressions that represent a quantity in terms of its context.
	+ a. Identify and interpret parts of a right triangle trigonometric expression, including terms, factors, coefficients.
* Create equations and inequalities in one variable that represent right triangle trigonometric relationships and use them to solve problems.
* Use similarity to solve problems and to prove theorems about triangles. Use theorems about triangles to prove relationships in geometric figures.
	+ A line parallel to one side of a triangle divides the other two sides proportionally and its converse.
	+ The Pythagorean Theorem
* Verify experimentally that the side ratios in similar right triangles are properties of the angle measures in the triangle, due to the preservation of angle measure in similarity. Use this discovery to develop definitions of the trigonometric ratios for acute angles.
* Use trigonometric ratios and the Pythagorean Theorem to solve problems involving right triangles in terms of a context.
* Develop properties of special right triangles ($45-45-90$ and $30-60-90$) and use them to solve problems.
* Prove theorems about triangles and use them to prove relationships in geometric figures including:
	+ The sum of the measures of the interior angles of a triangle is $180°$.
	+ An exterior angle of a triangle is equal to the sum of its remote interior angles.
	+ The base angles of an isosceles triangle are congruent.
	+ The segment joining the midpoints of two sides of a triangle is parallel to the third side and half the length.
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| **Critical Language:** includes the Academic and Technical vocabulary, semantics, and discourse which are particular to and necessary for accessing a given discipline.EXAMPLE: A student in Language Arts can demonstrate the ability to apply and comprehend critical language through the following statement: *“Mark Twain exposes the hypocrisy of slavery through the use of satire.”* |
| **A student in \_\_\_\_\_\_\_\_\_\_\_\_\_\_ can demonstrate the ability to apply and comprehend critical language through the following statement(s):**  | 1. How are the properties of equations related to trigonometric ratios?2. How can two algebraic expressions that appear to be different be the same?3. What are the characteristics of a special right triangles? 4. How can you use triangles to model real-world situations? |
| **Vocabulary:** | $30°-60°-90°$, $45°-45°-90°$, acute triangle, adjacent side, angle of depression, angle of elevation, Base, base angle, Cosine, equilateral triangle, Exterior angles, horizontal line, hypotenuse (Soh-Cah-Toa), interior angles, Inverse, isosceles triangle, Legs, line of sight, medians of a triangle, Midsegment, obtuse triangle, opposite side, Pythagorean Theorem, remote interior angles, right triangle, scalene triangle, Sine, Tangent, vertex angle |