

Common Core Shifts for Mathematics

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| <p>1. Focus strongly where the Standards focus</p> | <p>Focus: The Standards call for a greater focus in mathematics. Rather than racing to cover topics in today's mile-wide, inch-deep curriculum, teachers use the power of the eraser and significantly narrow and deepen the way time and energy is spent in the math classroom. They focus deeply on the major work* of each grade so that 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.</p> |
| <p>2. Coherence: think across grades, and link to major topics* within grades</p> | <p>Thinking across grades: The Standards are designed around coherent progressions from grade to grade. Principals and teachers carefully connect the learning across grades so that students can build new understanding onto foundations built in previous years. Teachers can begin to count on deep conceptual understanding of core content and build on it. Each standard is not a new event, but an extension of previous learning.</p> <p>Linking to major topics: Instead of allowing additional or supporting topics to detract from the focus of the grade, these topics can serve the grade level focus. For example, instead of data displays as an end in themselves, they support grade-level word problems.</p> |
| <p>3. Rigor: in major topics* pursue:</p> <ul style="list-style-type: none"> - conceptual understanding, - procedural skill and fluency, and - application with equal intensity. | <p>Conceptual understanding: The Standards call for conceptual understanding of key concepts, such as place value and ratios. Teachers support students' ability to access concepts from a number of perspectives so that students are able to see math as more than a set of mnemonics or discrete procedures.</p> <p>Procedural skill and fluency: The Standards call for speed and accuracy in calculation. Teachers structure class time and/or homework time for students to practice core functions such as single-digit multiplication so that students have access to more complex concepts and procedures</p> <p>Application: The Standards call for students to use math flexibly for applications. Teachers provide opportunities for students to apply math in context. Teachers in content areas outside of math, particularly science, ensure that students are using math to make meaning of and access content.</p> |

Grade	*Priorities in Support of Conceptual Understanding and Fluency
K-2	Addition and subtraction--concepts, skills, and problem solving
3-5	Multiplication and division of whole numbers and fractions - concepts, skills, and problem solving
6	Ratios and proportional relationships; early expressions and equations
7	Ratios and proportional relationships; arithmetic of rational numbers
8	Linear algebra

Grade 1/2: Module 1: Lesson Demonstration

Concept: Number Bonds within 10 and Adding/Subtracting Across 10
3 Part Lesson

Part 1: Fluency Work
(8 minutes)

Part 2: Problem Solving
(12 minutes)

Part 3: Content Lesson with Debrief (30 minutes)

To the teacher: This lesson was designed to demonstrate the coherence of topics across grade levels, in this case to show the ways in which a 2nd grade concept is built upon the conceptual understanding students developed in 1st grade. Here, students meld their knowledge of number bonds within 10 and partners to 10 to successfully add and subtract across 10, a skill which will in turn lead to success in completing a unit in many different contexts.

Teacher**Part 1: Fluency Focus: Plus 10, Partners to 10 (8 minutes)**

Materials: 10 linker cubes per pair of students, personal white board, eraser, and marker for each student.

Fluency Activity #1: Name the Hidden Part (2 minutes)

T: Everyone stand up and pair up with your closest neighbor.

T: One of you is Partner A. The other is Partner B.

T: Everyone who's Partner A, pick up a ten stick.

T: When I say, "Ready? Begin," Partner A, break your stick of 10 into 2 parts. Hide 1 part behind your back and show Partner B the other part.

T: Partner B, name the part that's hidden.

T: Does everyone understand? (Check for understanding.)

T: Switch roles back and forth. You have 1 minute. Ready? Begin! (After 1 minute)

T: Please sit down, put your linker cubes together, and put them back on the table.

To the teacher: First graders will be expected to master partners to 10, so in 2nd grade this activity will serve as a warm-up and a review.

Students work at their tables.

Student Accommodations/Comments/Pictures**Fluency Activity #2: Break Out 10 (2 minutes)**

T: Now we're going to break out ten. For example, I say, "16." You say, "10 + 6." Ready?

T: 16. (Signal)

S: 10 + 6.

T: 11. (Signal)

S: 10 + 1.

T: 14. (Signal)

S: 10 + 4.

T: (Continue in this manner through all the combinations.) Excellent!

To the teacher: Fluency with 10 + is necessary for students to use the Make a Ten strategy.

Fluency Activity #3: Take the 1 Out (3 minutes)

- T: Let's play Take the 1 Out. You'll need your white board and marker.
- T: If I say, "5," You write "1 + 4."
- T: If I say, "7," You write "1 + 6."
- T: Turn your board face down when you've written your answer. When I say, "Show me," hold your board in the air so I can see your work.
- T: If your answer is correct I'll give you a thumbs-up. If you made a mistake I'll say, "Think about it." Ready?
- T: 9. (Pause) Show me.
- S: 1 + 8. (Check answers.) Erase your board.
- T: 3. (Pause) Show me.
- S: 1 + 2. (Check answers.) Erase your board.
- Continue in this way but take out different numbers.
- T: Take the 2 out.
- T: 6.
- S: 2 + 4.
- T: 4.
- S: 2 + 2.
- T: Take the 3 out.
- T: 8.
- S: 3 + 5.
- T: Fantastic! Cap your marker, erase your board, and let's stand up and stretch!

Movement Piece (1 minute)

- T: (Do it and have students follow along. They'll pick it up very quickly. This is a syncopated rhythm of a fast 8 count, with the beats on 1, 4, and 7.) Say it with me. Step, step, clap. Step, step, clap. Step, step, clap. Step, step, clap.
- T: (With the movement) 3, 6, 9, 12, 15, 18, 21, 24, 27, 30. Louder. 3, 6, 9, 12, 15, 18, 21, 24, 27, 30. Louder! 3, 6, 9, 12, 15, 18, 21, 24, 27, 30. Bring it down softer. 3, 6, 9, 12, 15, 18, 21, 24, 27, 30. Whisper it. 3, 6, 9, 12, 15, 18, 21, 24, 27, 30.
- T: Alright! Take a seat.

Part 2: Problem Solving (11 minutes)

Materials: Read, Draw, Write (RDW) Worksheet

- T: (Pass out RDW 1. Project the problem on the board.)

To the teacher: When using personal white boards, designate one color as the writing side, so as students finish their work and turn their boards over you can easily see how many students need more time. When most of the class has flipped their board, say, "Show me." Students hold their boards in the air so you can see their work. Give each student the thumbs-up sign or say, "Try again" or "Think about it."

To the teacher: Knowing number bonds within 10 is necessary for students to break apart 1 addend in order to make ten with the other addend. These 3 fluency activities are warming students up in the skills they will use in the content lesson.

To the teacher: Anytime you can incorporate music, movement, and rhythm into an activity, you create a memorable total body experience. The patterned recurrence of the beat triggers an undeniable pull in our brain and we remember what's attached to that beat, in this case, skip counting by 3s.

- T: Read this problem with me.
- S: 8 children are swimming in the pool. 5 more children jump in. How many children are in the pool now?
- T: Reread the first sentence.
- S: 8 children are swimming in the pool.
- T: How can we show that? (Call on a volunteer.)
- S: "We can draw 8 circles."
- T: Let's do that. (Model and students copy.)
- T: And let's draw a bar around those circles. (Draw it and students copy.)
- T: Read the next sentence.
- S: 5 more children jump in.
- T: Are the 5 children joining (encircle arms in front of you to show coming together) or leaving (motion separation by pulling your hands apart?)
- T: Talk with your partner, and raise your hand when you have your answer. (Signal)
- S: "Joining!"
- T: How can we show that in our picture? (Call on a volunteer.)
- S: We can draw 5 more circles.
- T: Excellent idea! Everybody do that. (Model and students copy.)
- T: Now draw a bar around the 5 circles. (Model and students copy.)
- T: Talk with your partner: Does the problem give us the whole or the parts? (Allow about 30 seconds, and then signal.)
- S: The parts!
- T: Correct! And you know we always label our drawings, so let's do that. (Draw the arms and numbers. Students copy.)
- T: Read the question.
- S: How many children are in the pool now?
- T: We know the parts, so we're looking for...? (Signal)
- S: The whole!
- T: Let's label that. (Draw the arms and the question mark, students copy.)
- T: Raise your hand when you know the number sentence to solve this problem. Don't tell me the answer, tell me the number sentence. (Signal)
- S: $8 + 5 =$ blank.
- T: Yes. Write the number sentence and solve. (Pause, then signal.)
- T: Give me the complete number sentence. (Signal)
- S: $8 + 5 = 13$.
- T: So how many children are in the pool now? Give me the complete sentence. (Signal)
- S: 13 children are in the pool!

To the teacher: In the progression of learning how to use bar models, students start by drawing circles to represent the unit they are working with (e.g. marbles, children, kittens). The next step is to have them draw a box around the circles. In subsequent lessons, subtly replacing the word *box* with *bar* while drawing it allows students to understand the new vocabulary through context. The last step is students drawing the bars without the circles.

To the teacher: The RDW part of this lesson assumes that problem solving is a daily practice, and that a part of that practice is drawing circles to represent units. This is math class, not art class, and we don't want to lose time while students draw 6 toy cars or 5 ducks! Another assumption is that students are well versed in the knowledge that *part + part = whole* and *whole - part = missing part*, and that those 2 statements are posted in the classroom.

- T: Yes! Talk with your partner: How does your picture help you see the answer to the question? (Allow about 1 minute, and then choose a volunteer.)
- S: “I see the parts so I know how many children are in the pool.”
- T: Thank you. Can anyone add to that with a little more detail (with a wink at the part/whole statements)?
- S: “It shows the 2 parts so I know I have to add them to find the whole.”
- T: You are correct! I like the way you used part/whole language to explain your thinking.
- T: Put away your RDW and stand up for a stretch.

Movement Piece (1 minute)

- T: We’re going to punch the sky as we skip count by 5s, but instead of punching with a closed hand, a fist, we’re going to punch with an open hand, showing 5. Ready?
- S: (Punching and skip counting to 125.)
- T: Alright! Sit back down.