THE HEART OF IT ALL™

Ohio.org

Department of Education & Workforce

CONNECTING DATA AND ASSESSMENT RESULTS TO INSTRUCTION

Regional Data Leads December Meeting

CHERYL VOJACEK

Office of Assessment

BRIAN BICKLEY

Office of Academic Success

December 20, 2024

WHAT DO WE DO WITH THE DATA?

Notice

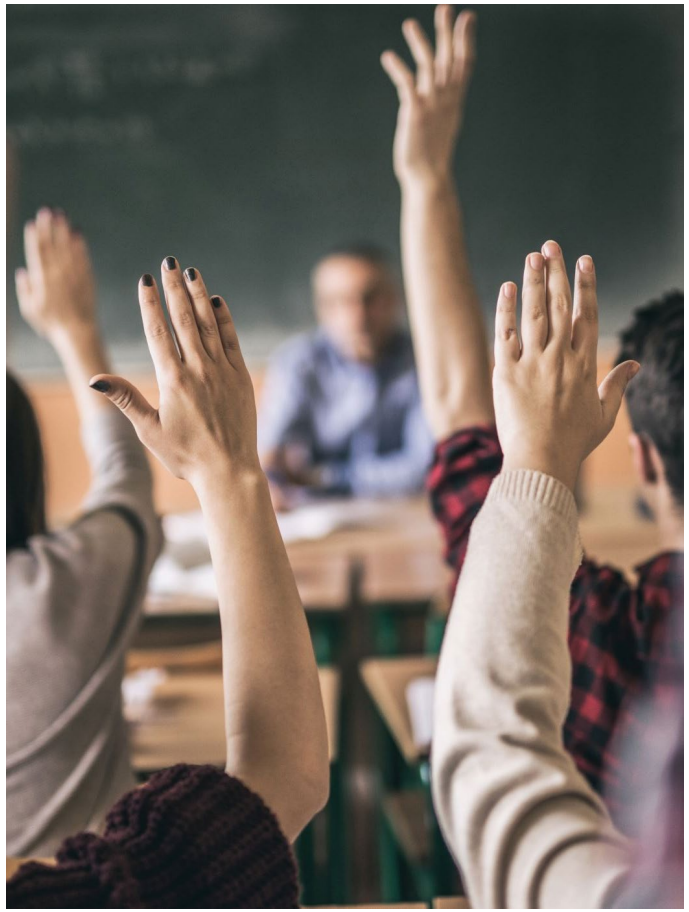
Wonder

Evaluate

DATA IN EDUCATION IS NOT GOING AWAY

District

Building



Classroom

THE STANDARDS FOR EDUCATIONAL AND PSYCHOLOGICAL TESTING

Decision

Characterization

Impact

INTERPRETING DATA FROM OHIO'S STATE TESTS

LEARNING STANDARDS

Districts

Schools

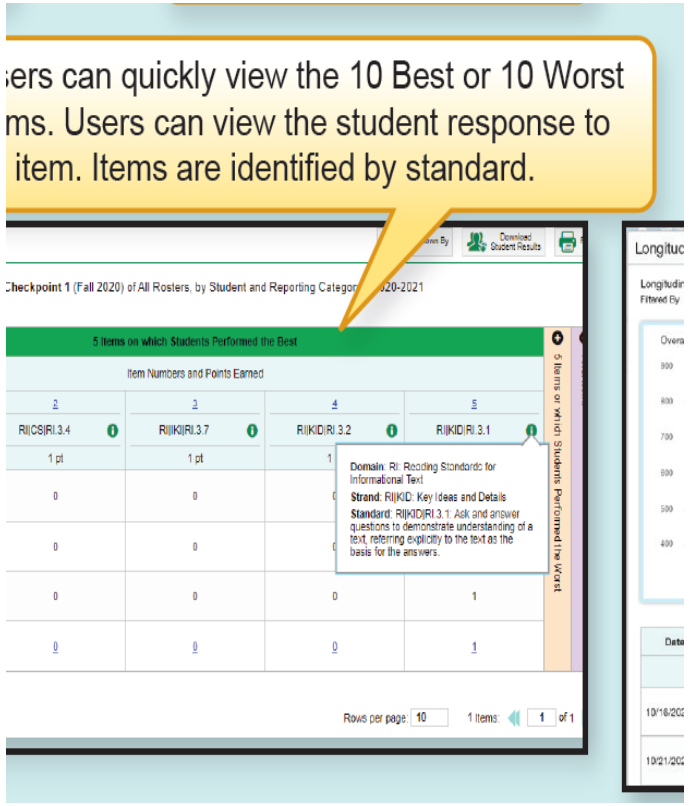
Students

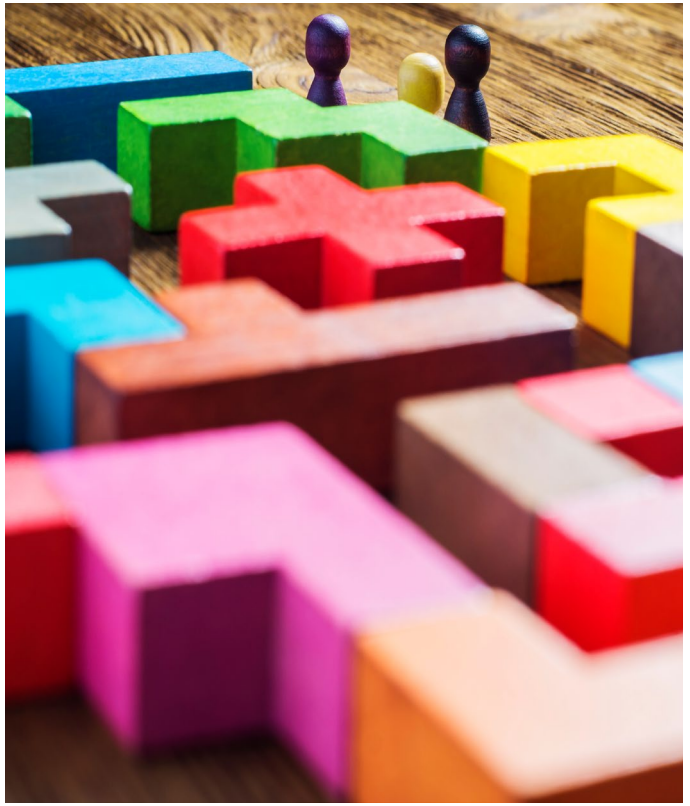
INTERPRETING DATA FROM OHIO'S STATE TESTS

Representative Sample

Strand/Domain


the more you know





NOTICE **WONDER** **EVALUATE**

LET'S DO SOME MATH

GRADE 5 MATH OHIO STATE TEST RELEASE ITEMS
(ANSWER THE 2 QUESTIONS BELOW)

Which expression is equivalent to $\frac{198}{4}$?

A $198 + 4$

B $198 - 4$

C 198×4

D $198 \div 4$

Point K is located 6 units to the right of the origin and 4 units up on the coordinate plane.

What are the coordinates of point K?

A (0, 10)

B (4, 6)

C (6, 4)

D (10, 0)

GRADE 5 MATH OHIO STATE TEST RELEASE ITEMS

Which expression is equivalent to $\frac{198}{4}$?

A $198 + 4$

B $198 - 4$

C 198×4

● $198 \div 4$

Scoring Guidelines

Rationale for Option A: This is incorrect. The student may interpret a fraction as addition of the numerator and the denominator.

Rationale for Option B: This is incorrect. The student may interpret a fraction as subtraction of the denominator from the numerator.

Rationale for Option C: This is incorrect. The student may interpret a fraction as multiplication of the numerator by the denominator.

Rationale for Option D: **Key** – The student correctly interprets a fraction as division of the numerator by the denominator.

Reporting Category: Fractions **Standard: 5.NF.3** **DOK 1**

DISCUSSION QUESTIONS

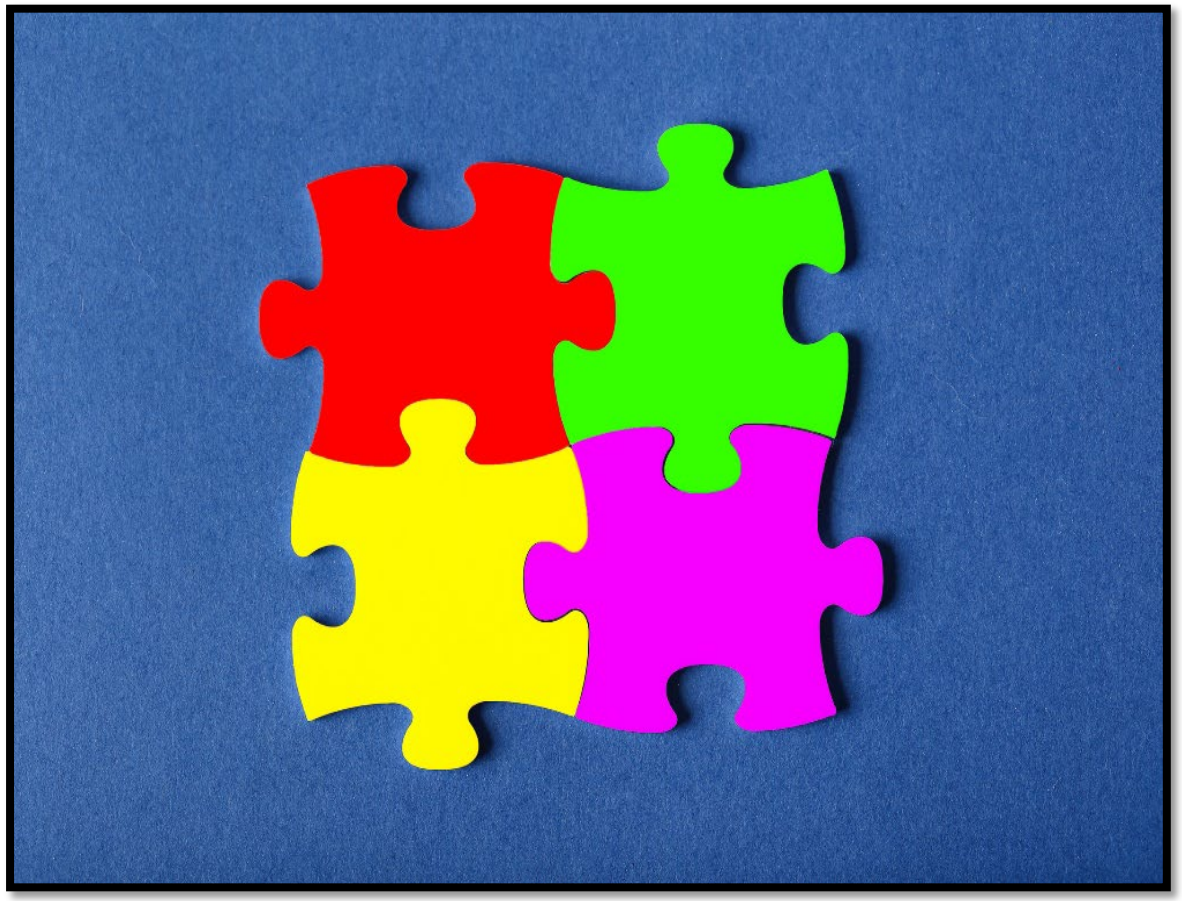
Which expression is equivalent to $\frac{198}{4}$?

- (A) $198 + 4$
- (B) $198 - 4$
- (C) 198×4
- ● $198 \div 4$

How might a student in Grade 5 solve this problem?

Describe the kind of instruction you think might be needed for a student to be able to demonstrate this type of mathematical thinking and reasoning.

MODEL CURRICULUM



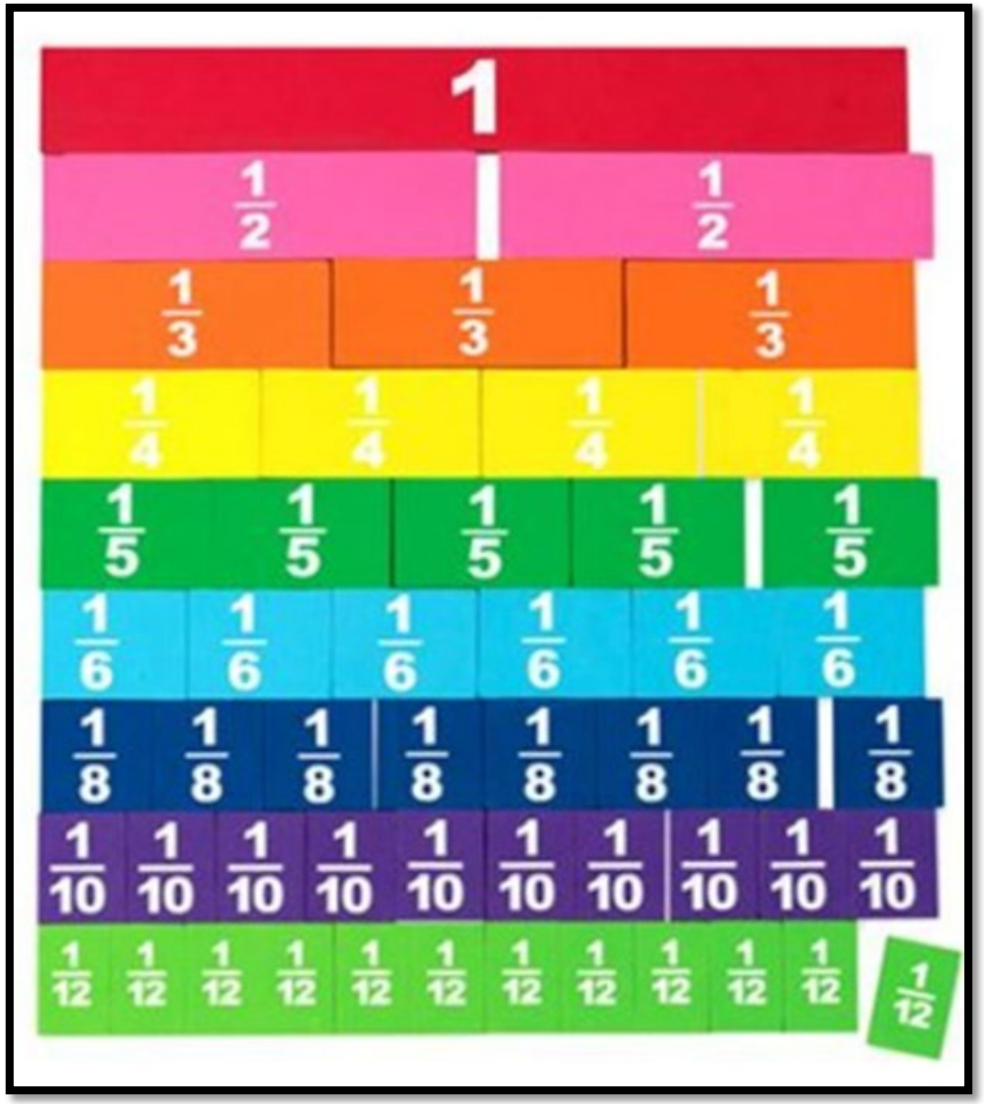
$$a/_b = \frac{a}{b}$$

Content Elaborations

Expectations for Learning

COMMON MISCONCEPTIONS

5.NF.3



GRADE 5 MATH OHIO STATE TEST RELEASE ITEMS

Point K is located 6 units to the right of the origin and 4 units up on the coordinate plane.

What are the coordinates of point K?

Ⓐ (0, 10)

Ⓑ (4, 6)

Ⓒ (6, 4)

Ⓓ (10, 0)

Scoring Guidelines

Rationale for Option A: This is incorrect. The student may add the two distances along the x- and y-axes together and determine that the y-coordinate would have a value of 10.

Rationale for Option B: This is incorrect. The student may mistake the x- and y-coordinates, and then identify a point that is 4 units to the right of the origin and 6 units up.

Rationale for Option C: **Key** – The student correctly identifies that a point 6 units to the right of the origin and 4 units up will have an x-coordinate of 6 and a y-coordinate of 4.

Rationale for Option D: This is incorrect. The student may add the two distances along the x- and y-axes together and determine that the x-coordinate will have a value of 10.

Reporting Category: Geometry **Standard: 5.G.1** **DOK 1**

DISCUSSION QUESTIONS

Point K is located 6 units to the right of the origin and 4 units up on the coordinate plane.

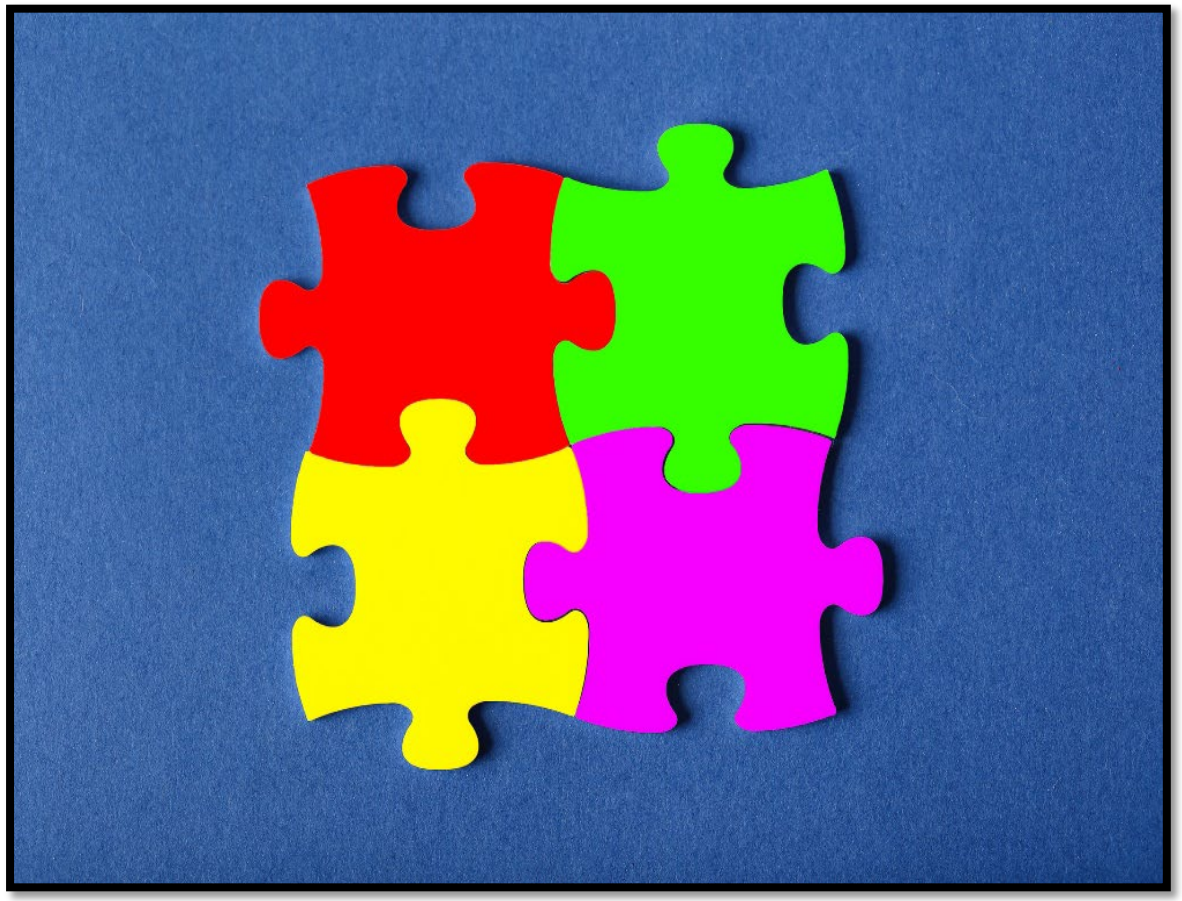
What are the coordinates of point K?

- Ⓐ (0, 10)
- Ⓑ (4, 6)
- Ⓒ (6, 4)
- Ⓓ (10, 0)

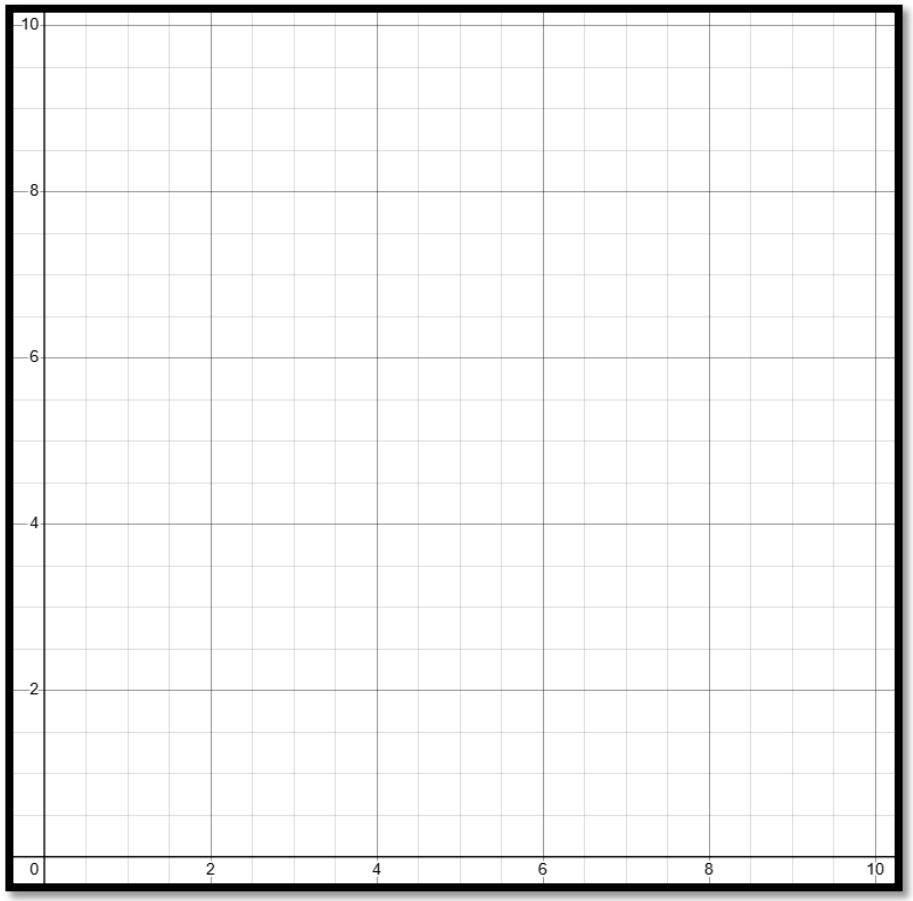
How might a student in Grade 5 solve this problem?

Describe the kind of instruction you think might be needed for a student to be able to demonstrate this type of mathematical thinking and reasoning.

MODEL CURRICULUM



Content Elaborations



Expectations for Learning

COMMON MISCONCEPTIONS

5.G.1

(X,Y)

LET'S DO SOME MORE MATH

GRADE 8 MATH OHIO STATE TEST RELEASE ITEMS

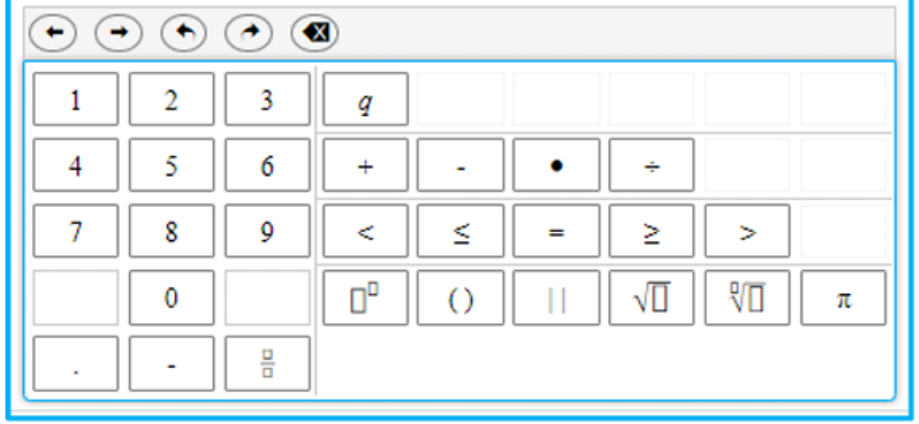
(ANSWER THE QUESTION BELOW)

A conversion chart between a number of quarts (q) and a number of liters (l) is shown.

Quarts (q)	Liters (l)
1	0.95
2	1.90
3	2.85
4	3.80
5	4.75

Complete the equation to model l in terms of q.

$l =$ [ ]



GRADE 8 MATH OHIO STATE TEST RELEASE ITEMS
(ANSWER THE QUESTION BELOW)

A conversion chart between a number of quarts (q) and a number of liters (l) is shown.

Quarts (q)	Liters (l)
1	0.95
2	1.90
3	2.85
4	3.80
5	4.75

Complete the equation to model l in terms of q.

$l =$ $0.95q$

Full Credit Response

A conversion chart between a number of quarts (q) and a number of liters (l) is shown.

Quarts (q)	Liters (l)
1	0.95
2	1.90
3	2.85
4	3.80
5	4.75

Complete the equation to model l in terms of q.

$l =$ $q+0.95$

No Credit Response

Reporting Category: Functions **Standard: 8.F.4** **DOK 2**

DISCUSSION QUESTIONS

A conversion chart between a number of quarts (q) and a number of liters (l) is shown.

Quarts (q)	Liters (l)
1	0.95
2	1.90
3	2.85
4	3.80
5	4.75

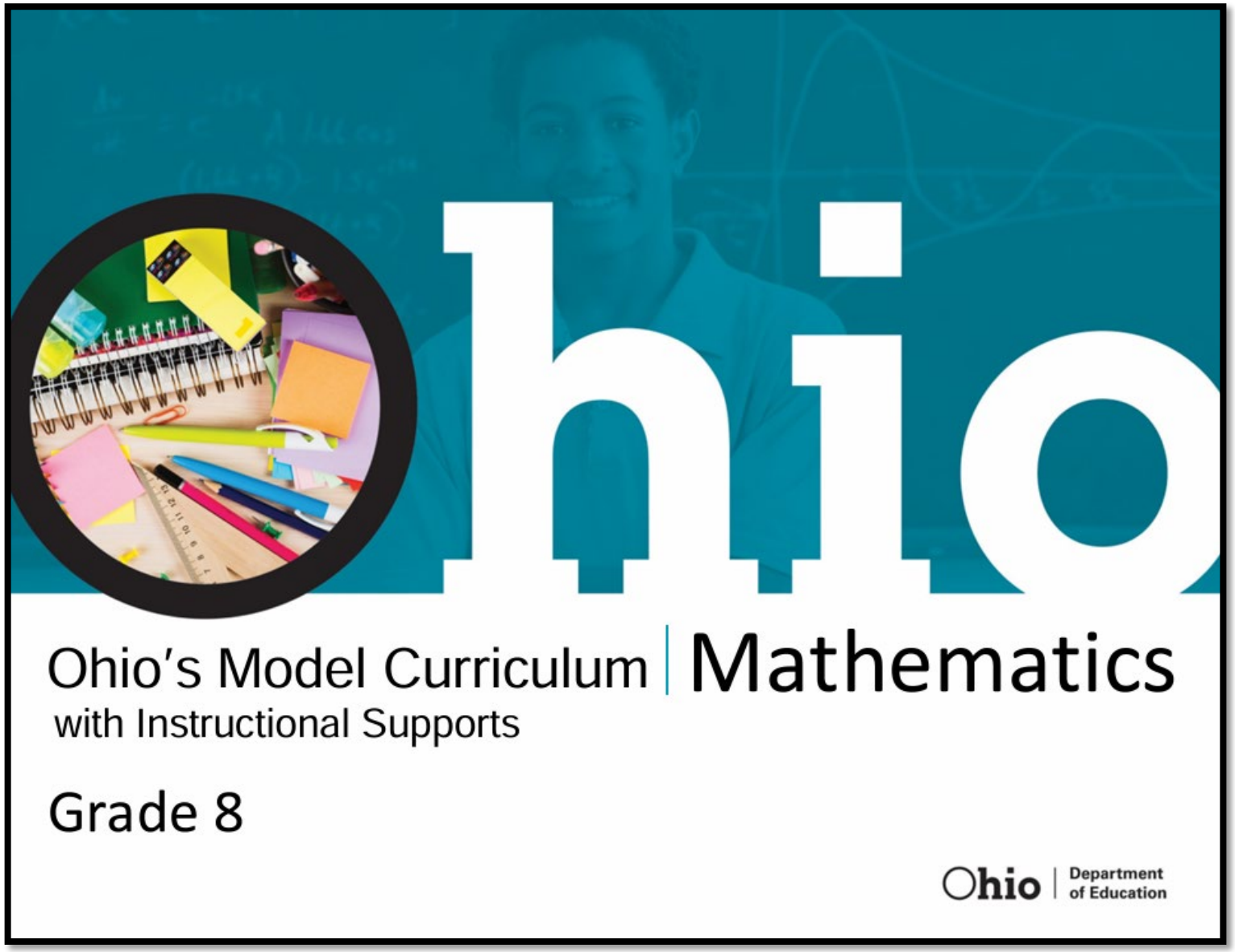
Complete the equation to model l in terms of q.

$l =$ $0.95q$

How might a student in Grade 8 solve this problem?

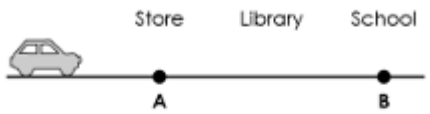
Describe the kind of instruction you think might be needed for a student to be able to demonstrate this type of mathematical thinking and reasoning.

OHIO'S MODEL CURRICULUM WITH INSTRUCTIONAL SUPPORTS

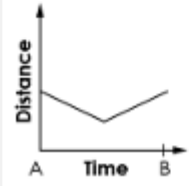


GRADE 8 MATH OHIO STATE TEST RELEASE ITEMS
(ANSWER THE QUESTION BELOW)

A car drives at a constant rate, passing a store, a library, and a school along the way. A model of the car's path is shown.



Match each building to the graph that models the distance from the car to the building over time as the car travels from point A to point B.

	Store	Library	School
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐

GRADE 8 MATH OHIO STATE TEST RELEASE ITEMS

A car drives at a constant rate, passing a store, a library, and a school along the way. A model of the car's path is shown.

Match each building to the graph that models the distance from the car to the building over time as the car travels from point A to point B.

	Store	Library	School
	☑	☐	☐
	☐	☐	☑
	☐	☑	☐

Full Credit Response

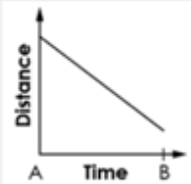
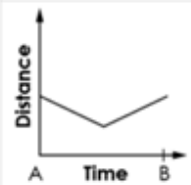
Reporting Category: Functions

Standard: 8.F.5

DOK 3

A car drives at a constant rate, passing a store, a library, and a school along the way. A model of the car's path is shown.

Match each building to the graph that models the distance from the car to the building over time as the car travels from point A to point B.

	Store	Library	School
	☐	☐	☑
	☑	☐	☐
	☐	☑	☐

No Credit Response

DISCUSSION QUESTIONS

How might a student in Grade 8 solve this problem?

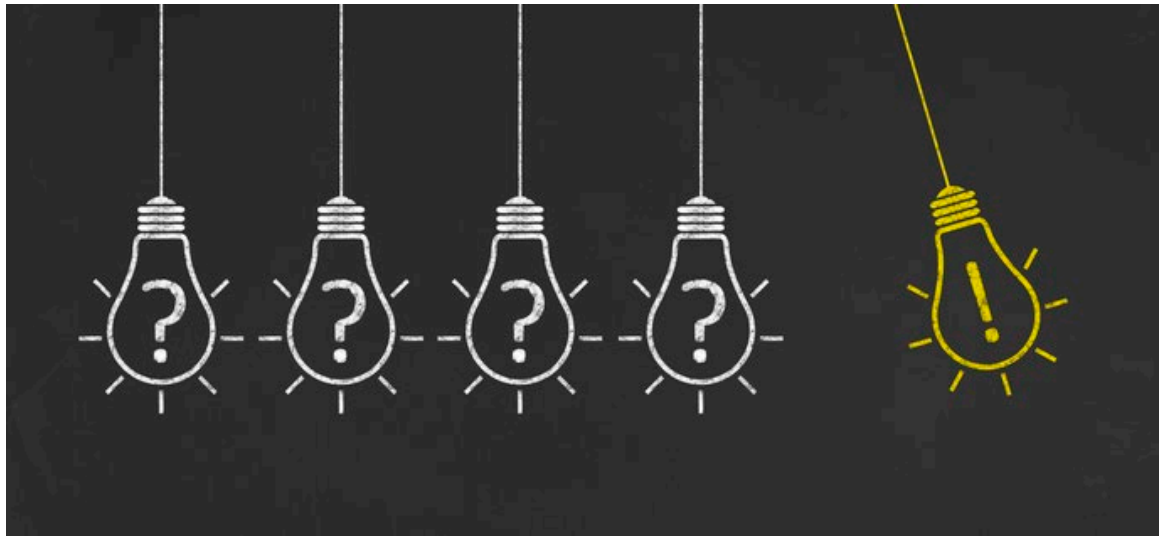
Describe the kind of instruction you think might be needed for a student to be able to demonstrate this type of mathematical thinking and reasoning.

A car drives at a constant rate, passing a store, a library, and a school along the way. A model of the car's path is shown.

Match each building to the graph that models the distance from the car to the building over time as the car travels from point A to point B.

	Store	Library	School
	☑	☐	☐
	☐	☐	☑
	☐	☑	☐

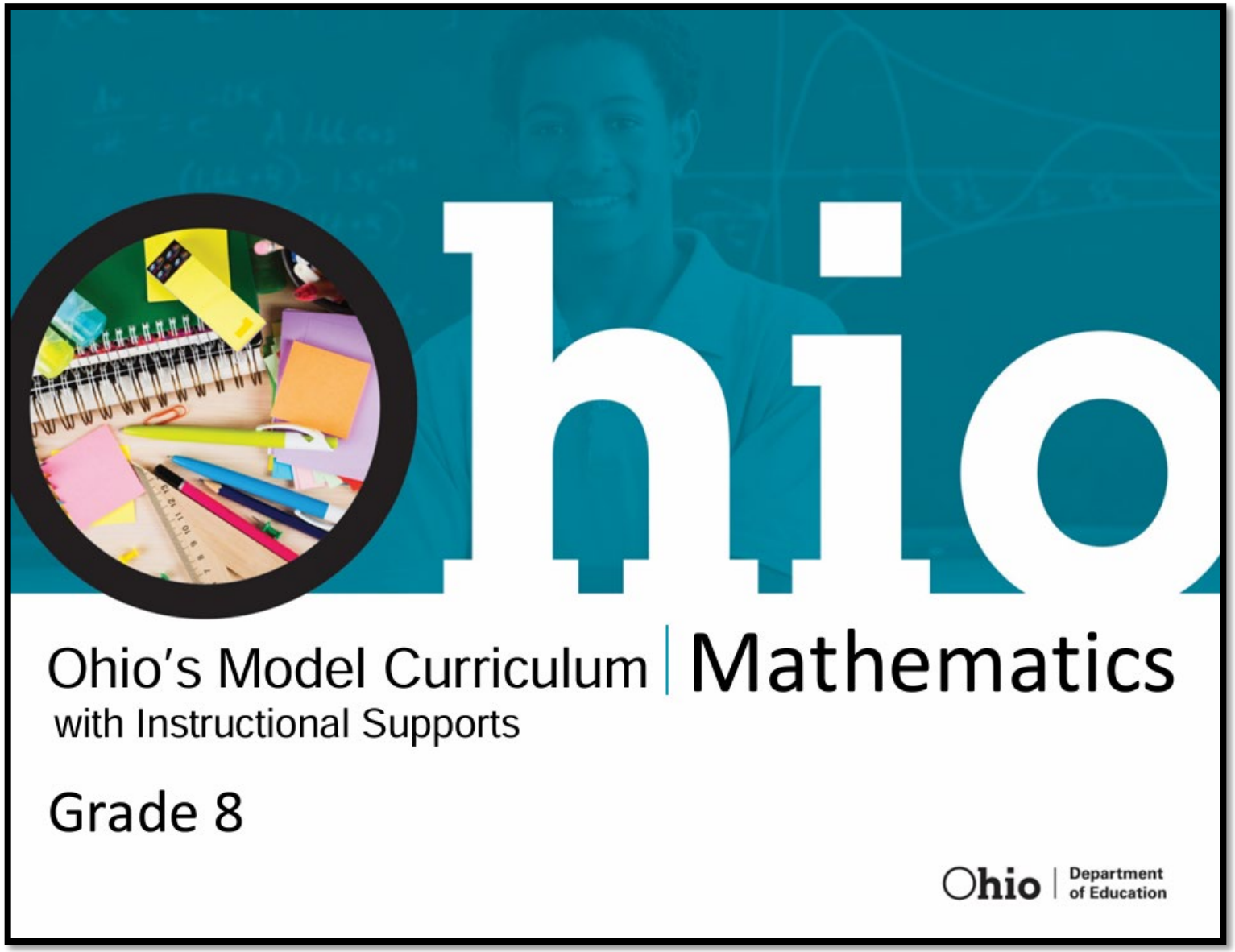
MODEL CURRICULUM



Content Elaborations

Expectations for Learning

OHIO'S MODEL CURRICULUM WITH INSTRUCTIONAL SUPPORTS

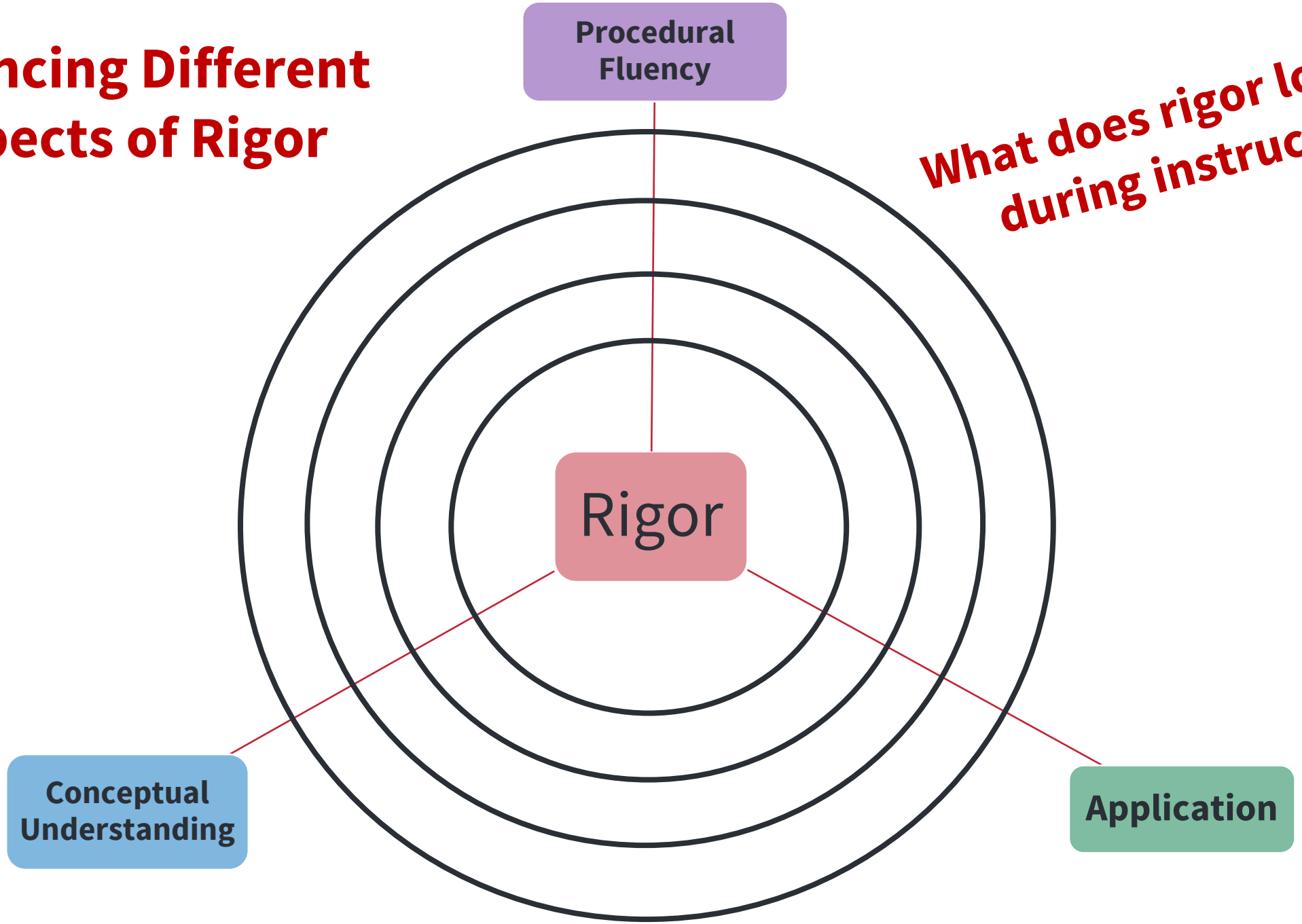


WHAT IS RIGOR?

Rigor refers to the deep, authentic command of mathematical concepts, not making math harder or introducing topics at earlier grades. To help students meet the standards, educators need to pursue, with equal intensity, three aspects of rigor in each grade: conceptual understanding, procedural skills, and fluency and application.

- **Conceptual understanding:** The Ohio Learning Standards call for conceptual understanding of key concepts. Teachers support students' ability to access concepts from several perspectives so that students can see math as more than a set of mnemonics or discrete procedures.
- **Procedural skill and fluency:** The Ohio Learning Standards call for accuracy in calculations. Educators embed a variety of opportunities for students to build upon their conceptual understandings to develop procedural skills and fluencies.
- **Application:** The Ohio Learning Standards call for students to use math flexibly through a variety of applications. Educators provide an abundance of opportunities for students to apply math in meaningful student contexts, including in other content areas and real-world situations.

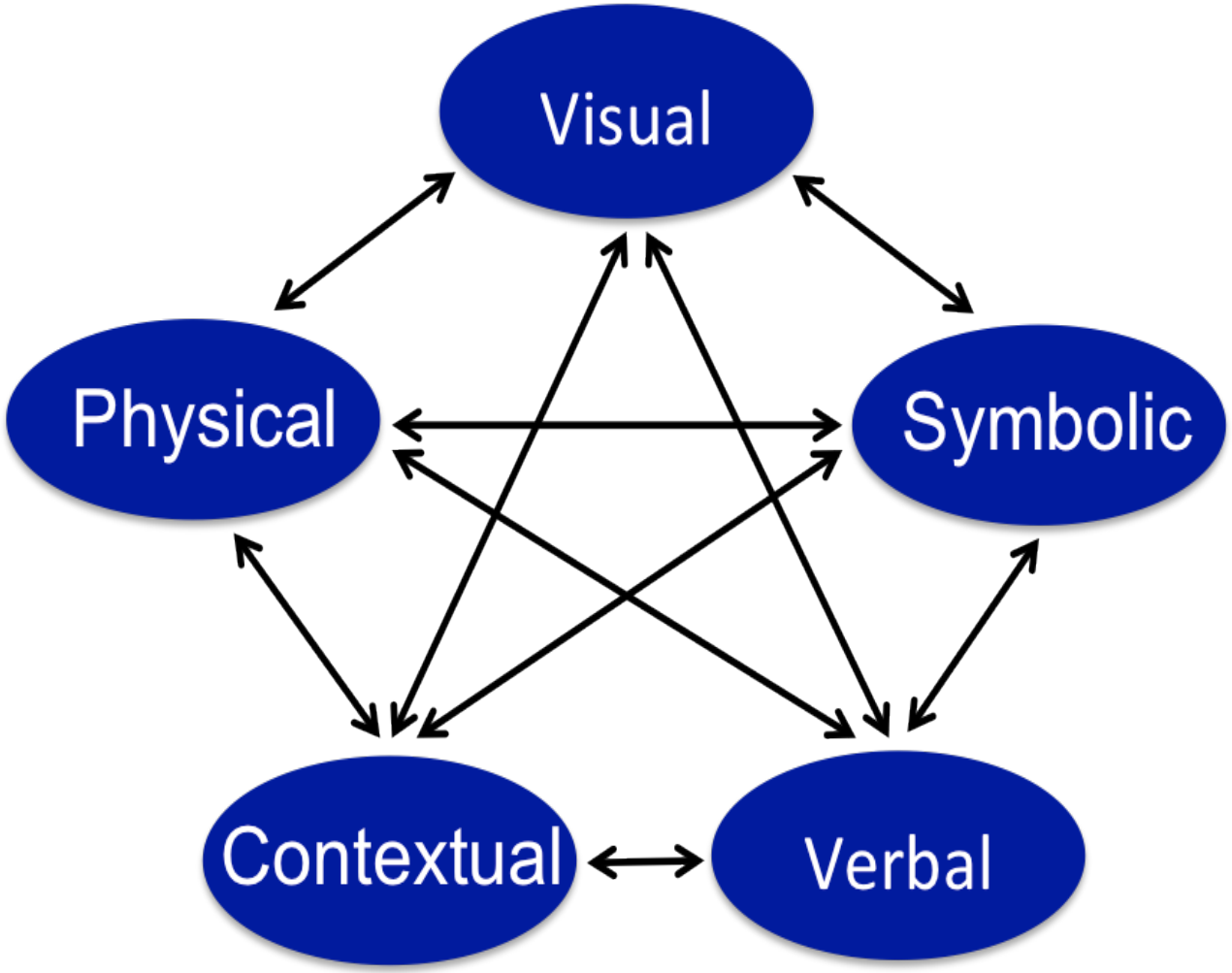
Balancing Different Aspects of Rigor



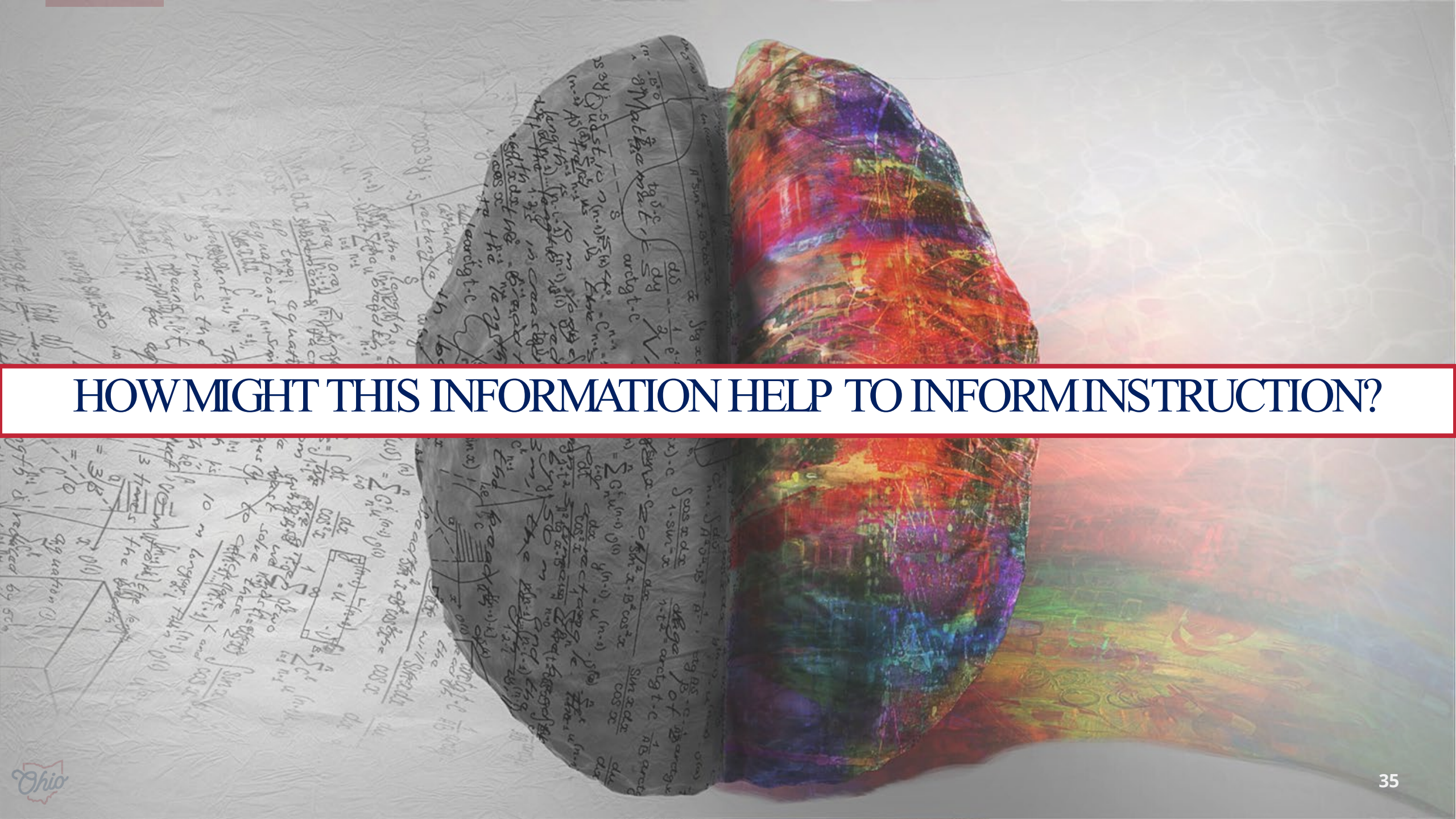
What does rigor look like during instruction?

FINDING A BALANCE

DEMONSTRATING CONCEPTUAL UNDERSTANDING



National Council of Teachers of Mathematics (NCTM). (2014). Effective teaching and learning. *Principles to Actions: Ensuring mathematical success for all.* p. 25. Reston, VA: Author.



HOW MIGHT THIS INFORMATION HELP TO INFORM INSTRUCTION?

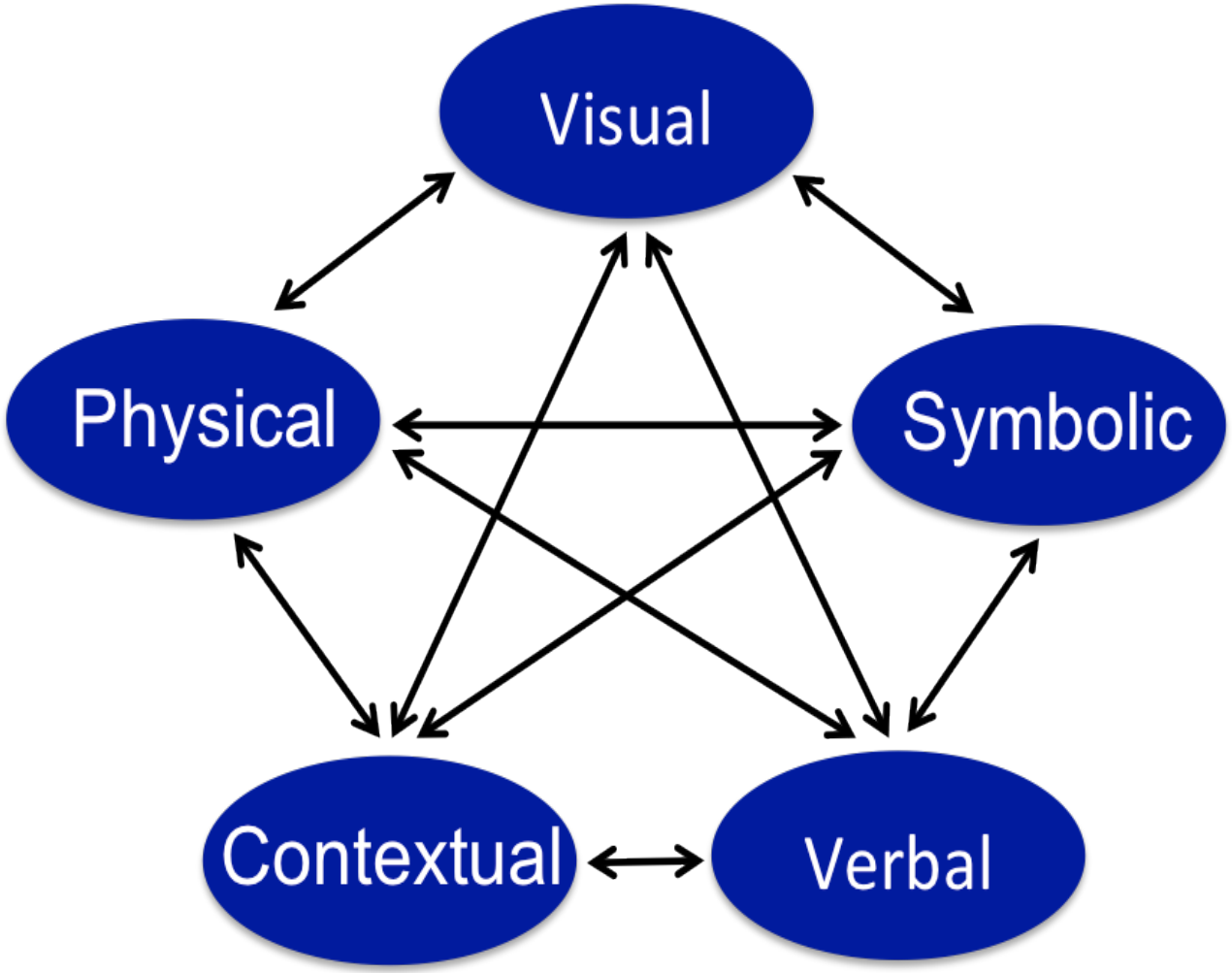
OHIO'S DEFINITION OF RIGOR

Students use mathematical language to communicate effectively and describe their work with clarity and precision. Students demonstrate how, when and why their procedures work and why they are appropriate. Students can answer the question, "How do we know?"

WHAT DOES RIGOR LOOK LIKE?

Rigorous courses are…	vs.	Rigorous courses are not…
Defined by complexity, which is a measure of the thinking, action or knowledge that is needed to complete the task.		Characterized by difficulty, which is a measure of effort required to complete a task.
Measured in depth of understanding.		Measured by the amount of work.
Opportunities for precision in reasoning, language, definitions and notation that are sufficient to appropriate age/course.		Based on procedure alone.
Determined by students' processes.		Measured by assigning difficult problems.
Opportunities for students to make decisions in problem-solving.		Defined only by the resources used.
Opportunities to make connections.		Taught in isolation.
Supportive of the transfer of knowledge to new situations.		Repetitive.
Driven by students developing efficient explanations of solutions and why they work, providing opportunities for thinking and reasoning about contextual problems and situations.		Focused on getting an answer.
Defined by what the students do with what you give them.		Defined by what you give the students.

DEMONSTRATING CONCEPTUAL UNDERSTANDING



National Council of Teachers of Mathematics (NCTM). (2014). Effective teaching and learning. *Principles to Actions: Ensuring mathematical success for all.* p. 25. Reston, VA: Author.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

QUESTIONS?

OHIO.ORG

Ohio™ THE HEART OF IT ALL™

QUESTIONS?

EDUCATION.OHIO.GOV

Department of Education & Workforce

OHIO.ORG

Department of Education & Workforce

EDUCATION.OHIO.GOV

GRADE 8 MATH OHIO STATE TEST RELEASE ITEMS
(ANSWER THE 2 QUESTIONS BELOW)

Four functions are shown.

Which function is linear?

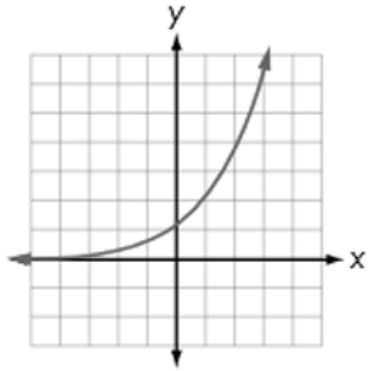
Ⓐ $y = -\frac{1}{2}x^2 + 1$

Ⓑ

x	y
−3	−1
0	1
3	3

Ⓒ $\{(-2, 5), (0, 1), (2, 5)\}$

Ⓓ



An increasing function passes through (x, y) and (m, n).

Which statement correctly compares the two points?

Ⓐ If $x < m$, then $y \leq n$.

Ⓑ If $x > m$, then $y \leq n$.

Ⓒ If $x < m$, then $y < n$.

Ⓓ If $x > m$, then $y < n$.

GRADE 8 MATH OHIO STATE TEST RELEASE ITEMS

Four functions are shown.

Which function is linear?

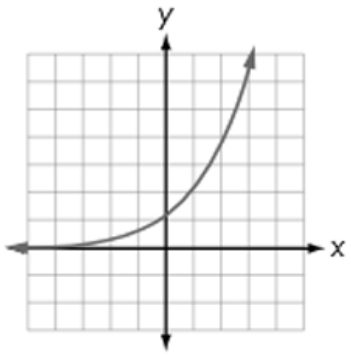
Ⓐ $y = -\frac{1}{2}x^2 + 1$

Ⓑ

x	y
−3	−1
0	1
3	3

Ⓒ $\{(-2, 5), (0, 1), (2, 5)\}$

Ⓓ



Scoring Guidelines

Rationale for Option A: This is incorrect. The student may think that because the format is similar to $y = mx + b$, it must be a linear function.

Rationale for Option B: **Key** – The student correctly determines that the table represents a linear function.

Rationale for Option C: This is incorrect. The student may realize that this represents a function but may not realize that the function is not linear.

Rationale for Option D: This is incorrect. The student may realize that this represents a function but may not realize that the function is not linear.

Reporting Category: Functions **Standard: 8.F.3** **DOK 2**

GRADE 8 MATH OHIO STATE TEST RELEASE ITEMS

An increasing function passes through (x, y) and (m, n).

Which statement correctly compares the two points?

A If $x < m$, then $y \leq n$.

B If $x > m$, then $y \leq n$.

C If $x < m$, then $y < n$.

D If $x > m$, then $y < n$.

Scoring Guidelines

Rationale for Option A: This is incorrect. The student may identify that when x is less than m, the point (x, y) is to the left of point (m, n) in the graph but may not realize that an increasing function is always increasing, so y could never be equal to n because in that case the function would create a horizontal line and not an increasing line.

Rationale for Option B: This is incorrect. The student may misread the question and answer as if the function is decreasing, since if x is greater than m the point (x, y) is to the right of point (m, n) in the graph and the student might not recognize that a decreasing function is always decreasing, so y could never be equal to n because in that case the function would create a horizontal line.

Rationale for Option C: **Key** – The student selects the statement that correctly compares the two points. When x is less than m, the point (x, y) is to the left of point (m, n) in the graph and when y is less than n, the point (x, y) is closer to the x-axis than point (m, n). When a line is drawn through these two points, it will create an increasing function.

Rationale for Option D: This is incorrect. The student may misread the question and answer as if the function were decreasing because when x is greater than m, then point (x, y) is to the right of point (m, n) in the graph and when y is less than n, point (x, y) is closer to the x-axis in the graph. When a line is drawn through these two points, it will create a decreasing function.

Reporting Category: Functions **Standard: 8.F.5** **DOK 3**

GRADE 8 MATH OHIO STATE TEST RELEASE ITEMS

(ANSWER THE 2 QUESTIONS BELOW)

A graph passes through the points (0, 0), (1, 2), and (2, 5).

Which statement about the graph is true?

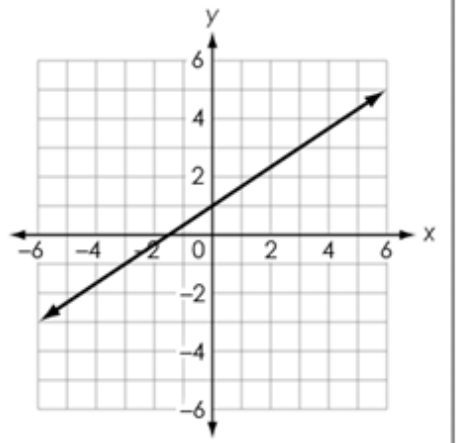
Ⓐ It is linear because the graph passes through the origin.

Ⓑ It is not linear because the graph passes through the origin.

Ⓒ It is linear because a straight line can pass through the given points.

Ⓓ It is not linear because a straight line cannot pass through the given points.

Two linear functions are shown.

Function *F*	Function *G*
$y = \frac{1}{2}x + 4$	

Select the **two** correct statements about functions *F* and *G*.

- ☐ Function *F* has a greater y-intercept than Function *G*.
- ☐ Function *G* has a greater y-intercept than Function *F*.
- ☐ Function *F* has a greater rate of change than Function *G*.
- ☐ Function *G* has a greater rate of change than Function *F*.
- ☐ Function *F* has the same rate of change as Function *G*.

GRADE 8 MATH OHIO STATE TEST RELEASE ITEMS
(ANSWER THE 2 QUESTIONS BELOW)

A graph passes through the points (0, 0), (1, 2), and (2, 5).

Which statement about the graph is true?

Ⓐ It is linear because the graph passes through the origin.

Ⓑ It is not linear because the graph passes through the origin.

Ⓒ It is linear because a straight line can pass through the given points.

Ⓓ It is not linear because a straight line cannot pass through the given points.

Scoring Guidelines

Rationale for Option A: This is incorrect. The student may identify that the graph passes through the origin, but does not consider that the line cannot pass through all three points since the slope of a line going through the first two points is 2, but the slope of a line going through the second two points is 3.

Rationale for Option B: This is incorrect. The student may mistakenly believe that a linear function must have a nonzero y-intercept and therefore not pass through the origin.

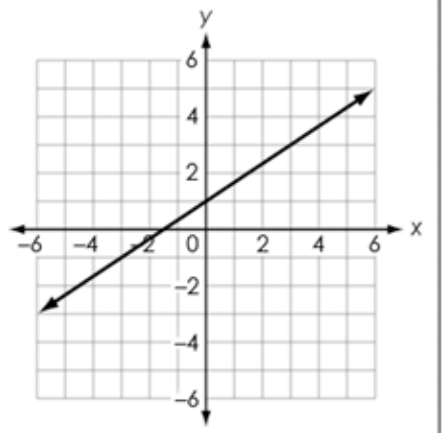
Rationale for Option C: This is incorrect. The student may think that since the x-coordinate increases by 1 for each point, then a line can be drawn that intersects all three points. However, to determine whether three or more points are collinear, the slope of a line connecting each adjacent pair of points must be the same. For the three given points, slope of a line connecting the first two points is 2, but the slope of a line connecting the last two points is 3.

Rationale for Option D: **Key** – The student correctly recognizes that the function that passes through the given points is not a linear function since the slope of a line connecting the first two points is 2, but the slope of a line connecting the last two points is 3.

Reporting Category: Functions **Standard: 8.F.3** **DOK 2**

GRADE 8 MATH OHIO STATE TEST RELEASE ITEMS

Two linear functions are shown.

Function *F*	Function *G*
$y = \frac{1}{2}x + 4$	

Select the **two** correct statements about functions *F* and *G*.

- ☐ Function *F* has a greater y-intercept than Function *G*.
- ☐ Function *G* has a greater y-intercept than Function *F*.
- ☐ Function *F* has a greater rate of change than Function *G*.
- ☐ Function *G* has a greater rate of change than Function *F*.
- ☐ Function *F* has the same rate of change as Function *G*.

Scoring Guidelines

Rationale for First Option: **Key** – The student identifies the y-intercept of Function *F* is 4 and the y-intercept of Function *G* is 1 and concludes that Function *F* has a greater y-intercept than Function *G* since 4 is greater than 1.

Rationale for Second Option: This is incorrect. The student may confuse the y-intercept with the rate of change of Function *F* and compare the slope of Function *F*, $\frac{1}{2}$, to the y-intercept of Function *G*, 1, and concludes that Function *G* has a greater y-intercept than Function *F* since 1 is greater than $\frac{1}{2}$.

Rationale for Third Option: This is incorrect. The student may confuse the rate of change with the y-intercept of Function *F* and compare the y-intercept of Function *F*, 4, to the rate of change of Function *G*, $\frac{2}{3}$, and concludes that Function *F* has a greater rate of change than Function *G* since 4 is greater than $\frac{2}{3}$.

Rationale for Fourth Option: **Key** – The student identifies the rate of change of Function *F* is $\frac{1}{2}$ and the rate of change of Function *G* is $\frac{2}{3}$, and concludes that Function *G* has a greater rate of change than Function *F* since $\frac{2}{3}$ is greater than $\frac{1}{2}$.

Rationale for Fifth Option: This is incorrect. The student may use the points (2, 2) and (0, 1) to find the slope of Function *G* to be $\frac{1}{2}$ without realizing that (2, 2) does not lie on *G*, and concludes that Function *F* has the same rate of change as Function *G* since $\frac{1}{2} = \frac{1}{2}$.

Reporting Category: Functions **Standard: 8.F.2** **DOK 2**

GRADE 5 MATH OHIO STATE TEST RELEASE ITEMS

A table with two patterns is shown.

Pattern X	4	8	12	16	20
Pattern Y	2	4	6	8	10

Each pattern uses a different rule.

Complete the statement that describes the corresponding terms in each pattern.

The value of each term in **Pattern X or Pattern Y** is **3 times, or 2 more than** the value of the same term in **Pattern X or Pattern Y**

half, twice,

Reporting Category: Geometry

Standard: 5.OA.1

DOK 3

GRADE 5 MATH OHIO STATE TEST RELEASE ITEMS

A table with two patterns is shown.

Pattern X	4	8	12	16	20
Pattern Y	2	4	6	8	10

Each pattern uses a different rule.

Complete the statement that describes the corresponding terms in each pattern.

The value of each term in Pattern X is twice the value of the same term in Pattern Y.

GRADE 5 MATH OHIO STATE TEST RELEASE ITEMS

A table with two patterns is shown.

Pattern X	4	8	12	16	20
Pattern Y	2	4	6	8	10

Each pattern uses a different rule.

Complete the statement that describes the corresponding terms in each pattern.

The value of each term in Pattern Y is half the value of the same term in Pattern X.

GRADE 5 MATH OHIO STATE TEST RELEASE ITEMS

A table with two patterns is shown.

Pattern X	4	8	12	16	20
Pattern Y	2	4	6	8	10

Each pattern uses a different rule.

Complete the statement that describes the corresponding terms in each pattern.

The value of each term in Pattern X is half the value of the same term in Pattern Y.

GRADE 5 MATH OHIO STATE TEST RELEASE ITEMS

A table with two patterns is shown.

Pattern X	4	8	12	16	20
Pattern Y	2	4	6	8	10

Each pattern uses a different rule.

Complete the statement that describes the corresponding terms in each pattern.

The value of each term in Pattern X is 2 more than the value of the same term in Pattern Y.