Our Objective:

Participants will engage in a mathematical discourse community in order to differentiate instruction to student identified proficiency levels and provide appropriate supports and strategies in the content area of mathematics.
Think of a number between 0 and 20. Add 32 to it. Multiply by 2. Subtract 1. Now close your eyes. It's dark. Isn't it.
Regular and active participation in the classroom – not only reading and listening but also discussing, explaining, writing, representing, and presenting – is critical to the success of ELs in mathematics.

✗ ELs should understand the text of word problems before they attempt to solve them. Ex.: Utilizing a consistent method for approaching and solving.

✗ There should be a focus on “mathematical discourse” and “academic language.” Ex.: Participating in a Mathematical Discourse Community.

✗ Vocabulary instruction, alone, is not sufficient for supporting mathematical communication. Ex.: Visual Vocabulary for Math is best practice.
ESEA as amended by Every Student Succeeds Act (ESSA) 2015

- High academic standards for all students
- ELs language proficiency and academic achievement are more fully integrated into accountability and assessment
Basic Interpersonal Communication Skills (BICS)
Social Language
1-2 years

(Cummins, 1979)

• Playground language
• Conversations with family, friends and neighbors
• Greetings that you exchange with others on the street or in the elevator
Cognitive Academic Language Proficiency (CALP)
Academic Language
5-7 Years

(Cummins, 1979)

Language necessary for academic success
• Listening
• Speaking
• Reading
• Writing
The Myth of Math

In the past, Math has been viewed as less linguistically challenging.

Today, there is a new focus on the language demands of Math for ALL students, particularly English Learners, as teachers realize proficiency is not only related to numeric computation, but demonstrating the ability to “speak math.”

Cummins-Early 2015
Mathematics Discourse Communities

What Teachers DO:

• Engage Students in purposeful sharing
• Select and Sequence student approaches and solutions strategies
• Facilitate discourse among
• Ensure progress toward mathematical goals
Mathematics Discourse Communities

What Students DO:

• Present and explain ideas, reasoning, and representations
• Participate in active listening to respond to the reasoning of peers
• Seek to understand the approaches used by peers
• Identify how different approaches to solving a task are similar or different
<table>
<thead>
<tr>
<th>Multiplication Word Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CCRS Standards</strong></td>
</tr>
<tr>
<td>- [4-OA2] Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.</td>
</tr>
<tr>
<td>- [5-OA2] Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.</td>
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<tr>
<td>- [6-NS3] Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.</td>
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<tr>
<td>- [7-NS3] Solve real-world and mathematical problems involving the four operations with rational numbers.</td>
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</tbody>
</table>
### What is a Language Objective?

<table>
<thead>
<tr>
<th>Content Objective/Learning Target</th>
<th>Language Objective/Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Students will <strong>identify</strong> the key parts of a word problem to <strong>develop</strong> an equation and <strong>solve</strong> using multiplication, <strong>documenting</strong> their reasoning in a <strong>double entry journal</strong>.</td>
<td>• Students use oral language to <strong>discuss</strong> key information in the word problem in <strong>small groups</strong> using a graphic organizer, sentence/paragraph frames, anchor charts, and <strong>visual vocabulary</strong>.</td>
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<tr>
<td></td>
<td>• Students <strong>note</strong> and <strong>explain</strong> their reasoning in <strong>small groups</strong> using a graphic organizer, sentence/paragraph frames, anchor charts, and <strong>visual vocabulary</strong>.</td>
</tr>
</tbody>
</table>
NO SCAFFOLDING
NO WORRIES
Graphic Organizers

1. Reading
   the question

2. Finding
   and marking the clue words

3. Getting a picture
   of the problem in my head

4. Thinking,
   what calculations do I need to do?

5. Estimating and
   Calculating

6. Checking,
   is the answer sensible?
Anchor Charts

• **MUST** be made in front of the students, or better, **BY** the students!

• Be direct and clear. Don't use a lot of **unnecessary** words.

• Include **graphics, icons, or pictures** to support comprehension

• Location, location, location—Where you place your anchor charts means something

• Many students, especially English learners, benefit greatly from having their own small copy of important anchor charts.
선셋 초등학교의 학생수가 1548명입니다. 교장 선생님이 학기 시작 전에 학생당 다섯 자루의 연필을 주려합니다. 교장 선생님은 모든 학생을 위해 몇자루의 연필을 사야될까요?
Visual Vocabulary
Pictures and Words - Words and Pictures!

Visual Vocabulary
Korean
How to GOOGLE Great Pictures:

• Go to Google and type the word in the search box.
• Click on “Images”
• Click on “Tools”
• Click on “Size” and designate “Large” – this will give you the pixel density you need to produce pictures the students can see well-and the pictures will look great in PPT!
• Choose your pic and PRINT in color!!!!!
Vocabulary Cards
<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students demonstrate solving word problems using multiplication strategies by reading the problem in L1 and/or using pictures, drawings and selected words in L2, in a small group, documenting mathematics strategies.</td>
<td>Supports:</td>
<td>Supports:</td>
<td>Supports:</td>
</tr>
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</table>

Supports:
- Visual Vocabulary
- Vocabulary Cards
- Graphic Organizer
- All Levels: Anchor Charts and Double Entry Journal
There are 1548 students in the school.
<table>
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<td>Students demonstrate solving word problems using multiplication strategies by reading the problem in L1 and/or using pictures, simple phrases/sentences in L2, in small group, documenting mathematical reasoning.</td>
<td>Supports: Visual Vocabulary, Vocabulary Cards, Graphic Organizer, Sentence Frames. All Levels: Anchor Charts and Double Entry Journal</td>
<td>Supports:</td>
</tr>
<tr>
<td>Supports: Visual Vocabulary, Vocabulary Cards, Graphic Organizer. All Levels: Anchor Charts and Double Entry Journal</td>
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</table>
There are 1548 students in the school. The principal needs 5 pencils for each student. How many pencils will the principal buy?
<table>
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<td>Students demonstrate solving word problems using multiplication</td>
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<tr>
<td>strategies by reading the problem in L1 and/or using pictures,</td>
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<tr>
<td>drawings and selected words in L2, in a small group, documenting</td>
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<tr>
<td>mathematical reasoning.</td>
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<tr>
<td>All Levels: Graphic</td>
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<tr>
<td>Organizer, Anchor Charts, and Double Entry Journal</td>
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<td>Students demonstrate solving word problems using multiplication strategies by reading the word problem including key technical vocabulary in simple paragraphs, in small groups, documenting their mathematical thinking.</td>
<td>Students demonstrate solving word problems using multiplication strategies by reading the word problem including key technical vocabulary in expanded sentence form, in small groups, documenting their mathematical thinking.</td>
</tr>
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<td>Supports: Visual Vocabulary, Vocabulary Cards, All Levels: Graphic Organizer, Anchor Charts, and Double Entry Journal</td>
<td>Supports: Visual Vocabulary, Vocabulary Cards, Sentence Frames, All Levels: Graphic Organizer, Anchor Charts and Double Entry Journal</td>
<td>Supports: Visual Vocabulary, Vocabulary Cards, Paragraph Frame, All Levels: Graphic Organizer, Anchor Charts and Double Entry Journal</td>
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It's YOUR turn

Please listen and follow instructions!
Home work is only helpful when there is someone at home to help!!!
References


