Curriculum Sample Template

Max. 8 Pages

Grade Level	10th	**Content Area**	Math
Course Title (grades 9-12 Only)	Geometry		
Expected Prior Knowledge *The knowledge/skills mastered earlier in the year foundational to the mastery of the required Standard in the current sample.*	Similarity for triangles. Congruence. Triangle notation. Triangles = 360 degrees. Pythagorean Theorem. Distribute binomials. Solve quadratics. Solve Quadratics with factoring. Quadratic Formula.		
Alignment to Program of Instruction *Briefly outline methods of instruction found in this sequence of lessons that align to the Program of Instruction described in A.3.*	Within these Geometry unit plans, a heavy emphasis is placed upon Blended Learning using videos. These videos have been carefully considered and many come directly from the acclaimed website Khan Academy. These Blended Learning techniques apply to Tier 1 instruction but can further be applied to Tier 2. As a geometry unit, the content itself is aligned to STEM. Kagan cooperative strategies (heterogeneous groups, individual whiteboards, jigsaw) are included and Marzano high yield strategies (objective driven vocabulary) are practiced throughout the units.		
Standard Number and Description *List the Number* and the full description for the Required Standard or Science Performance Objective listed in section A.6.*	(G-SRT.6) Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.		
Materials/Resources Needed	Calculator to calculate square roots of numbers with decimals. Individual whiteboards. Computer with Internet connection (for Blended Learning activities) Math glossary.		

* ***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, Standard (e.g., 6.EE.7). For HS Math, use Conceptual Category-Domain, Standard (e.g., A-REI.6). For Science, use Grade, Strand, Concept, PO (e.g., 4.1.3.1).*

Lesson (add as needed)	**Instructional Strategies**	**Student Activities**

1	**Objective:** Students will ("SW") understand similarity in right triangles using altitudes and corollary 1 with geometric mean **(Key Points)** • You can drop an altitude from the right angle to create two new similar triangles within your first triangle. • With Corollary 1, you can use the geometric mean to discern the length of an unknown altitude. • Corollary 1: The length of the altitude of the hypotenuse of a right triangle is the geometric mean of the lengths of the segments of the hypotenuse. • Geometric mean is the central number in a geometric progression (e.g. 3, __ , 27)	SW write the objective in their interactive notebooks on a new page. SW write the key points in the INM section of their interactive notebook. SW highlight unknown words, write the definitions of those unknown words from their math glossary, and rewrite the terms in their own words.
	Flipped Classroom/Blended Learning: https://www.youtube.com/watch?v=ipTQk_7ntK8	SW will watch ½ the video at home, up through corollary 1 questions. SW copy and answer all example problems, and write 10 questions or observations about the video in their interactive notebook.
	Activation of Prior Knowledge: Using the Mimeo board, Teach will ("TW") review similarity in triangles from the previous lesson and standard. Upon the board will be example triangles that are similar and examples of triangles that are not similar. TW model how to find and verify similar triangles.	SW open their interactive notebooks to the activation of prior knowledge section. SW follow along, copying down examples and asking clarifying questions unanswered in the previous lesson.
	Introduction to New Material ("INM") / Modeling: Using the Mimeo board, TW introduce similarity in right triangles. TW reference the key points when introducing how to drop an altitude and how to use each corollary of the geometric mean. On the board will be example right triangles that are similar. TW model how to find and verify similarity in right triangles and how dropping an altitude creates two new triangles that are similar to the original triangle. TW model how to find the geometric mean and model how to use the geometric mean to find unknown altitude length.	SW follow along, writing examples from the board in their interactive notebooks, answer all questions from the teacher, and write down significant information.
	Guided Practice. TW assign students to heterogeneous groups of 3. Once in groups, TW pass out manipulatives of right triangles and a question and answer document to be completed during guided practice.	SW work collaboratively with their groups and appropriately handle the manipulatives. SW use markers to drop an altitude from these manipulative and work collaboratively on filling out the question and answer document.
	Independent Practice: TW show 5 right triangle similarity problems on the board (worth 5 points each). Students must score 80% or higher to master the objective.	SW quietly answer the questions from the board in the Independent Practice section of their interactive notebook.
	Assessment: TW pass out a right triangle similarity quiz. 10 questions total worth 10 points each. Students must score 80% or	SW quietly complete the similarity quiz and flip their paper over once complete.

	higher to master the objective.	
2	**Objective:** SW use corollary 2 with the geometric mean to find the unknown sides of a right triangle **(Key Points)** • Once you have dropped an altitude in a right triangle, you can find the unknown side lengths using corollary 2. • Corollary 2: The length of the hypotenuse of a right triangle separates the hypotenuse so that the length of each leg for the triangle is the geometric mean of the length of the hypotenuse and the length of the segment of the hypotenuse adjacent to the leg. • Geometric mean is the central number in a geometric progression (e.g. 3, __ , 27) **Flipped Classroom/Blended Learning:** https://www.youtube.com/watch?v=ipTQk_7ntK8 **Activation of Prior Knowledge:** TW pass back the right triangle similarity quiz and review and complete two example problems from the two most frequently missed questions. **INM/Modeling:** Using the Mimeo board, TW show examples of corollary 2 to solve the lengths of unknown sides. TW reference key points and make connections to the prior lesson that used corollary 1. **Guided Practice:** TW assign heterogeneous groups of 4. TW pass out white boards to each group and put sample problems on the Mimeo board. TW ask students to complete each problem as a group and write answers on their white boards. TW then model how to solve each sample problem and address any clarifying questions. TW ask multiple checks for understanding questions to each group as he/she monitors behavior. **Independent Practice:** TW instruct students to open their interactive notebooks to the independent practice section. TW instruct students through a 3 part independent practice. TW put 4 problems up on the board (1 point each) and direct students to solve using the three-step method. [1) SW write out the steps to solve corollary 2) solve the problem 3) SW reflect on why they think they answered the question correctly] TW collect the Independent Practice **Assessment:** TW pass out a sticky note to each student and direct	SW open their interactive notebooks and write the objective on top of the page. SW write down the key points and illustrate the key points next to their definitions. SW highlight unknown words, write the definitions of the unknown words from their math glossary, and rewrite the terms in their own words. SW will watch the 2nd ½ of the video at home. SW copy and answer all example problems, and write 10 questions or observations about the video in their interactive notebook. SW open their interactive notebooks to the activation of prior knowledge section. SW follow along, copying down examples and asking clarifying questions unanswered in the previous lesson. SW follow along using their interactive notebooks, writing down examples and participating as needed by the teacher. SW group together. SW work collaboratively with the white boards, behave themselves, and ask clarifying questions when needed. SW answer all teacher questions and return whiteboards at the end of the activity. SW participate in the three step process in their interactive notebooks. SW participate in the stickies activity by filling out their sticky and

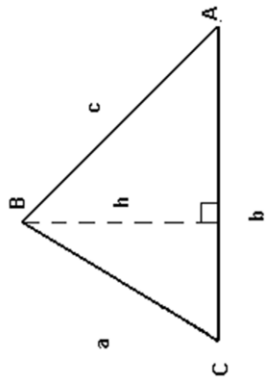
	students to solve the problem on the board. TW collect stickies at the end of class.	placing it on their desk for the teacher to collect at the end of class
3	**Objective:** SW learn the first three trigonometric ratios SIN, COS, TAN. **Key Points**. • Trigonometric – "trig" means triangle, "metric" means measure. • You only have a hypotenuse if you have a right triangle. • SOH CAH TOA **Flipped Classroom/Blended Learning** TW instruct students to watch the following two videos: https://www.khanacademy.org/math/trigonometry/basic-trigonometry/basic_trig_ratios/v/basic-trigonometry https://www.khanacademy.org/math/trigonometry/basic-trigonometry/basic_trig_ratios/v/basic-trigonometry-ii **Activation of Prior Knowledge:** TW instruct students to open their interactive notebooks to the prior lesson about similarity in triangles. TW call upon three students to reflect upon the lessons and share three interesting pieces of information they learned. **INM/Modeling**. Using the Mimeo board, TW introduce the meaning of "trigonometry" and reference the key points. **Guided Practice:** SW work together in a "jigsaw" activity. TW pass out pieces to the SOHCAHTOA puzzle. TW pair heterogeneous students up and place them in different locations around the room. TW model how to move around the room to complete the jigsaw activity. **Independent Practice.** TW pass out a "math map centers worksheet" of problem sets student will need to fill out for practice. TW model how students will fill out one question about trigonometric ratios and transition from center to center. **Assessment:** TW model how students are to create and answer their own problems on the back of their Independent Practice worksheet. TW explain that students must also write out how their found their solution using numbered steps and referencing the key points.	SW write the objective on top of their page. SW write the key points in their interactive notebook and highlight new vocabulary. SW write the definitions of the new vocabulary using their math glossary and rewrite the definitions in their own words. SW watch the Khan Academy videos at home and write 5 questions or observations for the narrator during the videos. SW open their interactive notebooks to the activation of prior knowledge page. SW reflect upon the last lesson and offer opinions and reflections to the teacher. SW follow along noting key examples and asking clarifying questions when needed. SW work collaboratively on the jigsaw activity and remain quiet as they transition from station to station. SW quietly and independently answer each question at the math centers and transition from location to location. Once finished, SW return to the desks and analyze their answers. SW create and answer a question related to trigonometric rations. SW write the steps involved in solving the problem and reference the key points.
4	**Objective:** SW learn the inverse of basic trigonometric ratios, leading to the understanding of new trigonometric ratios: CSC, SEC, COT **Key Points:** CSC is the reciprocal of SIN	SW write the objective on the top of a new page in their interactive notebook. SW write the key points in their interactive notebook. SW highlight any

	SEC is the reciprocal of COS COT is the reciprocal of TAN **Flipped Classroom/Blended Learning:** https://www.khanacademy.org/math/trigonometry/basic-trigonometry/basic_trig_ratios/v/example--the-six-trig-ratios **Activation of Prior Knowledge:** TW call three students to the board and have them write the three trigonometric ratios learned in the previous lesson **INM/Modeling:** TW write the inverse of the previously learned trigonometric ratios. TW explain that the inverse of the prior ratios are the next three ratios needed for trigonometry. **Guided Practice:** TW practice the activity with the whole classroom. TW pass out whiteboards to each students. TW call out names of ratios and students will need to write the ratio on the whiteboard to show the teacher. **Independent Practice:** SW fill out a matching worksheet pairing the new ratios from the ratios learned in the previous lesson. **Assessment:** TW pass out an exit ticket listing all six ratios learned in this lesson and the previous lesson. Students must answer 100% correctly to master the lesson.	new vocabulary, write the definitions using their math glossary in their interactive notebook, and rewrite the definitions in their own terms. SW watch the Khan Academy video, take notes, and make three observations about the video, drawing conclusion about why these new ratios are similar to the ratios from the previous lesson SW follow along in their interactive notebooks, finding their notes from the previous lessons to check their classmates board answers. SW take notes in their INM section and write all new information in their interactive notebook. SW receive their whiteboards. SW follow along and answer appropriately. SW return whiteboards to their teachers at the conclusion of the lesson. SW fill out their independent practice worksheets quietly. SW answer the exit ticket to the best of their ability.
5	TW instruct students to complete the summative assessment.	SW complete the summative assessment.

Summative Assessment Items: *Attach here.* For each summative assessment item, include an answer key or scoring rubric describing how points are to be awarded.

Summative Assessment: *2 points each

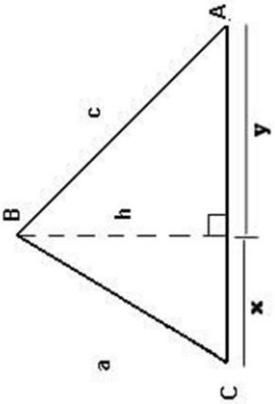
(Figure 1)



Use the above triangle (Figure 1) to solve the problems below. Round answers to the nearest tenth. (Note: Not drawn to scale)

1. Circle the altitude.
2. Find the length of the altitude if: **b = 25. Line Cb = 7, Line bA = 18**
3. Find the length of the attitude if: **b = 5. Line Cb = 1.5, Line bA = 3.5**
4. Find the length of the altitude if: **b = 10 ½ Line Cb = 3 ¼ Line bA = 7 ¼**

(Figure 2)



Use the above triangle (Figure 2). Round answers to the nearest tenth. Not drawn to scale.

5. Find the length of side a: if x = 5, y = 13
6. Find the length of side c: if x = 7, y = 20
7. Find the length of side c if the hypotenuse is 25, x = 8

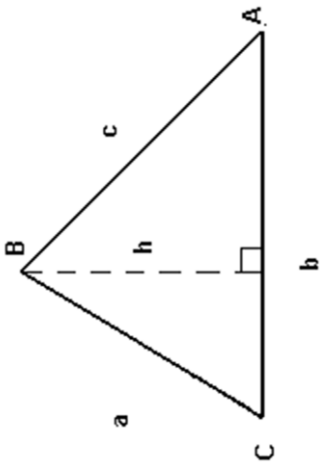
Use the above triangle (Figure 2) Round answers to the nearest hundredth. Not drawn to scale.
If a = 4, c = 6, and the hypotenuse is 7.21. Find

1.SIN (A)
2.COS (C)
3.TAN(A)

Use the above triangle (Figure 2) Round answers to the nearest hundredth. Not drawn to scale.
If a = 4, c = 6, and the hypotenuse is 7.21. Find

1. CSC (A)
2. SEC (C)
3. COT (A)

Summative Assessment Answer Key:



1. Circle the dashed line “h”
2. 11.1
3. 2.3
4. 4.9

5. side a = 9.5
6. side c = 23.2
7. side c = 20.7

8. SIN (A) = 4/7.21 = .55
9. COS (C) = 4/21 = .55
10. TAN (A) = 4/6 = .67

11. CSC (A) = 7.21/4 = 1.80
12. SEC (C) = 7.21/4 = 1.80
13. COT (A) = 6/4 = 1.50

Total _____/26; 0-18=Incomplete; 19-21=C; 22-23=B; 24-26=A