

Model Lesson

Unit Name: Triangles Congruence		Unit Length: 45	
Overview: Four shortcuts: SSS, SAS, ASA, AAS			
DESIRED RESULTS			
TEKS and Student Expectations (See Appendix A for detailed description.)			
(G.10) Congruence and the geometry of size. (B)			
Enduring Understandings (Big Ideas) Congruent means that the two triangles are exactly the same shape and exactly the same size		Essential Questions Is it possible for two triangles to have the same area and not be congruent? Is it possible for two triangles to have the same shape and not be congruent?	
		Critical Vocabulary Angle Side Congruent Correspondence	
Learning Goals Content objective: To determine and use four triangle congruency shortcuts. Language objective: The student will use the appropriate vocabulary for discussing the Pythagorean Theorem.		Materials Needed Sketches of pairs of triangles, some congruent with information indicated, printed on tag paper.	
ASSESSMENT PLAN			
Performance Tasks Using given sketches and information, the student will use shortcuts to determine whether or not two triangles are congruent. See Figure 1, #3, for examples.		Other Evidence The teacher will observe as the students mark and group their sets of congruent and non-congruent triangles to determine participation and understanding. Students will explain, orally or in their journals, what congruent means and how it can be determined whether or not two triangles are congruent.	

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LEARNING PLAN

It is assumed that the students are familiar with using a protractor to measure angles and the concept of area (area of a triangle).

The teacher will provide sketches of various pairs of triangles that have been printed on tag paper, with the pairs clearly identified. There will be at least one example of each possibility (similar but not congruent, same area but not congruent, SSS, SAS, ASA, and AAS) with congruency marks that will still be clearly visible after the triangles are cut out. The students will cut out the triangles, keeping the pairs together, stacking each pair to determine whether it represents congruent triangles. They will group the congruent pairs and the non-congruent pairs and use these examples as they write about the investigation in their journals. (MC-12), (MC-16)

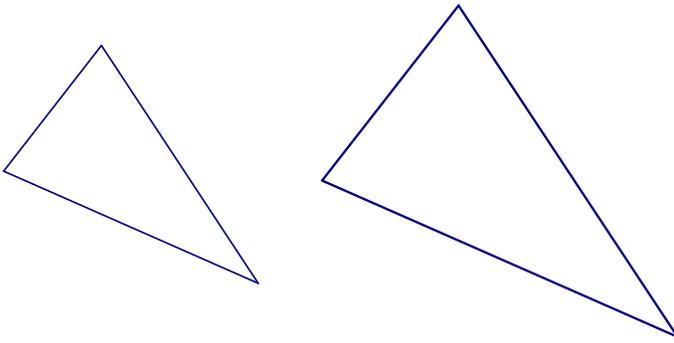
The teacher will provide sketches of triangles in pairs, with congruencies marked. Without cutting out the triangles, students will determine which triangles are congruent and which shortcut is indicated for each pair. At least one pair should represent triangles that might be congruent, but with given information that is not sufficient (see Figure 1, #3, the last pair). A class discussion will follow to clarify the concept. (MC-12), (MC-16)

MELL Connections

(MC-12) - ELLs should be given numerous opportunities to write about the mathematics concepts they are learning. Journal entries, for example, provide opportunities for the students to crystallize their thinking about concepts and for the teacher to check for understanding. Students who have limited English language skills should be allowed to write in their first language initially and should not be penalized for spelling or grammar errors.

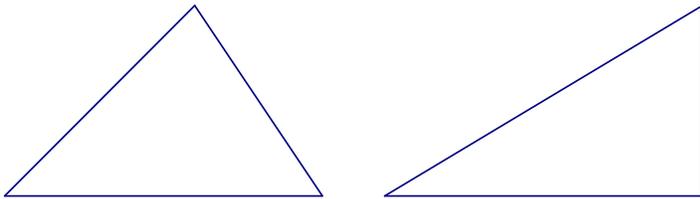
(MC-16) - When monitoring ELLs during instruction, the teacher should make a special effort to assist, re-explain and demonstrate again, if necessary. Encouragement and reinforcement should be used frequently.

1.



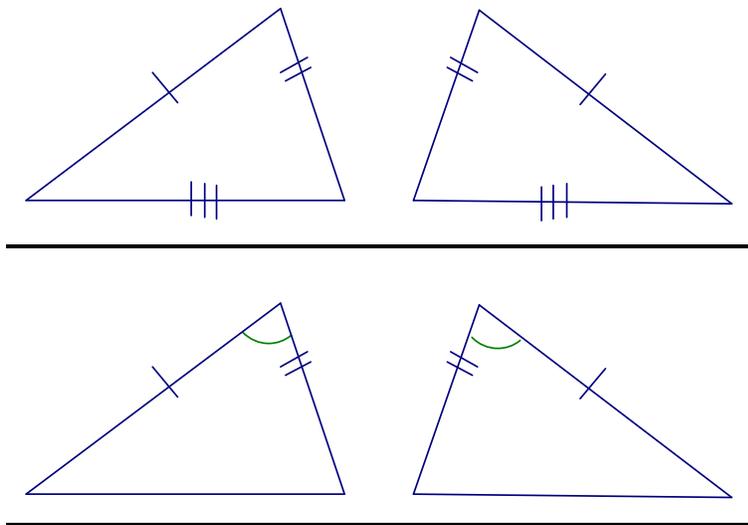
These two triangles have the same shape. Use your protractor to measure each angle to confirm this. Are these triangles congruent? Explain your answer.

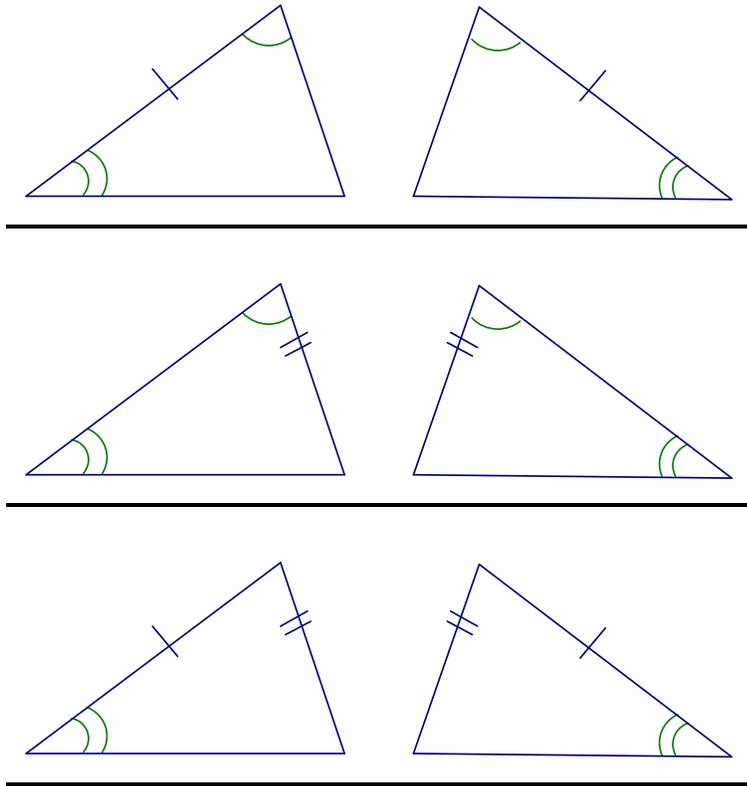
2.



These two triangles have the same height and the same length of base, so they have the same area measure. Are these triangles congruent? Explain your answer.

3.





The pairs of triangles have the indicated congruencies. Do any pairs represent congruent triangles? Explain your answer for each pair.

Figure 1

NOTE: Each pair of triangles should be a different shape.

English Language Proficiency Standards Quick Reference. (Chapter 74. Curriculum Requirements Subchapter A. Required Curriculum, §74.4. English Language Proficiency Standards). The standards checked here are merely examples for the teacher's consideration for inclusion in this lesson.

Cross-curricular second language acquisition/listening.

The ELL listens to a variety of speakers including teachers, peers, and electronic media to gain an increasing level of comprehension of newly acquired language in all content areas. ELLs may be at the beginning, intermediate, advanced, or advanced high stage of English language acquisition in listening. In order for the ELL to meet grade-level learning expectations across the foundation and enrichment curriculum, all instruction delivered in English must be linguistically accommodated (communicated, sequenced, and scaffolded) commensurate with the student's level of English language proficiency. The student is expected to:

- [X] (c)(2)(A) - distinguish sounds and intonation patterns of English with increasing ease;
- (c)(2)(B) - recognize elements of the English sound system in newly acquired vocabulary such as long and short vowels, silent letters, and consonant clusters;
- (c)(2)(C) - learn new language structures, expressions, and basic and academic vocabulary heard during classroom instruction and interactions;
- (c)(2)(D) - monitor understanding of spoken language during classroom instruction and interactions and seek clarification as needed;
- (c)(2)(AE) - use visual, contextual, and linguistic support to enhance and confirm understanding of increasingly complex and elaborated spoken language;
- (c)(2)(F) - listen to and derive meaning from a variety of media such as audio tape, video, DVD, and CD ROM to build and reinforce concept and language attainment;
- (c)(2)(G) - understand the general meaning, main points, and important details of spoken language ranging from situations in which topics, language, and contexts are familiar to unfamiliar;
- (c)(2)(H) - understand implicit ideas and information

	<p>in increasingly complex spoken language commensurate with grade-level learning expectations; and</p> <p>(c)(2)(I) - demonstrate listening comprehension of increasingly complex spoken English by following directions, retelling or summarizing spoken messages, responding to questions and requests, collaborating with peers, and taking notes commensurate with content and grade-level needs.</p>
<p><i>Cross-curricular second language acquisition/speaking.</i></p> <p>The ELL speaks in a variety of modes for a variety of purposes with an awareness of different language registers (formal/informal) using vocabulary with increasing fluency and accuracy in language arts and all content areas. ELLs may be at the beginning, intermediate, advanced, or advanced high stage of English language acquisition in speaking. In order for the ELL to meet grade-level learning expectations across the foundation and enrichment curriculum, all instruction delivered in English must be linguistically accommodated (communicated, sequenced, and scaffolded) commensurate with the student's level of English language proficiency. The student is expected to:</p>	<p>[X] (c)(3)(A) - practice producing sounds of newly acquired vocabulary such as long and short vowels, silent letters, and consonant clusters to pronounce English words in a manner that is increasingly comprehensible;</p> <p>(c)(3)(B) - expand and internalize initial English vocabulary by learning and using high-frequency English words necessary for identifying and describing people, places, and objects, by retelling simple stories and basic information represented or supported by pictures, and by learning and using routine language needed for classroom communication;</p> <p>(c)(3)(C) - speak using a variety of grammatical structures, sentence lengths, sentence types, and connecting words with increasing accuracy and ease as more English is acquired;</p> <p>(c)(3)(D) - speak using grade-level content area vocabulary in context to internalize new English words and build academic language proficiency;</p>

	<p>(c)(3)(E) - share information in cooperative learning interactions;</p> <p>(c)(3)(F) - ask and give information ranging from using a very limited bank of high-frequency, high-need, concrete vocabulary, including key words and expressions needed for basic communication in academic and social contexts, to using abstract and content-based vocabulary during extended speaking assignments;</p> <p>(c)(3)(G) - express opinions, ideas, and feelings ranging from communicating single words and short phrases to participating in extended discussions on a variety of social and grade-appropriate academic topics;</p> <p>(c)(3)(H) - narrate, describe, and explain with increasing specificity and detail as more English is acquired;</p> <p>(c)(3)(I) - adapt spoken language appropriately for formal and informal purposes; and</p> <p>(c)(3)(J) - respond orally to information presented in a wide variety of print, electronic, audio, and visual media to build and reinforce concept and language attainment.</p>
<p><i>Cross-curricular second language acquisition/reading.</i> The ELL reads a variety of texts for a variety of purposes with an increasing level of comprehension in all content areas. ELLs may be at the beginning, intermediate, advanced, or advanced high stage of English language</p>	<p>(c)(4)(A) - learn relationships between sounds and letters of the English language and decode (sound out) words using a combination of skills such as recognizing sound-letter relationships and identifying cognates, affixes, roots, and base words;</p> <p>(c)(4)(B) - recognize</p>

acquisition in reading. In order for the ELL to meet grade-level learning expectations across the foundation and enrichment curriculum, all instruction delivered in English must be linguistically accommodated (communicated, sequenced, and scaffolded) commensurate with the student's level of English language proficiency. For Kindergarten and Grade 1, certain of these student expectations apply to text read aloud for students not yet at the stage of decoding written text. The student is expected to:

directionality of English reading such as left to right and top to bottom;
(c)(4)(C) - develop basic sight vocabulary, derive meaning of environmental print, and comprehend English vocabulary and language structures used routinely in written classroom materials;
(c)(4)(D) - use prereading supports such as graphic organizers, illustrations, and pretaught topic-related vocabulary and other prereading activities to enhance comprehension of written text;
(c)(4)(E) - read linguistically accommodated content area material with a decreasing need for linguistic accommodations as more English is learned;
(c)(4)(F) - use visual and contextual support and support from peers and teachers to read grade-appropriate content area text, enhance and confirm understanding, and develop vocabulary, grasp of language structures, and background knowledge needed to comprehend increasingly challenging language;
(c)(4)(G) - demonstrate comprehension of increasingly complex English by participating in shared reading, retelling or summarizing material, responding to questions, and taking notes commensurate with content area and grade level needs;
(c)(4)(H) - read silently with increasing ease and comprehension for longer

	<p>periods;</p> <p>(c)(4)(I) - demonstrate English comprehension and expand reading skills by employing basic reading skills such as demonstrating understanding of supporting ideas and details in text and graphic sources, summarizing text, and distinguishing main ideas from details commensurate with content area needs;</p> <p>(c)(4)(J) - demonstrate English comprehension and expand reading skills by employing inferential skills such as predicting, making connections between ideas, drawing inferences and conclusions from text and graphic sources, and finding supporting text evidence commensurate with content area needs; and</p> <p>(c)(4)(K) - demonstrate English comprehension and expand reading skills by employing analytical skills such as evaluating written information and performing critical analyses commensurate with content area and grade-level needs.</p>
<p><i>Cross-curricular second language acquisition/writing.</i> The ELL writes in a variety of forms with increasing accuracy to effectively address a specific purpose and audience in all content areas. ELLs may be at the beginning, intermediate, advanced, or advanced high stage of English language acquisition in writing. In order for the ELL to meet grade-level learning expectations across foundation</p>	<p>(c)(5)(A) - learn relationships between sounds and letters of the English language to represent sounds when writing in English;</p> <p>[x] (c)(5)(B) - write using newly acquired basic vocabulary and content-based grade-level vocabulary;</p> <p>(c)(5)(C) - spell familiar English words with increasing accuracy, and employ English spelling patterns and rules with increasing accuracy as</p>

and enrichment curriculum, all instruction delivered in English must be linguistically accommodated (communicated, sequenced, and scaffolded) commensurate with the student's level of English language proficiency. For Kindergarten and Grade 1, certain of these student expectations do not apply until the student has reached the stage of generating original written text using a standard writing system. The student is expected to:

more English is acquired;
 (c)(5)(D) - edit writing for standard grammar and usage, including subject-verb agreement, pronoun agreement, and appropriate verb tenses commensurate with grade-level expectations as more English is acquired;

e(c)(5)(E) - employ increasingly complex grammatical structures in content area writing commensurate with grade-level expectations, such as:

- (i) using correct verbs, tenses, and pronouns/antecedents;
- (ii) using possessive case (apostrophe *s*) correctly; and
- (iii) using negatives and contractions correctly;

(c)(5)(F) - write using a variety of grade-appropriate sentence lengths, patterns, and connecting words to combine phrases, clauses, and sentences in increasingly accurate ways as more English is acquired; and

- [x] (c)(5)(G) - narrate, describe, and explain with increasing specificity and detail to fulfill content area writing needs as more English is acquired.

Appendix 1
TEKS and Student Expectations

(G.10) **Congruence and the geometry of size.** The student applies the concept of congruence to justify properties of figures and solve problems.

The student is expected to:

(B) justify and apply triangle congruence relationships.