Instead of That, Say This

One way to help students with their understanding of mathematics vocabulary is to emphasize formal mathematics language in the classroom. What follows are some examples of how informal or incorrect language (Instead of that…) can be replaced with formal mathematics language (Say this…).

Formal mathematics language is important because this is the type of language that students read in texts and on standardized assessments. If students only experience informal mathematics language, it will be difficult for students to fully participate in mathematics and demonstrate their mathematics competency.

These examples come from these two articles:

(1) *Supporting Clear and Concise Mathematics Language: Instead of That, Say This* (Hughes, Powell, & Stevens, 2016). This article can be accessed here: https://doi.org/10.1177/0040059916654901

(2) *Math Language in Middle School: Be More Specific* (Powell, Stevens, & Hughes, 2019). This article can be accessed here: https://doi.org/10.1177/0040059918808762

Here are examples related to number and operations.

Instead of…	**Say…**
The numbers you add Problem: This phrase is informal and emphasizes the action rather than the mathematical role of the numbers.	***Addends*** Solution: This term is mathematically precise and identifies the role of numbers or variables in addition expressions or equations.
The number you start with Problem: This phrase is informal and does not identify the mathematical role of the number in a subtraction expression or equation.	***Minuend*** Solution: This term is mathematically precise and identifies the quantity from which another quantity is subtracted.
The number you subtract Problem: This phrase is informal and does not clearly identify the role of the number in a subtraction expression or equation.	***Subtrahend*** Solution: This term is mathematically precise and identifies the number being subtracted in a subtraction expression or equation.
Times Problem: This term does not clearly represent the structure of multiplication.	***Groups of*** *or* ***multiplied by*** Solution: These phrases represent the multiplicative relationship (e.g., "4 groups of 3" or "4 multiplied by 3").
The numbers you multiply Problem: This phrase is informal and does not identify the mathematical role of numbers in a multiplication expression or equation.	***Factors*** Solution: This term is mathematically precise and identifies the numbers being multiplied in a multiplication expression or equation.
The number you divide Problem: This phrase is informal and does not identify the mathematical role of the quantity in a division expression or equation.	***Dividend*** Solution: This term is mathematically precise and identifies the quantity being divided in a division expression or equation.
The number you divide by Problem: This phrase is informal and does not clearly identify the role of the number in a division expression or equation.	***Divisor*** Solution: This term is mathematically precise and identifies the number used to divide the dividend in a division expression or equation.
Answer Problem: This is a catchall term with no specificity.	***Sum, difference, product,*** *or* ***quotient*** Solution: These terms reinforce the calculations students will perform to solve problems.

Hughes, Powell, and Stevens (2016);
Powell, Stevens, & Hughes (2019)

Here are examples related to comparing quantities.

Instead of...	Say...
Bigger or ***larger*** Problem: These terms do not represent mathematical language and they do not transfer to negative numbers.	***Greater*** Solution: This term is mathematically accurate and reflects the language in standards.
Smaller Problem: This term is not mathematical language and does not transfer to negative numbers.	***Less*** or ***fewer*** Solution: This term is mathematically accurate and reflects the language in standards.
Alligator eats the bigger number Problem: This phrase does not support students in understanding that the greater than (>) and less than (<) symbols are two distinct symbols. This phrase also does not help children read expressions from left to right.	***Is less than*** or ***is greater than*** Solution: Students learn how to read and write inequalities correctly. Students also learn that > and < are two distinct symbols and not one symbol that switches back and forth.
Equals Problem: This term often is used to indicate that students write an answer.	***The same as*** Solution: This term reinforces the equal sign as a symbol that indicates that quantities on both sides need to be the same.

Hughes, Powell, and Stevens (2016);
Powell, Stevens, & Hughes (2019)

Here are examples related to fractions and decimals.

Instead of…	Say…
Numbers in the fraction Problem: This language suggests that each part of the fraction (i.e., numerator, denominator) is a separate and independent number instead of a digit (or series of digits) that comprises a fraction.	***This fraction is a number*** Solution: A fraction is a number in itself and has a magnitude on a number line. A fraction is not two separate numbers.
Top number *and* ***bottom number*** Problem: These terms suggest that the numerator and denominator are separate and independent numbers.	***Numerator*** *and* ***denominator*** Solution: A fraction is a number with a specific magnitude that can be represented on a number line. While a fraction may have different parts, these parts do not work in isolation, but rather contribute to one another – the fraction.
2 over 3 Problem: This phrase communicates the location of the digits but not the actual number or magnitude.	***e.g., Two-thirds*** Solution: This term is accurate and reflects the magnitude of the number.
Reduce the fraction Problem: This phrase suggests the result is less in quantity.	***Simplify*** or ***find an equivalent fraction*** Solution: The quantity represented by the magnitude of the fraction does not change. The only change is with the digits used to communicate that magnitude.
Point Problem: Reading a decimal as "three point four" does not support the conceptual understanding of place value of the magnitude of the decimal.	***e.g., Three and four tenths*** Solution: This phase reinforces place value and supports understanding of magnitudes, values, and symbol use.
Move the decimal point over Problem: This language communicates an action. This language does not promote conceptual understanding when multiplying and dividing by 10s.	***Demonstrate process within Base-10*** Solution: This phrase helps with understanding the process of multiplying and dividing by 10s, 100s, etc.
Out of Problem: When talking about ratios, this language is incorrect because it does not communicate the ratio of one number to another but one number to the whole.	***e.g., Three to Four*** Solution: Although a minor change in language, the meaning is very different.

Hughes, Powell, and Stevens (2016);
Powell, Stevens, & Hughes (2019)

Here are examples related to geometry.

Instead of…	**Say…**
Box or ***ball*** Problem: With early descriptions of shapes, children use terms that relate to real-life objects. This is permissible but formal language also should be reinforced.	***Cube, rectangular prism,*** *or* ***sphere*** Solution: Use the formal language of shapes to confirm informal language.
Square (for any rectangular shape) Problem: A square has 4 equal straight sides and 4 right angles. A square is a rectangle, but a rectangle is not necessarily a square.	***Rectangle*** Solution: This term helps students distinguish between square and rectangle terminology.
Corner Problem: This general vocabulary term is not mathematically precise and may be confusing because it may refer to an angle or a vertex.	***Angle*** *or* ***vertex/vertices*** Solution: These terms reinforce that an angle is the space between two intersecting lines and a vertex is a point where two sides meet.
Side or ***angle*** (to describe 3D shapes) Problem: A 2D shape is made of straight sides that meet at vertices and form angles. In 3D figures, edges meet at vertices, and angles are formed where these edges meet.	***Edge, face,*** or ***vertex/vertices*** Solution: These terms reinforce the understanding that 2D and 3D figures are different.
Point (for 3D figures) Problem: This general vocabulary term is not mathematically accurate.	***Vertex*** Solution: This term accurately describes the endpoint where two or more line segments or rays meet.
Same *(e.g.,* ***"These are the same shape."****)* Problem: Too vague of a description.	***Similar*** Solution: Shapes are similar when the only difference is in size.
Same *(e.g.,* ***"These shapes are the same."****)* Problem: Too vague of a description.	***Congruent*** Solution: This term should be used to describe similar shapes that are the same size.
Same *(e.g.,* ***"These halves are the same."****)* Problem: Does not convey conceptual meaning.	***Symmetrical*** Solution: This term should be used to describe a reflection of a shape.
Flips, slides, and ***turns*** Problem: These terms help students remember the action of a transformation, but this vocabulary is not used on assessments.	***Reflections, translation,*** *and* ***rotations*** Solution: These are the correct mathematical terms to describe transformations.
Stretch or ***shrink*** Problem: These terms help students remember the action of a transformation, but this vocabulary is not used on assessments.	***Dilation*** Solution: This is the proper mathematical term.

Hughes, Powell, and Stevens (2016);
Powell, Stevens, & Hughes (2019)

Here are examples related to measurement.

Instead of...	Say...
Less versus ***fewer*** Problem: The difference is based on grammatical rules.	***Less*** or ***fewer*** Solution: Use less when it is something that cannot be counted or is singular; use less when referring to specific numbers with measurement. Use fewer with objects that can be counted one-by-one.
Bigger or ***larger*** Problem: These are general vocabulary terms and not mathematically accurate.	***Greater*** Solution: Greater refers to quantity.
Long Problem: "It is 2 cm long" becomes problematic when students describe the sides of 2D figures.	***Length*** Solution: "The length of the side is 2 cm."
Using ***weight*** and ***mass*** interchangeably Problem: Not mathematically accurate.	***Weight*** or ***mass*** Solution: Mass refers to the amount of matter in an object, whereas weight is the pull of gravity on an object.
Using ***capacity*** and ***volume*** interchangeably Problem: Not mathematically accurate.	***Capacity*** or ***volume*** Solution: Volume refers to the space of an object. Capacity refers to liquid measurement.
Using ***chart*** and ***graph*** interchangeably Problem: Not mathematically accurate.	***Chart*** or ***graph*** Solution: A graph represents exact numerical data. A chart presents data in an interpretable manner.
Using ***picture*** and ***pictograph*** interchangeably Problem: Not mathematically accurate.	***Picture*** or ***pictograph*** Solution: A pictograph is a graph with pictures to represent 1 (or multiple items).
Using ***then*** and ***than*** interchangeably Problem: Not grammatically correct.	***Then*** or ***than*** Solution: For comparison, use than.

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