

Model Lesson

Unit Name: Adding Integers		Unit Length: 45 minutes
Overview: Operations with integers		
<b>DESIRED RESULTS</b>		
<b>TEKS and Student Expectations (See Appendix A for detailed description.)</b>		
(7.2) Number, operation, and quantitative reasoning (C)		
<p><b><u>Enduring Understandings (Big Ideas)</u></b> The set of integers is an infinite set; integers are used in various ways depending on context. Real-world applications involve adding integers.</p>	<p><b><u>Essential Questions</u></b> 1. Why do we need negative integers? 2. Where do you see negative numbers? 3. How do we use operations with integers in our daily lives?</p>	<p><b><u>Critical Vocabulary</u></b> Positive (positivo) Negative (negativo) Zero (cero) Integers (integros) Number line (linea de numeros)</p>
<p><b><u>Learning Goals</u></b> Content objective: The student will be able to represent integers with symbols and to find the sum of two integers using different models. Language objective: The student will use appropriate mathematical vocabulary related to adding integers.</p>	<p><b><u>Materials Needed</u></b> Overhead projector and transparencies Dry erase board and markers (red and black) Playing cards (one deck for each group of 3 students) Two color counters Assessment task recording sheet</p>	
<b>ASSESSMENT PLAN</b>		
<p><b><u>Performance Tasks</u></b> Students' performance will be judged on their performance in a competitive game.</p> <p>1. Divide students into groups of three students. Give each group a deck of cards. Each group will shuffle cards</p>	<p><b><u>Other Evidence</u></b> During the activities from the Learning Plan below, the teacher will observe student understanding and provide assistance as needed.</p> <p>Active participation in the activities by students and</p>	
Submitted by: Leticia Gamez & Maria Bueno (ESC Region I), June 22, 2007		
Edited by: Bill Jasper & Sylvia Taube, October 31, 2007		
Edited by: Pat Curtin & John Beck, MELL Staff, March, 2008		

and divide the cards evenly between two of the students. The third person will serve as a referee. Each student throws down a card at the same time.

The teacher will discuss the rules of the game.

Each card will be assigned a value corresponding to the number and color on the cards selected. For example, the 6 of Hearts would have the value of -6. Face cards (jacks, queens, and kings) and 10's will be assigned 10 points, and an ace card will be assigned 11 points. Red cards will have negative values and black cards will have positive values.

Each student will randomly select a card from their group of playing cards. If the colors are the same, add the numbers and take the sign of the color in both cards. This would be equivalent to adding two negative integers.

If the the colors are different, subtract the the numbers and take the sign of the card that has more. This would represent addition of one negative and one positive integer. Students would quickly calculate the sum of the two cards chosen, and the referee would decide who has the correct answer first. The game continues until all of the cards have been played.

The referee will record all of the problems using symbols and solutions as the game is played. During the game, each

proper use of mathematical terms and algebraic symbols will further demonstrate student understanding of the concept covered by this lesson.

student will verify that the solutions are correct. At the end of the game, all three students will sign their names on the recording sheet and turn it in to the teacher.

The teacher will provide support to groups during the game by listening to each group play the game correctly, encouraging mathematical discussions, and verifying correct solutions.

#### **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

#### **LEARNING PLAN**

The teacher will first introduce the concept of negative integers. First, she can begin with asking how negative numbers are used in their daily lives. The teacher should lead the students to list ideas such as a drop in temperature (or a negative temperature in Alaska), a golf score

#### **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

below par, a negative balance in your checking account, the elevation of parts of New Orleans that are 10 feet below sea level (-10), walking backwards, negative coordinates of points on a graph, and a loss in the stock market. (MC-07), (MC-17)

As a motivating activity, the teacher should next ask whether there is a difference between American football and Mexican futbol. Hopefully, students will say that these are two different games with a similar name. Futbol in Mexico (and around the world) is what we call soccer in America. Football is a different game. In American football, often a play results in a loss of yards, such as -4 yards. A combination of plays that gain 6 yards (+6), lose 3 yards (-3), and gain 8 yards (+8) gives an overall result of +11 yards. In effect, the negative yards cancel out the equivalent number of positive yards. In mathematics, this is the concept of a "zero pair." For example, losing 1 yard (-1) and then gaining 1 yard (+1), results in a net gain of 0 yards. So -1 and +1 are a zero pair, since adding them together gives 0. (MC-11), (MC-17)

To help students understand the concept of zero pairs, students will use two-color counters to play a game. Two color counters have a red side and a yellow side. For this game, the red side will represent a negative 1 and the yellow side will represent a positive 1. One red counter and one yellow counter together represent a zero pair. (MC-06), (MC-08), (MC-09), (MC-10)

Each student will play the game with a partner. Each student will have a cup with 10 colored counters and an

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 concepts should be clearly emphasized and repeated.

(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.

(MC-11) - Include English language objectives in mathematics lessons for ELLs when appropriate.

(MC -12 ) - ELLs should be given numerous opportunities to write about the mathematics

area on a mat. Each will shake his or her cup, spill the counters out in their area, record the number of reds and yellows, and calculate the score. For example, getting 4 reds and 6 yellows will result in four zero pairs ( matching each yellow with a red counter), with two yellows left over, so the result would be a score of +2. Scores will be kept by each student, and the student who has the most positive points when the teacher ends the game will be declared the winner. Students should check each other's scores during the game. Multiple games may be played to help students practice the idea of zero pairs and addition of integers. (MC-08), (MC-10), (MC-14), (MC-15)

To further enhance learning and language development, students should write in their journals, answering the following questions. (MC-12)

1. How do the two-color counters relate to the idea of adding integers? Show an example using numbers and positive/negative signs to show your understanding.
2. Explain what a zero pair is and give an example.
3. Solve the following problems in your journal. Explain how you solved each problem.

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-14) - Teachers should support ELLs who need extra time for dialogue by providing opportunities to work in groups. When possible, pair each ELL with another student who has some fluency in the ELL's dominant language and who can function as a "peer tutor."

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

**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;
- [x] (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;
- [x] (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;
- (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;
- [x] (c)(2)(H) - understand

	<p>implicit ideas and information in increasingly complex spoken language commensurate with grade-level learning expectations; and</p> <p>[x] (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>[x] (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>[x] (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 acquisition in reading. In</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>

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;  
 [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;  
 (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 periods;

	<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 and enrichment curriculum, all instruction delivered in English must be linguistically</p>	<p>[x] (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,</p>

<p>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:</p>	<p>including subject-verb agreement, pronoun agreement, and appropriate verb tenses commensurate with grade-level expectations as more English is acquired;</p> <p>e(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 (apostrophe <i>s</i>) 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 phrases, clauses, and sentences in increasingly accurate ways as more English is acquired; and</p> <p>(c)(5)(G) - narrate, describe, and explain with increasing specificity and detail to fulfill content area writing needs as more English is acquired.</p>
--	---

**Appendix A**  
**TEKS and Student Expectations**

(7.2) **Number, operation, and quantitative reasoning.** The student adds, subtracts, multiplies, or divides to solve problems and justify solutions.

The student is expected to:

(C) use models, such as concrete objects, pictorial models, and number lines, to add, subtract, multiply, and divide integers and connect the actions to algorithms;