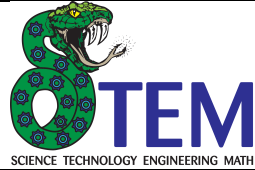


Python Coding – Congruence, Similarity & Attributes Length: 6 Weeks



Mathematics Unit Plan

Teacher: Hill	Grade: 10	Course: Geometry
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Unit Title: Python Coding – Triangles: Congruence, Similarity, and Attributes

LEARNING TARGETS

- LT 7: I can explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions. (CCSS.G-CO8)
- LT 8: I can prove theorems about triangles involving congruence. (CCSS.G-CO10)
- LT 9: I can use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. (CCSS.G-SRT5)
- LT 10: I can prove theorems about triangles involving similarity. (CCSS.G- SRT4)

UNIT OVERVIEW

Overall summary of the unit, activities, tasks, and/or content.

Students will explore the triangle congruence, similarities, and the properties of triangles. Through this process, students will learn to apply similarity with ratio and proportions to real world problems and create python code to solve for missing information in similar triangles.

MOTIVATORS

Hooks for the unit and supplemental activities. (PBL scenarios, video clips, websites, literature)

During week one, students will investigate congruence by manipulating the parts of a triangle on Illuminations online activity Congruent Theorems. In week three, students will complete the HMH Chapter 5 Project “Balancing Act.” The project can either be used as exploratory or after an introduction to attributes of triangles. Finally, in week 5, students will be introduced to the Math Design Collaborative (MCD) “Identifying Similar Triangles” to 1) Use facts about the angle sum and exterior angles of triangles to calculate missing angles. 2) Apply angle theorems to parallel lines cut by a transversal. 3) Interpret geometrical diagrams using mathematical properties to identify similarity of triangles.

Week	Learning Targets	Materials & Resources	Instructional Procedures	Differentiated Instruction	Assessment
1-2	LT 7: I can explain how the criteria for triangle congruence (ASA, SAS, and	Websites: Congruent Triangles (Illuminations) http://illuminations.nctm.org/activity.aspx?id=3504	Essential Questions How do you use rigid motions to determine if two figures are congruent? How do you apply theorems to solve problems involving interior and exterior angles of triangles? How do you use congruence criteria to prove triangles congruent and solve problems?	Remediation - Lesson Intervention (from HMH 4.1-4.4) or -Explorations in	Formative Assessments: -Homework Summative

	<p>SSS) follow from the definition of congruence in terms of rigid motions. (CCSS.G-CO8)</p> <p>LT 8: I can prove theorems about triangles involving congruence. (CCSS.G-CO10)</p> <p>LT 9: I can use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. (CCSS.G-SRT5)</p>	<p>http://mathforum.org/trscavo/tangrams/construct.html</p> <p>Materials:</p> <ul style="list-style-type: none"> - paper (8 1/8 x 11 or square sheets to make tangrams) - Scissors <p>iPad Apps</p> <ul style="list-style-type: none"> - HMH Fuse App: Geometry Common Core - 	<p>Set</p> <p>Teacher will read <i>Grandfather Tang's Story</i> by Ann Tompert and then help students explore the idea of congruence and similarity through creating tangrams out of paper. As they are creating the tangrams, teacher will lead a discussion on if the figures created are the same or different and what elements are the same or different. Then students will deepen their exploration by exploring possible combinations of SSS, SAS, ASA, and AAS through the Illuminations' activity "Congruent Triangles."</p> <p>Teaching Strategies</p> <ul style="list-style-type: none"> - Students will participate in large group discussion about figures developed during the tangram construction. - Students will participate in small group discussion about the ways in which they were able to create congruent triangles in the Illuminations activity. - Student will work independently and cooperatively on daily assignments from the HMH Fuse App <p>Summarizing Strategy</p> <p>Students will write a summary of their discoveries using tangrams and exploring congruent triangles on Illuminations. They will describe what they learned and predict what they will find during further learning in their HMH Fuse App</p> <p>Homework from HMH Fuse Common Core App</p> <p>4-1 PR Exercises: 14, 16, 20, 22, 25, 28, 34 AD Exercises: PR, 30, Challenge and Extend</p> <p>4-2 PR Exercises: 12, 16, 18, 22, 24, 28 AD Exercises: PR, 19, Challenge and Extend</p> <p>4-3 PR Exercises: 15, 16, 20, 22, 24, 29 AD Exercises: PR, 33, 37, Challenge and Extend</p> <p>4-4 PR Exercises: 13, 18, 19, 20, 24 AD Exercises: PR, 33, 37, Challenge and Extend</p> <p>4-5 PR Exercises: 8, 10, 12, 13, 14, 25 AD Exercises: PR, 33, 37, Challenge and Extend</p> <p>4-6 PR Exercises: 10, 12, 13, 14, 16, 22 AD Exercises: PR, 33, 37, Challenge and Extend</p> <p>4-7 PR Exercises: 7, 8, 10, 12, 14</p> <p>4-8 PR Exercises: 14, 18, 22, 24, 28, 30, 34</p> <p>4-9 PR Exercises: 12, 14, 18, 21, 28, 30 AD Exercises: PR, 33, Challenge and Extend</p>	<p>Math (from HMH 4.1-4.4)</p> <p>Enrichment</p> <ul style="list-style-type: none"> -Challenges 4-4 (from HMH) OR -Problem Solving 4-4 (from HMH) OR <p>Learning Styles</p> <p>Visual Auditory Kinesthetic</p>	<p>Assessments:</p> <p>Triangle Congruence – Summative Test</p>
3-4	<p>LT 8: I can prove theorems about triangles involving congruence. (CCSS.G-CO10)</p> <p>LT 9: I can use</p>	<p>Website</p> <ul style="list-style-type: none"> - Balancing Act: https://www.nsa.gov/academia/files/collected_learning/high_school/modeling/model_balance_act_2.pdf 	<p>Essential Questions</p> <p>How do you use properties and attributes of triangles to solve real world problems.?</p> <p>Set</p> <p>Students will be given the Balancing Act activity (lessons 1) from the nsa.gov website. They will be given time to read through the instructions and then begin constructing the balance. They will work through the problem and</p>	<p>Remediation</p> <ul style="list-style-type: none"> - Lesson Intervention (from HMH 5.1-5.8) <p>Enrichment</p> <ul style="list-style-type: none"> -Challenges 5-6 	<p>Formative Assessments:</p> <ul style="list-style-type: none"> -Homework <p>Performance Assessments:</p> <ul style="list-style-type: none"> Balancing Act

	<p>congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. (CCSS.G-SRT5)</p>	<p>Materials</p> <ul style="list-style-type: none"> - pencils - string - tape - scissors - cardboard <p>iPad Apps</p> <ul style="list-style-type: none"> - HMH Fuse App: Geometry Common Core 	<p>questions to explore perpendicular and angle bisectors and intuitively discover medians and centroids of triangles.</p> <p>Teaching Strategies</p> <ul style="list-style-type: none"> - Students will work in groups of two to complete the “Balancing Act” activity. - Student will work independently and cooperatively on daily assignments from the HMH Fuse App <p>Summarizing Strategy</p> <p>Students will write any observations or conclusions about the activity and in particular about special kinds of triangles such as isosceles and equilateral triangles. As a follow-up or extension lesson, students can write the steps necessary to find the centroid of any triangles and discuss how medians differ from altitudes, angle bisectors, and perpendicular bisectors.</p> <p>Homework from HMH Fuse Common Core App</p> <p>5-1 PR Exercises: 14, 16, 18, 20, 24, 26 AD Exercises: PR, Challenge and Extend</p> <p>5-2 PR Exercises: 12, 16, 18, 20, 22, 32 AD Exercises: PR, Challenge and Extend</p> <p>5-3 PR Exercises: 12, 16, 18, 22, 28 AD Exercises: PR, Challenge and Extend</p> <p>5-4 PR Exercises: 10, 12, 17, 18, 22 AD Exercises: PR, Challenge and Extend</p> <p>5-5 PR Exercises: 16, 18, 20, 26, 32, 48, 62 AD Exercises: PR, Challenge and Extend</p> <p>5-6 PR Exercises: 10, 15, 16, 18, 24 AD Exercises: PR, Challenge and Extend</p> <p>5-7 PR Exercises: 15–28, 30–55 AD Exercises: PR, Challenge and Extend</p> <p>5-8 PR Exercises: 10, 12, 14, 16, 17, 18 AD Exercises: PR, 29, 33, Challenge and Extend</p>	<p>(from HMH) OR -Problem Solving 5-6 (from HMH) OR</p> <p>Learning Styles</p> <p>Visual Auditory Kinesthetic</p>	<p>Summative Assessments:</p> <p>Attributes and Properties of Triangles – Summative Test</p>
5-6	<p>LT 9: I can use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. (CCSS.G-SRT5)</p>	<p>Materials</p> <ul style="list-style-type: none"> - MDC – Identifying Similar Triangles http://map.mathshell.org/materials/lessons.php?taskid=547&subpage=concept - MDC – question pages need to be printed or uploaded to <p>iPad Apps</p> <ul style="list-style-type: none"> - HMH Fuse App: Geometry Common Core 	<p>Essential Questions</p> <p>How do you apply similarity, ratio, and proportion to solve and/or model real world situations?</p> <p>Set</p> <p>Give “Identifying Similar Triangles” MDC pre-assessment. Group students according to pre-assessment responses and then complete MDC lesson.</p> <p>Teaching Strategies</p> <ul style="list-style-type: none"> - Student will work independently and cooperatively on daily assignments from the HMH Fuse App - MDC – Identifying Similar Triangles <ul style="list-style-type: none"> - Day 1: <ul style="list-style-type: none"> - Complete pre-assessment - Group according to pre-assessment data - Day 2: <ul style="list-style-type: none"> - Complete – Identifying Similar Triangles Activity is assigned groups 	<p>Remediation</p> <ul style="list-style-type: none"> - Lesson Intervention (from HMH 7.1-7.5) or - Extensions in Math (from HMH 7.1-7.5) <p>Enrichment</p> <ul style="list-style-type: none"> -Challenges 7.1 (from HMH) <p>Learning Styles</p> <p>Visual Auditory Kinesthetic</p>	<p>Formative Assessments:</p> <ul style="list-style-type: none"> -Homework <p>Performance Assessments:</p> <p>MDC “Identifying Similar Triangles”</p> <p>Summative Assessments:</p> <p>Similar Triangles – Summative Test</p>

			<p>- Day 3: - Complete post assessment</p> <p>Summarizing Strategy There will be a whole class discussion in which students will be allowed to explain their choices on the MDC and students will be allowed to improve upon their classmates' explanations or offer differing explanations.</p> <p>Homework from HMH Fuse Common Core App 7-1 PR Exercises: 8, 10, 11, 14, 20 AD Exercises: PR, 30, Challenge and Extend 7-2 PR Exercises: 14, 16, 18, 22, 23 AD Exercises: PR, 19, Challenge and Extend 7-3 PR Exercises: 11, 12, 14, 16, 18, 23 AD Exercises: PR, 33, 37, Challenge and Extend 7-4 PR Exercises: 8, 10, 12, 14, 16, 26 AD Exercises: PR, 33, 37, Challenge and Extend 7-5 PR Exercises: 12, 14, 16, 18, 20, 28 AD Exercises: PR, 33, Challenge and Extend</p>		
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