December Computational Fluency

COMPUTATIONAL FLUENCY

Put It on the Line

STUDENT BOOK

Overview

This month's Computational Fluency Workouts feature a game in which students round numbers, make estimates, consider the value of specific digits in numbers to 100,000, and do multi-digit computation focused around powers of and multiples of 10.

Frequency

One day per week

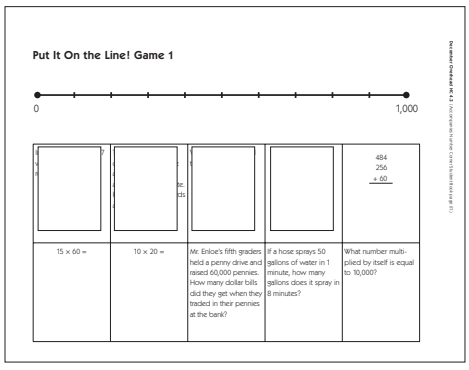
Skills & Concepts

- ★ reading, writing, ordering, and comparing numbers to 100,000
- ★ identifying the place values of digits in numbers to 100,000
- ★ rounding to the nearest 100 and the nearest 1,000
- ★ adding, multiplying, and dividing multi-digit numbers
- ★ multiplying by multiples of 10 to simplify calculations
- ★ using estimates to determine the reasonableness of the final answer

You'll need

- ★ Put It On the Line, Games 1–3 (Overheads NC 4.3 and 4.8, and 4.12, see Advance Preparation)
- ★ Put It On the Line, Games 1–3 (Number Corner Student Book, pages 61 and 68)
- ★ overhead pens in red and blue
- ★ 1 ½″ × 2″ sticky notes
- ★ regular and colored pencils
- ★ calculators

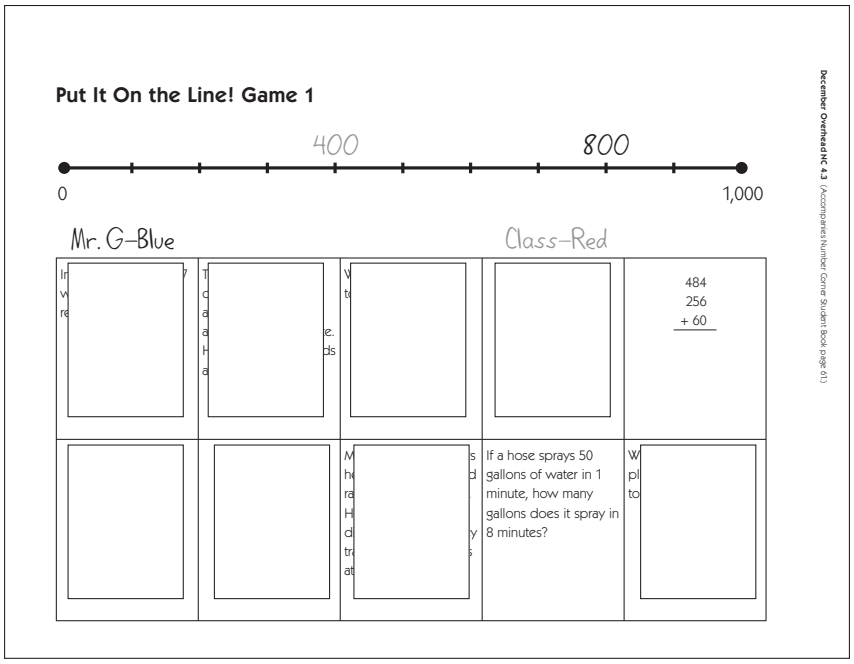
Advance Preparation Before each Computational Fluency Workout, cover each of the 10 problems at the bottom of the appropriate transparency with a stack of 3 or 4 sticky notes so that the problems are not visible as the light shines up through the transparency. You can re-use the sticky notes from week to week.



This month's Computational Fluency Workouts feature a new game called Put It On the Line in which the class and the teacher take turns revealing any of the 10 problems at the bottom of the game transparency, solving the problem, and recording the answer where it belongs along the number line. Each team uses a different color to write their numbers on the line. After each team has

Computational Fluency Put It on the Line (cont.)

solved 5 problems, students estimate each team's total to predict the winner and then compute the totals to determine the winner.



The problems ask players to round, estimate, identify the value of digits in large numbers, read and compare numbers into the 10,000's, and do computations like 50 × 60 and 80,000 ÷ 2. The focus is on place value, with a particular emphasis on multiplying and dividing by multiples of 10. Many students will be able to solve most or all of the problems mentally, especially if they have been working on multi-digit multiplication and division during regular math instruction. You may want to make calculators available to students to check their answers in some cases.

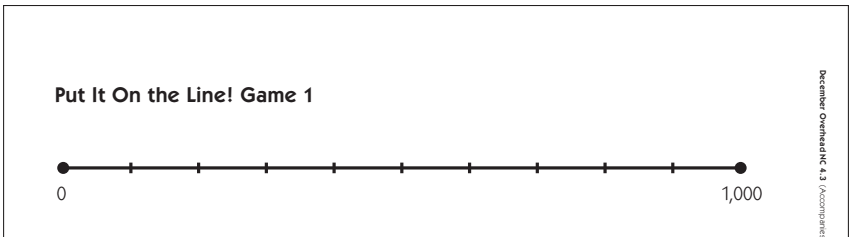
Although the number lines and problems vary from week to week, the game is played the same way every time. Below, you'll find instructions for conducting the first workout, along with some additional notes about continuing through the month. The answers for all questions on each overhead are provided on page 187.

Week 1 Put It On the Line, Game 1

Open the workout by displaying the Game 1 overhead. Take a minute to have students discuss what they notice about the number line. After they have shared some initial observations, ask students to pair-share about how they think the marks along the line should be numbered, given the available information. When they have had a minute or two to talk it over, invite students

Computational Fluency Put It on the Line (cont.)

to share their thinking with the class. Don't number the line right now. It will be labeled during the game.



Explain that the class will play as a team against you in a new game. Take a few minutes to explain how the game is played (see pages 183 and 184) and have them turn to page 61 in their Student Books. Explain that they'll be marking the answers using one color for them and one color for you, and then decide who will be red and who will be blue.

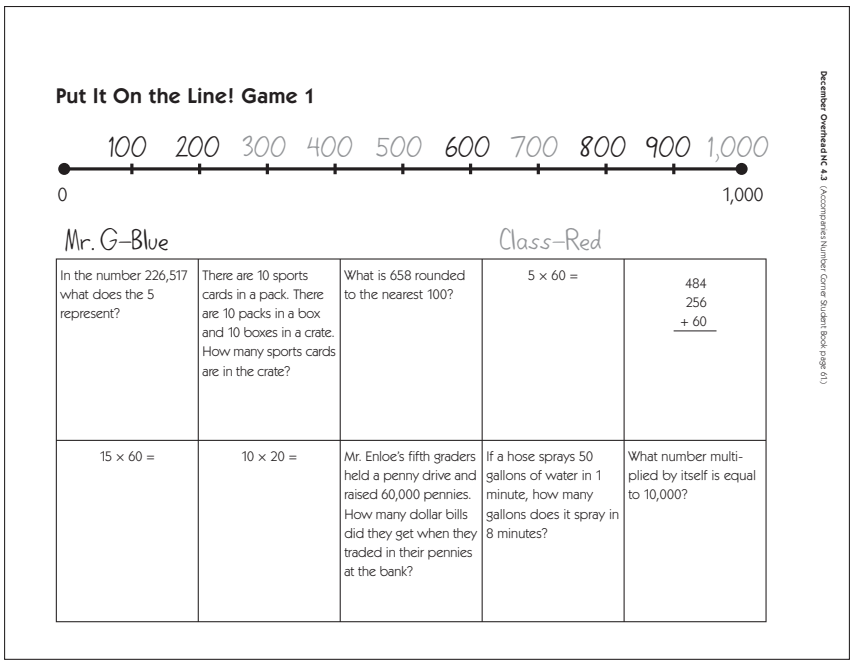
Invite a volunteer to remove one of the sticky notes from the lower portion of the transparency. Before she does, explain that you want to give everyone the benefit of some think time. Ask students to read the problem together and then simply give the thumbs-up sign when they have the answer, rather than raising their hands or calling out. Encourage them to use either the space on their page or a piece of scratch paper if they need to write it down, but let them know that it's fine to solve the problem in their head if they want to. Then have the volunteer reveal the problem of her choice.

When you see plenty of thumbs up around the room, have students pair-share their answers and reasoning. After a few moments, have volunteers share their answers with the whole group and explain their thinking. This is a chance for students to learn from one another, so encourage them to listen carefully and challenge them to paraphrase one another's strategies from time to time. Finally, have the student volunteer record the answer above the appropriate mark on the line, using the students' color, as the rest of the class records the answer in their Student Books. Remind them to use their team's color.

Now uncover another problem on the overhead. Ask students to read it aloud together and give the thumbs-up sign when they have a solution. Repeat the discussion process described above and then write the answer above the appropriate mark on the line, using your color while the students do the same in their books.

Take turns until all 10 problems have been solved and the answers recorded along the number line. Then ask students to estimate each team's total to predict who will win.

Computational Fluency Put It on the Line (cont.)



Put It On the Line! Game 1

100 200 300 400 500 600 700 800 900 1,000

0 1,000

Mr. G–Blue Class–Red

In the number 226,517 what does the 5 represent?	There are 10 sports cards in a pack. There are 10 packs in a box and 10 boxes in a crate. How many sports cards are in the crate?	What is 658 rounded to the nearest 100?	5 × 60 =	484 256 + 60
15 × 60 =	10 × 20 =	Mr. Enloe's fifth graders held a penny drive and raised 60,000 pennies. How many dollar bills did they get when they traded in their pennies at the bank?	If a hose sprays 50 gallons of water in 1 minute, how many gallons does it spray in 8 minutes?	What number multiplied by itself is equal to 10,000?

December Overhead NC 4.3 (Accompanies Number Corner Student Book page 61)

Students *Mr. G got some pretty low numbers, but he got three of the highest ones too.*
Okay, 3 + 4 + 5 is 12, and then 7 more is 19, and then 1 more is 20.
If you're going to do it that way, the thousand has to be 10.
Oh, right, okay, we got 29. That's 2,900.
He got 1 + 2 + 6. That's 9, and then 8 more is 17, plus 9 is 26.
We won, I'm pretty sure.

Finally, ask students to confirm their predictions by adding each team's numbers. They can do this in the space on their Student Book page, on a piece of scratch paper, or on the calculator if you prefer.

Continuing Through the Month

Repeat the game each week, using a new overhead each time. For each new game, the number at the end of the line increases from 1,000 to 10,000 to 100,000. You'll probably discover that some students find many of the problems easy, while others may not yet have efficient strategies for solving such problems. In some cases, you may need to review a skill, for example, how to round to the nearest 100 or 1,000. In other cases, students may share their own strategies, which their classmates will adopt as they are able and ready to do so.

A Note about Calculator Use

If some of the computations are currently out of reach for some students, you might invite them to use a calculator. As students find the answers on the calculator, record them in the problem boxes, as well as along the number line. Then take time at the end of the game to examine the answers a little

Computational Fluency Put It on the Line (cont.)

more closely. What happens when you multiply 50 × 80? How is the answer like 5 × 8? How is it different? This can be a good opportunity to work backwards from the solutions to help students gain insights into these kinds of calculations.

ANSWER KEYS FOR PUT IT ON THE LINE, GAMES 1–3

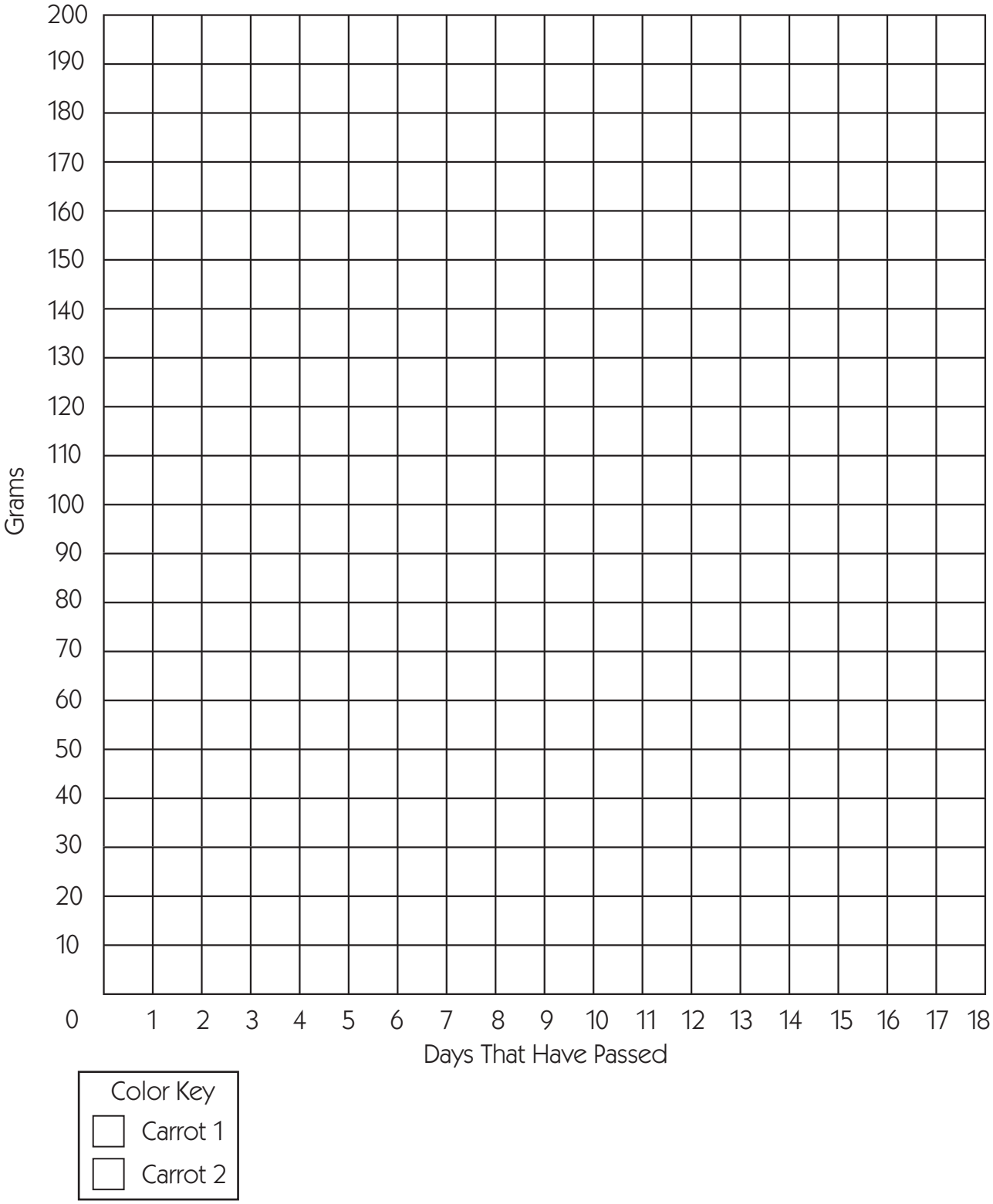
Answer	Game 1	Game 2	Game 3
1	500	9,000	50,000
2	1,000	5,000	40,000
3	700	1,000	10,000
4	300	3,000	100,000
5	800	6,000	60,000
6	900	4,000	30,000
7	200	2,000	20,000
8	600	10,000	90,000
9	400	8,000	80,000
10	100	7,000	70,000

Put It On the Line! Game 1

In the number 226,517 what does the 5 represent?	There are 10 sports cards in a pack. There are 10 packs in a box and 10 boxes in a crate. How many sports cards are in the crate?	What is 658 rounded to the nearest 100?	5 × 60 =	484 256 + 60
15 × 60 =	10 × 20 =	Mr. Enloe's fifth graders held a penny drive and raised 60,000 pennies. How many dollar bills did they get when they traded in their pennies at the bank?	If a hose sprays 50 gallons of water in 1 minute, how many gallons does it spray in 8 minutes?	What number multiplied by itself is equal to 10,000?

Carrot Weights Double Line Graph

CALENDAR COLLECTOR



Put It On the Line! Game 3

5,000 × 10 =	If you multiply this number by 5, you get 200,000.	Which of these numbers is between 9,000 and 14,000? a. 910 b. 1,425 c. 10,000 d. 14,900	In the number 187,432 what does the 1 represent?	What is 62,965 rounded to the nearest ten thousand?
500 × 60 =	24,238 people packed the stadium. At half time, 4,000 of them left. *About* how many were left? a. 2,000 b. 20,000 c. 22,000	What is 93,247 rounded to the nearest 10,000?	The best *estimate* for 16,075 23,008 + 40,025 is a. 70,000 b. 75,000 c. 80,000	If you multiply this number by 2 and subtract 1,000, you get 139,000.

Put It On the Line! Game 1

Students' Total _____ Teacher's Total _____

Put It On the Line! Game 2

Students' Total _____ Teacher's Total _____

NAME _____

Put It On the Line! Game 3

COMPUTATIONAL FLUENCY

Put It On the Line! Game 3

Students' Total _____ Teacher's Total _____