FLUENCY

Grade 2, Mission 2

Explore Length

Fluencies

Think of fluency activity as having three goals:

1. **Maintenance**: Staying sharp on previously learned skills

2. **Preparation**: Targeted practice for the current lesson

3. **Anticipation**: Skills that ensure that students will be ready for the in-depth work of upcoming lessons
    a. Example of anticipatory fluency: Students must be secure in working with fractions with the same denominator before they can be expected to work with fractions with unlike denominators.

Topic A: Understand Concepts About the Ruler

Topic A opens with students exploring concepts related to the centimeter ruler and ends with students using their unit rulers to measure lengths (**2.MD.1**), thereby connecting measurement with a ruler.

LESSON 1

Happy Counting 20–40
(2 min)

Note: Counting helps students prepare for counting centimeter cubes in the lesson.

T: Let's count by ones starting at 20. Ready? (Rhythmically point up until a change is desired. Show a closed hand, and then point down. Continue, mixing it up.)
S: 20, 21, 22, 23. (Switch direction.) 22, 21, 20. (Switch direction.) 21, 22, 23, 24, 25. (Switch direction.) 24, 23, 22, 21, 20. (Switch direction.) 21, 22, 23, 24, 25, 26, 27, 28, 29, 30. (Switch direction.) 29, 28, 27. (Switch direction.) 28, 29, 30, 31, 32. (Switch direction.) 31, 30, 29, 28. (Switch direction.) 29, 30, 31, 32, 33, 34. (Switch direction.) 33, 32, 31, 30, 29. (Switch direction.) 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40.
T: Excellent! Try it for 30 seconds with your partner starting at 28. Partner A, you are the teacher today.

Two More
(1 min)

Note: Students practice adding two more to make a ten, which builds fluency when crossing a ten.

T: For every number I say, you will say the number that is 2 more. If I say 2, you would say 4. Ready? 3.
S: 5.

Continue with the following possible sequence: 6, 8, 9, 18, 38, 58, 78, 79, 19, 29, and 39.

LESSON 2

Renaming the Say Ten Way
(2 min)

Note: Renaming the Say Ten way reviews skills taught in Mission 1 and reinforces using place value concepts to add. Use a Rekenrek to model the first few times to help students with visualization.

T: When I say 52, you say 5 tens 2. Ready? 67.
S: 6 tens 7.
T: 98.
S: 9 tens 8.
T: 100.
S: 10 tens.
T: 113.
S: 11 tens 3.

Continue with the following possible sequence: 103, 123, 127, 137, 132, 142, 143, 163, 168, 188, 198, and 200.

Say Ten to the Next Ten
(4 min)

Note: This activity helps students see the connection between renaming the Say Ten way and making a ten. It provides practice adding ones to make a multiple of 10.

T: Let's add to make the next ten the Say Ten way. I say 5 tens 2, you say 5 tens 2 + 8 = 6 tens. Ready? 6 tens 7.
S: 6 tens 7 + 3 = 7 tens.
T: 5 tens 1.
S: 5 tens 1 + 9 = 6 tens.
T: 7 tens 8.
S: 7 tens 8 + 2 = 8 tens.

Continue with the following possible sequence: 8 tens 4, 8 tens 5, 8 tens 9, 9 tens 6, 9 tens 3, and 9 tens 9.

Making the Next Ten to Add
(6 min)

Materials: (S) Personal white board

Note: Students make a unit of ten to add within 20. This foundational fluency is a review of Small Group Lesson 3 from Mission 1.

T: Let's make 10 to add. If I say 9 + 2, you say 9 + 2 = 10 + 1. Ready? 9 + 3.
S: 9 + 3 = 10 + 2.
T: Answer?
S: 12.
T: 9 + 5.
S: 9 + 5 = 10 + 4.
T: Answer?
S: 14.

Post on board:

9 + 3 = _____
/\
1 2

9 + 3 = 10 + 2

Continue with the following possible sequence: 9 + 7, 9 + 6, 9 + 8, 8 + 3, 8 + 5, 7 + 4, and 7 + 6.

T: On your personal white board, write at least three other similar examples.

LESSON 3

Happy Counting 40–60
(2 min)

Note: Students fluently count by ones with an emphasis on crossing the tens.

T: Let's count by ones starting at 40. Ready? (Rhythmically point up until a change is desired. Show a closed hand, and then point down. Continue, mixing it up.)
S: 40, 41, 42, 43. Switch direction.) 42, 41, 40. (Switch direction.) 41, 42, 43, 44, 45. (Switch direction.) 44, 43, 42, 41, 40. (Switch direction.) 41, 42, 43, 44, 45, 46, 47, 48, 49, 50. (Switch direction.) 49, 48, 47. (Switch direction.) 48, 49, 50, 51, 52. (Switch direction.) 51, 50, 49, 48. Switch direction.) 49, 50, 51, 52, 53, 54. (Switch direction.) 53, 52, 51, 50, 49. (Switch direction.) 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60.
T: Excellent! Try it for 30 seconds with your partner starting at 48. Partner B, you are the teacher today.

Make Ten by Identifying the Missing Part
(3 min)

Materials: (S) Personal white board

Note: Students identify the missing part to make the next ten.

T: If I say 9, you say 1 because 9 and 1 make 10.
T: Wait for the signal, 5. (Signal with a snap.)
S: 5.

Continue with the following possible sequence: 15, 25, 16, 24, 19, and 21.

T: This time I'll say a number, and you write the addition sentence to make ten on your personal white board.
T: 19. Get ready. Show me your board.
S: (Write 19 + 1 = 20.)
T: Get ready. Show me your board.

Continue with the following possible sequence: 18, 12, 29, 31, 47, and 53.

T: Turn and tell your partner what pattern you noticed that helped you solve the problems.
T: Turn and tell your partner your strategy for finding the missing part.

Topic B: Measure and Estimate Length Using Different Measurement Tools

Students build skill in measuring using centimeter rulers and meter sticks in Topic B. They learn to see that a length unit is not a cube, or a portion of a ruler (which has width), but is a segment of a line.

LESSON 4

Related Facts on a Ruler
(4 min)

Materials: (S) 30 cm ruler created in Small Group Lesson 3

Note: This fluency activity utilizes the ruler made in Lesson 3 to fluently review related facts.

T: Put your finger on 3 on the ruler you made. Raise your hand when you know 8 more than 3. Ready?
S: 11.
T: Give a number sentence starting with 3 that shows 8 more.
S: 3 + 8 = 11.
T: Give a number sentence to show 3 more than 8.
S: 8 + 3 = 11.
T: Put your finger on 11. Raise your hand when you know 3 less than 11.
S: 8.
T: What is the number sentence?
S: 11 – 3 = 8.
T: Give a number sentence to show 8 less than 11.
S: 11 – 8 = 3.

Continue with the following possible sequence: 9, 2, 11; 4, 9, 13; 8, 5, 13; and 9, 6, 15.

LESSON 5

Break Apart by Tens and Ones
(4 min)

Materials: (S) Personal white board

Note: This fluency activity reviews place value understanding from Mission 1 and helps develop skills needed for Mission 3.

T: If I say 64, you write 6 tens 4 ones. If I say 7 tens 2 ones, you write 72.
T: Turn your board over when you've written your answer. When I say, "Show me," hold it up.
T: 5 tens 2 ones. (Pause.) Show me.
S: (Hold up board showing 52.)
T: 84. (Pause.) Show me.
S: (Show 8 tens 4 ones.)

Continue with the following possible sequence: 7 tens 3 ones, 79, 8 tens 9 ones, 9 tens 9 ones, 10 tens 2 ones, 10 tens 4 ones, 104, 10 tens 8 ones, 11 tens, and 11 tens 5 ones.

T: Partner B, quiz Partner A for one minute.

Take Out a Part
(4 min)

Note: In this activity, students build fluency with decomposing a whole, which allows them to use the make a ten strategy with larger numbers (e.g., 80 + 50 = 80 + 20 + 30).

T: Let's take out 2 tens from each number.
T: I say 5 tens. You say, 2 tens + 3 tens = 5 tens.
T: 5 tens.
S: 2 tens + 3 tens = 5 tens.
T: 7 tens.
S: 2 tens + 5 tens = 7 tens.
T: Let's take out 20 from each number.
T: I say 50. You say, 20 + 30 = 50.
T: 50.
S: 20 + 30 = 50.
T: 70.
S: 20 + 50 = 70.

Continue with the following possible sequence: 83, 52, 97, 100, 105, 110, and 120.

T: Now, let's take out 40. If I say 60, you say 40 + 20 = 60.
T: 50. Wait for the signal.
S: 40 + 10 = 50.

Continue with the following possible sequence: 70, 75, 81, and 87.

Topic C: Measure and Compare Lengths Using Different Length Units

In Topic C, students measure and compare to determine how much longer one object is than another (**2.MD.4**). They also measure objects twice using different length units, both standard and non-standard, thereby developing their understanding of how the total measurement relates to the size of the length unit (**2.MD.2**).

LESSON 6

Happy Counting
(2 min)

Materials: (T) 2 meter sticks

Note: Students fluently count by tens crossing the hundred and relate it to metric units.

T: Let's do some Happy Counting in centimeters. Watch me as I pinch the meter stick where the centimeters are while we count. When I get to 100 centimeters (1 meter), I will call a volunteer to hold another meter stick.
T: Let's count by tens, starting at 70 centimeters. When we get to 100 centimeters, we say 1 meter, and then we will go back to counting by centimeters. Ready? (Pinch the meter stick to stop on a number, moving pinched fingers up and down to lead students in Happy Counting by tens on the meter stick.)
S: 70 cm, 80 cm, 90 cm, 1 m, 110 cm, 120 cm. (Switch direction.) 110 cm, 1 m, 90 cm, 80 cm. (Switch direction.) 90 cm, 1 m, 110 cm, 120 cm.
T: Now, let's say it with meters and centimeters. Let's start at 80 centimeters. Ready?
S: 80 cm, 90 cm, 1 m, 1 m 10 cm, 1 m 20 cm, 1 m 30 cm, 1 m 40 cm. (Switch direction.) 1 m 30 cm, 1 m 20 cm. (Switch direction.) 1 m 30 cm, 1 m 40 cm, 1 m 50 cm, 1 m 60 cm, 1 m 70 cm, 1 m 80 cm, 1 m 90 cm, 2 m.

LESSON 7

Which Is Shorter?
(2 min)

Note: Students prepare for comparing lengths by identifying the shorter length and providing the number sentence to find the difference.

T: I am going to say two lengths. Tell me which length is shorter. Ready? 6 centimeters or 10 centimeters?
S: 6 centimeters.
T: Give the number sentence to find how much shorter.
S: 10 cm – 6 cm = 4 cm.

Continue with the following possible sequence: 12 cm and 22 cm, 16 cm and 20 cm, 20 cm and 13 cm, 20 cm and 9 cm, 9 cm and 19 cm, 24 cm and 14 cm, 12 cm and 24 cm, 23 cm and 15 cm, and 18 cm and 29 cm.

Topic D: Relate Addition and Subtraction to Length

The mission culminates as students relate addition and subtraction to length. They apply their conceptual understanding to choose appropriate tools and strategies, such as the ruler as a number line, benchmarks for estimation, and tape diagrams for comparison, to solve word problems (**2.MD.5, 2.MD.6**).

LESSON 8

How Many More to Make a Meter?
(3 min)

Note: This activity extends upon the make a ten strategy within the metric system. It also reinforces that 1 meter is composed of 100 centimeters.

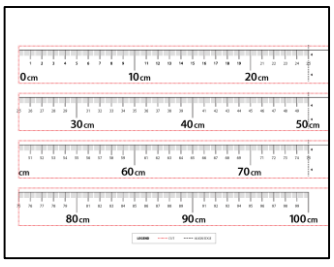
T: For every number of centimeters I say, you say the number needed to make a meter. If I say 70 centimeters, you say 30 centimeters. Ready?
T: 70 centimeters.
S: 30 centimeters.
T: Number sentence.
S: 70 cm + 30 cm = 1 m.
T: 40 centimeters.
S: 60 centimeters.
T: Number sentence.
S: 40 cm + 60 cm = 1 m.

Continue with the following possible sequence: 20 cm, 90 cm, 10 cm, 9 cm, 11 cm, 50 cm, 49 cm, and 51 cm.

LESSON 9

Meter Strip Addition: Adding Multiples of 10 to Numbers
(6 min)

Materials: (S) Meter strip (Lesson 9 Template) (as pictured)



Note: Students apply knowledge of using the ruler as a number line to fluently add multiples of 10. The meter strip solidifies the process for visual and tactile learners and creates the groundwork for students to make tape diagrams in Small Group Lesson 9.

T: (Each student has a meter strip.) Put your finger on 0 to start. I'll say the whole measurement. Slide up to that number. Add 10 centimeters and tell me how many centimeters your finger is from 0.
T: Let's try one. Fingers at 0 centimeters! (Pause.) 30 centimeters.
S: (Slide their fingers to 30.)
T: Remember to add 10. (Pause.) How far is your finger from 0?
S: 40 centimeters.

Continue with the following possible sequence: 45 cm, 51 cm, 63 cm, 76 cm, 87 cm, and 98 cm. As students show mastery, advance to adding 20 centimeters.

Happy Counting by Centimeters
(4 min)

Note: Students practice counting by 10 centimeters and exchanging centimeters for meters. This activity relates to Say Ten counting, where ones are exchanged for tens. It can be demonstrated on a Rekenrek, with each bead representing 10 centimeters.

T: Let's count by 10 centimeters, starting at 80 centimeters. When we get to 100 centimeters, we say 1 meter, and then we will count by meters and centimeters. Ready? (Rhythmically point up until a change is desired. Show a closed hand, and then point down. Continue, mixing it up.)
S: 80 cm, 90 cm, 1m, 1m 10 cm, 1 m 20 cm, 1 m 30 cm, 1 m 40 cm, 1 m 50 cm. (Switch direction.) 1 m 40 cm, 1 m 30 cm, 1 m 20 cm. (Switch direction.) 1 m 30 cm, 1 m 40 cm, 1 m 50 cm, 1 m 60 cm, 1 m 70 cm, 1 m 80 cm, 1 m 90 cm, 2 m. (Switch direction.) 1 m 90 cm. (Switch direction.) 2 m, 2 m 10 cm, 2 m 20 cm. (Switch direction.) 2 m 10 cm, 2 m, 1 m 90 cm.
T: Excellent! Try it for 30 seconds with your partner starting at 80 centimeters. Partner B, you are the teacher today.

LESSON 10

Meter Strip Subtraction: Subtracting Multiples of 10 from Numbers
(6 min)

Materials: (S) Meter strips (Lesson 9 Template)

Note: Students fluently subtract multiples of 10 while using the ruler as a number line.

T: Put your finger on 0 to start. I'll say the whole measurement. Slide up to that number. Then, take away 10 centimeters and tell me how many centimeters your finger is from 0.
T: Fingers at 0 centimeters! (Pause.) 30 centimeters.
S: (Slide their fingers to 30.)
T: Remember to take 10. (Pause.) How far is your finger from 0?

S: 20 centimeters.

Continue with the following possible sequence: 45 cm, 52 cm, 64 cm, 74 cm, 82 cm, 91 cm, and 99 cm. As students show mastery, advance to subtracting 20 centimeters.

Take from Ten
(3 min)

Note: Students explore an alternate method of using ten to subtract in preparation of subtracting throughout the year. Draw a number bond for the first example to model student thinking to solve.

(Draw on board)
12 – 3 =___
/
2 1

T: For every number sentence I say, you will give a subtraction number sentence that takes from the ten first. When I say 12 — 3, you say 12 – 2 – 1. Ready?
T: 12 – 3.
S: 12 – 2 – 1.
T: Answer.
S: 9.

Continue with the following possible sequence: 12 – 4, 12 – 5, 14 – 5, 14 – 6, 14 – 7, 15 – 7, 15 – 8, 15 – 9, 16 – 9, and 16 – 8.

Relate Subtraction to Addition
(3 min)

Note: This activity challenges students to mentally subtract the ones and add the difference to 10. Draw a number bond for the first example to support student answers. (Students may answer verbally or on their personal white board.)

T: 2 – 1.
S: 1.
T: When I say 12 – 1, you say 10 + 1. Ready? 12 – 1.
S: 10 + 1.
T: 3 – 1.
S: 2.
T: 13 – 1.
S: 10 + 2.
T: Answer.
S: 12.

(Draw on board)
12 – 1 =____
/
10 2

Continue with the following possible sequence: 14 – 1, 15 – 1, 16 – 1, 17 – 1, 17 – 2, 17 – 4, 16 – 4, 15 – 4, 15 – 2, and 14 – 2.

Note: Students who are struggling with pictorial representations may need to use concrete models (e.g., linking cubes) to demonstrate conceptual understanding of addition and subtraction. Incremented bars can be added to the tape diagram as a transition from base ten blocks to a pictorial model, as well.

Appendix

Lesson 9

Meter Strip