

Vocabulary to Use When Writing About Math

Angles	Mass
Area	Meter
Attribute	Metric
Capacity	Mile
Centimeter	Milligrams
Cubic unit	Milliliter
Cups	Millimeter
Customary	Minutes
Degree	Nearest
Degrees	Ounces
Elapsed time	Perimeter
End time	Pints
Equivalent measure	Pounds
Estimate	Quarts
Foot	Scale
Formula	Seconds
Gallons	Square unit
Grams	Start time
Grid	Temperature
Height	Tool
Hours	Unit
Inch	Volume
Kilograms	Weight
Kilometer	Width
Length	Yard
Liter	
Mass	

BCRs and ECRs in Math

The Hows and The Whys



***What Do You Need
to Know?***

Why? BCRs

- Why? BCRs are **expl anatory**.
 - Require an explanation for the reason behind what you did. (Why did you do what you did?)
- Example:**
 “I rounded because the question asked, ‘About how many?’”
 “I multiplied because I needed 5 pair of shoes that cost about \$20 each. The total is \$100 because $5 \times 20 = 100$.”
 “I rounded 6.9 to 7 because there are 9 tenths.”
 “I know 5 or more tenths tells me to round up.”



Shoes cost \$18.34 a pair at Payless. About how much will it cost to buy 5 pairs?

Use what you know about estimation to explain **why** your answer is correct. Use words and/or numbers to support your explanation.

\$18.34	→	\$20	cost of shoes
X 5	→	x 5	# of shoes
		\$100	Total cost of shoes

- Rounded because it used the words about how many.



Vocabulary to Use When Writing About Math

<u>Standard #2 Geometry</u>	
Acute angle	Pentagon
Attribute	Perpendicular lines
Center	Point Line
Circle	Polygons
Closed figure	Protractor
Cone	Pyramid Prism
Congruent	Quadrilateral
Cylinder	Radius Diameter
Degrees	Ray Angle
Diagonal	Rectangle
Dimension (s)	Rhombus
Edges	Right angle
Equilateral triangle	Scalene triangle
Flip (reflection)	Shape
Geometric figure	Sides Faces
Hexagon	Similar
Horizontal line	Size
Intersecting lines	Slide (translation)
Isosceles triangle	Solid figure
Line segment	Sphere
Mirror Image Net	Square
Obtuse angle	Symmetry
Obtuse triangle	Trapezoid
Octagon	Turn (rotation)
Parallel lines	Vertex
Parallelogram	Vertical line
	Vertices

For further information refer to:

www.aacps.org

- On left side bar, choose *Testing/Student Achievement*
- *Scroll down and choose Maryland MSA Site*
- *Scroll down and choose Information Sheet: MSA Mathematics*

www.mdk12.org

- Choose *Instruction* on top bar under page title
- Choose *Teaching and Learning* and then choose *Mathematics*
- On right side bar, choose *MSA* under Assessment Resources

How? BCRs

- How? BCRs are **procedural** .
- Bullets/numbers with verbs telling what you have done to complete the problem.

Example:

"I compared the 8 and 9."

"I rounded 6.8 to the nearest whole number and got 7."

"I divided by 6 to find the mean."



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Put the following numbers in order from least to greatest: 998; 853; 863; and 965.

Use what you know about place value to explain how you determined your answer is correct. Use words and/or numbers to support your explanation.

H	T	O	
8	5	3	*Compared the highest place value to Find 800 is <900.
8	6	3	*Compared tens and found out 50<60<90.
9	6	5	*Compared the ones and found 3<5<8.
9	9	8	

Conditional BCRs

- Conditional BCRs are the “*What If?*” type of questions.
- STEP A: Requires students to answer the original question
- STEP B: requires students to explain how the answer in STEP A would be different when the condition of the problem changes.
- They are similar to the ECRs in 5th grade. However, in STEP B students do not have to explain how or why they got their answer in STEP A; students only have to explain how their answer would change with the new condition given.



A group of 7 third graders went bowling. They each ate 6 chicken nuggets.

Step A:

Write a number sentence to show how many chicken nuggets were eaten at the bowling alley.

$$\underline{7 \times 6 = 42 \text{ nuggets}}$$

Step B:

If 8 third graders went bowling, how would your number sentence change?

Use what you know about computation in your explanation.

Use words, numbers, and/or symbols in your explanation.

- 7 would become 8 because there would be 1 more student so 7×6 would now be 8×6
- There were 42 eaten, now 48, so 6 more nuggets were eaten

Vocabulary to Use When Writing About Math

<u>Standard #7</u>	Test
<u>Processes of Mathematics</u>	Try
<u>(Problem Solving)</u>	
Accuracy	
Accurate	
Alternative	
Apply	
Check	
Do	
Equation	
Guess	
Identify	
Justify	
List	
Model	
Number sentences	
Pattern	
Picture	
Plan	
Question	
Reasonable	
Revise	
See	
Select	
Strategy	
Table	

Vocabulary to Use When Writing About Math

<u>Standard #6</u>	Multiples
<u>Number Relationships,</u>	Multiplicand
<u>Computation/Arithmetic</u>	Multiply Divide
Add Subtract	Number sentence
Addend	Numerator Denominator
Array	Ones, tens, hundreds,
Breaking apart	Parentheses
Compatible numbers	Partial product
Compensation	Period
Decimals	Place value
Difference	Product
Digit	Quotient
Dividend divisor	Regroup
Divisible Divisibility	Related fact
Equivalent fraction	Relational symbols (< > =)
Estimate Round	Remainder
Expanded form	Simplest form
Fact family	Standard form
Factors	Subtrahend
Front end estimation	Sum
Improper fraction	Thousands, millions
Inequality	Total
Inverse operation	Under/over estimate
Minuend	Whole numbers
Mixed number	Word form

MSDE Rubric

For Step B of Written Response

Score 2

The response demonstrates a complete understanding and analysis of a problem.

- Application of a reasonable strategy in the context of the problem is indicated.
- Explanation¹ of and/or justification² for the mathematical process (es) used to solve a problem is clear, developed, and logical.
- Connections and/or extensions made within mathematics or outside of mathematics are clear. Supportive info and/or numbers are provided as appropriate.³

Score 1

The response demonstrates a minimal understanding and analysis of a problem.

- Partial application of a strategy in the context of the problem is indicated.
- Explanation¹ of and/or justification² for the mathematical process (es) used to solve a problem is partially developed, logically flawed, or missing.
- Connections and/or extensions made within mathematics or outside of mathematics are partial or overly general, or flawed. Supportive information and/or numbers may or may not be provided as appropriate.³

Score 0

The response is completely incorrect, irrelevant to the problem, or missing.⁴

Notes:

¹ **Explanation** refers to students' ability to communicate **how** they arrived at the solution for an item using the language of mathematics.

² **Justification** refers to students' ability to support the reasoning used to solve a problem, or to demonstrate **why** the solution is correct using mathematical concepts and principles.

³ Students need to complete rubric criteria for **explanation, justification, connections** and/or **extensions** as cued for in a given problem.

⁴

Merely an exact copy or paraphrase of the problem will receive a score of "0".

Page 6 ECR Rubric (4 points total)

This is for STEP B ONLY

(Step A = 1 point and Step B = 3 points)

Score 3

The response demonstrates a comprehensive understanding and analysis of a problem.

- Application of a reasonable strategy in the context of the problem is indicated.
- Explanation¹ of and/or justification² for the mathematical process(es) used to solve a problem is clear, fully developed, and logical.
- Connections and/or extensions made within mathematics or outside of mathematics are clear and stated explicitly.
- Supportive information and/or numbers are provided as appropriate.³

Score 2

The response demonstrates a general understanding and analysis of a problem.

- Application of a reasonable strategy in the context of the problem is indicated.
- Explanation¹ of and/or justification² for the mathematical process(es) used to solve a problem is feasible, but may be only partially developed.
- Connections and/or extensions made within mathematics or outside of mathematics are partial or overly general, or may be implied.
- Supportive information and/or numbers are provided as appropriate.³

Score 1

The response demonstrates a minimal understanding and analysis of a problem.

- Partial application of a strategy in the context of the problem is indicated.
- Explanation¹ of and/or justification² for the mathematical process(es) used to solve a problem is logically flawed or missing.
- Connections and/or extensions made within mathematics or outside of mathematics are flawed or missing.
- Supportive information and/or numbers may or may not be provided as appropriate.³

Score 0

The response is completely incorrect, irrelevant to the problem, or missing.⁴

Notes:

1

Explanation refers to students' ability to communicate **how** they arrived at the solution for an item using the language of mathematics.

2

Justification refers to students' ability to support the reasoning used to solve a problem, or to demonstrate **why** the solution is correct using mathematical concepts and principles.

3

Students need to complete rubric criteria for **explanation, justification, connections** and/or **extensions** as cued for in a given problem.

4

Merely an exact copy or paraphrase of the problem will receive a score of "0".

Vocabulary to Use When Writing About Math

Standard #5

Probability

Certain

Chance

Denominator

Equally likely

Event

Experimental probability

Fair

Fraction

Impossible

Improbable

Less/least likely

More/most likely

Numerator

Organized list

Possible outcome

Prediction

Probability statement

Probable outcome

Sample space

Tally chart

Tally mark

Theoretical probability

Tree diagram

Unfair

Vocabulary to Use When Writing About Math

<u>Standard #4</u>	Range
<u>Statistics</u>	Scale
Bar graph	Set
Category	Stem-leaf plot
Choices	Survey
Circle graph	Table
Collect	Title
Coordinate pair	Vertical
Data	Vertically
Display	X axis
Frequency	Y axis
Horizontal	
Horizontally	
Interval	
Key	
Label	
Line graph	
Line plot	
Mean	
Median	
Mode	
Multiple	
Organize	
Pictograph	
Point	

ECR SAMPLE And Response

Michele took a 20-question quiz in her mathematics class.

She answered 17/ 20 of the questions correctly on the quiz.

Step A

What is Michele's score written as a percent?

Step B

- Explain how you found the percent that is equivalent to the fraction form of Michele's score. Use what you know about fractions and percents in your explanation. Use words, numbers, and/or symbols.
- Michele took a 25-question quiz in her science class. She answered 17/25 of the questions correctly. Is the score on her science quiz the same or different than her math score? Explain why your answer is correct. Use what you know about fractions and percents in your explanation. Use words, numbers, and/or symbols.

Answer:

Step A: 85%

Step B: (Notice the answer addresses both bullets in the Step B of the question above.)

- Michael's score is 85% because 20 times 5 is 100. 17 times 5 is 85. The top number in the fraction converts to a percent.
- Michael's science score is 68% because 25 x 4 is 100 and 17 times 4 is 68%. The top number once again converts.

Verbs to Use When Answering a BCR/ECR

Added	Flipped (reflected)	Slid (translated)
Analyzed	Formulated	Solved
Arranged	Graphed	Subtracted
Calculated	Grouped	Transformed
Classified	Halved	Turned (rotated)
Collected	Identified	
Compared	Increased	
Computed	Interpreted	
Confirmed	Listed	
Connected	Located	
Converted	Measured	
Counted	Multiplied	
Created	Ordered	
Decreased	Ordered	
Displayed	Organized	
Divided	Placed	
Doubled	Plotted	
Estimated	Predicted	
Evaluated	Regrouped	
Examined	Repeated	
Experimented	Rounded	
Extended	Skipped	

Vocabulary to Use When Writing About Math

	Ordered pairs
Algorithm	Output
Change	Plot
Constant	Points
Coordinate grid	Relational symbols ($<$, $>$, $=$)
Core (of pattern)	Repeating
Decrease	Sequence
Equation	Solution
equivalent	Steady
Expression	Symbol
Formula	Two operation rule
Function	Unknown
Greater than	Variable
Growing	Vertical
Horizontal	X axis
Increase	X coordinate
Inequality	Y axis
Inequality	Y coordinate
Input	
Less than	
Missing number	
Number sentence	
One operation rule	
Operational symbols ($+$ - x \div)	