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Tip Sheet

Use Accurate Math Vocabulary

SUMMARY

Mathematics is often called a universal language, however many math vocabulary words can lead to misunderstandings that confuse and distort student understanding. Here are some helpful tips to encourage students to "speak mathematically" to ensure clear communication and comprehension.

AUDIENCE

All educators in grades K-12.

WHY IS IT IMPORTANT TO USE PROPER MATH VOCABULARY?

The language of mathematics presents challenges to both fluent English speakers as well as English Language learners because words used in math have unique meanings that sometimes differ from everyday meaning. Correct math vocabulary strongly correlates to comprehension; students expand their ability to reason abstractly and move beyond operations to problem solving.

SUGGESTED APPROACHES TO TEACHING MATH VOCABULARY

Highlight the importance of math vocabulary:

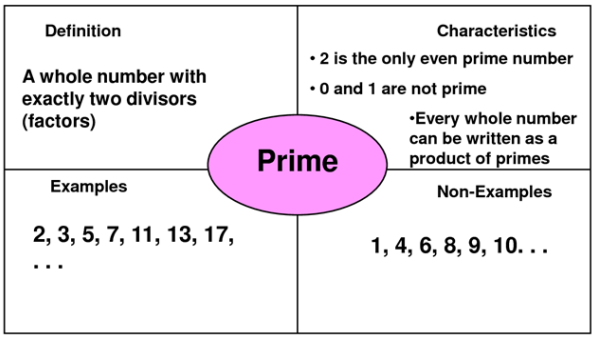
- Introduce vocabulary words to students through active engagement in math, and encourage students to find ways to describe the topic they are working on in their own words
- Give examples of words that can be confusing, e.g., product can mean either multiplication or an item in a store.
- Start lessons with the mathematical terms that will be used.
- Encourage students to "speak mathematically" to ensure clear communication

Math terms may be confusing to students:

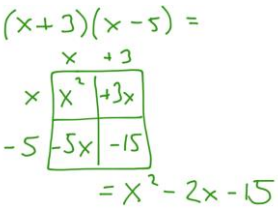
- Certain math terms are also **commonly used in non-mathematical ways** such as: *product, table*, *origin*, *side, corner, face*, *volume, mean, prime, pound, yard,* and *leg*.
- Some words have **precise mathematical meanings**, such as: *average, integer, outlier, obtuse, and algorithm.*
- **Word combinations** have a specific meaning in math: *value* by itself has one meaning, whereas *absolute value* has a far different meaning.
- Some words have **more than one mathematical meaning:** *square, round, degree, and second.*
- **Symbols for words** may also confuse students. For example, the use of the symbol **"–"** can mean *subtract, minus, less, few, negative, different direction*. Model and take care to speak and use the correct meaning for the symbol so as to avoid student confusion (e.g., saying "minus 2" when really meaning "negative 2" can lead to misunderstandings and mistakes).

Some Strategies for Learning Math Vocabulary:

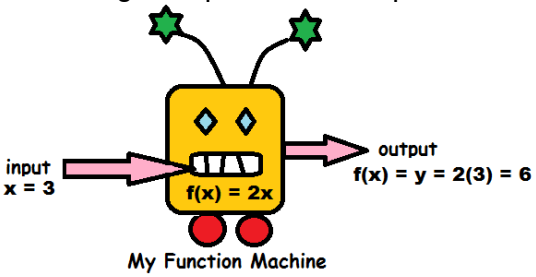
- **Graphic Organizers,** such as the The Frayer Model (Frayer, Frederick, and Klausmeier, 1969) offer ways for students to define a math term, identify examples, list non-examples, essential and nonessential characteristics. For example, students could list prime numbers, and then work in groups to discuss, and then put on the organizer, all the essential and nonessential characteristics as follows:



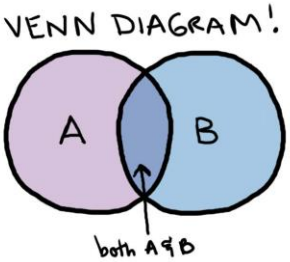
- **Visual organizers** can help students to understand the meaning of a term, such as drawing a picture of a machine having an input and an output to describe the terms *input, output,* and *function*.



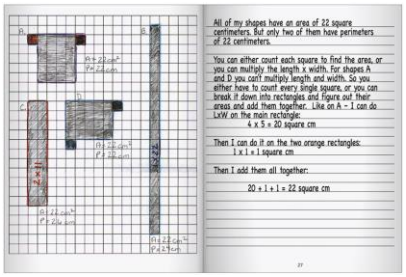
Factoring a Polynomial



My Function Machine



- **Math Journals ---** have students keep track of math words, visual examples, and symbols for reference in their own journals. Periodically review the contents of the journals for accuracy and use.



RELATED RESOURCES

RAFT hands-on activities that can support the use of accurate mathematics vocabulary:

The Grapes of Math –	http://www.raft.net/ideas/Grapes of Math.pdf
Meet My Function Machine –	http://www.raft.net/ideas/Meet My Function Machine.pdf
Algebra Rummy –	http://www.raft.net/ideas/Algebra Rummy.pdf
Who is The Outlier? –	http://www.raft.net/ideas/Who is The Outlier.pdf

Additional examples of strategies for organizing math vocabulary:

- http://dox.aea1.k12.ia.us/math/mathvocab.html
- http://www.teacher-support-force.com/math-teaching-strategies.html