Strategies for Teaching Common Core Math to Language Learners: Part 2

Brentwood School District
December 2, 2013
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Agenda with Key Questions

- 9:00-10:30 What are sheltering strategies for teaching math? (Review)
- 10:30-10:50 Break
- 10:50-12:00 What guidelines should I follow to develop lessons and materials?
- 12:00-1:00 Lunch
- 1:00-1:55 Sample Lesson 1: How can we support students in solving word problems?
- 1:55-2:30 Sample Lesson 2: How can we support students in speaking math?
- 2:30-3:00 Closure and Evaluation

Objectives

- Language Objectives: I can describe at least 5 sheltering strategies that I want to use in my math instruction to support student Common Core math language acquisition.
- Content Objective: I can explain to a partner ways I can use small groups differentiate instruction during Common Core math.

Math Talk: One Sentence

- ★Take one set of cards (one with the key word; one with the key word and example; one with key word, example, and definition)
- ★Circulate with all 3 cards and ask a partner to use the word in a sentence.
- ★If their partner needs help, flip to the second and then to the 3rd card with the definition to help them complete a sentence.
- ★Find a new partner and repeat.

What I know	What I want to know	What I learned

Analysis of Video of Sheltered Math Lesson

- As you watch the video, note sheltering strategies that you see. Use the Lesson Planning Sheet and fill in the sections.

Video Part 1

Video Part 2

Write-On/Wipe-Off Lesson Planning Sheet for Common Core Math Lessons with Language Learners

Common Core Critical Area (*What critical area from the Math Common Core will this lesson address?*):

Make sure the lesson makes sense to LLs!

_____

Objectives (*What **math** and **math language** can I expect the students be able to use at the end of this lesson?*):

Math Objective: *I can ...* _____

Math Language Objective: *I can ...* _____

Vocabulary (*What key vocabulary will I need to teach so the students can understand the lesson?):*

Key Vocabulary	How I will teach it?
	❏ use pictures/clipart/animation ❏ topical/thematic word wall with visuals ❏ act out the word ❏ write a student-friendly definition ❏ write/draw classroom-based examples ❏ talk about parts of the word ❏ 2 or 4 corners vocabulary ❏ Jeopardy! ❏ charades ❏ write/sing a song ❏ write/perform a rhyme/poem ❏ word web ❏ create a hand signal/body motion for vocab ❏ provide a desk reference of math terms and symbols ❏ other: _____ _____

Connecting to Prior Knowledge and/or **Providing Background Information** (*How will I remind the students what they already know about this math concept? Or how will I introduce them to new concepts in a fun or meaningful way?*): ❏ read aloud book/poem ❏ tell a story from personal or school experience ❏ whole class K/W/L ❏ show a video clip ❏ show pictures/clip art ❏ role-play with student help ❏ student 2 min. quick-write ❏ share a story problem based on the class/room
❏ other(s):

_____

Hands-On Materials (*What materials can students touch and manipulate as they practice?*): ❏ blocks ❏ counting beans & cups ❏ unifix cubes ❏ attribute blocks ❏ paper & scissors ❏ tangrams ❏ organizers made out of yarn/string and slips of paper with words/numbers to fill in spaces ❏ cut up the worksheet ❏ word cards and examples to match ❏ store-bought, teacher and student-made games ❏ make a giant-sized version of the problem with masking tape, boxes, props, signs etc. ❏ calculators ❏ individual whiteboards and dry-erase markers ❏ index cards with numbers, problems, answers etc. ❏ small bags, containers, boxes with rice, Cheerios etc.
❏ other(s):

Write-On/Wipe-Off Lesson Planning Sheet for Common Core Math Lessons with Language Learners

Meaningful Practice (*How will students repeatedly practice with the math and math language in a meaningful way?*) ❑ turn & talk ❑ finish sentence frames (i.e. "I can ___ using ___." "One way to ___ is ___.") ❑ partner work ❑ place vocab. in graphic organizers ❑ add words to word bank/personal dictionaries ❑ make/build a model ❑ create 5 problems and switch with a partner to solve ❑ with a partner, say/write as many sentences with key vocab as possible ❑ pairs solve problems and write answers on individual whiteboards ❑ students write story problems ❑ solve problems/answer questions in small groups ❑ solve real-world/school based problems ❑ math conversations ❑ math dramatization ❑ give students math discussion starter sentence frames (e.g. "If I try ___ I think ___will happen." etc.) ❑ model thinking aloud when problem-solving
❑ provide a checklist of problem solving steps
❑ other(s):
_____

_____

_____

Open-Ended Questions (*What interesting questions will I ask during the lesson that could be answered in many different ways (i.e. will elicit higher-order thinking)?):*
(Ideas: *Do you think..? What would happen if...? Is there a better solution..? How many ways can you..? What's the easiest/hardest part...? What is this similar to? Do you think...? Why did you...? How can you use this in life? What do you notice about...? etc.*)

1)_____

2)_____

3)_____

Constant Assessment (*How will I and how will the students measure their math and math language learning throughout the lesson?*):
❑ ask open-ended questions related to your objective (e.g. "How do you know..." "How will you know if you are right?" etc. ❑ students give a thumbs up, down or sideways based on their achievement of the objective ❑ conference with individual students and note successes and stuck places ❑ ask individual students a question they would need to answer with a key vocabulary word ❑ partners share what they are learning with one another ❑ direct a student to think out-loud about a problem ❑ exit tickets where students write 1-3 things they learned or questions on a post-it
❑ other(s):
_____

_____

Break

- Please enjoy a break and return by 10:55.

8 Guidelines for Planing Instruction

1. Focus on the CCSS Standards for Mathematical Practice and how they require students to read, write, listen, and speak:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Expect emergent speaker's language to be imperfect and have incomplete sentences.

When do students use these practices?

Mathematical Practice	READING	WRITING	LISTENING	SPEAKING
1. Make sense of problems and persevere in solving them.				
2. Reason abstractly and quantitatively.				
3. Construct viable arguments and critique the reasoning of others.				
4. Model with mathematics.				
5. Use appropriate tools strategically.				
6. Attend to precision.				
7. Look for and make use of structure.				
8. Look for and express regularity in repeated reasoning.				

Guidelines for Planing Instruction

2. Keep tasks focused on high cognitive demand, conceptual understanding, and correspondences among representations.

Focus on mathematical concepts and how they relate to one another.

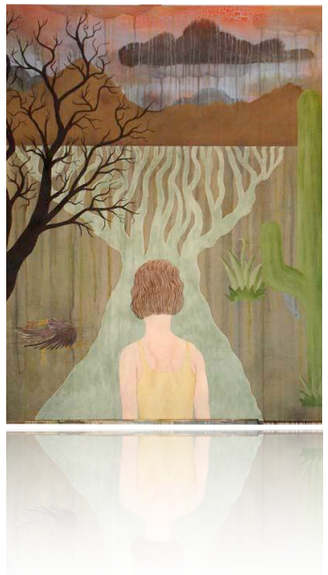
Ask students to explain and justify their answers, but also allow them to do so by <u>showing</u> why their answer is correct with diagrams, models, and acting out problems.

- Without talking, work with a partner to *show*

$$5/3 = 10/6$$

8 Guidelines for Planing Instruction

3. Create <u>multiple instructional pathways</u> that provide students with different academic and linguistic backgrounds access to, engagement with, and achievement of the standards.



In other words, differentiate math instruction through:

small group problem-solving, guided math/math workshop, utilizing classroom structures that allow you to work with a small group etc.

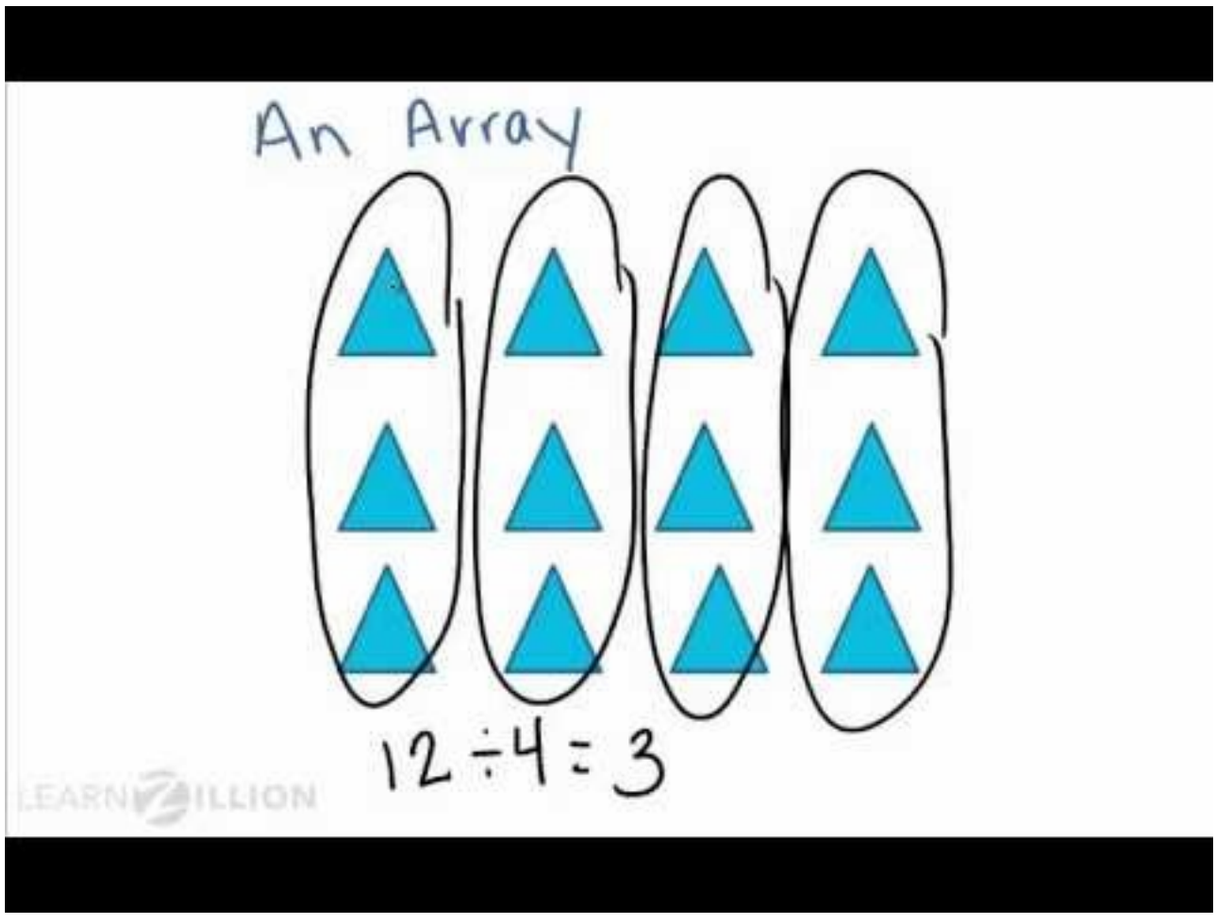
8 Guidelines for Planing Instruction

4. Facilitate students' production of different kids of reasoning (algebraic, geometric, statistical, etc.) and comparisons of reasoning.

Include different language functions like: describing, comparing, and arguing.

Often, use flexible sentence frames more like sentence starters (e.g."I understand…" instead of "The solid shape is a _____ because it has _____ sides and ___ vertices.")

- What are some *sentence starters* that students could use to describe, compare, and argue the following:



8 Guidelines for Planing Instruction

5. Facilitate students' participation in different kinds of structures (i.e. informal, collaborative groups, formal presentations etc.) that allow them to use their L1 and collaborate with others to explain their ideas, interpret information, and present and defend claims.

Give students pair, small group, and whole class math inquiry problems/projects.

8 Guidelines for Planing Instruction

6. Focus on language as a resource for reasoning, sense making, and communicating with different audiences for different purposes.

Grammar, vocabulary, language structures, conventions etc. should be taught <u>within</u> a lesson activity, not in isolation.

8 Guidelines for Planing Instruction

7. Prepare students to deal with the typical texts in math, word problems, and textbooks.

Don't rewrite word problems or the text. Teach students strategies to manage the texts.

Choose texts that are typical with typical challenging language.

Give students practice with a variety of text challenges.

Let your content and language objective be your guide in when to annotate texts.

Which text would allow students to focus on ambiguous language often found in math texts?

Use the table above to answer the following questions:	Solve the following problems:

"Table *above*" is the clue that this is not a table where you sit

8 Guidelines for Planing Instruction

8. Activate background/prior knowledge without stopping student opportunity to practice reading a difficult math text/problem.

Lunch

- Please enjoy lunch and return by 1:00.

Food Stories

- read the picture books on the overhead projector/document camera/big book

What a Caterpillar Eats

DAY	Monday	Tuesday	Wednesday	Thursday	Friday
FOOD	1 apple	2 pears	3 plums	4 strawberries	5 oranges

Use the table above to answer the question.

There were 2 caterpillars who ate on Monday. Two more caterpillars ate on Tuesday. How many items did they eat altogether?

Center Directions

- Work with a partner.
- Take turns.
- Move to the next center when your teacher signals.

- Center A: Read and solve word problems using 4 steps.
- Center B: Write and model a multiplication or division problem using the words drawn.
- Center C: Roll the die to model and solve a multiplication or division problem.

Assessment

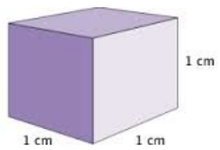
- Tell your partner one thing that you learned about reading, writing, and solving word problems.
    - What did you notice about multiplication? Division?

I noticed…_____ .

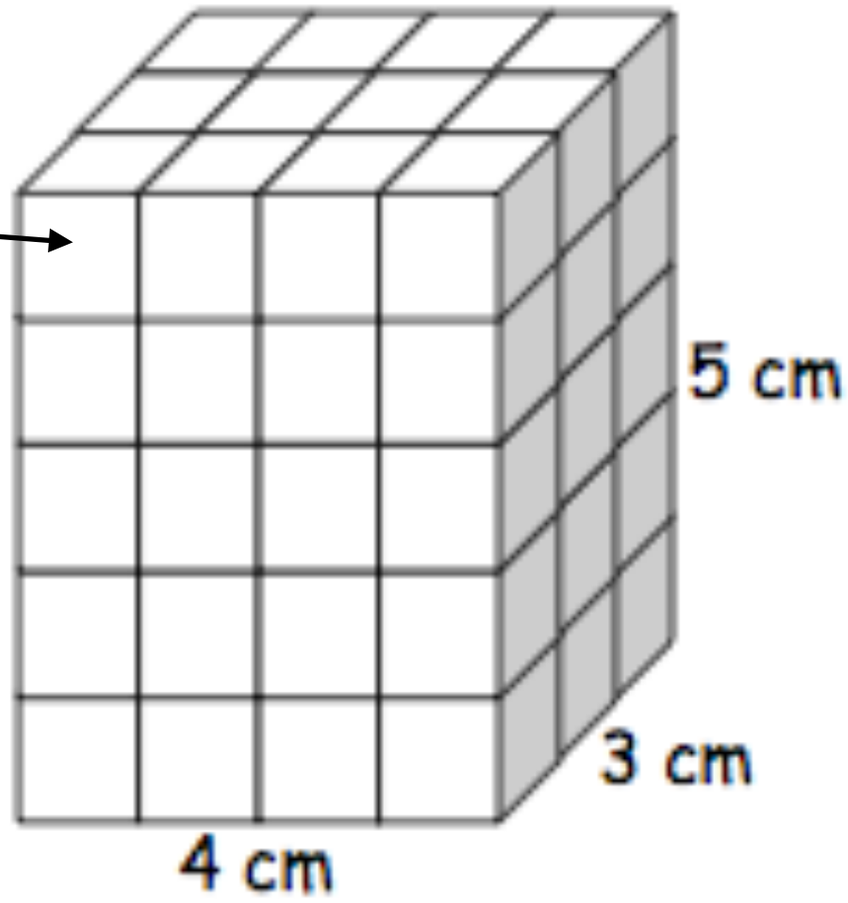
Fill A Bucket

- read the picture books on the overhead projector/document camera/big book

Make this right rectangular prism with your table group.



unit



What is the volume of the prism?

Fill A Bucket

<u>Directions:</u>

1. In your table group take turns giving compliments to one another.
2. When the compliment makes you feel good, take one unit cube and put it in your bucket.
3. Continue until the teacher makes a signal to stop.
4. Pair up and solve these 2 problems:
    1. Compare the volumes of your buckets. Write your comparison using numbers.
    2. What is the volume of your buckets combined?

Student Materials:
Mathematically Speaking

Date _____

Partner Names _____ & _____

Task Name _____

1. Solve the problem. Show your work
2. Explain your thinking, strategies, and solution to your partner. Use the target words in your explanation.
3. Listen to your partner's explanation and make a tally for each time he or she used the target vocabulary.

Explain how you solved the problem.	Explain how you solved the problem.
Problem 1	Problem 2

Vocabulary Words	Tally: How many times used
Example: variable	III
volume	
length	
greater than	
less than	
equal to	
units	

Vocabulary Words	Tally how many times used
Example: Constant	IIII
volume	
units	
added	
combined	
array	

Assessment

- Tell your partner 2 things you learned about measuring volume.

Make a Plan to Support Language in Your Math Lessons

Based on what you learned today and your current thinking about language learners:

- What are 5 things you need to start doing?
- What are 2 things you need to stop doing?
- What are 2 questions that you have.

Assessment

- With a partner, describe at least 5 sheltering strategies that I want to use in my math instruction to support student Common Core math language acquisition.
- Explain to a partner ways I can use small groups differentiate instruction during Common Core math.

Assessment

 = I can't do it.

 = I can do it, but I am getting closer.

 = I can do it.

Evaluation

- Please provide feedback about the session and presenter.