

Model Lesson

Unit Name: Graphing Transformations on Coordinate Plane		Unit Length: 1 to 2 class periods	
Overview: To use illustrations and models to help the student understand the vocabulary and methods used to graph transformations on the coordinate plane.			
<b>DESIRED RESULTS</b>			
<b>TEKS and Student Expectations (See Appendix A for detailed description.)</b>			
(8.6) Geometry and spatial reasoning. (B)			
<b>Enduring Understandings (Big Ideas)</b> To understand that a transformation is a change and the image is the result of a change. This skill is used in art and architecture		<b>Essential Questions</b> Where in the real world do we use transformations? Where in the art world do we see transformations? Where might you use transformations?	
		<b>Critical Vocabulary</b> Translation, reflection, rotation, degrees, coordinate plane, x and y axis, integers, vertices, lattice points	
<b>Learning Goals</b> The student will be able to take a shape on a coordinate plane and, using the coordinate system of points, be able to reflect it, translate it and rotate it.		<b>Materials Needed</b> Poster board, graph paper, two-dimensional shapes, ruler, tape	
<b>ASSESSMENT PLAN</b>			
<b>Performance Tasks</b> Use a rubric to assess a student-produced poster with illustrations of one shape being translated and one being reflected.		<b>Other Evidence</b> The students will view other posters and be able to describe the transformation and movement to produce it on each poster. Teacher monitors student work and provides corrective feedback as needed.	

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**GENERAL MELL CONNECTIONS THAT APPLY TO ALL LESSONS**

(MC-01) - To assist the ELLs, the teacher should avoid speaking too rapidly and when possible use basic words rather than unfamiliar ones to introduce new concepts.

(MC-02) - Teachers should foster trusting relationships with ELLs through informal conversations and presentation of a culturally rich classroom.

(MC-03) - ELLs may need extra opportunities to demonstrate mastery. Grading policies should be flexible enough to provide multiple learning opportunities without severe grade penalties.

(MC-04) - ELLs may work at a slower pace than other students because of limited English language skills and should be provided with shortened assignments, or when appropriate, extra time to work on assignments.

(MC-05) - ELLs should be scheduled in a math class that has students who have some proficiency in both languages. Teachers may need to work with counselors and others to ensure that this happens.

(MC-06) - Teachers should offer tutoring as frequently as possible and encourage ELLs to come in for extra assistance. If possible, the teacher should arrange for an aide or parent volunteer who speaks the language of the ELL to help with translation during the tutoring period on a regular schedule (for example, on Tuesdays and Thursdays, after school).

**LEARNING PLAN**
**Engage**

The teacher will hand out graph paper with a coordinate plane and a geometric shape. The teacher will model the activity using the ELMO to illustrate how some vertices need to touch lattice points (intersecting x [horizontal] and y [vertical] lines) to find clear coordinates. The teacher will ask the students to place their figure onto the coordinate plane and ask them to trace it. The teacher will monitor

**MELL Essentials**

(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

the activity by walking around to make sure the students understand. The students will remove the traced shape and list the coordinates of the vertices. Again the teacher will check their lists. With the aid of the ELMO, the teacher will model a translation and image and a reflection and image. The student will practice with the shape given to them. The teacher will monitor the activity. (MC-08), (MC-09), (MC-16)

#### Explore

The student will then choose another shape and two clean graph papers. The student will trace the shape and list the coordinates. The student will then perform each transformation on two different graphs, starting with the initial shape and the first coordinates and then labeling the coordinates of the images. (MC08)

#### Explain

The student will produce a summary describing each transformation and movement to produce it. The students will have labeled each image of the new transformation. (MC-12)

#### Elaborate

The students will do a gallery walk sharing, examining and explaining other students transformations. The teacher will give examples of where they may use this activity in real life from simply planning how to move furniture to fit into their room to how professional architects, decorators, artists, and computer

ELLs, the teacher should model the expected task and use visual representations to reinforce concepts and/or steps in the problem-solving process. Critical concepts should be clearly emphasized and repeated.

(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.

(MC-07) - 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 -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

graphic artists use these tools.  
(MC-17)

Evaluate

The teacher will check the students' work for accuracy. The teacher will give the students a short worksheet to check their understanding of the concept. (MC-16)

and should not be penalized for spelling or grammar errors.

(MC-17) - Examples that are relevant to the lives of ELLs are helpful in motivating students and in promoting their engagement with the content.

(MC-10) - ELLs should be provided with or assisted in developing a learning aid that shows math vocabulary in both English and their native language and should be allowed to use this tool when working on assignments. Student-made glossaries, word walls, and compare and contrast charts may help ELLs learn mathematics vocabulary.

***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.***

<p><b><i>Cross-curricular second language acquisition/ listening.</i></b> 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</p>	<p>[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;  [X] (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;  [X] (c)(2)(E) - use visual, contextual, and linguistic support to enhance and confirm understanding of increasingly complex and elaborated spoken language;  [X] (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 in increasingly complex spoken language commensurate with grade-level learning expectations; and  (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>
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<p>to:</p> <p><b><i>Cross-curricular second language acquisition/speaking.</i></b> 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>[X] (c)(3)(D) - speak using grade-level content area vocabulary in context to internalize new English words and build academic language proficiency;</p> <p>[X] (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>[X] (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,</p>
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	electronic, audio, and visual media to build and reinforce concept and language attainment.
<p><b><i>Cross-curricular second language acquisition/reading</i></b></p> <p>. 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 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:</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 directionality of English reading such as left to right and top to bottom;</p> <p>(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;</p> <p>(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;</p> <p>(c)(4)(E) - read linguistically accommodated content area material with a decreasing need for linguistic accommodations as more English is learned;</p> <p>[X] (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;</p> <p>(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;</p> <p>(c)(4)(H) - read silently with increasing ease and comprehension for longer periods;</p> <p>(c)(4)(I) - demonstrate English comprehension and expand reading skills by employing basic reading skills such as</p>

	<p>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></p> <p>. 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 and enrichment curriculum, all instruction delivered in English must be linguistically accommodated</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 more English is acquired;</p> <p>(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;</p> <p>(c)(5)(E) - employ increasingly complex grammatical structures in content area writing commensurate with grade-level expectations, such as:</p> <ul style="list-style-type: none"> <li>(i) using correct verbs, tenses, and pronouns/antecedents;</li> <li>(ii) using possessive case (apostrophes) correctly; and</li> <li>(iii) using negatives and contractions correctly;</li> </ul> <p>(c)(5)(F) - write using a variety of grade-appropriate sentence lengths, patterns, and connecting words to combine</p>

<p>(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:</p>	<p>phrases, clauses, and sentences in increasingly accurate ways as more English is acquired; and (c)(5)(G) - narrate, describe, and explain with increasing specificity and detail to fulfill content area writing needs as more English is acquired.</p>
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Appendix 1  
TEKS and Student Expectations

(8.6) **Geometry and spatial reasoning.**

The student uses transformational geometry to develop spatial sense.

The student is expected to:

(B) graph dilations, reflections, and translations on a coordinate plane.