

Unit Name: Parallel and Perpendicular Lines		Unit Length: 45 minutes	
Overview: Properties of parallel and perpendicular lines			
<b>DESIRED RESULTS</b>			
<b>TEKS and Student Expectations (See Appendix A for detailed description.)</b>			
<b>(G.9) Congruence and the geometry of size. (A)</b>			
<b>Enduring Understandings (Big Ideas)</b> If two parallel lines are cut by a transversal, pairs of congruent angles are created: Corresponding, Alternate-Interior, Alternate-Exterior Conversely, presence of these congruent pairs of angles confirms that the associated lines are parallel.		<b>Essential Questions</b> How many degrees are there in a full revolution? Are the four angles created by two intersecting lines related? How can it be determined that two angles are congruent?	
		<b>Critical Vocabulary</b> Line Linear pair of angles Parallel Interior Exterior Alternate Corresponding Transversal Vertical angles	
<b>Learning Goals</b> Content objective: Students will discover three pairs of congruent angles that are created when parallel lines are cut by a transversal. Language objective: Students will use appropriate vocabulary for writing about parallel lines and congruent pairs of angles.		<b>Materials Needed</b> Protractors Patty Paper Examples of parallel and perpendicular lines	
<b>ASSESSMENT PLAN</b>			
<b>Performance Tasks</b> Quiz Given a sketch of two parallel		<b>Other Evidence</b> During the guided discovery lesson, the teacher will	

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lines cut by a transversal and the measure of one angle, students will determine the measures of the other seven angles.

observe the students to determine understanding and participation in the lesson. The students will write a conjecture based on the investigation:  
If two parallel lines are cut by a transversal, pairs of congruent angles include corresponding, alternate-interior, and alternate-exterior angles.

### **LEARNING PLAN**

Some of the vocabulary words in this lesson will be meaningless until the students have grasped the concepts and connected concepts to vocabulary.

Review (Figure 1: one revolution is 360 degrees, the sum of the measures of a linear pair of angles is 180 degrees, vertical angles are congruent):

The teacher will provide a sketch of two intersecting lines and ask the sum of the measures of the four adjacent angles. If students are unsure of this sum, they may use protractors to measure each angle and then add the measures. The teacher will ask why the sums differ and help students understand that lack of precision in the protractors or in the measuring techniques can cause the sum to differ slightly from 360 degrees. (MC-07), (MC-08), (MC-09), (MC-12), (MC-16)

Next, the teacher will review linear pairs of angles. Again, the students may need to measure

### **MELL Connections**

**(MC-07)** - New concepts should first be presented to ELLs in a concrete manner, followed by a semi-concrete manner, and finally an abstract manner.

**(MC-08)** - Hands-on activities involving math manipulatives are typically helpful to ELLs because the lesson involves multiple learning modalities and does not require the student to rely solely upon his/her ability to understand verbal instruction.

**(MC-09)** - To assist the ELLs, the teacher should model the expected task and use visual representations to reinforce concepts and/or steps in the problem-solving process. Critical

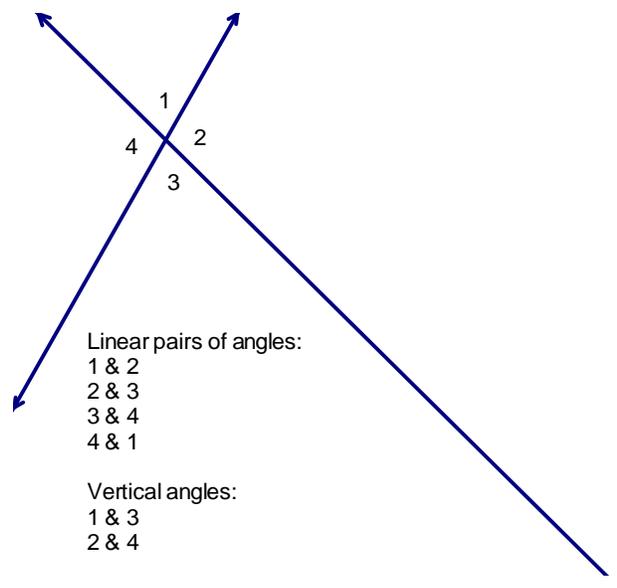
various linear pairs. Finally, the teacher will review vertical angles. Once again, the students may need to actually measure various pairs of vertical angles. Another method would be to provide patty paper and use paper folding to confirm that the vertical angles are congruent, without actually measure each angle. (MC-12), (MC-16)

Conjectures about angles formed when parallel lines are cut by a transversal (Figure 2: Congruent pairs include corresponding angles, alternate-interior angles, and alternate-exterior angles) The teacher will provide the vocabulary and assist as students write and illustrate the terms. Then the students will measure each of the angles in the figure and determine their conjectures about the congruent pairs. Another method would be to use patty paper and trace one of the intersections and compare this to the other intersection, determining congruent pairs without actually measuring the angles. (MC-12), (MC-16)

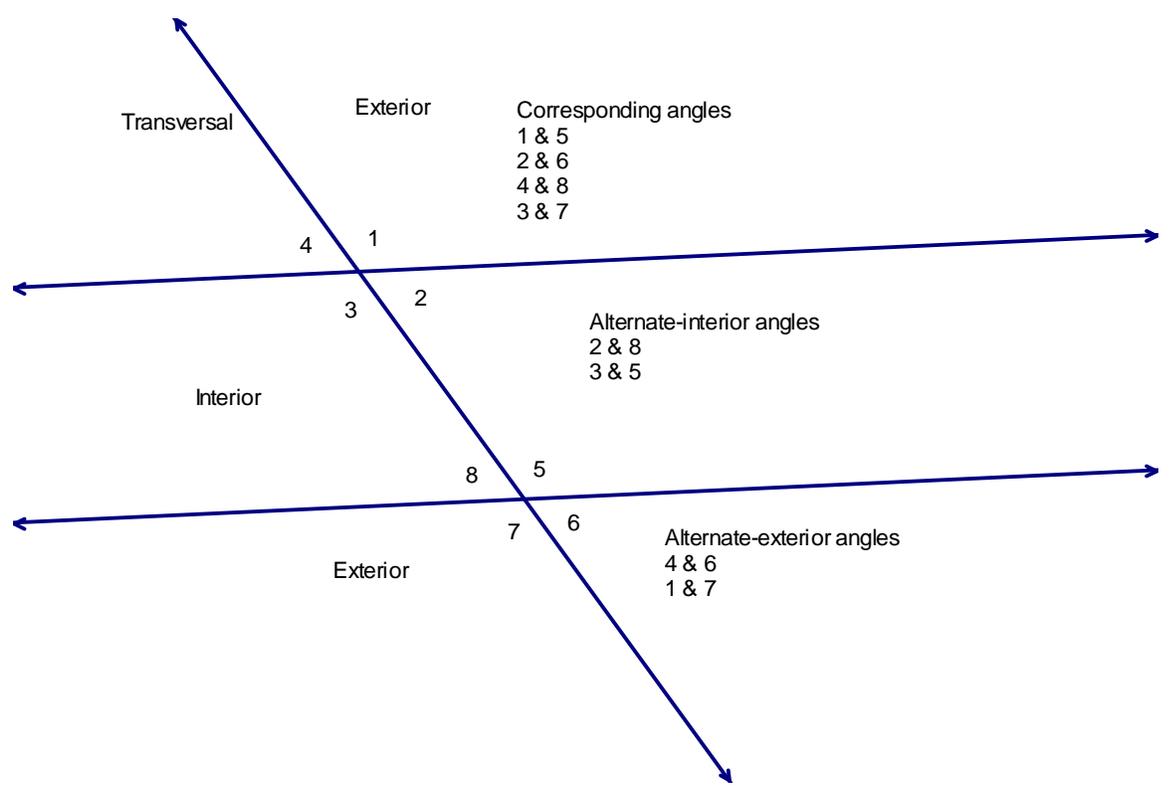
concepts should be clearly emphasized and repeated.

**(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.



**Figure 1**



**Figure 2**

**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><b><i>Cross-curricular second language acquisition/speaking.</i></b></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><b><i>Cross-curricular second language acquisition/reading.</i></b>  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><b><i>Cross-curricular second language acquisition/writing.</i></b>  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 A**  
**TEKS and Student Expectations**

(G.9) **Congruence and the geometry of size.** The student analyzes properties and describes relationships in geometric figures.

The student is expected to

(A) formulate and test conjectures about the properties of parallel and perpendicular lines based on explorations and concrete models.