

Getting Results with Mathematical Vocabulary



Words are powerful tools used to express ideas, communicate with others, and connect new concepts with prior knowledge. Building academic content vocabulary is important in order for students to be successful during collaboration and communication of 21st century learning. Research states when effective vocabulary instruction is built into a mathematics curriculum, student achievement is likely to improve. Contextually rich instruction builds basic language comprehension through the use of context clues that include authentic pictures, illustrations, diagrams, graphic organizers, and interactive learning experiences. Students must be able to communicate their learning and be able to explain and justify their reasoning. Building content vocabulary and actively involving students in utilizing the vocabulary will assist them when explaining their solutions.

The following are ways teachers can assist students in learning and building vocabulary content knowledge:

- **Modeling** – The teacher uses the targeted vocabulary within the meaningful context, often “revoicing” the student’s informal language with the formal mathematical terminology.
 - ✓ **Example:**

Student: I added 5 to both sides which is the opposite of subtracting 5

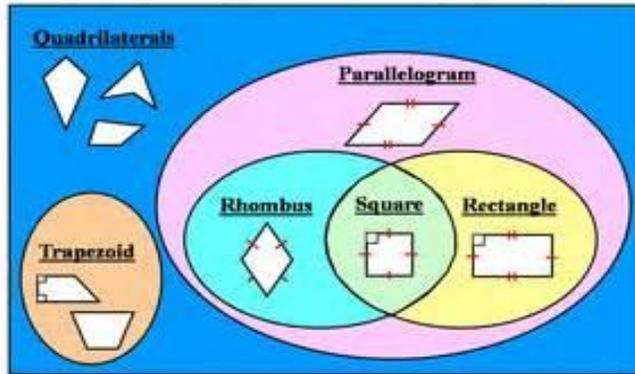
Teacher: So the inverse operation of subtraction is addition?

Student: Yes, I performed the inverse operation of subtraction by adding 5 to both sides.
- **Discourse** – The teacher orchestrates activities and poses questions that elicit student talk about mathematical ideas as they arise within the course of the lesson.
 - ✓ **Example:** Students are graphing quadratic equations. The teacher projects two quadratic graphs on the screen and asks: “*Compare and contrast these two graphs. Take 5 minutes and talk with your partner.*”
- **Writing** – The students use the targeted vocabulary to reflect on and organize their thoughts around related mathematical ideas (*journals, justification of solution, explanations*, etc.).
- **Assessment** – The teacher uses informal observation and formal assessment tools to determine the depth to which the student understands and explains his/her understanding using the targeted vocabulary.
- **Multiple Representations** – The teacher uses various graphic organizers and displays them to reinforce targeted vocabulary.
 - ✓ **Frayer Model:** The Frayer Model is a word categorization activity that helps learners develop their understanding of concepts. It allows students the opportunity to communicate their understanding and to make connections by providing definitions, examples and non-examples from their own experiences with the concept.

Definition (In your own words) A simple, closed, plane figure made up of three or more line segments	Facts/Characteristics <ul style="list-style-type: none"> Closed Simple (curve does not intersect itself) Plane figure (2D)
Examples <ul style="list-style-type: none"> Rectangle Triangle Pentagon Trapezoid Hexagon 	Nonexamples <ul style="list-style-type: none"> Circle Cone Arrow (ray) Cube Letter A

- ✓ **Venn Diagram:** A Venn diagram can be used to compare or contrast terms. An extension can be added to allow for deeper conceptual understanding.

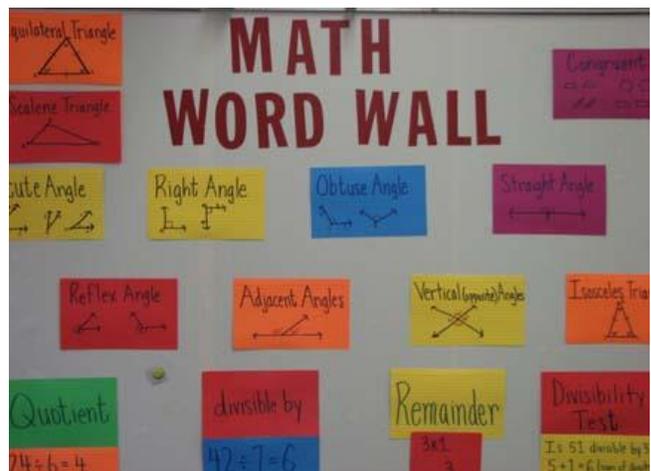
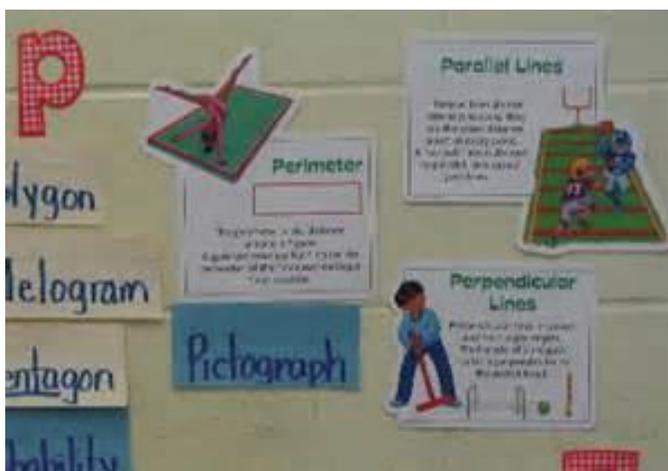
Venn Diagram of Quadrilaterals



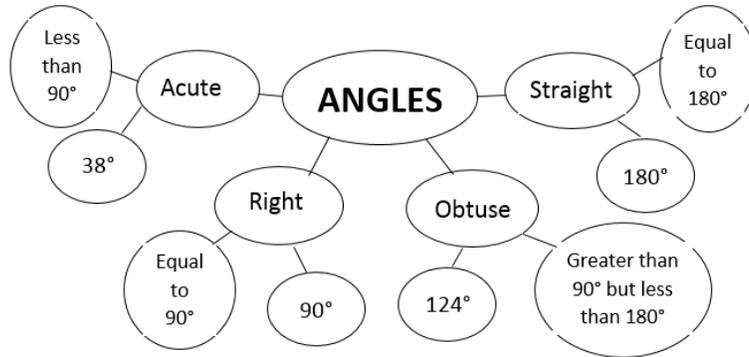
Extension: Many sports are played on a quadrilateral playing field. Name three sports that are played on various shaped quadrilaterals, classify the specific shape, and explain your justification for classification.

- ✓ **Word Wall:** A word wall is a group of academic vocabulary words that are displayed on a wall, bulletin board, chalkboard, or whiteboard in a classroom. Word walls are designed to serve as visual scaffolds and are a common classroom tool used to support vocabulary content instruction. An interactive word wall, as opposed to the traditional word wall, provides visual aids that assist in illustrating word meanings and conceptually organize words to deepen understanding. These word walls usually include a visual representation of the word along with a vocabulary label.

Good	Better	Best
Academic vocabulary is posted.	Academic vocabulary is posted.	Academic vocabulary is posted.
Words are aligned with current instruction.	Words are aligned with current instruction.	Words are aligned with current instruction.
Words are visible from a distance.	Words are visible from a distance.	Words are visible from a distance.
	Words are arranged to illustrate relationships and organize learning.	Words are arranged to illustrate relationships and organize learning.
	Wall may contain student-generated material.	Wall contains student-generated material.
	Visual supports are black-line pictures or cartoons.	Visuals supports are color pictures, photographs, or actual real items.



- ✓ **Word Web:** Word webs help students to visualize how characteristics, examples, and definitions relate and support a specific vocabulary word or mathematical concept. They can be completed as a whole group discussion or given individually as a formative assessment to allow students to summarize their understanding of a mathematical concept.



Reference:

Building a Bridge to Academic Vocabulary in Math.

http://curriculum.austinisd.org/math/elem/resources/general/M_el_res_acVocabBridge.pdf