Teaching Academic Vocabulary in the Math Classroom

Presented by:

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Expectations

- Prepare your cell phones
- Take care of yourself and those around you
- Stay focused
- Learn by doing
- Share your experiences and ideas
- Ask questions
- Apply what you learn
Agenda

• Teaching Academic Vocabulary
• Strategies for Teaching Vocabulary
• Making Word Walls Interactive
Session Objectives

Content Objectives

• Participants will develop background knowledge of why direct instruction of academic vocabulary is an essential part of lesson delivery for Limited English Proficient (LEP) students in Mathematics.

• Participants will be able to describe how interactive word walls can be used to teach academic vocabulary.
Session Objectives

Language Objectives

• Participants will orally discuss why direct instruction is essential for an in-depth understanding of academic vocabulary.

• Participants will demonstrate their knowledge of strategies for teaching academic vocabulary using word walls by orally sharing with their partners and small groups.
What is Academic Vocabulary?

“The key words and concepts in the Mathematics TEKS that will help ELLs:

• read and understand text
• develop subject-matter literacy, and
• demonstrate their knowledge and skills.”

The Meadows Center, 2010
Why Is Academic Vocabulary Important?
Teaching Vocabulary

We cannot assume that students will automatically understand complex content and technical vocabulary. (TALA, 2010)

I wonder if my teacher gets tired of saying “WAH wa Wah” all day?
Knowing a Word is More than a Definition

Looking up words in the dictionary is not effective for helping students learn new words.

(Scott & Nagy, 1997)

Teaching students only formal definitions does not improve comprehension.

(Baumann & Kame‘enui, 1991; Stahl & Fairbanks, 1986)
Knowing a Word is More than a Definition

Students need to be exposed to a word at least six times in context before they have enough experience with the word to remember its meaning.

Vocabulary should be meaningful, memorable, and useful.
Direct Instruction Works

Direct instruction on words that are critical to new content produces the most powerful learning and increases student comprehension of new material.

The issue is not whether we should have vocabulary instruction, but how to make that vocabulary instruction have meaning beyond assigned word lists.

(TALA, 2010)
Vocabulary Development

- Direct vocabulary instruction is important, but insufficient and inefficient alone.
- Provide multiple opportunities for students to practice using language in discussions and writing.
- Ensure that students read often from a variety of text types.
- Heighten the students’ awareness of the language in the world around them.
- Develop the skills of students to learn new vocabulary on their own.

The Meadows Center, 2010
How Do I Teach Academic Vocabulary?

• Foster a love of words and language in your classroom.
• Teach word learning strategies.
• Focus on important content area words and common academic words that may be unfamiliar to ELLs.
• Encourage wide reading.
• Use student-friendly definitions of words and concepts.
• Capitalize on students’ knowledge of their first language.
• Use graphs, pictures, or symbols when appropriate.

The Meadows Center, 2010
How Do I Teach Academic Vocabulary?

• Foster a love of words and language in your classroom.
What is a Word Wall?

A word wall is a displayed collection of words that support ongoing teaching and learning (Cunningham and Allington 1994).
Types of Vocabulary

(TALA, 2010)

BICS
Common Words
- Basic
- Conversational

Academic Words
- High function
- Frequently occurring in academic settings

Direct Instruction

CALPS
Content-Specific Words
- Related to a specific discipline
- Not frequently encountered
How Do I Teach Academic Vocabulary?

- Focus on important content area words and common academic words that may be unfamiliar to ELLs.
Constructing a Word Wall

Select words that:

• are essential for understanding

Key Vocabulary and Specificity from IFD

• are important for success on the test

Performance Indicator & Unit Assessment

• are likely to be encountered in the future

Vertical Alignment Document
# Key Vocabulary and Specificity from IFD

**KEY ACADEMIC VOCABULARY SUPPORTING CONCEPTUAL DEVELOPMENT**
- **Area model** – a rectangular grid formed from square units
- **Array** – a set of items arranged in rows and columns
- **Division** – one of the four basic operations of arithmetic where in the division statement $a \div b = c$, $a$ is the **dividend**, $b$ the **divisor**, and $c$ is the **quotient**
- **Factor** – a number multiplied by another number to find a **product**
- **Multiplication** – one of the four basic operations. It can be thought of as **repeated addition**: $4 \times 3$ can be interpreted to mean four 3’s or $3 + 3 + 3 + 3 = 12$
- **Product** – the result of multiplication

<table>
<thead>
<tr>
<th>TEKS#</th>
<th>TEKS</th>
<th>SPECIFICITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.4</td>
<td><strong>Number, operation, and quantitative reasoning. The student recognizes and solves problems in multiplication and division situations. The student is expected to:</strong></td>
<td><strong>Learn, Apply</strong></td>
</tr>
<tr>
<td>3.4A</td>
<td><strong>Learn and apply multiplication facts through 12 by 12 using concrete models and objects.</strong></td>
<td><strong>MULTIPLICATION FACTS THROUGH 12 BY 12 USING MODELS</strong></td>
</tr>
</tbody>
</table>

**Supporting Standard**
- Variety of concrete models and objects
  - **Arrays** to investigate the relationship between the factors of a given number (rows and columns)
  - Distinguish between $3 \times 8 = 24$ and $8 \times 3 = 24$ (turn-around fact)
  - **Equivalent products** can be represented by different factors
    - **Ex:** $4 \times 3$ and $3 \times 4, 6 \times 2$ and $2 \times 6, 1 \times 12$ and $12 \times 1$ all yield the product of 12
  - **Grid area models** to investigate the relationship between the factors of a given number (rows and columns)
  - Distinguish between $3 \times 8 = 24$ and $8 \times 3 = 24$ (turn-around fact)
  - **Equivalent products** can be represented by different factors
    - **Ex:** $4 \times 3$ and $3 \times 4, 6 \times 2$ and $2 \times 6, 1 \times 12$ and $12 \times 1$ all yield the product of 12
  - Product determined by **sum of partial products**
    - **Ex:**
Performance Indicator

Use a graphic organizer for each problem to record (1) the fact and solution represented by the situation, (2) a sketch of a division model to include the related multiplication number sentence, (3) the remaining related facts, and (4) a justification of the reasonableness of the solution. (3.4C; 3.6C; 3.10; 3.14A, 3.14B, 3.14C, 3.14D; 3.15A, 3.15B; 3.16B)

ELPS 1H; 4J; 5G

Unit Test

20 What is the value of Point N on the number line below?

[Number line with points 18, 21, 24, and a point labeled N]
Which Words to Teach?

You may not be able to teach directly all of the academic and content specific words you identified.

Consider which words need to be...
  • defined for the students
  • taught using an extended instructional routine

(TALA, 2010)
Making Word Wall Interactive

“I have found few Word Walls that are successful if they are prepared in the absence of teaching and learning. You will want your Word Wall to be a living part of the classroom with new words being added each day as they are encountered and taught.”

(Allen 2007)
Interactive Activities using Word Walls

1. Flashlight Definitions
2. Table Tennis
3. Fact or Fib
4. Mix-n-Quiz
5. Mystery Word
6. Missing Word
7. Mind Reader
8. 20 Questions
9. Circle Up
10. Connect
Flashlight Definitions

1. Turn the classroom lights off.
2. With a flashlight select a word.
3. Call on a student to define the word.
4. Repeat.

The definition of _____ is ....

* Remember to give “think time.”
Table Tennis

1. Students are assigned a partner and given a set of cards with selected words from the word wall.

2. The students distribute the cards equally.

3. Student A shows student B one of his words and defines the word.

4. Student B shows student A one of his words and defines the word.

5. The students repeat the process until all the cards are gone.

The definition of _____ is ....
Fact or Fib

1. Students have two cards labeled “FACT” and “FIB.”
2. The teacher reads a true or false statement about a word from the Word Wall.
3. On the count of three, the students must slap down either the “fact” or “fib” card.
4. Repeat.

* Remember to give “think time.”
Mix-n-Quiz

1. Each student is given a card that has a word from the Word Wall with its definition and a few facts.
2. Students stand with their card and find a partner.
3. Student A reads the definition and student B chooses a word from the Word Wall that matches the definition.
4. If student B does not choose the correct word, student A reads a fact and student B tries again.
Mix-n-Quiz

5. If student B does not choose the correct word after he is given the definition and facts on the card, student A tells student B the word.

6. The roles are reversed and process is repeated.

7. When both students have had a turn, the students switch cards, find a new partner, and process is repeated again.
Mystery Word

1. The teacher chooses a word from the Word Wall.
2. The word is written on the board in a scrambled order.
3. Students unscramble the word and define the word.
4. Clues can be given to help students.

The mystery word is … and its definition is…

* Cooperative Learning Structure
1. Before class begins, the teacher removes a word from the Word Wall before class begins and rearranges the order of the other words.

2. Students must identify the missing word and define the word.

3. Clues can be given to help students.

The missing word is … and its definition is…

* Cooperative Learning Structure
Mind Reader

1. Each student numbers his/her paper from 1 to 5.
2. Before any clues are given, always say: “I am thinking of a word on the Word Wall.”
3. The teacher then gives clues about one of the words from the Word Wall.
4. After each clue, the students record their guess.
5. By the fifth clue, everyone can “guess” the word!

* Cooperative Learning Structure
20 Questions

1. The teacher selects a word from the Word Wall.
2. Students think of yes or no questions they would want to ask.
3. The teacher calls on students to ask questions and the teacher answers yes or no.
4. If at anytime a student thinks he knows the word, he writes the word on a piece of paper or whiteboard and stands up. (But once a student has chosen a word they can not change their answer.)
20 Questions

5. The teacher continues to answer questions until 20 questions have been asked or all students are standing.

6. Then the teacher reveals the word.

* Cooperative Learning Structure
Circle Up

1. Divide students into groups of 3 or 4.
2. Give each student a card with a different word from the Word Wall.
3. Have students stand and form a circle.
4. In turn, each student announce his vocabulary word and explains how it is related to the word held by the student to his right.
5. Repeat until each student has had a turn.

My word is ____ and their word is _____. They are related because....

* Remember to give “think time.”
Connect

1. Have students fold a 4 x 4 table and fill-in the table as shown.

<table>
<thead>
<tr>
<th></th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Word</td>
<td>Word</td>
<td>Word</td>
</tr>
<tr>
<td>2</td>
<td>Word</td>
<td>Word</td>
<td>Word</td>
</tr>
<tr>
<td>3</td>
<td>Word</td>
<td>Word</td>
<td>Word</td>
</tr>
</tbody>
</table>
Connect

2. Roll a die and have students use words in the corresponding row or column to create a factual sentence, make connections, or explain similarities and differences.

3. Repeat.

My words are ____ and ____. They are (connected/similar/different) because....

* Cooperative Learning Structure
* Remember to give “think time.”
How Do I Teach Academic Vocabulary?

• Capitalize on students’ knowledge of their first language.
When ELLs in a classroom all speak Spanish as their first language, you can use activities that prompt them to make connections to their native language.

<table>
<thead>
<tr>
<th>English</th>
<th>Spanish</th>
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<tbody>
<tr>
<td>circle</td>
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<tr>
<td>radius</td>
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<tr>
<td>diameter</td>
<td>diámetro</td>
</tr>
<tr>
<td>circumference</td>
<td>circunferencia</td>
</tr>
</tbody>
</table>
How Do I Teach Academic Vocabulary?

• Use student-friendly definitions of words and concepts.
• Use graphs, pictures, or symbols when appropriate.
Frayer Model

• This graphic organizer helps students think about the relationships and categories associated with vocabulary being taught.

• Students have the opportunity to explain and elaborate with examples their understanding of a concept or word.

```
<table>
<thead>
<tr>
<th>Definition</th>
<th>Facts</th>
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<tbody>
<tr>
<td>A whole number that can be divided evenly by more than two numbers</td>
<td>It can be divided by itself, by 1, and by at least one other number</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Examples</th>
<th>Nonexamples</th>
</tr>
</thead>
<tbody>
<tr>
<td>4, 6, 8, 9, 10, 12, 14</td>
<td>0, 1, 2, 3, 5, 7, 11</td>
</tr>
</tbody>
</table>
```
Frayer Model – A student sample

**Vocabulary Term**

**Composite Numbers**

**Definition**

A composite number has more than 2 factor pairs.

**Example**

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>9</td>
<td>10</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>6x1</td>
<td>9x1</td>
<td>10x1</td>
<td>12x1</td>
<td>16x1</td>
</tr>
<tr>
<td>1x6</td>
<td>1x9</td>
<td>10x1</td>
<td>12x1</td>
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<tr>
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<td>5x5</td>
<td>5x10</td>
<td>8x2</td>
</tr>
</tbody>
</table>
Key Elements to Remember

1. Sentence Starters
2. Think Time
3. Cooperative Learning
4. Active Monitoring
5. Corrective Feedback
Contact Information

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