Making Meaning

USING READING COMPREHENSION STRATEGIES TO ENHANCE MATHEMATICAL UNDERSTANDING

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Why Reading Strategies?
What do readers do to promote their understanding?

<table>
<thead>
<tr>
<th>Characteristics of Readers</th>
<th>Characteristics Mathematicians</th>
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<td>They call upon their prior knowledge to make meaning from text.</td>
<td>They call upon prior knowledge to understand concepts and solve problems.</td>
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<td>They are fluent readers.</td>
<td>They are procedurally fluent.</td>
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<td>They have a mental image of what they are reading.</td>
<td>They create multiple representations of mathematics concepts and problems.</td>
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<td>They use multiple strategies to understand and interpret text.</td>
<td>They use multiple strategies to understand concepts and solve problems.</td>
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<td>They monitor their understanding as they read.</td>
<td>They monitor their understanding as they solve problems.</td>
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<td>They can clearly explain their interpretation of the text to others.</td>
<td>They can clearly explain their mathematical thinking to others.</td>
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Adapted from Minton, 2007
The Seven Comprehension Strategies
(Keene and Zimmerman, 2006)

1. Making Connections
2. Asking Questions
3. Visualizing
4. Making Inferences
5. Determining Importance
6. Synthesizing
7. Monitoring Meaning
Mathematicians as Readers (Lent, 2010)

When mathematicians read, they...

• Use information to piece together a solution
• Look for patterns and relationships
• Decipher symbols and abstract ideas
• Ask questions
• Apply mathematical reasoning
In a certain game, a player can solve easy or hard puzzles. A player earns 30 points for solving an easy puzzle and 60 points for solving a hard puzzle. Tina solved a total of 50 puzzles playing this game, earning 1,950 points in all. How many hard puzzles did Tina solve?
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In quadrilateral $ABCD$ above, $BC$ is parallel to $AD$, and $AB = CD$. If $BC$ and $AD$ were each doubled and $BE$ was reduced by 50 percent, how would the area of $ABCD$ change?
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Aaron is staying at a hotel that charges $99.95 per night plus tax for a room. A tax of 8% is applied to the room rate, and an additional onetime untaxed fee of $5.00 is charged by the hotel.
The line graph above shows the monthly rainfall from March to October last year in Chestnut City.
What might I ask you?

Source: 101.qs.com
What might I ask you?
How Many Bundles of Money are there?

What % of the Room is Money?

Is there more money or space?

How much money is there?

What is the surface area?

What's the volume of the money?

How much does the money weigh?
Do kids with background knowledge ask better questions?
When might you use percent?
Percent

- %
- used in money
- simple interest
- stock market

Converting decimals

Compound interest

Converting fractions

Increasing/decreasing

Multiple grading

Grades

Percent Coupons Grades
Percents have a symbol of %

Percents are always out of 100

Percents are never negative

Percents are an easier way to represent numbers that are fractions

Percents can be used instead of fractions and decimals
“What is Statistics?”

- make predictions
- look at data
- analyze data
- find averages like goals per game
- strategies
- charts & graphs

- research
- make comparisons

- Questions
- metric
- models
- Do statisticians make a lot of money?
Four Essential Understandings About How We Learn Words

❖ Our depth of word knowledge is determined by how we use words.
❖ We need to have a reason to learn new words. Engagement matters.
❖ Words are concepts related to other words and can have multiple uses, which means that our knowledge of words can deepen.
❖ We learn words both through intentional instruction and incidentally.

Cobb and Blachowicz, 2014
The power of word study

- Whole
- Integer
- Rational
Vocabulary Demands

Marzano and Pickering identify over 200 words/phrases in the Grade 6 – 8 Mathematics Word List (2005)

Students add 3000-4000 words per year to their active vocabulary during middle school. (Cobb and Blachowicz)
What might these words have in common?

Model  Sample  Scale
Root  Table  Argument
Odds  Plane  Slide
There is a difference between knowing the word and knowing its meaning.
What is this? How is it used?
What is this?
How is it used?
Reading and Writing Reciprocity
When mathematicians write, they...

- Explain, justify, describe, estimate or analyze
- Favor calculations over words
- Use precise vocabulary
- Include reasons and examples
- Utilize real-world situations
Convince yourself
Convince a friend
Convince a skeptic

www.youcubed.org
Convince Me…

❖ **Show your thinking:** Use numbers, symbols and models (pictures, tables, graphs…) to show how you arrived at your answer.

❖ **Explain:** Use words to describe the process you used to arrive at your answer or to support your claim.

❖ **Justify:** Use words to state your conclusion/answer and support your thinking by showing your mathematical evidence.
a) How many total students are in the class? 

28

b) What fraction of the students downloaded fewer than 6 songs? 

\[ \frac{23}{28} \]

c) Which interval contains the median of the data? 

0 - 2

d) Molly claims the mode is in the interval 0-2. Is Molly correct? Briefly explain your thinking.

No, because you can't determine the numbers in every interval. For example, there could be 5 or 0 in the 0-2 interval, and there could be 8 threes in the 3-5 interval, making the mode in the 3-5 interval. So if you can't determine the numbers, you can't determine the mode.
Why Reading Strategies?
https://www.youcubed.org/weeks/week-1-grades-5-9/

Cobb, C., & Blachowicz, C. L. (2014). No more "look up the list" vocabulary


    VA: Association for Supervision and Curriculum Development.

Sammons, L. (2011). Building mathematical comprehension:. Huntington Beach, CA:

    Shell Education.