Curriculum Sample Template – 8 Pages Max. (12 pages for integrated ELA sample)

Grade Level	12th	**Content Area**	Math
Course Title (grades 9-12 Only)	Pre-calculus		
Expected Prior Knowledge *List the knowledge/skills mastered earlier in the year that are foundational to the mastery of the Required Standard(s).*	Pythagorean Theorem; Special Right Triangles; Angles: both degrees and radians; A basic understanding of sine, cosine, and tangent; Basic understanding of circles and coordinate planes.		
Alignment to Program of Instruction *Describe how the methods of instruction found in this sequence of lessons align to the Program of Instruction described in the application package.*	During this unit SDAIE strategies are being employed to engage English learners, but also for the general benefit of the entire student population. Students who are engaged in small group lessons will benefit from the type of instruction described here. Some SDAIE strategies include math journals, special attention to vocabulary; heterogeneous grouping; pair-shares to explain steps of math problems; student friendly objectives; etc. This lesson also adheres to the philosophy laid out by the Understanding by Design framework. For example, "transfer of learning" is used during objective 2 to relate trigonometry to real-world applications. Desired results are clearly stated throughout the lesson. Class, group, and individual discussions are throughout the lesson as well ensuring deeper understanding and that the teacher is not simply a "purveyor of knowledge." Finally, students are engaged in higher levels of cognitive thought in accordance with Bloom's Taxonomy		
Standard Number* and Description *The standard number and description of the Required Standard(s) being instructed and assessed to mastery in the curriculum sample.*	F-TF.A.3 Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3$, $\pi/4$ and $\pi/6$, and use the unit circle to express the values of sine, cosine, and tangent for π-x, π+x, and 2π-x in terms of their values for x, where x is any real number.		
Materials/Resources Needed *List all items the teacher and students will need for the entire sequence of instruction (excluding common consumables)*	Smart Board and computer with Smart Notebook Software. Guided Notes. Student math journals. Math glossary. Blank unit circle. Problems ready to pass out.		

* ***Standard Number****: For English Language Arts (Reading and Writing), use Grade, Strand, Standard (e.g., 3.RI.2). For K-8 Math, use Grade, Domain, Cluster, Standard (e.g., 6.EE.B.7). For HS Math, use Conceptual Category-Domain, Cluster, Standard (e.g., A-REI.C.6).*

Lesson (add as needed)	**Instructional Strategies -** *List and describe teacher actions, lesson by lesson, which will provide students with opportunities to engage the grade-level rigor defined by the Required Standard(s). Indicate alignment of instructional strategies to specific component(s) or content/skill(s) of the Required Standard/component.*	**Student Activities -** *Describe the activities, lesson by lesson, in which students will engage to allow them to master the grade-level rigor defined by the Required Standard(s). Indicate alignment of student activities to specific component(s) or content/skill(s) of the Required Standard/component.*
1	**Objective:** Students will use special right triangles to find the values of sine, cosine, and tangent. **(Key/Advancing Questions)** • Using our special right triangles, why are we able to find the values of sine, cosine, and tangent with angles like $30°$, $45°$, and $60°$ but not $36°$? **Activation of Prior Knowledge:** Using the Smart Board, the **teacher will** assign "warm-up" problems on the $45° - 45° - 90°$ and $30° - 60° - 90°$ right traingles. The **teacher will** check for understanding as students work on the "warm-up." Gauging the class' understanding of prior knowledge, the **teacher will** discuss the warm-up problems. **Introduction to New Material ("INM") / Modeling:** The **teacher will** pass out the guided notes that go with the day's lesson. Using the Smart Board the **teacher will** introduce the unit circle to the students and show how special right triangles can be used to find the x an y coordinates of the unit circle, which translates to the values of sine, cosine, and tangent. The **teacher will** pass out a blank unit circle and have the students fill it out as the teacher explains how each value is found. The **teacher will** use the different colors of the Smart Board to highlight key parts of the problem and differentiate each step. **Guided Practice.** The **teacher will** pass out problems where the students have to find the values of sine, cosine and tangent to find without using a calculator. The **teacher will** assign the students into heterogeneous groups of 3. The teacher will be clear in their instructions. The **teacher will** check for understanding while each group is working on the matching activity **Independent Practice**: The **teacher will** give each student 4 problems to calculate the value of sine, cosine, and tangent. The **teacher will** ask the students to complete the problems – students must score at least 3 out of 4 to achieve mastery.	**Students will** write the objective in their guided notes. **Students will** write down the key/advancing questions in their journal to answer at the end of class. These questions will serve as a closure/self-reflection for students. **Students will** work on the warm-up problems. **Students will** look at their past notes, ask their peers, or call for the teacher as needed to complete the warm-up problems. **Students will** ask questions and discuss the warm-up problems until students understand them. **Students will** follow along, writing examples from the board in their guided notes, answer all questions from the teacher, and write down significant information. **Students will** take notes on how special right triangles can be used to find the x an y coordinates of the unit circle, which translates to the values of sine, cosine, and tangent. **Students will** complete the unit circle so that it is clear and accurate for later use. **Students will** also highlight key vocabulary words that they do not understand and rewrite them in student friendly language. **Students will** work together in their groups to create a poster explaining how to derive the equation of a circle. If there is a student in their group that doesn't understand then the rest of the **group will** explain it to them. After this peer interaction, if there are still students that don't know how to solve the problems, the **students will** call the teacher over to help. **Student will** have a graph visual of what is happening when deriving the equation of a circle **Students will** answer the questions from the board in the Independent Practice section of their guided notes. Students will show that they are able to find the values of sine, cosine, and

	Assessment: The **teacher will** give an exit ticket to assess whether students know how to find the values of sine, cosine, and tangent. This concept will be on a summative test later in the unit.	tangent. **Students will** complete the key/advancing questions in their notes. The students will also complete the exit ticket questions and turn it in to the teacher.
2	**Objective:** Students will use the unit circle to find any other values of sine, cosine, and tangent that are possible. **(Key/Advancing Questions)** • How can you find values of sine, cosine, and tangent if the angles are not in our special right triangles? • In what way is this method better than using a typical calculator? **Activation of Prior Knowledge:** Using the Smart Board, the **teacher will** assign a "warm-up" problem with a partially filled out unit circle. The **teacher will** check for understanding as students work on the "warm-up." Gauging the class' understanding of prior knowledge, the **teacher will** discuss the warm-up problems as needed. **Introduction to New Material ("INM") / Modeling:** The **teacher will** pass out the guided notes that go with the day's lesson. Using the Smart Board, the **teacher will** show them how to find the values of sine, cosine, and tangent that aren't on their unit circle yet (for example, $sin 15°$). The **teacher will** allow students to have their unit circle out for reference and even add the newfound values. The **teacher will** show students how this can be applied to some real-world math problems involving trigonometry. The **teacher will** use the different colors of the Smart Board to highlight key parts of the problem and differentiate each step. **Guided Practice.** The **teacher will** pass out other angles that have not been filled in on the students' unit circle yet. The **teacher will** assign the students into heterogeneous groups of 3 The **teacher will** ask the students to complete all the values for their unit that the can. The **teacher will** check for understanding while each group is working on the task. The **teacher will** start a class discussion on any patterns that the students see in the unit circle. **Independent Practice**: The **teacher will** ask the students to put away their unit circles before giving them some problems to do. The **teacher will** ask the students to find the values of sine, cosine, and tangent. HW will also be given. Students need to get 4 out of 5 for mastery.	**Students will** write the objective in their guided notes. **Students will** write down the key/advancing questions in their journal to answer at the end of class. **Students will** pull out their materials and work on the warm-up problem. **Students will** look at their past notes, ask their peers, or call for the teacher as needed to complete the warm-up problem. **Students will** ask questions and discuss the warm-up problem until students understand them. **Students will** follow along, writing examples from the board in their guided notes, answer all questions from the teacher, and write down significant information regarding how to find the values of sine, cosine, and tangent that aren't on their unit circle yet. The students will complete parts of the unit circle that were not filled in yet. **Students will** ask questions if they are unsure of the method or steps. **Students will** also highlight key vocabulary words that they do not understand throughout the course of the lessons. After a class discussion about the words, looking them up in the math glossary, or during group work time students can rewrite them in their notes using student friendly language. **Students will** work together in their groups to work to complete all the values for their unit task. **Students will** complete the unit circle fully using the techniques the teacher just showed them. If there is a student in their group that doesn't understand then the rest of the **group will** explain it to them. After this peer interaction, if there are still students that don't know how to solve the problems, the **students will** call the teacher over to explain it. The **students will** actively participate in the class discussion, trying to find patterns in the unit circle and writing down ones they find.

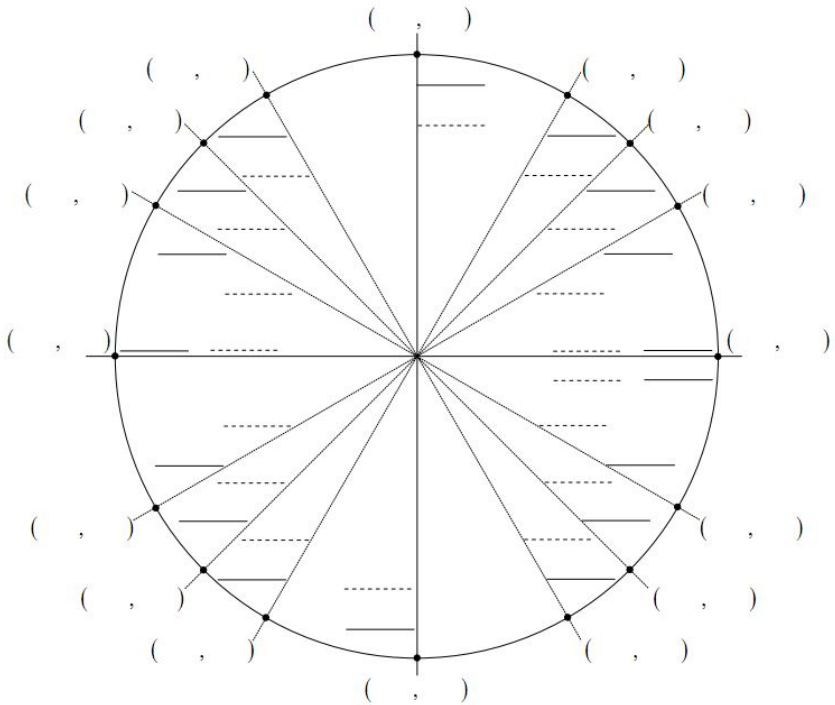
	Assessment: The **teacher will** pass out a summative test that will assess students on both objectives. See page 5 and 6. The **teacher will** also have an exit ticket to assess student's knowledge on the identities learned.	**Students will** answer the questions from the board in the Independent Practice section of their guided notes.
3	The **teacher will** instruct students to complete the summative assessment.	The **students will** complete the summative assessment.
4	**Objective:** Students will use special right triangles to find the values of sine, cosine, and tangent. **(Key/Advancing Questions)** • Using our special right triangles, why are we able to find the values of sine, cosine, and tangent with angles like $30°$, $45°$, and $60°$ but not $36°$? **Activation of Prior Knowledge:** Using the Smart Board, the **teacher will** assign "warm-up" problems on the $45° - 45° - 90°$ and $30° - 60° - 90°$ right traingles. The **teacher will** check for understanding as students work on the "warm-up." Gauging the class' understanding of prior knowledge, the **teacher will** discuss the warm-up problems. **Introduction to New Material ("INM") / Modeling:** The **teacher will** pass out the guided notes that go with the day's lesson. Using the Smart Board the **teacher will** introduce the unit circle to the students and show how special right triangles can be used to find the x an y coordinates of the unit circle, which translates to the values of sine, cosine, and tangent. The **teacher will** pass out a blank unit circle and have the students fill it out as the teacher explains how each value is found. The **teacher will** use the different colors of the Smart Board to highlight key parts of the problem and differentiate each step. **Guided Practice.** The **teacher will** pass out problems where the students have to find the values of sine, cosine and tangent to find without using a calculator. The **teacher will** assign the students into heterogeneous groups of 3. The teacher will be clear in their instructions. The **teacher will** check for understanding while each group is working on the matching activity **Independent Practice**: The **teacher will** give each student 4 problems to calculate the value of sine, cosine, and tangent. The **teacher will** ask the students to complete the problems – students must score at least 3	**Students will** write the objective in their guided notes. **Students will** write down the key/advancing questions in their journal to answer at the end of class. These questions will serve as a closure/self-reflection for students. **Students will** work on the warm-up problems. **Students will** look at their past notes, ask their peers, or call for the teacher as needed to complete the warm-up problems. **Students will** ask questions and discuss the warm-up problems until students understand them. **Students will** follow along, writing examples from the board in their guided notes, answer all questions from the teacher, and write down significant information. **Students will** take notes on how special right triangles can be used to find the x an y coordinates of the unit circle, which translates to the values of sine, cosine, and tangent. **Students will** complete the unit circle so that it is clear and accurate for later use. **Students will** also highlight key vocabulary words that they do not understand and rewrite them in student friendly language. **Students will** work together in their groups to create a poster explaining how to derive the equation of a circle. If there is a student in their group that doesn't understand then the rest of the **group will** explain it to them. After this peer interaction, if there are still students that don't know how to solve the problems, the **students will** call the teacher over to help. **Student will** have a graph visual of what is happening when deriving the equation of a circle **Students will** answer the questions from the board in the Independent Practice section of their guided notes. Students will

	out of 4 to achieve mastery. **Assessment:** The **teacher will** give an exit ticket to assess whether students know how to find the values of sine, cosine, and tangent. This concept will be on a summative test later in the unit.	show that they are able to find the values of sine, cosine, and tangent. **Students will** complete the key/advancing questions in their notes. The students will also complete the exit ticket questions and turn it in to the teacher.
S.A.	*Provide an opportunity for the student to complete the summative assessment items which is clearly separate from instruction and guided or independent practice, and in which the student is assessed independently. In the Student Activities column, provide a brief description of the summative assessment (S.A.) items that will allow students to demonstrate mastery of the rigor of the Required Standard(s)/components, and the context in which the items will be administered.*	1. Fill in a unit circle by calculating. 2. Find the exact value of an expression. 3. Find the value of tan.

Summative Assessment Items and Scoring: *Below, provide at least three Summative Assessment Items that together accurately measure student mastery of the application of the content and/or skills as defined by the grade-level rigor in the Required Standard(s). For each assessment item, provide an answer key or scoring rubric which clearly describes how assessment items are to be scored and how points will be awarded, such that mastery of the application of the content and/or skills as defined by the grade-level rigor in the Required Standard is clearly demonstrated by an acceptable score.*

Summative Assessment Item 1 (clearly identify answer key/scoring rubric, and acceptable score):

(1) Fill in the blanks for the unit circle. You can use radian or degrees (4 point)
Total: _____/4; Grading Scale: 1-2.7: Incomplete; 2.8-3.1: C; 3.2-3.5: B; 3.6-4: A. 2.8 is considered Mastery



(2) Find the exact value of each expression below. (1 point, ½ point each)

Total__/1; 0-.69 = Incomplete; .7-.79 = C; .8-.89 = B; .9-1.0 = A (.7=Mastery)

(a) $\tan 30°$

(b) $\tan \frac{3\pi}{2}$

Summative Assessment Item 2 (clearly identify answer key/scoring rubric, and acceptable score):

(3) Find the exact value of each expression below (1 point, ½ point each)

Total__/1; 0-.69 = Incomplete; .7-.79 = C; .8-.89 = B; .9-1.0 = A (.7=Mastery)

(a) $\sin\frac{\pi}{12}$

(b) $\cos 345°$

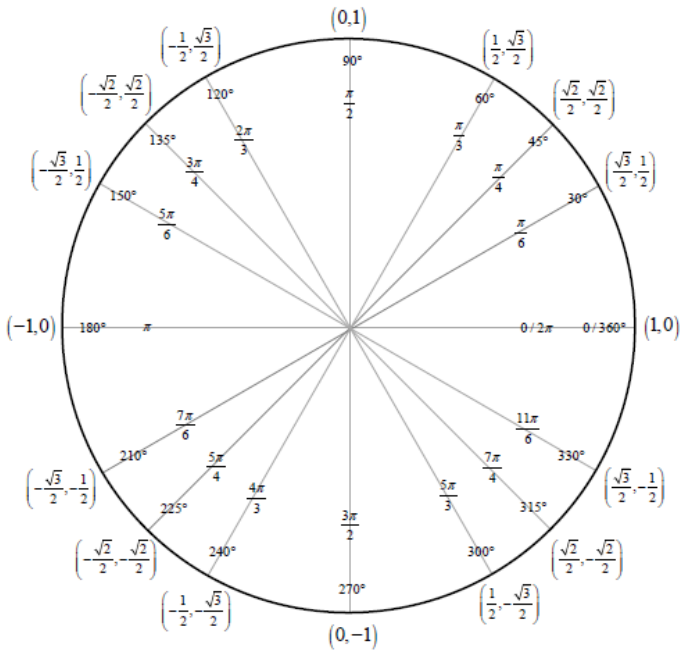
Summative Assessment Item 3 (clearly identify answer key/scoring rubric, and acceptable score): (add as needed):

(4) Can you find the value of $\tan 9°$, using the unit circle? If so, find the value. If not, explain why it's not possible. (2 point, 1 point for answer and 1 point for explanation)

Total__/2; 0-1.3 = Incomplete; 1.4-1.5 = C; 1.6-1.7 = B; 1.8 = A (1.4=Mastery)

Answer Key:

(1) 4 points; Each answer is 1/4 of a point.



(2a) (2 points; 1/2 point each)

$$\frac{\sqrt{3}}{3}$$

(2b)

$$undefined$$

(3a) (2 points; 1/2 point each)

$$\sin\frac{\pi}{12} = \sin\left(\frac{\pi}{4} - \frac{\pi}{3}\right) = \sin\frac{\pi}{4}\cos\frac{\pi}{3} - \cos\frac{\pi}{4}\sin\frac{\pi}{3} = \frac{\sqrt{6}-\sqrt{2}}{4}$$

(3b)

$$\cos 345° = \frac{1+\sqrt{3}}{2\sqrt{2}}$$

(4) (2 point; ½ point for answer and ½ point for explanation)

You cannot find the exact value of this without using a calculator. The reason is that you are not about to halve, add, subtract, or double any of the special right triangle angles to get 9°.

Total_____/8; 0-5.5 = Incomplete; 5.6-6.3 = C; 6.4-7.1 = B; 7.2-8 = A (Mastery = 5.6)
To achieve mastery of Standard F-TF.A.3, students must receive 5.6 out of 8 or 70% on the summative assessment items.