

Improving Teacher Quality Program

Mathematics Within: Algebraic Processes and its Connections to Geometry

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Broad Topic: The Language of Mathematics

Grade Level: 5th grade

Time Frame: Daily 20- or 30-minute sessions

Aim: To integrate the language, concepts and skills of math into the daily routine and classroom environment

Specific Objectives:

Students will learn to think mathematically by participating in short, daily, individual, small group, whole group and transitional activities that are a fun way of introducing (laying the foundation for), challenging, reinforcing and checking understanding of math concepts. (You can use these activities to move students about the class and create groups.)

Concept Areas:

- number sets/kind of numbers (i.e. prime, square, composite, even, odd, positive, negative, etc.)
- multiples/factors
- place values
- fractions (equivalent), decimals, percents
- vocabulary
- properties
- geometry (triangles, quadrilateral, 3-D)
- number sentences
- operations

Materials/Supplies: Vary by day

Transitional Activities:

Assign students a number each and have them line up in the following ways:

- "All prime numbers may line up." (as each student calls out his/her number, the class determines whether it is a prime number or not)
- Repeat using square numbers, multiples of ____, factors of ____
- Have the students pick a number, define it and give their reasoning for the definition
- Think of a pattern/set. Call out various numbers in the set/pattern so that these students line up in order. Tell the class "you can line up if you can identify the pattern, tell me an observation, or tell me who else can line up."
- Ask the students to "give me a definition of or an example of _____" (vocabulary).

- Tell the students that "Multiples of 2 line up at the front of the line, multiples of 5 line up at the back of the line, multiples of both line up in the middle of the line." As students call out their numbers, the class discusses where that number belongs. Unused numbers form another line.

Sample Lesson Plans:

- Day One: Using tiles and working with a partner show me the numbers from 1-10. "How would you represent them?" Have each group draw them on a poster and display these in class.
- Day Two: *Morning work* - have students list on the board as many different equations with a product of 24 as they can. Ask them if they have thought of all of them and how they would know if they did have them all. "Can we come up with a plan to make sure we have them all?"
- Day Three: Discuss different models (i.e. arrays, area models, T-table)
Whole group - Create models of all factor pairs for the numbers from 11-25.
Homework - Create models of all factor pairs from 1-10. Write about what you did. How do you know you have all the factor pairs?
- Day Four: Post all factor pairs for the numbers 1-10.
Class discussion - "What do you see?" Introduce vocabulary as observations are made (i.e. prime, square, composite, factors, multiples).
Write and post class definitions for vocabulary words.
- Day Five: Using a different model discuss the difference between factors and multiples.
Writing assignment - "What makes a number prime?" "What is special about square numbers?" "Explain the difference between factors and multiples."
- Day Six: Common Multiples (whole group activity)
Tell students that "Any student (using assigned numbers) who is a multiple of 2 go to the back of the room. Any student who is a multiple of 5 go to the front of the room. Multiples of both - center of the room."

Class discussion - "What can we say about each group?" "What makes them similar?" "What makes them different?"
"What about the numbers left at the sides of the room?" (They don't fit in any group.) "How are they the same?" "How are they different."
"What about the number 1?" "Is there anyway we can get it to belong in any group?" (Identify operation - if the number one holds hands with another number and tells me that they are multiplying themselves, the number one can be with any other number - $1 \times \text{any number} = \text{that number}$).