Common Core Knowledge and Practice Survey Report Companion

Math Grades K-2

About

The Common Core Knowledge and Practice Survey (Survey) is a tool for educators to use to reflect on their instructional practice and understanding of the Common Core State Standards (CCSS). Designed for use in a professional learning community (PLC) setting within a school, the Survey is meant to spark conversation, identify areas for growth, and offer concrete ways for teams of teachers to continue to align their practice to the Shifts. Following the administration of the Survey in a PLC, this resource can be used by coaches and teachers to better understand the Survey questions and their relationship to the Shifts.

The Survey was intentionally designed to take no more than 30 minutes. As a result, there are a limited number of questions pertaining to each aspect of the Shifts. When considering the performance of an individual or group on a Shift, it is important to look closely at the questions to tease out which aspect(s) of the Shift may be creating confusion. This resource is broken into two parts.

PART 1 : SURVEY

The Survey uses a variety of question types and formats to highlight specific features of the Standards and Shifts. It is intended to capture information from educators about their understanding of different elements of the Standards and how the Shifts manifest in planning and classroom instruction. Each Survey question will be followed by commentary. The "Purpose" section will offer information about why the question was included in the Survey. The "Rationale" section will explain the different response options.

Some of the Survey questions have correct answers because they ask about items that can be objectively verified. Other questions ask participants to apply their knowledge of the Shifts and Standards to a specific example or classroom scenario. For these questions, there may be circumstances in the course of instruction where any number of answer choices could be correctly applied; however, for the purpose of this Survey the correct answers are those actions that most closely tie instruction practice to the expectations of the Standards and Shifts. Finally, a subset of the questions about practice are designed to help illuminate what's currently happening in classrooms and schools, in order to facilitate conversation about what training or structures might support future work.

Each question will have a label to indicate which category the question relates to – one of the Shifts (Focus, Coherence, Rigor) or "Practice-Content Connections." Questions that have one or more correct answers will have the correct response(s) indicated.

Shift of Focus
Focus strongly where the Standards focus

Shift of Coherence
Think across grades, and link to major topics within grades

Shift of Rigor
In major topics pursue: conceptual understanding, procedural skill and fluency, and application with equal intensity.

Practice-Content Connections
Knowledge of the Mathematical Practice Standards and strategic connection of the Practice and Content standards in materials and instruction

PART 2 : SHIFTS SUMMARY

Part two shows which questions relate to each category. Part two also includes discussion questions and resource recommendations intended to drive conversation and provide a starting point for next steps and long-term professional learning.

Part 1 : Survey

Q. 4
Shift of Focus

Question

Which of the following belongs to the Major Work of the indicated grade or course? Please select all that apply.

a. K grade
   - ☐   a) Compare numbers
   - ☐   b) Use tally marks
   - ☐   c) Develop understanding of fractions as numbers
   - ☐   d) Understand meaning of addition and subtraction
   - ☐   e) I don't know

b. 1ˢᵗ grade
   - ☐   a) Add and subtract within 20
   - ☐   b) Measure lengths indirectly and by iterating length units
   - ☐   c) Extend understanding of fraction equivalence and ordering
   - ☐   d) Create and extend patterns and sequences
   - ☐   e) I don't know

c. 2ⁿᵈ grade
   - ☐   a) Identify line of symmetry in two dimensional figures
   - ☐   b) Understand the place value
   - ☐   c) Apply and extend previous understandings of multiplication and division to multiply and divide fractions
   - ☐   d) Represent and solve problems involving addition and identify line of symmetry in two dimensional figures
   - ☐   e) I don't know

d. 3ʳᵈ grade
   - ☐   a) Multiply and divide within 100
   - ☐   b) Identify the measures of central tendency and distribution
   - ☐   c) Develop understanding of fractions as numbers
   - ☐   d) Understand meaning of addition and subtraction
   - ☐   e) I don't know

Correct Answer - K Grade: a, d; 1st Grade: a, b; 2nd Grade: b, d; 3rd Grade: a, c

PURPOSE

Rather than racing to cover topics in a mile-wide, inch-deep curriculum, the Standards require us to significantly narrow and deepen the way time and energy is spent in the math classroom. By focusing deeply on the Major Work of each grade, students can gain strong foundations: solid conceptual understanding, a high degree of procedural skill and fluency, and the ability to apply the math they know to solve problems inside and outside the math classroom. This question addresses teachers' knowledge of the Major Work of the grade. More information can be found at **www.achievethecore.org/focus**.

RATIONALE

This question showed different grade levels depending on the grade the teacher selected at the beginning of the Survey. The selected grade, one grade level below, and one grade level above were displayed for this question.

K grade
a) Compare numbers - Major Work of Kindergarten
b) Use tally marks - not in the Standards
c) Developing the understanding of fractions as numbers - begins in 3rd grade
d) Understand meaning of addition and subtraction - Major Work of Kindergarten
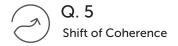e) I don't know.

1st grade
a) Add and subtract within 20 - Major Work of 1st grade
b) Measure lengths indirectly and by iterating length units - Major Work of 1st grade
c) Extend understanding of fraction equivalence and ordering - 4th grade standard
d) Create and extend patterns and sequences - not in the Standards
e) I don't know.

2nd grade
a) Identify line of symmetry in two dimensional figures - 4th grade standard
b) Understand the place value system - Major Work of 2nd grade
c) Apply and extend previous understandings of multiplication and division to multiply and divide fractions - 6th grade standard
d) Represent and solve problems involving addition and subtraction - Major Work of 2nd grade
e) I don't know.

3rd grade
a) Multiply and divide within 100 - Major Work of 3rd grade
b) Identify the measures of central tendency and distribution - not in the Standards
c) Develop understanding of fractions as numbers - Major Work of 3rd grade
d) Understand meaning of addition and subtraction - 1st grade standard
e) I don't know.

Q. 5
Shift of Coherence

Question
Over the past school year, how frequently have you done the following?

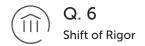|	Almost never/Never	About once a month	Several times a month	About weekly	Several times a week
a) Discussed Common Core State Standards for Mathematics with teachers in other grades					
b) Discussed Common Core State Standards for Mathematics with teachers in your own grade					
c) Looked at student mathematical work with other teachers for the purposes of professional development					
d) Received suggestions from colleagues for curricular materials aligned to the Common Core State Standards for Mathematics					

Correct Answers - N/A

PURPOSE
Supportive environments in which teachers are able to discuss, question, and work collectively to study student expectations support a deeper understanding of the coherence of the Standards. Teacher collaboration can facilitate more consistency in both instructional materials and instruction, and allows teachers to see connections across grades more clearly and make those connections in their classrooms. This question addresses the frequency of teacher collaboration around the Standards.

RATIONALE
There is no correct amount of time required for teachers to spend working together; however, teacher collaboration can support high quality CCSS-aligned instruction.

a) Vertical collaboration helps teachers develop a deeper understanding of the expectations of their own grade and provides an understanding of the progression of the standards in the surrounding grades.
b) Teachers collaborating within a grade allows for a collective reflection on specific content standards, lesson, and activities that are applicable to the content of the grade.
c) Examining student work with other teachers is useful in identifying key misconceptions and discussing how to make classroom adjustments.
d) Finding and sharing aligned resources with colleagues is useful for many schools/districts in which instructional materials are not aligned to the Standards.

Question
Carefully examine each standard below and select which aspect of rigor is being targeted.

	Conceptual Understanding	Procedural Skill and Fluency	Application	I don't know
a) Fluently add and subtract within 5.				
b) Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.				
c) Explain why addition and subtraction strategies work, using place value and the properties of operations.				
d) Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:				
i. 10 can be thought of as a bundle of ten ones – called a "ten."				
ii. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.				
iii. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).				
e) Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.				

Correct Answers - a) Procedural Skill and Fluency, b) Application, c) Conceptual Understanding, d) Conceptual Understanding, e) Procedural Skill and Fluency

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PURPOSE

In order to reach the depth of the Standards, a balance of conceptual understanding, procedural skill/fluency, and application is required in the classroom. Each standard embodies at least one aspect of rigor; often the language in the standard indicates which aspect is being targeted (e.g., "fluently" identifies a procedural standard; "understand" identifies a conceptual understanding standard, and "real world problems" identifies an application standard). This question asks teachers to identify the aspect of rigor in the standard; understanding the intended aspect of rigor in a particular standard is critical for teachers to plan and execute lessons that address the expected learning of the Standards.

RATIONALE

a) "Fluently add and subtract within 5" targets procedural skill/fluency.

b) The standard includes the phrase "solve word problems" which indicates students are using their ability to perform addition and subtraction within 20 within a context—not just pure math; this standard targets application.

c) "Explain why addition and subtraction strategies work…" indicates students are to understand and be able to communicate the meaning behind addition and subtraction; this standard targets conceptual understanding.

d) "Understand that the two-digits of a two-digit number…" indicates students are learning about the concept of place value; this standard targets conceptual understanding.

e) "Measure the length of an object…" indicates students are practicing the skill of measurement; this standard targets procedural skill/fluency.

Q. 7
Shifts of Focus, Coherence and Rigor

Question
Please indicate the extent to which you agree or disagree with the following statements as they relate to your mathematics teaching this school year.

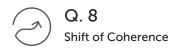|	Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree	Not Applicable
a) I choose which standards to teach based on the major work of the grade.					
b) I try to incorporate conceptual understanding into every lesson that I teach.					
c) I try to incorporate real-world applications into every lesson that I teach.					
d) I use the textbook to determine the order of the standards that I teach.					
e) I use the wording of the standards to determine if procedural skills, conceptual understanding, and/or real-world applications are emphasized in my lessons.					
f) I order lessons based on the order of the standards at my grade.					
g) I spend less time in the classroom on additional/supporting standards.					
h) I organize which standards to teach based on how they connect to one another within and across units.					
j) I seek to balance my unit across procedural skills, conceptual knowledge and real-world applications.					
j) I consider students' prior knowledge when writing my lesson and learning objective.					
k) I try to give equal importance to all topics throughout the year.					

Correct Answers - N/A

PURPOSE

There are many pedagogical choices a teacher can make when supporting students in mathematics. This question details an array of instructional practices and asks teachers to identify which behaviors they exhibit in the classroom. Given the variety of decisions that can be made in different educational contexts, many of the statements above could be valid. However, some instructional practices better support Standards-based instruction and a teacher fully implementing the Standards would be more likely to emphasize those practices over others. To learn more about the Shifts, go to **www.achievethecore.org/shifts-mathematics**.

RATIONALE

The practices associated with the italicized sections below are those that a teacher fully implementing the Standards is likely to emphasize.

a) *Major Work of the grade is prioritized content within the Standards and requires more class time. Making instructional decisions based on the Major Work of the grade is important for ensuring that students spend the time necessary to master the concepts and skills that lead to algebra.*
b) Conceptual understanding is one of the three aspects of rigor and should be incorporated into lessons appropriately – based on the expectation of the standard. Not all standards focus on the development of mathematical concepts; lessons based on standards that set expectations of fluencies or the application of math should not target conceptual understanding.
c) Application is one of the three aspects of rigor and should be incorporated to lessons appropriately – based on the expectation of the standard. Not all standards focus on applying mathematical concepts; lessons based on standards that set expectations of fluencies or building mathematical concepts should not target application.
d) While the textbook might present a sound mathematical sequence of topics, the curriculum should be carefully reviewed for alignment to the Shifts. Tools such as the Instructional Materials Evaluation Tool (IMET) can help determine whether adjustments should be made. For more information go to **www.achievethecore.org/imet**.
e) *The Standards require a balance of conceptual understanding, procedural skill/fluency, and real-world application across the year, but the realization of these in the classroom should be specific to the intent of the standard being addressed. As noted in the rationale for Q6, the language of a standard indicates the aspect(s) of rigor targeted by the standard. Each of the aspects of rigor does not need to be attended to every day or in every lesson. For more information go to* **www.achievethecore.org/rigor**.
f) The standards within each grade are organized by domain, not in a suggested instructional sequence. Decisions around how to sequence topics should be made thoughtfully based on the coherence of the content of the grade and the progressions of mathematical ideas.
g) *Teachers should spend the majority of instructional time on the Major Work of the grade, and strategically connect Supporting Work to strengthen an understanding of the Major Work. For more information go to* **www.achievethecore.org/focus**.
h) *The Standards are built on mathematical progressions that support the development of concepts and skills across grades.*
i) The three aspects of rigor should be balanced across a full year in order to ensure students master the full depth of the Shifts. Units might have a balance of the aspects of rigor, but the relative time on each aspect will depend on which standards are being addressed in that unit.
j) *Building upon students' prior knowledge helps to make connections across grades clear to students, which, in turn, strengthens student understanding. For more information go to* **www.achievethecore.org/coherence**.
k) *The Shift of Focus highlights that some content is more important for students to succeed and progress towards algebra. Teachers should spend the majority of instructional time on the Major Work of the grade, and strategically connect Supporting Work to strengthen an understanding of the Major Work. For more information go to* **www.achievethecore.org/focus**.

Question
Consider this standard.

Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

i.   10 can be thought of as a bundle of ten ones – called a "ten."

ii.   The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.

iii. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

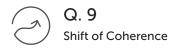This standard is a preceded by which of the following standards? *(Select one.)*

○ a) Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (e.g., 18 = 10 + 8);   understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine   ones.

○ b) Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:
    i.   100 can be thought of as a bundle of ten tens – called a "hundred."
    ii.   The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).

○ c) Use place value understanding to round multi-digit whole numbers to any place.

○ d) Use place value understanding to round whole numbers to the nearest 10 or 100.

○ e) I don't know

Correct Answers - a

PURPOSE
The Standards are designed around coherent progressions that develop across grades. Understanding how content builds and connects to grades before and after is critical for teachers to properly support all students. This question asks teachers to choose the closest related standard that would precede the standard in the box; the standard comes from a prior grade in a related domain.

RATIONALE
a) In Kindergarten students are composing and decomposing numbers from 11 to 19 into tens and ones which is conceptually a precursor to the standard in the box, in which students extend this skill to generalize their understanding of place value of a two-digit number.

b) Understanding place value of a three-digit number would be introduced after understanding place value in a two-digit number. This standard appears in 2nd grade.

c) "Use place value understanding to round multi-digit whole numbers to any place" indicates that students have a comprehensive understanding of the place value system. This standard appears in 4th grade

d) Rounding to the nearest 10 or 100 would be introduced after the standard in the box since it includes operating with three-digit numbers. This standard appears in 3rd grade.

Q. 9
Shift of Coherence

Question

Consider this standard.

Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:

i.   100 can be thought of as a bundle of ten tens – called a "hundred."

ii. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones)

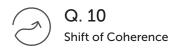This standard prepares students for which of the following standards? *(Select one.)*

○ a) Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (e.g., 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.

○ b) Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:
- i.   10 can be thought of as a bundle of ten ones – called a "ten."
- ii. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
- iii. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

○ c) Use place value understanding to round whole numbers to the nearest 10 or 100.

○ d) Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).

○ e) I don't know

Correct Answers - c

PURPOSE

This question asks teachers to choose the closest related standard that would follow the standard in the box. The correct answer comes from the next grade in a related domain.

RATIONALE

a) Composing and decomposing numbers from 11 to 19 into tens and ones would be introduced before the standard in the box, in which students extend this skill to generalize their understanding of place value. This standard appears in Kindergarten.

b) Understanding place value in a two-digit number would be introduced before understanding place value in a three-digit number. This standard appears in 2nd grade.

c) "Use place value understanding to round multi-digit whole numbers to any place" indicates that students have a comprehensive understanding of the place value system. This standard conceptually follows the standard in the box in which students extend their place value understanding to a three-digit number.

d) Decomposing numbers less than 10 precedes understanding place value in a three-digit number. This standard appears in Kindergarten.

Question

From the list of five standards below, choose three (in any order) that could be taught together in a coherent unit.

☐ a) Apply properties of operations as strategies to add and subtract. *Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known (commutative property of addition). To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12 (associative property of addition).*

☐ b) Order three objects by length; compare the lengths of two objects indirectly by using the third object.

☐ c) Tell and write time in hours and half-hours using analog and digital clocks.

☐ d) Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.

☐ e) Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. *For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 – 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2.*

☐ f) Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

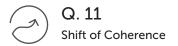**Correct Answers -** a, d, e

PURPOSE

Understanding how standards relate to one another and support each other is a powerful tool in the classroom to ensure each lesson is not treated as a discrete topic and students are given the opportunity to build upon their understanding and prior knowledge. This question asks teachers to identify coherence within a grade as opposed to across grades as seen in questions 8 and 9.

RATIONALE

The standards listed in a, d, and e all relate to addition and subtraction and could reasonably be taught together in a coherent unit. The other standards listed in b, c, and f address ordering objects by length, writing and telling time, and organizing and interpreting data which do not directly relate to addition and subtraction.

a) Applying properties of operations as strategies to add and subtract relates to students solidifying and strengthening their understanding of arithmetic as they begin to apply their knowledge to larger numbers.
b) Ordering and comparing objects according to length does not relate to the other standards listed.
c) Telling and writing time does not relate to the other standards listed.
d) Adding within 100 using strategies based on place value, operations, directly relates to students understanding the properties of operations.
e) Understanding the meaning of the equal sign is a fundamental concept to understanding and practicing addition and subtraction.
f) Organize, represent, and interpret data does not relate to the other standards listed.
early development of understanding and manipulating fractions.

Q. 11
Shift of Coherence

Question

Please briefly explain your reasoning for your selections in Q. 10

PURPOSE

This question is not scored. It allows teachers to attach a rationale to their responses. We recommend teachers share their ideas and reflections on developing a coherent unit with their PLCs as a collaborative learning opportunity.

Q. 12
Shift of Focus

Question

Yesterday, Mr. Jones taught a math lesson to his 1st grade class and he would like comments on a few elements of his lesson.

Mr. Jones wants to be sure his lesson plan was Common Core-aligned. This was the objective for his class: *"Students will solve word problems that call for addition of three whole numbers, relate counting on to addition, and understand that the two digits of a two-digit number represent amounts of tens and ones."*

This objective is:

- a) Supporting work of 3rd grade
- b) Major work of 3rd grade
- c) Not a 3rd grade objective
- d) I don't know.

Correct Answers - b

PURPOSE

A large majority of class time should be devoted to the Major Work of the grade, as it is the content most central to grade-level understanding. The lesson objective is often used to convey the intent of the lesson, and it is frequently where information about the standard(s) in the lesson can be found. This question asks teachers to use the lesson objective to identify the standard in the lesson and identify how that standard relates to the focus of the grade (specifically, whether it is appropriate for the grade and whether it is Major or Supporting Work). For more information, see Criterion #1 of the K–8 Publishers' Criteria for the Common Core at www.achievethecore.org/publisherscriteria-math-k-8.

RATIONALE

The lesson objective refers to students solving word problems involving addition and subtraction of three numbers as well as understanding place value in a two-digit number; both of these concepts are Major Work of 1st grade. Understanding place value and working towards fluency in arithmetic is critical to students' progress towards algebra.

The Supporting Work of 1st grade—1.MD.C.4 : "Organize, represent, and interpret data with up to three categories..."—could be connected to the Major Work in this objective by asking students to use addition and subtraction in the three categories of data.

PC Q. 13
Practice-Content Connections

Question
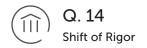Which activity would be appropriate for this lesson objective? Select one.

○ a) Students work with counters to create equal groups and writing number sentences for their models
○ b) Students play a game for multiplication fact fluency
○ c) Students work with partners to write word problems for multi-digit multiplication
○ d) Students work with 3 digit numbers and base-10 blocks
○ e) I don't know.

Correct Answers - b

PURPOSE

Different standards require different types of activities or tasks depending upon what understanding or application a student needs to demonstate in order to exhibit mastery. It is important that any activity students are asked to do supports the learning and practice of the lesson's target. This question asks teachers to choose the appropriate lesson activities for a targeted standard.

RATIONALE

a) Playing a game involving addition and subtraction of cards would not meet the lesson objective of solving word problems.
b) Modeling a story problem and solving problems using a tool that emphasizes place value (cubes and 10-frames) would support the lesson objective of solving word problems involving addition and subtraction and developing place value understanding of a two-digit number.
c) Using base-10 blocks to model two-digit numbers would meet the second half of the objective—developing place value understanding of a two-digit number—but not the first half of the objective about word problems.
d) Measuring the length of objects does not address addition and subtraction of word problems or two-digit place value understanding.

Q. 14
Shift of Rigor

Question

In the lesson plan below, which type(s) of student learning is/are addressed? Please select all that apply.

Lesson: *The Very Hungry Caterpillar* by Eric Carle

Objective:

Students will solve word problems that call for addition of three whole numbers, relate counting on to addition, and understand that the two digits of a two-digit number represent amounts of tens and ones.
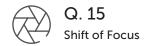
Lesson plan:

- Read the book, *The Very Hungry Caterpillar*, to the class. After the story has ended, ask, "How many things do you think the caterpillar ate in this story?" Take a minute to have students share an estimate with a partner.

- Next, provide each student with a dry erase board, ten-frames, and a set of counters or unifix cubes. Read the book again. After each page, pause so that the students can add counters or unifix cubes to the ten-frame to represent the number of things the caterpillar ate, and then write an equation on the dry erase board connecting addition to the number of counters used.

    i. If the students are working in pairs, one student can add the counters/unifix cubes to the ten-frame while the other student writes the equation. By the end of the story, there should be a total of 25 food items eaten and one leaf eaten (the students can decide as a class whether to count the leaf as a food). There will be two ten frames completed with five or six counters/unifix cubes on the third ten-frame.

- At various points during the activity, stop and ask students to share their answers. If students come up with different equations, use them as a point of discussion. Ask students, "Can all of these be correct?"

Correct Answers - a, c

PURPOSE

It is important to identify the aspect(s) of rigor targeted in a standard in order to know what type of activities are most appropriate for the instructional materials. This question asks teachers to analyze the lesson plan and identify which aspect of rigor is addressed in the objective and activities.

RATIONALE

a) In the above lesson plan, part of the objective is for students to "understand" place value in a two-digit number. The use of 10-frames reinforces place-value understanding for students.

b) While students are solving arithmetic problems, which are procedural in nature, they are doing so to practice arithmetic within a context as well as using models to develop place value understanding.

c) In the above lesson plan, part of the objective is for students to "solve word problems." Students are working on pure math problems throughout this lesson and therefore are not applying math to any real-world situations or problems. This lesson requires students to apply their knowledge of addition subtraction within the context of the story of the Very Hungry Caterpillar.

Question

Which standard is addressed in the lesson plan?

☐ a) Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. For example, which of the following equations are true and which are false? $6 = 6$, $7 = 8 - 1$, $5 + 2 = 2 + 5$, $4 + 1 = 5 + 2$.

☐ b) Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

☐ c) Understand that the two digits of a two-digit number represent amounts of tens and ones.

☐ d) Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

☐ e) None of the above.

☐ f) I don't know.

Correct Answers - b, c

PURPOSE

Building lesson objectives from the language of the targeted standard(s) is critical to ensuring the lesson will meet the expectations of that standard. This question asks teachers to use the lesson objective to identify the standard addressed.

RATIONALE

a) Addition and subtraction are addressed in the lesson, however the meaning of the equal sign is not specifically targeted by the objective or any lesson activities.

b) The lesson objectives "solve word problems" and "understand place value" directly support the part of the lesson objective: "solve word problems that call for addition of three whole numbers."

c) Understanding two digits of a two-digit number directly supports the latter part of the lesson objective around place value.

d) Organizing and representing data does not directly relate to the lesson activities around addition and subtraction or place value.

Q. 16
Rigor

Question
Briefly, how would you improve upon the lesson plan to more thoroughly address this/these standard(s)?

Q. 17
Practice-Content Connections

Question
Given the sample lesson plan, which statement(s) below reflect the lesson? Please select all that apply.

☐ a) The lesson asks students to attend to precision.
☐ b) The lesson asks students to reason abstractly and quantitatively.
☐ c) The lesson asks students to construct arguments and critique reasoning in others.
☐ d) The lesson requires students to model with mathematics.
☐ e) The lesson has students look for and express repeated reasoning.
☐ f) The lesson builds on previous knowledge.
☐ g) The lesson encourages students to use appropriate tools strategically.
☐ h) I don't know.

Correct Answers - d, f, g

PURPOSE
The mathematical practices describe the varieties of expertise math teachers should seek to develop in their students. These student behaviors and actions are elicited by a teacher in the classroom within a lesson and in connection to the classroom norms. The content and/or approach of a particular lesson should support the development of particular practices. This question asks teachers for the practices required based on the description of the activities in the lesson plan.

RATIONALE
a) The lesson activities do not focus specifically on attention to precision.
b) The lesson activities do not focus on students reasoning abstractly or quantitatively.
c) Students are not constructing arguments or critiquing reasoning in this lesson.
d) Modeling with mathematics means using mathematics to represent real-world situations. This lesson uses manipulatives, the 10-frame, to represent the situation presented in the story.
e) The lesson activities do not ask students to look for or express repeated reasoning.
f) The lesson builds on previous student knowledge because they are using their understanding of addition and subtraction in the context of the Very Hungry Caterpillar.

g) Using appropriate tools strategically involves an element of strategy—students must choose which tool to use and when to use it. While this lesson does make use of tools, because the tools are chosen for the students, the students are not engaging in this practice.

Q. 18
Shift of Coherence

Question
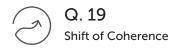Which prerequisite content will prepare students for this lesson? Select one.

○ a) Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.

○ b) For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation

○ c) Count forward beginning from a given number within the known sequence (instead of having to begin at 1).

○ d) Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (such as 18 = 10 + 8)

○ e) None of the above.

○ f) I don't know.

Correct Answers - a

PURPOSE
Considering how the content of the standards connects to one another and builds across grades is important for understanding the coherence of the Standards, and for supporting differentiation within the classroom. This question asks teachers to reflect on the content addressed in the lesson in order to identify which mathematical concepts students would need to understand prior to the lesson.

RATIONALE
a) This standard deals with addition and subtraction within 10 from word problems, which leads naturally into solving word problems involving addition and subtraction within 20.

b) This standard is from a previous grade dealing with addition and subtraction; however, "making a 10" as described in the standard does not directly build towards adding three numbers.

c) This standard is from a previous grade dealing with counting and cardinality, which does not directly build towards place value and or addition and subtraction of three numbers.

d) Composing and decomposing numbers from 11 to 19 is a standard from a previous grade and deals with place value understanding; however, it does not directly prepare students for the lesson activities.

Q. 19
Shift of Coherence

Question
This lesson most directly prepares students to learn which of the following standards? (Select one.)

○ a) Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.

○ b) Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

○ c) Count within 1000; skip-count by 5s, 10s, and 100s.

○ d) Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.

○ e) None of the above.

○ f) I don't know.

Correct Answers - b

PURPOSE
This question asks teachers to reflect on the content addressed in the lesson in order to identify which mathematical concepts students would be prepared to learn next.

RATIONALE
a) Determining whether or not a number is odd or even is not directly related to addition of three numbers or place value understanding.

b) This standard describes the next stage in students' understanding of addition and subtraction in which they expand to arithmetic within 100 and two-step problems.

c) This standard is related to counting and cardinality, but would be introduced further in the learning progression when students learn about the number system beyond two digit place-value.

d) This standard is about reading and writing numbers to 1000 which is much further in the learning progression than the numbers students are working with at this grade level.

Question

Thinking about the last complete unit that you taught in Kindergarten-2nd grade, how often did you do the following?

	Never	Rarely	Sometimes	Often	In all or most lessons
a) Build on prior skills and knowledge when teaching new content					
b) Ground procedures and formulas in conceptual understanding					
c) Make the mathematics of the lesson explicit by using explanations, representations, and/or examples					
d) Use repeated practice to improve students' computational skills					
e) Have students do work with and practice grade-level problems and exercises.					
f) Emphasize one solution method to strengthen all students' understanding of the content					
g) Have students choose and use appropriate tools when solving a problem					
h) Check for understanding throughout the lesson using informal, but deliberate methods (such as questioning or assigning short problems)					
i) Summarize the mathematics with references to student work to reinforce the focus of the lesson					
j) Predominantly use questions and problems that are from the textbook					
k) Review standards from previous grades					
l) Ask students to explain and justify their work					
m) Provide feedback to help students revise initial work					

Correct Answers - N/A

PURPOSE

As with question 7, this question details an array of choices a teacher can make when supporting students with mathematics and asks teachers to identify which behaviors they exhibit in the classroom. Given the variety of decisions that can be made in different educational contexts, many of the statements above could be valid. However, some instructional practices better support the content and structure of the Standards, and a teacher fully implementing the Standards would be more likely to emphasize those practices over others. To learn more about Shifts-aligned instructional practice, go to **www.achievethecore.org/instructional-practice**.

RATIONALE

The practices associated with the italicized sections below are those that a teacher fully implementing the Standards is likely to emphasize.

a) *Building on previous work ensures that students see math as cohesive as opposed to a set of discrete skills.*
b) *Grounding procedures and formulas in conceptual understanding ensures that students understand why a procedure works and will be able to apply it to more complex mathematics.*

c) *Using a variety of explanations, representations, and examples to make the mathematics of the lesson clear helps to reinforce student understanding. Representations display concepts or problems by using drawings or models, whereas examples may show different strategies or methods to solve a particular problem.*

d) *Repeated practice is important for students to build towards the fluency and procedural skill expectations of their grade-level standards.*

e) *All students need consistent practice with grade-level problems and exercises in order to meet the expectations of the Shifts.*

f) A variety of student solution methods should be shared and examined together to support mathematical understanding for all students.

g) *MP.5 explicitly states that students should choose appropriate tools strategically. Students must have the opportunity to select tools, when appropriate.*

h) *Checks for understanding throughout the lesson allow a teacher to assess progress of all students and make adjustments to instruction, as needed.*

i) *A lesson that includes a summary with references to student work and discussion reinforces the mathematics of the lesson and supports student learning.*

j) All materials should be carefully reviewed for alignment to the Shifts. If the text is found to be aligned to the Shifts, using its tasks frequently is appropriate. However, if the text is not aligned to the Shifts, educators should explore supplementing with other resources for questions and problems.

k) While there may be appropriate times to briefly review the standards of a previous grade, the majority of instruction should be on grade-level standards.

l) *Asking students to regularly explain and justify work and providing feedback that helps students revise initial work supports students in developing mathematical proficiency.*

m) *Providing feedback on student work and allowing students to revise and correct/improve their answers supports students in perseverance and developing strong arguments and evidence in their mathematical reasoning.*

(PC) Q. 21
Practice-Content Connections

Question

A teacher walking around the classroom overhears the comments below during student group work. Which comment shows students demonstrating the practice standard "construct viable arguments and critique the reasoning of others"? Select one.

○ a) "That could be the answer, or the answer could be 18."
○ b) "No, the answer can't be 27, because both numbers you're adding are less than 10."
○ c) "Yep, I agree that the answer is 16."
○ d) "I don't think the answer is 16. I'm going to ask the teacher."
○ e) I don't know

Correct Answers - b

PURPOSE

Understanding how the mathematical practices are translated into the classroom and student behavior is important for ensuring CCSS-aligned instruction. This question asks teachers to select the activity that best embodies MP.3.

a) The student's explanation does not include any reasoning.

b) The student clearly communicates reasoning in her response.

c) The student agrees with no justification or reasoning.

d) The student relies on the teacher for identifying and/or understanding the correct answer.

PC Q. 22
Practice-Content Connections

Question

Which scenario shows students demonstrating the practice standard "**model with mathematics**"? Select one.

a) Students completing a worksheet on adding and subtracting within 20.

b) Students explaining why addition strategies work.

c) Students arranging counters to represent a subtraction situation.

d) Students working in a group to answer problems comparing two numbers.

e) I don't know

Correct Answers - c

PURPOSE

Understanding how the mathematical practices are translated into classroom activities and student behavior is important for ensuring aligned instruction. This question asks teachers to select the activity that best embodies MP.4.

PURPOSE

a) Students are performing procedural skill/fluency and are not applying mathematics in a real-world situation.

b) Students are expressing their understanding, but do not apply their knowledge of mathematics to a real-world situation

c) Students are using manipulatives to represent and solve subtraction problems which is a grade-appropriate way to model mathematics.

d) Students are not using manipulatives or solving real-world problems.

Part 2 : Shifts Summary

In the following section, each category will be shown along with the questions from the Survey that comprise that data. These are followed by discussion questions and recommended resources. The discussion questions are meant to provide guidance for coaches and teachers to collectively reflect on classroom practice in relation to the Shifts. We recommend that these be used in a professional learning community or professional development setting in which educators can have an open and honest dialogue about the current state of aligning instruction and practice to the Standards. These conversations will help educators continue to develop strategies and make progress towards effective implementation of the Shifts.

The recommended resources are meant to provide a starting point to support the discussion between instructional leaders/coaches and teachers, and to help educators continue to learn about the Shifts and how they can be translated into classroom practice. You can find these and many other professional development and classroom resources at **www.achievethecore.org**.

Category	Topic	Question Number
Focus	Identify Major Work of the Grade	4, 12, 15
	Agreement with the statements about dedicating time to the major work of the grade.	7a, 7j, 7g
Rigor	Identification of rigor targeted by a standard and how rigor manifests in a lesson plan.	6, 14
	Evaluate the quality of lessons based on aspects of rigor	16 (unscored)
	Agreement with the statements about balance teaching the three aspects of rigor throughout the year.	7b, 7c, 7e, 7i
Coherence	Understanding of the progression of standards within and across grades.	8, 9, 18, 19
	Recognize how standards in a grade form a coherent unit.	10, 11 (unscored)
	Frequency at which teachers meet with colleagues to discuss the Common Core State Standards for Mathematics.	5a, 5b
	Agreement with statements about using coherence to organize their curriculum.	7d, 7f, 7h, 7k
Practice-Content Connections	Frequency in which teachers connect the standards for mathematical practices and standards for mathematical content in the classroom.	20
	Identification of mathematical practices elicited in a lesson plan	17, 13, 21, 22

Shift of Focus
DISCUSSION QUESTIONS

1. What does Major Work of the grade mean? Why is it so important?
2. What is the Major Work of our grade?
3. Approximately how much time are we teaching Major Work? What's our evidence?
4. How have we adapted our curricular materials to spend more time on the Major Work of the grade?
5. What have we stopped teaching since implementing the CCSS for Mathematics?
6. What have we taught less of since implementing the CCSS for Mathematics?

Resources
1. The Shifts (http://achievethecore.org/shifts-mathematics): Webpage containing information and resources of the three Shifts
2. Focus by Grade Level (http://achievethecore.org/focus): A collection of PDFs detailing the mathematical content emphasized in the Standards by grade level. Includes Widely Applicable Prerequisites for High School.

Shift of Coherence
DISCUSSION QUESTIONS

1. When do we work with teachers in surrounding grade levels to help students make connections across grades/courses?
2. What opportunities have we found to create coherence among the standards for our students, both within and across grades/courses?
3. Have we found ways to connect Major/Supporting Work in our grade/course? When? What are examples?

Resources
1. The Shifts (http://achievethecore.org/shifts-mathematics): Webpage containing information and resources of the three Shifts
2. Progressions Documents (http://achievethecore.org/progressions): A collection of narratives that explain how mathematical content develops coherently across grades

Shift of Rigor
DISCUSSION QUESTIONS

1. What are the fluency or procedural skill standards for our grade?
2. What standards in our grade focus on conceptual understanding (in which students make meaning of the math)?
3. Which standards in our grade ask students to apply their knowledge in real-world settings?
4. Are all students given time for regular practice with the fluency standards?
5. Does our teaching reflect a balance of conceptual understanding, procedural skill/fluency, and application? What is our evidence?

Resources
1. The Shifts (http://achievethecore.org/shifts-mathematics): Webpage containing information and resources of the three Shifts
2. Annotated Tasks (http://achievethecore.org/math-tasks): Math tasks that illustrate the K-12 standards
3. Annotated Mini-Assessments (http://achievethecore.org/math-mini-assessments): A collection of mini-assessments designed for teachers to use

Practice-Content Connections
DISCUSSION QUESTIONS

1. Are we incorporating the mathematical practices in a way that ensures students learn grade-level content?
2. How do we make decisions about which mathematical practices to target within a specific lesson?
3. What evidence do we look for from students to know that they are demonstrating the mathematical practices?

Resources
1. The Standards for Mathematics Practice (http://achievethecore.org/math-practices): excerpted from the Standards, describe the behaviors and skills meant to be elicited by teachers in the math classroom.
2. Planning Tool (http://achievethecore.org/planning-tool): Lesson Planning Tool
3. Coaching Tool (http://achievethecore.org/coaching-tool): Tool to assist teachers, and those who support them, build understanding about CCSS-aligned instruction