Extended Response for Grade 8

EdReports Evaluation of *Connected Mathematics* Alignment with Common Core State Standards for Mathematics

The EdReports evaluation of instructional materials for Grades 6 – 8 developed by the Connected Mathematics Project and published by Pearson concludes that those materials, "do not meet the requirements for alignment to the Common Core State Standards." We challenge many specific critical statements about alignment of the instructional materials and the Common Core State Standards for Mathematics. In general, the two major themes and our clarifying responses are summarized as follows:

- *Some unit test items target content above grade level.* Some of the items reviewed were from Algebra 1 units. These test items need to be re-examined and identified as meeting the Grade 8 CCSSM.

- *Limited support for differentiation*. Differentiation is a strong component of Connected Mathematics and that its curriculum and pedagogical model is designed to enhance the learning experience of *all* students. This claim needs to be re-examined as fully supporting differentiation.

To provide clarification for the specific critical statements, the following section is organized by the *Focus* and *Coherence* indicators for Gateway One. This is the only Gateway of three reviewed for Connected Mathematics 3. The *Indicators* and *Claims* provided below are direct quotes from the Report released to Connected Mathematics on February 18, 2015.

We believe the proven record of Connected Mathematics and the concerns elaborated for each grade level review raise serious doubts about validity of the 'does not meet expectations' judgment in the EdReports evaluation of Connected Mathematics 3 and that reconsideration of the evaluation is in order.

Overview

Several claims in the Overview to 8th Grade appear to be contradictory, which make it difficult to create a response. Instead, we identify the inconsistencies.

Claim

Alignment: DOES NOT MEET EXPECTATIONS
The instructional materials reviewed for Grade 8 do not meet the requirements for alignment to the standards. The materials devote the majority of class time to the major work for Grade 8. The materials are coherent and consistent with the CCSSM. There are explicit connections between major clusters. The supporting work is used to enhance the major clusters. The materials have some lessons and assessment items that go beyond the Grade 8 standards. The support for differentiation of instruction could be more explicit to help teachers in their daily work. Since the materials reviewed for Grade 8 do not meet the expectations for alignment to the common core state standards in the areas of focus and coherence, they were not reviewed for rigor and the math practices

GATEWAY ONE
(Harvey Ball - half filled in.)
The instructional materials reviewed for Grade 8 partially meet the requirements for Gateway 1. The materials devote the majority of class time to the major work for Grade 8. The materials are coherent and consistent with the CCSSM. There are explicit connections between major clusters. The supporting work is used to enhance the major clusters. The materials have some lessons and assessment items that go beyond the Grade 8 standards. The support for differentiation of instruction could be more explicit to help teachers in their daily work.

Response

It is unclear if the report is saying that the Grade 8 materials partially meet or do not meet the requirements. The first statement in the Overview says, “The instructional materials reviewed for Grade 8 do not meet the requirements for alignment to the standards.” Yet, the first statement in Gateway One says, “The instructional materials reviewed for Grade 8 partially meet the requirements for Gateway 1.”

Claim

FOCUS: DOES NOT MEET EXPECTATIONS
The instructional materials reviewed for Grade 8 do not meet the expectations for indicators 1a and 1b. The materials are focused on the major work for Grade 8. The students would spend more than 60% of their class time on this major work. However, within the units there are many high school standards and it is distinguished clearly for teachers and students where this occurs. Many of the assessment items are assessing Grade 8 content standards. Five unit assessments have items that are high school standards. Removal of the high school assessment items and clearly labeling the high school items in the instructional materials would make Grade 8 meet the expectations.

Response

We would like to provide clarification that the high school items in the 8th Grade units of Connected Mathematics are identified for teachers, but there appears to be a contradiction in the claim. As stated in the report, "… there are many high school standards and it is distinguished clearly for teachers and students where this occurs." This contradicts the last statement, that "…clearly labeling the high school items in the instructional materials would make Grade 8 meet the expectations," also shown above.

Gateway I Major Work (Focus) and Coherence

FOCUS

Focus: Indicator I

The instructional materials assess* the grade-level content indicated on the reference sheet and, if applicable, content from earlier grades. Content from future grades may be introduced but students should not be held accountable for future content.

Claim

The instructional materials reviewed for Grade 8 do not meet the expectations for assessing material at the Grade level 8. The materials assess topics that are in future grades.

- On the *Looking for Pythagoras* unit test, question 7 is on using a 30-60-90 triangle, which is a HSG.SRT.C.6.
- On the *Growing, Growing, Growing* unit test, questions 1, 2, 4, and 8 are high school exponential functions HSF.LE.A.1.
- The *Frogs, Fleas, and Painted Cubes* unit test is all high school quadratic functions HSF.LE.A.1.
- On the *It's in the System* unit test, questions 4 and 6 have system of inequalities and graphing inequalities with are high school HAS.REI.B.3 and HAS.REI.C.5.
- The *Function Junction* unit test is all high school algebra concepts.

Response

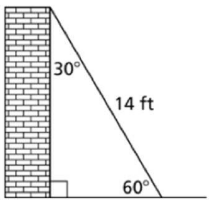
Unit Test for *Looking for Pythagoras*

We provide clarification that assessment item 7 on the unit test for *Looking for Pythagoras* is not aligned to the high school standard and is appropriate for the Grade 8 standard 8.G.A.7, *Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions*. (CCSSM p. 56)

This item is a standard application of the Pythagorean Theorem. 30-60-90 triangles are addressed earlier in the unit using similarity to show that the length of the side opposite the hypotenuse is half the length of the hypotenuse. The assessment item does not involve trigonometry, as described in HSG.SRT.C.6, *Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.* (CCSSM p. 77)

Question 7

7. A 14-foot piece of wire is strung between a building and the ground, making a 30–60–90 triangle as shown.



a. How far straight out from the base of the building is the wire attached to the ground?

b. How far up the side of the building is the wire attached?

Unit Test for *Growing, Growing, Growing*, questions 1, 2, 4, and 8

We provide clarification that assessment items 1, 2, 4, and 8 on the unit test for *Growing, Growing, Growing* are appropriate for the Grade 8 standard, 8.F.A.2, *"Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables or by verbal descriptions.)* and Grade 8 standard, 8.F.B.5, *Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing decreasing, linear, or nonlinear.* (CCSSM p. 55)

Questions 1, 2, 4 and 8

1. The population of Alaskan Reindeer has been exploding. Suppose that, in the year 2010, there were 2,000 Alaskan Reindeer and that the population was predicted to continue to grow as shown in the table.

Year (y)	Reindeer (r)
0 (2010)	2,000
1	2,200
2	2,420
3	2,662
4	2,928
5	3,221
6	3,543

a. Which equation below models this population pattern?

A. $R = 2{,}000(0.1^y)$ **B.** $R = 2{,}000(1.1^y)$ **C.** $R = 2{,}000 + 200^y$ **D.** $R = 2{,}000^y$

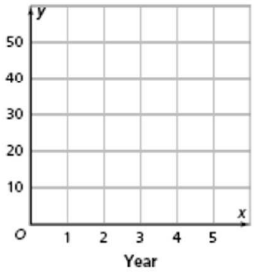
b. What is the growth factor for the relationship? Explain how you determined your answer.

c. According to the prediction, what will the reindeer population be in 2017?

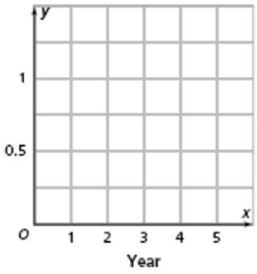
d. When the population reaches approximately 5,000 reindeer, the population growth is no longer sustainable. When will this happen? Explain your answer.

2 **a.** On Grid 1, sketch and label graphs of $y = 2^x$ and $y = 2.5^x$.
On Grid 2, sketch and label graphs of $y = 0.5^x$ and $y = 0.2^x$.

Grid 1



Grid 2



b. On Grid 1, which equation represents the faster rate of growth?
c. On Grid 2, which equation represents the faster rate of decay?
d. How does the graph help you to answer parts (b) and (c)?
e. How do the equations help you to answer parts (b) and (c)?

4. Monty has a different plan for distributing prize money for the trivia contest. The contestant will receive \$5 for the first correct response. For the second correct response, the total winnings will increase to \$25. For the third correct response, the total winnings will increase to \$125, and so on.

a. Make a table showing a contestant's earnings for answering questions 1 through 6 correctly.

b. Make a graph of the data in your table.

c. Write an equation for the relationship between the number of correct responses c and the amount of money the contestant will receive m.

8. Kai's brother Jack collects fuzzy insects called tribetts. The tribett population decreases by 30% each year.

a. Make a table showing the number of tribetts at the end of the first 5 years for a starting population of 10,000 tribetts

b. Write an equation for the relationship between years and number of tribetts.

c. In what year will there first be fewer than 1,000 tribetts?

Comment

The CCSSM Standard, 8.F.B.5 does not state which non-linear function to use. We choose exponential functions because they provide a contrast to linear. The rate of change for a linear function is additive while the rate of change for an exponential functions is multiplicative. This contrast deepens the understanding of linear functions while providing a foundation for future study of exponential functions. Exponential functions also provide motivation and a context for developing the rules of exponents, standard, 8.EE.A, *Work with radicals and exponents.* Understanding of exponential functions is revisited in high school and connected to logarithmic functions.

Unit Test for *It's In the System*, question 4

We provide clarification that assessment question 4 on the unit test for *It's In the System* is appropriate for the Grade 8.

This item aligns with standard, 8.EE.C.8, *Analyze and solve linear equations and pairs of simultaneous linear equations*. It connects to and builds on standard,7.EE.B.4.b, *Solve word problems leading to inequalities of the form $px + q > r$ or $px = q < r$, where p, q, and r are specific rational numbers. Graph the solution set of inequality and interpret it in the context of the problem.* Additionally, it provides a foundation for further study for high school standard, A.REI.D.12 (CCSSM, pp. 49, 55, 66)

Question 4

4. a. Suppose there are at most 18 members of the drum and bugle corps who rent an instrument. Write an inequality relating x and y that describes this condition.
b. Graph your inequality.
c. Suppose the corps's monthly goal includes an income of at least \$100 and no more than 18 member rentals. Write a system of inequalities that describes these conditions.
d. Graph your system of inequalities.
e. Find two solutions (x, y) that satisfy your system of inequalities.

Unit Test for It's In the System, question 6
We agree that assessment item 6 on the unit *It's In the System* is for algebra only.

6. Graph the following system. $\begin{cases} 2x + y \geq 7 \\ -x + y \leq 15 \end{cases}$

Use the graph to find one possible solution (x, y).

Unit Tests for *Frogs, Fleas, and Painted Cubes* and *Function Junction*

We agree with the claim that the unit tests for *Frogs, Fleas, and Painted Cubes* and *Function Junction* are aligned with the high school standards. These two units are not listed as Grade 8 units. In addition, these two units and the corresponding assessments are not available to teachers unless the Algebra 1 course is purchased.

Comment
Since the number of standards for 8th Grade CCSSM is substantially less than those for Grades 6 and 7 and since the 8th Grade standards have a major focus on algebra and functions, we were able to provide additional algebra and function content to 8th grade. This allows for two paths through 8th grade—six of the units comprise 8th grade and all eight units comprise Algebra 1. If students study all eight units, they will have met the CCSSM for Grade 8 and Algebra 1. This is clearly delineated in the teacher support materials.

Focus: Indicator II

Instructional material spends the majority of class time on the major cluster of each grade.

Claim

The instructional materials reviewed for Grade 8 meet the expectations for spending the majority of class time on the major clusters for Grade 8. Grade 8 has more than

65% of the work on the major clusters of 8.EE.A, 8.EE.B, 8.EE.C, 8.F.A, 8.F.B, and 8.G.A.

- The units *Thinking With Mathematical Models; Looking for Pythagoras; Growing, Growing, Growing*; and *Butterflies, Pinwheels, and Wallpaper* had the majority of the lessons on major work.

- The concern is that the units also contained work that is high school CCSSM and this could distract from the major work. A notation to teachers on where the distinctions are would be helpful to keep the focus on the major work. One example of this is in *Growing, Growing, Growing*. The work with exponential equations is a high school standard, but used as a counter example to solidify linear work could be helpful. Without more guidance, teachers and students could spend a lot of time working on lessons that are actually high school concepts. Another example is that in *Say it With Symbols* there are lessons on quadratic, exponential and linear functions. The focus of Grade 8 is supposed to be linear functions and the work on quadratic and exponential functions could take time away from the work on linear functions.

Response

We agree with the review of this indicator. However, the unit*, It's In the System: Systems of Linear Equations and Inequalities* also addresses standard, 8.EE.C.8, *Analyze and solve pairs of simultaneous linear equations*. (CCSSM, p. 55). Therefore, it is major work for Grade 8 and should be listed above. Note that this unit is cited as developing major work in this report in both the third and fourth indicators for Coherence.

Finally, we are puzzled by the list of major clusters for Grade 8 in the preceding claim. We understand that 8.G.B, which is not listed above, is also a Grade 8 major cluster.

Coherence

Coherence: Indicator I

Supporting content enhances focus and coherence simultaneously by engaging students in the major work of the grade.

Claim

The instructional materials reviewed for Grade 8 partially meet the expectations for the supporting content enhancing the major work. There are areas where the

materials have strong connections and areas that could be stronger.

- In *Thinking With Mathematical Models*, the use of scatterplots to tie into linear equations enhances the major work of 8.EE.B.
- In *Looking for Pythagoras*, there is an attempt to connect working with irrational numbers and 8.G.B.
- There are connections made with linear equations and high school content standards in many of the units.

Response

Thinking With Mathematical Models and Scatterplots

We agree with the review that in *Thinking with Mathematical Models*, the use of scatterplots to tie into linear equations enhances the major work of 8.EE.B.

We provide clarification that *Looking for Pythagoras* connects standard,8.G.B, *Understand and apply the Pythagorean Theorem* to the work with irrational numbers, standard, 8.NS.8, *Know that there are numbers that are not rational, and approximate them by rational numbers*.

Problem 4.1

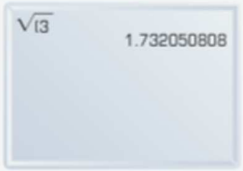
A Use the Pythagorean Theorem to find the length of each hypotenuse in the Wheel of Theodorus. On a copy of the wheel, label each hypotenuse with its length. Use the $\sqrt{\ }$ symbol to express lengths that are not whole numbers.

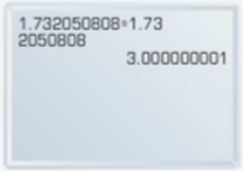
B Use a cut-out copy of the ruler below to measure each hypotenuse on the wheel. Label the place on the ruler that represents the length of each hypotenuse. For example, the first hypotenuse length would be marked like this:

C For each hypotenuse length that is not a whole number:

1. Give the two consecutive whole numbers between which the length lies. For example, $\sqrt{2}$ is between 1 and 2.
2. Use your ruler to find two decimal numbers (to the tenths place) between which the length lies. For example, $\sqrt{2}$ is between 1.4 and 1.5.
3. Use your calculator to estimate the value of each length and compare the result to the approximations you found in part (2).
4. In Question B, you used a ruler to measure length. What is a reasonable level of accuracy for the lengths you found? Explain.

D Joey uses his calculator to find $\sqrt{3}$. He gets 1.732050808. Geeta says this must be wrong because when she multiplies 1.732050808 by 1.732050808, she gets 3.000000001. Why do these students disagree?



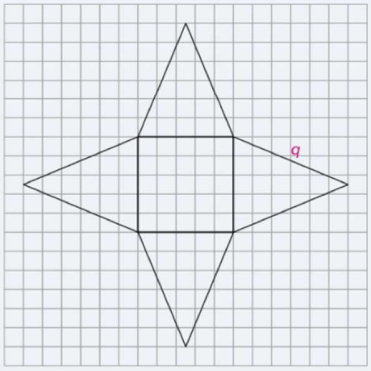


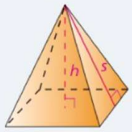
Problem 4.4 *continued*

D Tell whether each number is *rational* or *irrational*. Explain your reasoning.

1. $\sqrt{7}$	**2.** $\sqrt{16}$	**3.** $\sqrt{4} \cdot \sqrt{4}$
4. $\sqrt{7} \cdot \sqrt{7}$	**5.** $2\sqrt{7}$	**6.** $\sqrt{28}$
7. $\sqrt{14}$	**8.** $\sqrt{\frac{1}{16}}$	**9.** 2.45455
10. 2.45454545 . . .	**11.** 2.454554555 . . .	**12.** 2.455455545555 . . .

E As part of her math project, Angela is making a pyramid. She starts with the net shown below, drawn on centimeter grid paper.





1. What is the exact value of *q*? Is the value of *q* a rational or irrational number? Explain.
2. What is the exact height *h* of the pyramid? Is the height a rational or irrational number? Explain.

Connections between Linear Equations and High School Content Standards

We agree with the review that there are connections made with linear equations and high school content standards in many of the units. Further, we contend that there is supporting content to enhance the focus and coherence not cited in the report in the following units.

In *Say It With Symbols*, the use of the distributive property and solving equations enhances the major work of standard, 8.EE.C, *Analyze and solve linear equations and pairs of simultaneous linear equations.*

Problem 3.1

A The school choir is selling boxes of greeting cards to raise money for a trip. The equation for the profit in dollars P in terms of the number of boxes sold s is

$$P = 5s - (100 + 2s)$$

1. What information do the expressions $5s$ and $100 + 2s$ represent in the situation? What information do 100 and $2s$ represent?
2. Use the equation to find the number of boxes the choir must sell to make a \$200 profit. Explain.
3. How many boxes must the choir sell to break even? Explain.
4. Write a simpler expression for profit. Explain how your expression is equivalent to the original expression for profit.
5. One of the choir members wrote the following expression for profit: $5s - 2(50 + s)$. Explain whether this expression is equivalent to the original expression for profit.

B Describe how to solve an equation that has parentheses such as $200 = 5s - (100 + 2s)$ without using a table or graph.

In *Say It With Symbols*, writing equivalent expressions connects with standard, 8.F.A, *Define, evaluate, and compare functions*, and standard, 8.F.B, *Use functions to model relationships between quantities.*

Problem 1.1

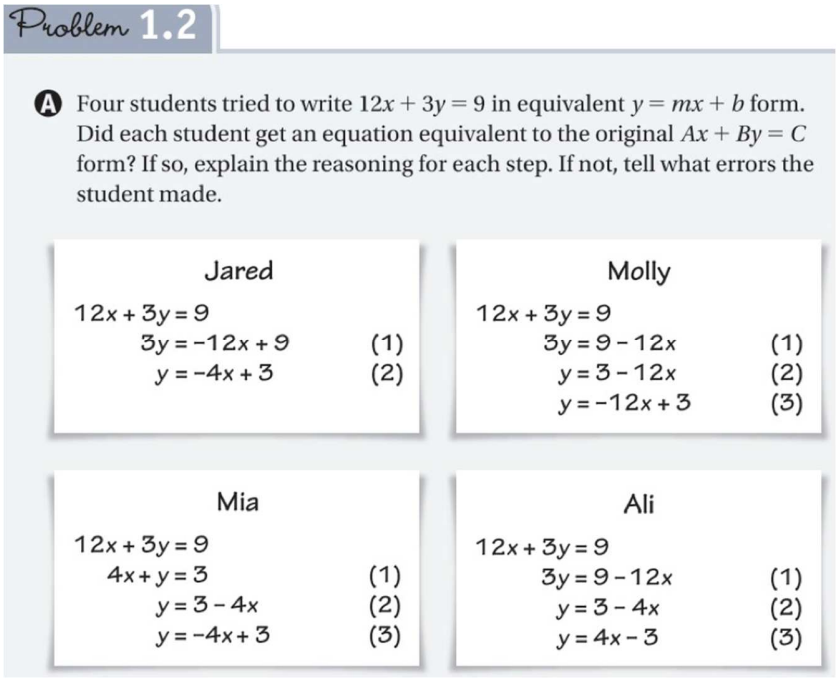
In order to calculate the number of tiles needed for a project, the Custom Pool manager wants an equation relating the number of border tiles to the size of the pool.

A
1. Write an expression for the number of border tiles needed to surround a square pool with sides of length s feet.
2. Write a different but equivalent expression for the number of tiles needed to surround the square pool.
3. Explain why your two expressions for the number of border tiles are equivalent.

B
1. Use each expression in Question A to write an equation for the number of border tiles N. Make a table and a graph for each equation.
2. Based on your table and graph, are the two expressions for the number of border tiles in Question A equivalent? Explain.

C Is the relationship between the side length of the pool and the number of border tiles linear or nonlinear? Explain.

In the unit *It's In the System,* working with forms of linear equations supports 8.EE.C, *Analyze and solve linear equations and pairs of simultaneous linear equations.*



Problem 1.2

A Four students tried to write $12x + 3y = 9$ in equivalent $y = mx + b$ form. Did each student get an equation equivalent to the original $Ax + By = C$ form? If so, explain the reasoning for each step. If not, tell what errors the student made.

Jared

$12x + 3y = 9$
$3y = -12x + 9$ (1)
$y = -4x + 3$ (2)

Molly

$12x + 3y = 9$
$3y = 9 - 12x$ (1)
$y = 3 - 12x$ (2)
$y = -12x + 3$ (3)

Mia

$12x + 3y = 9$
$4x + y = 3$ (1)
$y = 3 - 4x$ (2)
$y = -4x + 3$ (3)

Ali

$12x + 3y = 9$
$3y = 9 - 12x$ (1)
$y = 3 - 4x$ (2)
$y = 4x - 3$ (3)

These are just three out of many examples that support this claim.

Coherence: Indicator II

The amount of content designated for one grade level is viable for one school year in order to foster coherence between grades.

Claim

The instructional materials reviewed for Grade 8 meet the expectations for being able to be taught in one school year.
The Grade 8 materials could be completed within the timeline of 170-190 days.
This includes all lessons, mathematical reflections, Looking Back and Looking Ahead and all assessments.

Response

We agree with the review of this indicator.

Coherence: Indicator III

Materials are consistent with the progressions in the Standards i. Materials develop according to the grade-by-grade progressions in the Standards. If there is content

from prior or future grades, that content is clearly identified and related to grade-level work ii. Materials give all students extensive work with grade-level problems iii. Materials relate grade level concepts explicitly to prior knowledge from earlier grades.

Claim

The materials reviewed for the Grade 8 materials partially meet the expectations for being consistent with the progressions in the standards. The connections between standards to build understanding are strong. There are some off grade level topics that could be identified to help teachers and students know that these are topics that are beyond the CCSSM necessary for that grade.

All three grade levels have major work on equations, EE.A and EE.B:

- Grade 6: Reason about and solve one-variable equations and inequalities can be found in several units (e.g., Let's Be Rational, Variables and Patterns) using informal methods of solving.
- Grade 7: Solve real-world and mathematical problems using numerical and algebraic expressions and equations is primarily in Moving Straight Ahead where they start using symbolic equations and properties of equality.
- Grade 8: Analyze and solve linear equations and pairs of simultaneous linear equations is found in It's in the System, where various methods of solving systems are explored.

All three grade levels have major work on ratio and proportional reasoning, 6.RP and 7.RP:

- Grade 6: Comparing Bits and Pieces begins work with ratios/rates and proportions then continues the major work of Grade 6 ratio and proportion into Variables and Patterns.
- Grade 7: Stretching and Shrinking works with ratios using scale factors and Comparing and Scaling continues the work by solving proportions using many strategies learned from Grade 6 and Grade 7.
- Grade 8: Butterflies, Pinwheels and Wallpaper use the concepts of proportional reasoning in transformational geometry work.

All three grades have major work on the number system (6.NS.A, 6.NS.B, 6.NS.C to 7.NS.A to 8.NS.A):

- Prime Time begins the work of 6.NS.B.4 when it asks students to find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor.
- This leads to finding the least common multiple in order to find common denominators for fractions in Comparing Bits and Pieces, Let's be Rational and Decimal Ops in Grade 6 and extends to ratios in Comparing and Scaling in

Grade 7. This continues into Accentuate the Negative in Grade 7 with performing arithmetic operations with integers and rational numbers (7.NS.A).
- Comparing Bits and Pieces begins developing the ideas of positive and negative numbers on a number lines and absolute value (6.NS.C). This leads to 7.NS.A in Accentuate the Negative with operations on rational numbers. The also leads into 8.NS.A on approximating rational numbers (although not major work of Grade 8).
- Let's Be Rational begins 6.NS.A with students dividing fractions. This continues in Grade 7 with 7.NS.A in Accentuate the Negative.

There is limited support for differentiation of instruction.

- There is guidance for the teacher in the book titled A Guide to Connected Mathematics 3 that discusses differentiation. This gives best practices from research to be used while working on the problem with all students.
- Differentiation is embedded within the instructional model for Connected Mathematics 3 that all kids get the problem launched and summarized the same way and that the differentiation comes during the explore phase of the problem.
- There were specific strategies and guidance for English language learners.
- To help make differentiation more explicit, strategies need to be discussed in the teacher's unit planning pages and it needs to be tied into the specific problems so the teachers have guidance.
- The guide has general best practices but what to use with specific parts of a unit would make it more accessible for teachers and students.

There are many places where the materials relate grade level concepts to explicitly to prior knowledge from earlier grades. These can be found in the student editions in the problems and in the teacher editions in charts and in a narrative called Mathematics Background.

- Let's Be Rational in Grade 6: Page 3, "These situations require addition, subtraction, multiplication, and division of fractions, including mixed numbers. You will decided which operation makes sense in each situation;" "You may already know shortcuts for working with fractions..."
- Comparing and Scaling in Grade 7: Problem 2.3 references work in unit rates in the prior Grade 6 unit Comparing Bits and Pieces.
- Accentuate the Negative in Grade 7: Problem 4.2 references work with the distributive property in Grade 6.
- Accentuate the Negative in Grade 7: Page 3, "Most of the numbers you have worked with in math class have been greater than or equal to zero. However, ...;" "You will also learn more about the properties of operations on numbers." Page 4, "You will extend your knowledge of negative numbers."

Page 8, "You have worked with whole numbers, fractions, and decimals in earlier units." Page 58, "You have already examined patterns in ..."

- Thinking With Mathematical Models in Grade 8: Page 3, "In earlier Connected Mathematics units, you explored relationships between two variables. You learned how to find linear relationships from tables and graphs and then write their equations. Using the equations, you solved problems.

Response

While some of the statements are fairly positive, the reviewers still fail to recognize the focus of the "major work" in all of the six units listed for Grade 8. See earlier discussions about focus of "major work." We also challenge the following claim:

There is limited support for differentiation:

We provide clarification that differentiation is a strong component of Connected Mathematics and that its curriculum and pedagogical model is designed to enhance the learning experience of *all* students.

For over 25 years of field-testing, revision, and evaluation, differentiation is and has been an important concern of the authors of Connected Mathematics. We take seriously our overarching goal:

> *The overarching goal of CMP is to help students and teachers develop mathematical knowledge, understanding, and skill along with an awareness of and appreciation for the rich connections among mathematical strands and between mathematics and other disciplines. The CMP curriculum development has been guided by our single mathematical standard:*
>
> All students should be able to reason and communicate proficiently in mathematics. They should have knowledge of and skill in the use of the vocabulary, forms of representation, materials, tools, techniques, and intellectual methods of the discipline of mathematics, including the ability to define and solve problems with reason, insight, inventiveness, and technical proficiency.

Connected Mathematics is a problem-centered curriculum. The problems were carefully selected to provide multiple access points and time for students to acquire the understanding of important mathematical understandings embedded in the Problems. The development of a concept moves gradually from informal to formal mathematics through a sequence of problems within Investigations in a Unit and continues when students revisit the concept to build understandings of related ideas in other units throughout Grades 6, 7, an 8.

The reviewers note that the Explore is a significant time to attend to differentiation, which we agree with. But we also contend that differentiation starts with the teacher's planning and is implemented throughout the lesson, ending with the teacher's reflection. The Launch, Explore, Summarize phases of the lesson were developed to provide guidance on differentiation at each stage. For example, the first part of a Launch connects the challenge of the problem to prior knowledge. This is an important step in scaffolding and hence differentiation. Throughout the Launch the teacher is asking questions and taking note of strengths and weaknesses, which are used to guide the rest of the lesson during the Explore and Summarize. Each phase, Launch, Explore and Summarize, contain numerous questions, possible student responses and suggestions for follow-up to each response. *Going Further* and *Check for Understanding* are also important features that occur in the Explore or Summarize, which the teacher can use to attend to the individual needs of students. The homework, Applications, Connections, and Extensions are also designed to provide for individual needs.

Further, the authors have provided numerous examples of possible student responses, stumbling blocks, and misconceptions with suggestions that the teacher can use in these situations throughout the Teacher Guide, the Math Background, Unit, Investigation and Problem Overviews, Mathematical Reflections, Looking Back, Labsheets, Assessments, Self Assessments and in the Guide to CMP3: Understanding, Implementing, and Teaching.

Comment

> *It is also beyond the scope of the Standards to define the full range of supports appropriate for English language learners and for students with special needs. At the same time, all students must have the opportunity to learn and meet the same high standards if they are to access the knowledge and skills necessary in their post-school lives. The Standards should be read as allowing for the widest possible range of students to participate fully from the outset, along with appropriate accommodations to ensure maximum participation of students with special education needs. CCSSM,* P. 4

Finally, we are curious as to why the comments on Differentiation occur with Gateway I. According to the EdReports.org *Quality Instructional Materials Tool: Grades K–8 Mathematic,s* differentiation is not mentioned until Gateway III. p. 19

Rating Sheet 4: Differentiated Instruction

- For 'Differentiated Instruction' to attain a score of 'Meets Expectations,' material must earn at least 10 points.

CRITERION	INDICATORS	RATING	EVIDENCE
Differentiated instruction: Materials support teachers in differentiating instruction for diverse learners within and across grades. Earned: _____ of 12 points ☐ **Meets expectations (10-12 points)** ☐ **Partially meets expectations (8-9 points)** ☐ **Does not meet expectations (<8 points)**	**3r.** Materials provide strategies to help teachers sequence or scaffold lessons so that the content is accessible to all learners.	0 1 2	
	3s. Materials provide teachers with strategies for meeting the needs of a range of learners.	0 1 2	
	3t. Materials embed tasks with multiple entry-points that can be solved using a variety of solution strategies or representations.	0 1 2	
	3u. Materials suggest support, accommodations, and modifications for English Language Learners and other special populations that will support their regular and active participation in learning mathematics (e.g., modifying vocabulary words within word problems).	0 1 2	
	3v. Materials provide opportunities for advanced students to investigate mathematics content at greater depth.	0 1 2	
	3w. Materials provide a balanced portrayal of various demographic and personal characteristics.	0 1 2	
	3x. Materials provide opportunities for teachers to use a variety of grouping strategies.		
	3y. Materials encourage teachers to draw upon home language and culture to facilitate learning.		

Coherence: Indicator IV

Materials foster coherence through connections at a single grade, where appropriate and required by the Standards i. Materials include learning objectives that are visibly shaped by CCSSM cluster headings. ii. Materials include problems and activities that serve to connect two or more clusters in a domain, or two or more domains in a grade, in cases where these connections are natural and important.

Claim

The materials reviewed for Grade 8 meet the expectations for coherence. Each investigation within each unit lists the CCSSM that are taught. The mathematical highlights for each unit stress the clusters from CCSSM. All investigations in the student books contain the standards included in that lesson. Every investigation includes activities that connect two or more clusters in a domain, or two or more domains.

An example of this is in Butterflies, Pinwheels, and Wallpaper. Two of the highlights are identify congruent and similar triangles and quadrilaterals efficiently; and use properties of congruent and similar triangles to solve problems about shapes and measurements.

There are many links between major clusters in this curriculum.

- In It's in the System, investigation 1, students analyze and solve pairs of simultaneous linear equations (8.EE.C) and define, evaluate and compare functions (8.F.A).
- In Thinking With Mathematical Models, investigation 2, students graph proportional relationships, interpreting the unit rate as the slope of the graph (8.EE.B) and understand

that a function is a rule that assigns to each input exactly one output. The graph of a function is a set of ordered pairs consisting of an input and the corresponding output (8.F.A).

- In Growing, Growing, Growing, investigation 1, students compare properties of two functions each represented in a different way (8.F.A) and use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large quantities (8.EE.A).
- Due to the nature of the problems being "investigations," there are very few instances where materials do not connect two or more clusters in a domain and almost all connect two or more domains. One example of this connection is in Thinking with Mathematical Models, investigation 2, Linear Models and Equations includes Expressions and Equations, Functions, and Statistics and Probability (8EE.B.5, 8.EE.C, 8.F.B.4, 8.F.A, 8.SP.A.1-8.SP.A.3).
- In Looking for Pythagoras understanding real numbers connects to 8.G.A, 8.G.B and 8.EE.A. In Butterflies, Pinwheels, and Wallpaper in lesson 1.1, 8.G.A.1, 8.G.A.1.A, 8.G.A.1.B, 8.G.A.1.C are all connected.
- There is no unit or investigation that only focuses on one aspect of the CCSSM. Connections are evident in all grade levels and in all units. This is a very strong aspect of Connected Mathematics 3.

Response

We agree with the review of this indicator.

We agree with the fourth indicator for coherence in the following ways.

- The materials reviewed for Grade 8 meet the expectations for coherence.
- Each investigation within each unit lists the CCSSM that are taught.
- The mathematical highlights for each unit stress the clusters from CCSSM.
- All investigations in the student books contain the standards included in that lesson.
- Every investigation includes activities that connect two or more clusters in a domain, or two or more domains.
- There exists many links between major clusters in the curriculum.
- There is no unit or investigation that only focuses on one aspect of the CCSSM.
- Connections are evident in all grade levels and in all units.