

UMLN Meeting

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Why Vocabulary?

- Most often, reading problems in high school are not due to deficient decoding skills (Buly & Valencia, 2002; OERI, 2001)
- Poor readers commonly evidence vocabulary knowledge that is strikingly lower than that of their higher achieving counterparts (Beck & McKeown, 2002; Hart & Risley, 2003)
- Matthew Effects: This gap widens over time (Stanovich, 1986)

How Many Words Must Be Known?

- Everyday speech consists of 5,000 – 7,000 words (Klein, 1988).
- By high school, need to know 88,500 words (Nagy & Anderson, 1984).
- Readers must understand between 90 -95% of the words in text in order to comprehend the text (Beck & McKeown, 2002).

Vocabulary Instruction in Middle and High School

- Little vocabulary instruction takes place at the middle and high school level and
- If taught, vocabulary instruction tends to take place in the ELA classroom (Beck & McKeown, 2002)
- When content area teachers do teach vocabulary, they tend to focus on words specific to the core material for the course (e.g. geometry instructional words: *equilateral triangle, rhombus*)
- ***There is very little current research on which words are most important for grade school students to know***

Math Textbook Study

(Nair, 2005 & 2007)

- Study of all the words in 7th grade math textbooks produced by three different publishers
- Removed words shown to be known even by lowest performing readers and analyzed remaining 'challenge' words (based on frequency, word forms, text type & whether glossed)

Findings

- 25% of the text in 7th grade math textbooks is made up of approximately 3,000 ‘challenge words’
- Most are low frequency words and few are glossarized
- Glossary definitions are typically made up of a high proportion of challenge words (20% for one textbook)

Glossary Example

- **significant digits:** All of the **digits** of a **measurement** that you know for sure, plus one **estimated digit**.

Also...

- **significant digits:** All of the _____ of a _____ that you know for sure, plus one _____.

More Findings: The Good News

- ***Knowledge of 380 high-frequency words found across textbooks increases proportion of known words to 94%***
- Many of these high frequency words are not specific to the core material for any discipline and therefore not given direct instruction in any subject
- Many challenge words are 'Task' words or words used to ask students to perform tasks or show their knowledge

Sample of Most Frequently Occurring Words Across Textbooks

- Source
- Determine
- Skill, Skills
- Strategies, Strategy
- Mixed number, Mixed numbers
- Perimeter
- Amount
- Factor
- Prism, Prisms
- Function
- Polygon, Polygons
- Information
- Result, Resulting, Results
- Median
- Original, Origins
- Reasonable

(Words in pink are high-frequency math words that are NOT typically taught by math teachers)

Word Problem Example

Determine whether the given precision unit is appropriate to use in estimating the length of each object. Explain your reasoning. If it is not, describe an appropriate precision unit.

a. driveway: 1 inch

b. compact disc: 1 meter

c. calculator key: 0.1 centimeter

Also...

_____ the given _____
is _____ to use in _____ the
length of each _____. Explain your
reasoning. If it is not, describe an _____
_____. (Lesson 12-6)

- a. driveway: 1 inch
- b. compact disc: 1 meter
- c. calculator key: 0.1 centimeter

MCAS Test Items Study

(Martiniello, 2007)

- DIF: Differences in difficulty/performance of a particular item for ELLs and non ELLs who were matched according to their levels of proficiency on math
- Identified items with large DIF and analyzed based on
 - Linguistic features (vocabulary difficulty, sentence structure)
 - Curriculum
 - Think-aloud protocols

MCAS Example & Findings

Question 30 is a short-answer question. Write your answer to this question in the box provided in your Student Answer Booklet. Do not write your answer in this test booklet. You may do your figuring in the test booklet.

- 30 Mr. Garcia gave each of his students a notepad, a pencil, and a ruler on the first day of school. The chart below shows the different colors of the notepads, pencils, and rulers.

Colors of Notepads, Pencils, and Rulers

Notepads	Pencils	Rulers
Yellow	Red	Green
White	Blue	Purple
	Orange	

How many different combinations of 1 notepad, 1 pencil, and 1 ruler can Mr. Garcia make?

- 8 Every Saturday in the fall, Martin has to do 1 inside chore and 1 outside chore. The chores are listed below.

Inside Chores	Outside Chores
vacuum	rake
wash dishes	weed
dust	

How many different combinations of 1 inside chore and 1 outside chore can Martin make?

- A. 3
- B. 5
- C. 6
- D. 9

ELLs performed better on Item 30 than on Item 8. The difference in difficulty between these two items lies in the vocabulary used rather than the math required.

Math Vocabulary Intervention

Word Generation Project (SERP Boston)

- Weekly words presented by 6th – 8th grade content area teacher
- Focus: 'easy math as context for hard words'
- WGEN Lesson

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