NUMBER® CORNER

SECOND EDITION

TEACHERS GUIDE

DECEMBER

GRADE 3

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Number Corner Second Edition Grade 3 Teachers Guide Volume 2

The Number Corner Grade 3 package consists of:

Number Corner Grade 3 Teachers Guide Volumes 1–3
Number Corner Grade 3 Teacher Masters
Number Corner Grade 3 Student Book
Number Corner Grade 3 Teacher Masters Answer Key
Number Corner Grade 3 Student Book Answer Key

Number Corner Grade 3 Components & Manipulatives

Assessment Guide:
- Number Corner Assessments
- Comprehensive Growth Assessment

Digital resources noted in italics.

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Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates Number Corner, a collection of daily skill-building activities for students.

The Math Learning Center is a nonprofit organization serving the education community. Our mission is to inspire and enable individuals to discover and develop their mathematical confidence and ability. We offer innovative and standards-based professional development, curriculum, materials, and resources to support learning and teaching. To find out more, visit us at www.mathlearningcenter.org.

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Number Corner December

Teacher Masters

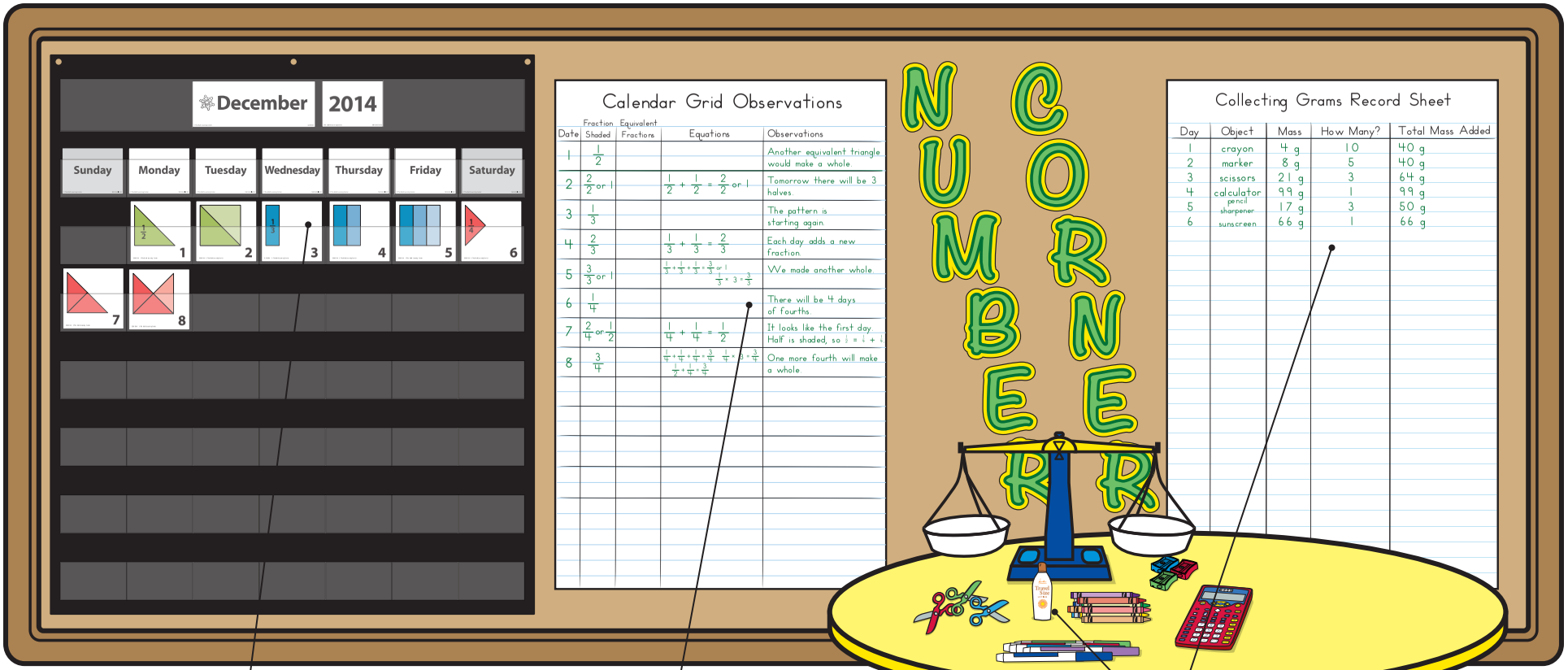
Pages renumber each month.

Number Corner Student Book Pages

Page numbers correspond to those in the consumable books.

December Sample Display

Of the items shown below, some are ready-made and included in your kit; you'll prepare others from classroom materials and the included teacher masters. Refer to the Preparation section in each workout for details about preparing the items shown. The display layout shown fits on a 10′ × 4′ bulletin board or on two 6′ × 4′ bulletin boards. Other configurations can be used according to classroom needs. If you have extra space to work with, a Number Corner header may be made from bulletin board letters, student-drawn letters, or other materials.



Calendar Grid Pocket Chart

Remember to consult a calendar for the starting day of this month and year.

Calendar Grid Observations Chart

You might use 24″ × 36″ chart paper. If you laminated a sheet in previous months, you can erase and reuse it now.

Calendar Collector Collection & Record Sheet

You'll measure and collect the mass of a variety of ordinary objects during Calendar Collector this month. See the Preparation section of the workout for more information.

☑ December Daily Planner

Day	Date	Calendar Grid	Calendar Collector	Computational Fluency	Number Line	Solving Problems
1		**Activity 1** Introducing the December Calendar Grid (p. 8)				
2		*Update*	**Activity 1** Introducing the December Calendar Collector (p. 17)			
3		*Update*	*Update*	**Activity 1** Multiplying by Zero & One (p. 24)		
4		**Activity 2** Introducing the December Calendar Grid Observations Chart (p. 9)	*Update*			
5		*Update*	*Update*		**Activity 1** Rounding to the Nearest Hundred (p. 28)	
6		*Update*	**Activity 2** Making Estimates & Predictions (p. 18)			
7		*Update*	*Update*	**Activity 2** The Doubles Facts (p. 24)		
8		*Update*	*Update*		**Activity 2** Playing Round & Add Hundreds as a Class (p. 29)	
9		*Update*	*Update*			**Activity 1** Problem String 7 (p. 34)
10		**Activity 3** Equivalent Fractions (p. 11)	*Update*	**Activity 3** Zeroes, Ones & Doubles Facts on the Multiplication Table (p. 25)		
11		*Update*	*Update*			**Activity 2** Problem String 8 (p. 36)
12		*Update*	**Activity 3** Finding the Total Mass of the Collection (p. 21)		**Activity 3** Playing Round & Add Hundreds in Pairs (p. 32)	
13		**Activity 4** Updating the Calendar Grid (p. 13)	*Update*	**Activity 4** Scout Them Out (p. 26)		
14		**Activity 5** Completing the Thinking About Fractions Page (p. 14)	*Update*			
15		*Update*	**Activity 4** Comparing the Collection to a Kilogram (p. 22)			

Note *On days when the Calendar Grid or Calendar Collector are not featured in an activity, a student helper will update one or both either before or after Number Corner. Summaries of the update routines appear below.*

Calendar Grid – The student helper posts one or more calendar markers so that the Calendar Grid is complete up to the current date. After the Observations Chart is posted, the student will update the chart as well.
Calendar Collector – The student helper finds a classroom object to add to the collection, estimates its mass, and then finds its exact mass and records all the information on the record sheet.

Number Corner
December

Overview

From fractions to measuring mass to rounding to multiplication problems, this short month explores a variety of strands, skills, and strategies. In all the workouts, students look for patterns, develop mathematical reasoning, and solve problems.

Activities

Workouts	Day	Activities	D	G	SB
Calendar Grid Unit Fraction Squares Students explore fractions with this month's Calendar Grid pattern, which features halves, thirds, fourths, sixths, eighths, and twelfths. Each day another amount is added to a square until the square is complete. Students discuss and find equivalent fractions and equations for fractions and explore whole numbers as fractions and vice versa.	1	**1** Introducing the December Calendar Grid	●		
	4	**2** Introducing the December Calendar Grid Observations Chart	●		
	10	**3** Equivalent Fractions	●		
	13	**4** Updating the Calendar Grid	●		
	14	**5** Completing the Thinking About Fractions Page	●		●
Calendar Collector Collecting Grams Each day of the month, students add an object from the classroom (or a group of the same kind of object), to a growing collection. Before adding the object(s), students find the mass in grams and record it on a record sheet. The challenge is to create a collection that is as close to 1,000 grams (1 kilogram) as possible. Because they do not keep a running total each day, students must use estimation strategies to gauge how close they are to meeting their goal. Periodically, students check their progress by finding the exact mass of the collection. At the end of the month, students compare the mass of their collection to a collection of objects that together weigh exactly 1 kilogram.	2	**1** Introducing the December Calendar Collector	●		
	6	**2** Making Estimates & Predictions	●		
	12	**3** Finding the Total Mass of the Collection	●		
	15	**4** Comparing the Collection to a Kilogram	●		
Computational Fluency Fact Fluency for Multiplying by Zero, One & Two Students review multiplying by 0, 1, and 2. They discuss patterns within each group of facts and consider how many of the 121 basic multiplication facts fall within these three fairly straightforward categories. At the end of the month, they complete a Scout Them Out page on which they identify facts in each category first and then solve them.	3	**1** Multiplying by Zero & One	●		
	7	**2** The Doubles Facts	●		
	10	**3** Zeroes, Ones & Doubles Facts on the Multiplication Table	●		●
	13	**4** Scout Them Out	●		●
Number Line Rounding to the Nearest Hundred During the Number Line workout this month, students focus on practicing skills which help them round to the nearest hundred. They play an extension to the Round & Add game they learned during last month's Number Line workout. In this variation, they practice rounding to the nearest ten and hundred as a strategy for making reasonable computational estimates.	5	**1** Rounding to the Nearest Hundred	●		
	8	**2** Playing Round & Add Hundreds as a Class		●	
	12	**3** Playing Round & Add Hundreds in Pairs		●	●
Solving Problems Multiplying with the Distributive Property In this short month, students complete two multiplication problem strings that focus on using the distributive property. One string features the number line and the other features the array model. Through discussion, modeling, and solving problems, students become more efficient and adept at seeing patterns and solving problems efficiently.	9	**1** Problem String 7	●		
	11	**2** Problem String 8	●		

D – Discussion, **G** – Game, **SB** – Number Corner Student Book

Teaching Tips

This is a short month of school, so there are only 15 days of Number Corner activities planned. If you have more time, there are suggestions in the workouts about how to stretch the activities. Conversely, don't worry if you are short on time. Many of the topics and themes will be revisited throughout the year.

Despite the busyness of this time of year, you can help students by maintaining normal routines, such as doing Number Corner at a predictable time each day.

Use your observations from earlier in the year to help guide your teaching and provide differentiated instruction. For example, if students struggled with rounding to the nearest ten in November, use the December Number Line rounding activities to review and practice.

You can also use Number Corner activities as informal assessment. The Calendar Grid brings up fractions for the first time in Number Corner; it will be interesting to gain a sense of your students' familiarity with fractions as they study the pattern.

Target Skills

The table below shows the major skills and concepts addressed this month. It is meant to provide a quick snapshot of the expectations for students' learning during this month of Number Corner.

Major Skills/Concepts Addressed	CG	CC	CF	NL	SP
3.OA.1 Interpret products of whole numbers					●
3.OA.5 Multiply using the distributive, associative, and commutative property					●
3.OA.7 Fluently multiply with products to 100 using strategies, and recall from memory products of two 1-digit numbers			●		●
3.OA.9 Identify patterns among basic multiplication facts and in the multiplication table			●		●
3.OA.9 Explain patterns among basic multiplication facts by referring to properties of the operation			●		
3.NBT.1 Round whole numbers to the nearest hundred				●	
Supports 3.NBT Estimate sums and differences to approximate solutions to problems and determine reasonableness of answers				●	
Supports 3.NBT Read, write, and order numbers to 10,000 represented with numerals				●	
3.NBT.2 Fluently add with sums to 1,000				●	
3.NBT.3 Multiply whole numbers from 1–9 by multiples of 10 from 10–90 using strategies based on place value and properties of operations		●			
3.NF.1 Demonstrate an understanding of a unit fraction 1/b as 1 of *b* equal parts into which a whole has been partitioned (e.g., ¼ is 1 of 4 equal parts of a whole)	●				
3.NF.1 Demonstrate an understanding of a fraction *a/b* as a equal parts, each of which is 1/*b* of a whole (e.g., ¾ is 3 of 4 equal parts of a whole or 3 parts that are each ¼ of a whole)	●				
3.NF.3a Identify equivalent fractions by comparing their sizes	●				
3.NF.3b Recognize simple and generate simple equivalent fractions, and explain why two fractions must be equivalent	●				
3.NF.3c Write a whole number as a fraction, and recognize fractions that are equivalent to whole numbers	●				
3.NF.3d Compare two fractions with the same numerator or with the same denominator	●				
3.NF.3d Demonstrate that fractions can only be compared when they refer to the same whole; use the symbols >, =, and < to record comparisons of two fractions; explain why one fraction must be greater than or less than another fraction	●				
3.MD.2 Estimate and measure mass in grams and kilograms; solve story problems involving multiplication or division of mass measurements given in grams or kilograms		●			
3.MP.1 Make sense of problems and persevere in solving them		●			

Major Skills/Concepts Addressed	CG	CC	CF	NL	SP
3.MP.2 Reason abstractly and quantitatively			●		
3.MP.3 Construct viable arguments and critique the reasoning of others	●				
3.MP.4 Model with mathematics				●	●
3.MP.5 Use appropriate tools strategically		●			
3.MP.6 Attend to precision			●		
3.MP.7 Look for and make use of structure	●			●	
3.MP.8 Look for and express regularity in repeated reasoning	●				●

CG – Calendar Grid, **CC** – Calendar Collector, **CF** – Computational Fluency, **NL** – Number Line, **SP** – Solving Problems

Materials Preparation

Each workout includes a list of required materials by activity. You can use the table below to prepare materials ahead of time for the entire month.

Materials		Done
Copies	Run copies of Teacher Masters T1–T6 according to the instructions at the top of each master.	
	If students do not have their own Number Corner Student Books, run a class set of pages 18–23.	
	Run a single display copy of Number Corner Student Book pages 18–22.	
Charts	Prepare the Observations Chart according to Preparation instructions in the Calendar Grid workout.	
	Prepare the Record Sheet according to Preparation instructions in the Calendar Collector workout.	
Special Items	Before Calendar Collector Activity 4, gather a collection of items that together have a mass of 1 kilogram. See Preparation instructions in the workout for more details.	

December Calendar Grid

Unit Fraction Squares

Overview

Students explore fractions with this month's Calendar Grid pattern, which features halves, thirds, fourths, sixths, eighths, and twelfths. Each day another amount is added to a square until the square is complete. Students discuss and find equivalent fractions and equations for fractions and explore whole numbers as fractions and vice versa.

Skills & Concepts

- Demonstrate an understanding of a unit fraction 1/b as 1 of b equal parts into which a whole has been partitioned (e.g., ¼ is 1 of 4 equal parts of a whole) (3.NF.1)
- Demonstrate an understanding of a fraction a/b as a equal parts, each of which is 1/b of a whole (e.g., ¾ is 3 of 4 equal parts of a whole or 3 parts that are each ¼ of a whole) (3.NF.1)
- Identify equivalent fractions by comparing their sizes (3.NF.3a)
- Recognize and generate simple equivalent fractions (3.NF.3b)
- Explain why two fractions must be equivalent (3.NF.3b)
- Write a whole number as a fraction (3.NF.3c)
- Recognize fractions that are equivalent to whole numbers (3.NF.3c)
- Compare two fractions with the same numerator (3.NF.3d)
- Compare two fractions with the same denominator (3.NF.3d)
- Demonstrate that fractions can only be compared when they refer to the same whole (3.NF.3d)
- Use the symbols >, =, and < to record comparisons of two fractions (3.NF.3d)
- Explain why one fraction must be greater than or less than another fraction (3.NF.3d)
- Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. (3.G.2)
- Construct viable arguments and critique the reasoning of others (3.MP.3)
- Look for and make use of structure (3.MP.7)

Materials

Activities	Day	Copies	Kit Materials	Classroom Materials
Activity 1 Introducing the December Calendar Grid	1		• December Calendar Grid Markers • Calendar Grid pocket chart • Day, Month, and Year markers	
Activity 2 Introducing the December Calendar Grid Observations Chart	4			• Calendar Grid Observations Chart (see Preparation) • erasable markers
Activity 3 Equivalent Fractions	10			
Activity 4 Updating the Calendar Grid	13			
Activity 5 Completing the Thinking About Fractions Page	14	**NCSB 18*** Thinking About Fractions		

TM – Teacher Master, **NCSB** – Number Corner Student Book
Copy instructions are located at the top of each teacher master.

** Run 1 copy of this page for display.*

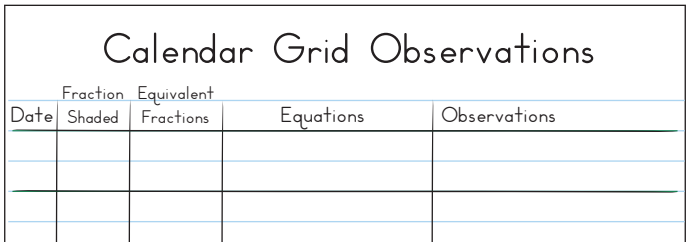
Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

denominator*
equation*
equivalent fraction*
fraction*
numerator*
whole

Preparation

Erase the Calendar Grid Observations Chart from last month. Create five columns and label the top of the first sheet as shown below for use with this month's markers. The chart may be extended midway through the month using the second sheet of laminated chart paper. Use an erasable marker to record students' observations so that you can reuse the chart each month.

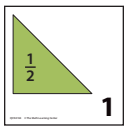


Note that the chart is not posted until Activity 2.

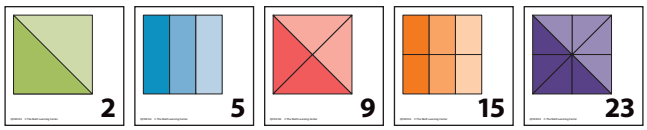
Mathematical Background

This month's calendar markers are closely related to the work students did in November's Calendar Collector, in which they collected unit fractions. (A unit fraction is any fraction with 1 in the numerator; a unit fraction represents just 1 of some number of equal parts of a whole (1/n where the whole is divided into n equal parts).) The calendar markers this month are divided into small sets, each of which begins with a unit fraction and then builds up to 1 whole by adding another of the same unit fraction each day: day 1 shows ½ and day 2 shows ²⁄₂; day 3 shows ⅓, day 4 shows ²⁄₃, and day 5 shows ³⁄₃. This continues all month.

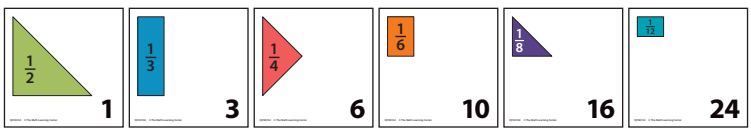
Each time students are presented with a new unit fraction, you'll challenge them to sketch what the whole looks like. In this way, students begin with the unit fraction and then iterate it to build up to the whole. This idea will be revisited later in the year when students see a unit fraction (¼) represented as part of a line and are asked to envision what the whole would look like. Students also worked in this way in last month's Calendar Collector when they accumulated unit fractions ⅛, ¼, and ½ to build up to 1 and then numbers greater than 1.



As the pattern continues, students have opportunities to solidify their understanding of fractions. They continue to reinforce the idea that certain fractions are equivalent to whole numbers. Five calendar markers show a complete square (²⁄₂, ³⁄₃, ⁴⁄₄, ⁶⁄₆, and ⁸⁄₈). Seeing whole numbers as fractions will help students later on as they begin to add and subtract fractions. For example, knowing that 1 equals ⁴⁄₄ makes is easy to know how much is left if someone eats ¼ of a pizza (1 – ¼ = ⁴⁄₄ – ¼ = ¾).



The pattern also includes several unit fractions. The markers on days 1, 3, 6, 10, 16, and 24 help reinforce that a unit fraction is a fraction with a numerator of 1. On those days, they see only one segment on the marker. Having a solid foundation with unit fractions helps students as they go on to work with other fractions.



After the unit fraction, each subsequent markers adds another fraction until the square is complete. Students are encouraged to see the growing accumulation as iteration. For example, ¾ is ¼ + ¼ + ¼. The Observations Chart brings out these iterations by asking students to come up with equations for most of the markers. Day 21 shows ⅝ for which there are many possible equations, including ⅛ + ⅛ + ⅛ + ⅛ + ⅛ + ⅛ = ⅝, ½ + ⅜ = ⅝, and 6 × ⅛ = ⅝.

Equivalent fractions naturally and purposefully arise within the pattern. Though shown in different colors, equivalent fractions take on the same shape, making it easy for students to see that ½ is equal to ²⁄₄ and ⁴⁄₈. Students will be more challenged however to prove that ³⁄₆ is also equal to ½, and interesting discussions should arise as a result. Do fractions need to be the same shape or size in order to be equivalent? What does equivalence really mean?

Finally, students also compare fractions, using the calendar markers to explain why one fraction must be greater or less than another.

About the Pattern

This month's pattern is made up of sets of accumulations of fractions. Each day adds another unit fraction to a growing collection. Each set of markers has the same denominator and same major color, although the shades of the color change systematically in order to help students see equivalent fractions. The table below provides more information about these markers.

The denominators are generated by starting with 2 for the first set and then doubling on alternating sets (2, 4, 8). Every other set is generated by starting with 3 for the second set and then doubling on alternating sets (3, 6, 12). The result is that the denominators appear in the following order: 2, 3, 4, 6, 8, 12. Students might enjoy the challenge of determining what other denominators would appear if the pattern continued indefinitely.

Dates	Denominator	Generating Denominators	Fractions in Set	Color
1, 2	2 (2 × 1 = 2)	Start with 2	½, ²⁄₂	green
3–5	3 (3 × 1 = 6)	Start with 3	⅓, ²⁄₃, ³⁄₃	blue
6–9	4 (2 × 2 = 4)	Double 2 (4)	¼, ²⁄₄, ¾, ⁴⁄₄	red
10–15	6 (3 × 2 = 6)	Double 3 (6)	⅙, ²⁄₆, ³⁄₆, ⁴⁄₆, ⁵⁄₆, ⁶⁄₆	orange
16–23	8 (2 × 4 = 8)	Double 4 (8)	⅛, ²⁄₈, ³⁄₈, ⁴⁄₈, ⁵⁄₈, ⁶⁄₈, ⁷⁄₈, ⁸⁄₈	purple
24–30	12 (2 × 6 = 12)	Double 6 (12)	¹⁄₁₂, ²⁄₁₂, ³⁄₁₂, ⁴⁄₁₂, ⁵⁄₁₂, ⁶⁄₁₂, ⁷⁄₁₂	turquoise

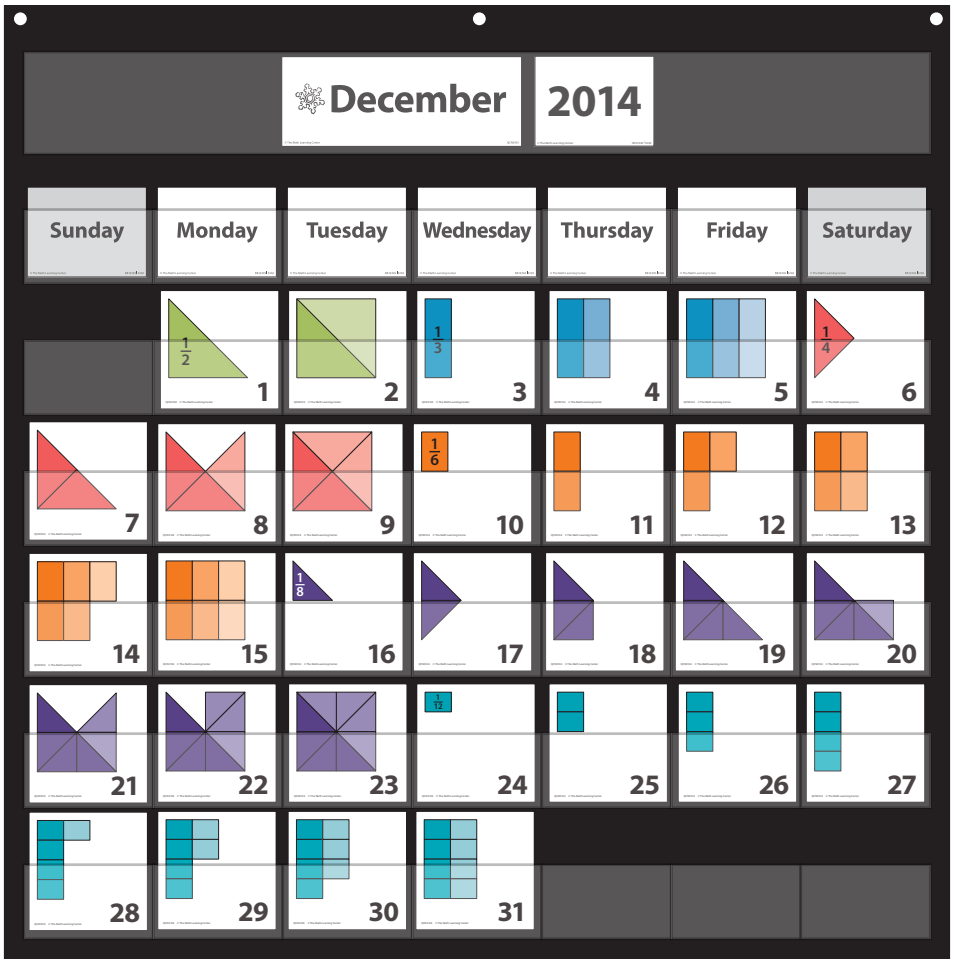
For more information on the pattern, please review the Mathematical Background section above.

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- After Activity 2, update the Calendar Grid Observations Chart as well.



Key Questions

Use these questions to help guide students' discussion this month.

- This is what ½ (or ⅓, ¼, ⅙, 1/12) looks like. What would the whole look like?
- What is a unit fraction?
- Can you think of an equation for ¾? (or any other fraction)
- What fractions are equal to ½? ⅔? ¾? (and other fractions)
- Why are there no fractions equal to ⅝ on the Calendar Grid?
- If the month continued, what would the 33rd day look like? What about the 36th day?
- On what day will we see the next fraction that is equal to 1 whole?
- On what day will we see the next fraction that is equal to ½?
- What are some of the fractions we'll see that don't have equivalent fractions on the calendar? On what date will each appear?
- **CHALLENGE** If the pattern kept going forever, what other denominators would we see? On what date would each new denominator appear for the first time?

Date	Fraction Shaded	Equivalent Fractions	Equations	Observations
1	½			Add observations from students.
2	⅔ or 1		½ + ½ = ⅔ = 1	
3	⅓			
4	⅔		⅓ + ⅓ = ⅔	
5	⅗ or 1			
6	¼			
7	¾ or ½	¾ = ½	¼ + ¼ = ¾ = ½	
8	¾			
9	⁴⁄₄ or 1	⁴⁄₄ = ⅔ = 1	¼ + ¼ + ¼ + ¼ = ⁴⁄₄ = 1	
10	⅙			
11	⅔ or ⅓	⅔ = ⅓	⅙ + ⅙ = ⅔ or 2 * ⅙ = ⅔	
12	⅜ or ½	⅜ = ½	⅙ + ⅙ + ⅙ = ⅜	
13	⁴⁄₆ or ⅔	⁴⁄₆ = ⅔	⅙ + ⅙ + ⅙ + ⅙ = ⁴⁄₆	
14	⅚		⅙ + ⅙ + ⅙ + ⅙ + ⅙ = ⅚	
15	⁶⁄₆ or 1	⁶⁄₆ = 1	⅙ + ⅙ + ⅙ + ⅙ + ⅙ + ⅙ = ⁶⁄₆	
16	⅛			
17	⅜ or ¼	⅜ = ¼	⅛ + ⅛ = ¼	
18	⅜			
19	⁴⁄₈ or ½	⁴⁄₈ = ½	⅛ + ⅛ + ⅛ + ⅛ = ¼ + ¼ = ½	
20	⅝			
21	⁶⁄₈ or ¾	⁶⁄₈ = ¾	⅛ + ⅛ + ⅛ + ⅛ + ⅛ + ⅛ = ¼ + ¼ + ¼ = ¾	
22	⅞			
23	⁸⁄₈ or 1	⁸⁄₈ = 1	⅛ + ⅛ + ⅛ + ⅛ + ⅛ + ⅛ + ⅛ + ⅛ = ¼ + ¼ + ¼ + ¼ = ½ + ½ = 1	
24	¹⁄₁₂			
25	²⁄₁₂ or ⅙	²⁄₁₂ = ⅙	¹⁄₁₂ + ¹⁄₁₂ = ⅙	
26	³⁄₁₂			
27	⁴⁄₁₂ or ⅔	⁴⁄₁₂ = ⅔	¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ = ⁴⁄₁₂ = ⅔	
28	⁵⁄₁₂			
29	⁶⁄₁₂ or ½	⁶⁄₁₂ = ½	¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ = ⁶⁄₁₂ = ½	
30	⁷⁄₁₂			
31	⁸⁄₁₂ or ⅔	⁸⁄₁₂ = ⅔	¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ = ⁸⁄₁₂ = ⅔	

About the Pattern

This month's pattern is made up of sets of accumulations of fractions. Each day adds another unit fraction to a growing collection. Each set of markers has the same denominator and same major color, although the shades of the color change systematically to help students see equivalent fractions. The table below provides more information about these markers.

The denominators are generated by starting with 2 for the first set and then doubling on alternating sets (2, 4, 8). Every other set is generated by starting with 3 for the second set and then doubling on alternating sets (3, 6, 12). The result is that the denominators appear in the following order: 2, 3, 4, 6, 8, 12. Students might enjoy the challenge of determining what other denominators would appear if the pattern continued indefinitely.

Dates	Denominator	Generating Denominators	Fractions in Set	Color
1, 2	2 (2 × 1 = 2)	Start with 2	$\frac{1}{2}$, $\frac{2}{2}$	green
3–5	3 (3 × 1 = 6)	Start with 3	$\frac{1}{3}$, $\frac{2}{3}$, $\frac{3}{3}$	blue
6–9	4 (2 × 2 = 4)	Double 2 (4)	$\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$, $\frac{4}{4}$	red
10–15	6 (3 × 2 = 6)	Double 3 (6)	$\frac{1}{6}$, $\frac{2}{6}$, $\frac{3}{6}$, $\frac{4}{6}$, $\frac{5}{6}$, $\frac{6}{6}$	orange
16–23	8 (2 × 4 = 8)	Double 4 (8)	$\frac{1}{8}$, $\frac{2}{8}$, $\frac{3}{8}$, $\frac{4}{8}$, $\frac{5}{8}$, $\frac{6}{8}$, $\frac{7}{8}$, $\frac{8}{8}$	purple
24–30	12 (2 × 6 = 12)	Double 6 (12)	$\frac{1}{12}$, $\frac{2}{12}$, $\frac{3}{12}$, $\frac{4}{12}$, $\frac{5}{12}$, $\frac{6}{12}$, $\frac{7}{12}$	turquoise

Notes:

CALENDAR GRID OBSERVATIONS

DATE	FRACTION SHADED	EQUIVALENT FRACTIONS	EQUATIONS	OBSERVATIONS

December Calendar Collector

Collecting Grams

Overview

Each day of the month, students add an object from the classroom (or a group of the same kind of object) to a growing collection that is stored in a clear plastic bag. Before adding the object(s), students find the mass in grams and record it on a record sheet. The challenge is to create a collection that is as close to 1,000 grams (1 kilogram) as possible. Because they do not keep a running total each day, students must use estimation strategies to gauge how close they are to meeting their goal. Periodically, students check their progress by finding the exact mass of the collection. At the end of the month, they compare the mass of their collection to a collection of objects that together weigh exactly 1 kilogram.

Skills & Concepts

- Fluently multiply and divide within 100 using strategies that involve the relationship between multiplication and division or properties of operations (3.OA.7)
- Round whole numbers to the nearest ten or hundred (3.NBT.1)
- Estimate sums and differences to approximate solutions to problems and determine reasonableness of answers (supports 3.NBT)
- Fluently add and subtract with sums and minuends to 1,000 (3.NBT.2)
- Use strategies based on place value, properties of operations, or the relationship between addition and subtraction to add fluently with sums to 1,000 and subtract fluently with minuends to 1,000 (3.NBT.2)
- Use algorithms to add fluently with sums to 1,000 and subtract with minuends to 1,000 (3.NBT.2)
- Estimate and measure mass in grams and kilograms (3.MD.2)
- Attend to precision (3.MP.6)
- Use appropriate tools strategically (3.MP.5)

Materials

Activities	Day	Copies	Kit Materials	Classroom Materials
Activity 1 Introducing the December Calendar Collector	2		• balance scale with weights in 1g, 5g, and 10g increments (5 each)	Used in all Calendar Collector activities this month: • Collecting Grams Record Sheet (see Preparation) • erasable markers • large clear plastic bag • various small classroom items (see Preparation)
Activity 2 Making Estimates & Predictions	6			• calculator (optional)
Activity 3 Finding the Total Mass of the Collection	12			
Activity 4 Comparing the Collection to a Kilogram	15			• a collection of objects that together have a mass of 1 kilogram, gathered in a clear plastic bag (see Preparation) • calculator (optional)

TM – Teacher Master, **NCSB** – Number Corner Student Book
Copy instructions are located at the top of each teacher master.

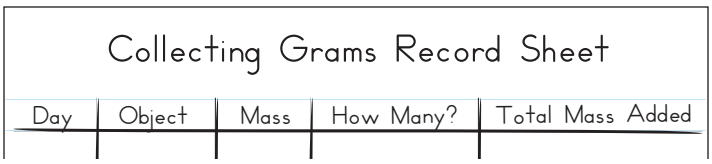
Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

gram (g)*
kilogram (kg)*
mass*
unit*

Preparation

Erase the entries on the Calendar Collector Record Sheet from last month. Then redraw the lines to create 6 columns. Label them as shown here for use with this month's collector and post the record sheet before Activity 1.



Place a pan balance scale in front of, or close to, the Calendar Collector Record Sheet. Use the compensator clips to balance the scale, if needed, when both pans are empty.

This month's collection will consist of small objects from around the classroom, such as pencils, crayons, and erasers. You'll need a plastic bag big enough to contain quite a few of these objects (at least 1 gallon in size) and the objects themselves, which need not be anything in particular.

Before Activity 3, gather a collection of objects that together have a mass of exactly 1 kilogram. Put them together in a clear plastic bag so that you can easily place them on one side of the balance scale. You might assemble some grocery items that together have a mass close to 1 kilogram and then make up the difference with the weights that go with the balance scale. You might also be able to measure exactly 1 kilogram worth of rice or beans in the bulk aisle at your grocery store. Don't use items in cardboard boxes if you can help it: the mass of the box is significant but not accounted for in the product mass printed on the package. The smaller the volume of the items, the easier it will be to place them on the scale to compare with the class collection.

Mathematical Background

This month's workout focuses on mass. Mass is the measure of how much matter an object contains. Weight is a measure of how heavy an object is, or more specifically, a measure of the pull of gravity on an object. The mass of an object doesn't change when the location of the object changes, but weight does vary with location. For instance, an object's weight on the moon is less than the same object's weight on Earth, because the object is subjected to far less gravitational pull on the moon than on Earth. However, the object's mass remains constant because the amount of matter it contains does not change. By using correct terminology (*mass* rather than *weight*, *finding the mass* rather than *weighing*) you'll help students begin to understand the somewhat subtle difference between mass and weight this month, though the distinction will probably not become meaningful for them for quite a few years.

The emphasis of this month's Calendar Collector is helping students develop a sense for the units *gram* and *kilogram*. Students will have the opportunity to estimate different objects' masses, based on the known masses of other objects of similar size. You'll encourage them to lift objects and collections of objects to experience what a given number of grams feels like, and students will find the mass of classroom objects when they update the collector. The activities this month also provide many opportunities for students to estimate and calculate the sums of multi-digit numbers to 1,000.

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll update the Calendar Collector as part of Activities 2 and 3 as well.

Procedure

- The student helpers select an object to add to the collection.
- They estimate the mass of the object and record their estimate on the record sheet.
- They find the exact mass of the object using the balance scale.
- They add the object to the collection in the bag.

Key Questions

Use these questions to help guide students' discussion this month.

- What do you estimate the mass of this object is?
- How can you estimate the total mass of the objects we have collected so far this month? Do you think it is more than 500 grams? More than a kilogram? How can you tell?
- How many more grams do we need to get to 1 kilogram (1,000 grams) exactly?

Literature Connections

Use the following books as read-alouds this month.

The Hundred Pound Problem
by Jennifer Dussling

How Much, How Many, How Far, How Heavy, How Long, How Tall Is 1,000?
by Helen Nolan

COLLECTING GRAMS
RECORD SHEET

DAY	OBJECT	MASS	HOW MANY?	TOTAL MASS ADDED

December Computational Fluency

Fact Fluency for Multiplying by Zero, One & Two

Overview

Students review multiplying by 0, 1, and 2. They discuss patterns within each group of facts and consider how many of the 121 basic multiplication facts fall within these three fairly straightforward categories. At the end of the month, they complete a Scout Them Out page on which they identify facts in each category first and then solve them. Students will review and practice the other categories of facts in future months of Computational Fluency workouts.

Skills & Concepts

- Fluently multiply with products to 100 using strategies (3.OA.7)
- Identify patterns among basic multiplication facts and identify patterns in the multiplication table (3.OA.9)
- Explain patterns among basic multiplication facts by referring to properties of the operation (3.OA.9)
- Reason abstractly and quantitatively (3.MP.2)
- Attend to precision (3.MP.6)

Materials

Activities	Day	Copies	Kit Materials	Classroom Materials
Activity 1 Multiplying by Zero & One	3	**TM T1** Zero Facts **TM T2** Ones Facts		• orange crayon • red crayon
Activity 2 The Doubles Facts	7	**TM T3** Doubles Facts		• yellow colored pencils
Activity 3 Zeroes, Ones & Doubles Facts on the Multiplication Table	10	**NCSB 19*** Multiplying by Two **NCSB 20*** Multiplication Table		
Activity 4 Scout Them Out	13	**NCSB 20** Multiplication Table **NCSB 21*** Scout Them Out		• blue, red and green crayons

TM – Teacher Master, **NCSB** – Number Corner Student Book
Copy instructions are located at the top of each teacher master. ** Run 1 copy of this page for display.*

Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

equal*
equation*
factor*
multiple*
multiply*
pattern*
product*
skip-count
strategy

Mathematical Background

The National Research Council, in *Adding It Up,* recommends that efforts to promote computational fluency be intertwined with conceptual understanding and strategic mathematical thinking. For the rest of the year, the Computational Fluency workouts will provide the kind of systematic, strategy-based practice students need to increase fluency in computing basic multiplication and division facts. Students will also strengthen their conceptual understanding of multiplication by reviewing a variety of multiplication strategies. This month, students think about multiplying by 0, 1, and 2. In so doing, they review the zero and identity properties of multiplication and think about the patterns among the Doubles facts.

Students keep track of the different categories of multiplication facts by color coding a Multiplication Table in their Number Corner Student Books. Developing strategies that can be used to multiply any number by a particular factor (e.g., to multiply any number by 5, multiply by 10 and then divide the result in half) is more efficient than memorizing all of the facts by rote, though

students will develop a degree of automaticity with these facts over time. The strategies also capitalize upon the associative and distributive properties of multiplication and can be generalized for use with any number: this kind of generalized arithmetic is an early form of algebraic thinking.

Key Questions

These questions guide students to think about the operation of multiplication.

- What patterns do you see on the multiplication table?
- If you skip-count by ___, will you ever land on ____? Why or why not?
- When you multiply 2 by another number, will the product be odd or even? Why?
- Does 7 times 2 have the same product as 2 times 7? Why?
- How can addition help you with multiplication?
- What model or strategy do you think will help you solve this problem?

Literature Connections

Use the following books as read-alouds this month.

Even Steven and Odd Todd
by Kathryn Cristaldi

Two of Everything
by Lily Toy Hong

December Number Line

Rounding to the Nearest Hundred

Overview

At the beginning of the month, students mark a number line in multiples of 50 and 100 from 0 to 1,000 and then use it to practice rounding to the nearest hundred. For the rest of the month, they play Round & Add Hundreds, a variation of Round & Add, which was introduced the previous month. Students also complete a sheet of rounding practice problems independently.

Skills & Concepts

- Round whole numbers to the nearest ten and nearest hundred (3.NBT.1)
- Estimate sums and differences to approximate solutions to problems and determine reasonableness of answers (supports 3.NBT)
- Fluently add with sums to 1,000 (3.NBT.2)
- Read, write, and order numbers to 10,000 represented with numerals (supports 3.NBT)
- Model with mathematics (3.MP.4)
- Look for and make use of structure (3.MP.7)

Materials

Activities	Day	Copies	Kit Materials	Classroom Materials
Activity 1 Rounding to the Nearest Hundred	5	**TM T4** Number Line		• pencil
Activity 2 Playing Round & Add Hundreds as a Class	8	**TM T5** Round & Add Hundreds	• 3 dice, 2 numbered 1–6 and 1 numbered 4–9	• erasable markers in red and blue • sticky notes in two different colors or small squares of scrap paper in two colors, plus tape
Activity 3 Playing Round & Add Hundreds in Pairs	12	**NCSB 22*** More Rounding Practice **NCSB 23** Round & Add Hundreds **TM T4** Number Line (for support)	• 3 dice, 2 numbered 1–6 and 1 numbered 4–9 for each pair of students	

TM – Teacher Master, **NCSB** – Number Corner Student Book
Copy instructions are located at the top of each teacher master. ** Run 1 copy of this page for display.*

Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

compute
estimate*
hundreds
round

Mathematical Background

The activities this month use the number line to help students round numbers to the nearest hundred. Students find the approximate location of a number on the number line, identify the two multiples of 100 the number lies between, and then determine whether the number is closer to the lower or higher of those two multiples of 100. The result is that students have rounded the number in question to the nearest hundred. Using the number line makes rounding less abstract: students see that when we round to the nearest hundred, we are simply asking, "Is this number closer to the next lower or the next higher multiple of 100?"

When we round a number, we replace it with a number that is easier to work with. This is useful when we need an estimate rather than an exact calculation. This month, students play Round & Add Hundreds, a game in which they compare the sum of their rounded scores to the sum of their exact scores: the player with the smallest difference between rounded and exact sums wins the game.

December Solving Problems

Multiplying with the Distributive Property

Overview

In this short month, students complete two multiplication problem strings that focus on using the distributive property. One string features the number line and the other features the array model. Through discussion, modeling, and solving problems, students become more efficient and adept at seeing patterns and solving problems efficiently.

Skills & Concepts

- Interpret products of whole numbers (3.OA.1)
- Multiply using the distributive, associative, and commutative property (3.OA.5)
- Fluently multiply with products to 100 using strategies (3.OA.7)
- Recall from memory products of two 1-digit numbers (3.OA.7)
- Identify patterns among basic multiplication facts (3.OA.9)
- Model with mathematics (3.MP.4)
- Look for and express regularity in repeated reasoning (3.MP.8)

Materials

Activities	Day	Copies	Kit Materials	Classroom Materials
Activity 1 Problem String 7	9	**NCSB Appendix** Problem String Work Space		
Activity 2 Problem String 8	11	**NCSB Appendix** Problem String Work Space		

TM – Teacher Master, **NCSB** – Number Corner Student Book
Copy instructions are located at the top of each teacher master.

Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

distributive property*
factor*
multiple*
multiplication
multiply*
product*

Preparation

If you are not familiar with the models and strategies explored this month, practice using them with a few problems. Think about how you will model student thinking for the whole class to see.

Mathematical Background

This month's problem strings are meant to deepen students' understanding of and fluency with multiplication, regardless of how much progress they have already made toward mastering the multiplication facts. You'll represent students' strategies for the problems in the first string using a number line. This model illustrates skip-counting nicely, while also being open to more efficient strategies. The first few problems are very close together, illustrating what happens when you have one group more or one group less (4×7, 3×7, 5×7). Then, the numbers get a little bigger and the problems become combinations of previous problems (12×7 is composed of 3×7 and 9×7 or 5×7 and 7×7). If some students skip-count to solve all of the problems, encourage them to make sense of how their peers are making use of partial products to build on problems they have already solved in order to solve new problems more efficiently. The sequence of problems in the second string is similar to that of the first string, but you'll model them on an array, which lends itself nicely to use of partial products. After the string is finished, you'll record all of the problems on a ratio table, so that students can see the connections between the different problems and between arrays and ratio tables.

Activity 1

Problem String 7 — Day 9

1 Open today's activity by gathering students in the discussion area and reviewing the process of doing a problem string.

- Remind students to bring their Number Corner Student Books and a pencil.
- Ask students to turn to the person sitting next to them and summarize how a problem string works.
  - » Problems are delivered one at a time.
  - » Students solve the problem independently and then give a silent thumbs up to show when they are done.
  - » Students share their strategies for solving the problem.
  - » Generally, the earlier problems are easier and the later problems more difficult. Students should try to use the solutions to the earlier problems to help solve the later ones.
- Give students an opportunity to ask any questions they have about problem strings.

2 Have students turn to the next blank page of Problem String Workspace in their Number Corner Student Books. Have them write the date and get ready for the first problem of today's string.

3 Deliver the problem string shown in this table.

- Model students' strategies for solving the problems on a number line.
- Encourage students to build on the number lines used in previous problems.
- Use arrows and labels to make the connections between problems shown on the number line explicit.

SUPPORT Help students use skip-counting on the number line more effectively by asking them how they knew when to stop skip-counting and how they kept track of how many times they had skip-counted.

CHALLENGE If the problems are too easy for some students, have them explore 20×7, 19×7, and 21×7. Ask them to generalize what they notice about these problems. For example:

- $20 \times 7 = (10 + 10) \times 7 = 140 + 140 = 280$
- $19 \times 7 = (20 - 1) \times 7 = (20 \times 7) - (1 \times 7) = 280 - 7 = 273$
- $21 \times 7 = (20 + 1) \times 7 = 280 + 7 = 287$

Key Questions

Use these questions to help guide students' discussion this month.

- What do you know that could help you solve this problem?
- What strategy could you use?
- How can you show your thinking?
- What model could you use to show your thinking?
- How can solving one problem in a string help you solve another problem, later in the string?
- What is the big idea of this string?
- How can your work with this string help you with other problems?

Problem String 7

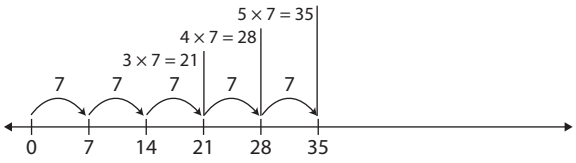
<table>
<tr><th>Problems</th><th>Sample Strategies & Recording</th><th>Connections</th></tr>
<tr><td>4 × 7

3 × 7

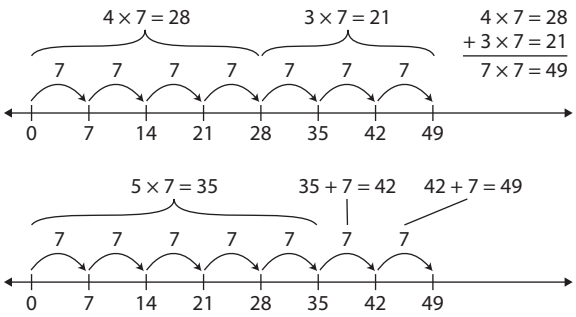
5 × 7</td><td>Some students may skip-count by 4s. If so, draw a number line showing 7 jumps of 4 (4, 8, 12, 16, 20, 24, 28). Then, compare that to a number line with jumps of 7, as shown here. Ask students which looks more efficient.

If students say they “just know it,” acknowledge that being able to recall facts from memory is very useful, and then draw the number line as a foundation for future problems.

Model each problem one at a time on the same number line so that it looks like this after all 3 problems are finished.

 
</td><td>Students may see on the first number line that 3 × 7 is 1 group of 7 less than 4 × 7.

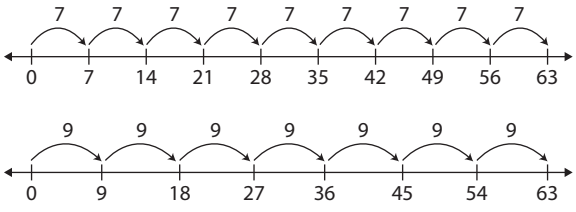
You can add 1 more jump of 7 on to the number line to show that 7 × 5 is 1 more group of 7 than 4 × 7, which is equal to 28 + 7 or 35.

Big Idea
When multiplying, you can think about equal groups or repeated jumps on a number line. You can use what you know about one combination to solve another, for example, by adding or subtracting equal groups to use known combinations like 4 × 7 to solve unknown combinations like 3 × 7 and 5 × 7.</td></tr>
<tr><td>7 × 7</td><td> 
</td><td>Students might see that the product of 7 × 7 is equal to the sum of the products of 3 × 7 and 4 × 7. Calculating the product in this way is fairly straightforward, because they have already found those products. Other students might see that 7 × 7 = (5 + 2) × 7 = 5 × 7 + 2 × 7. Since they already found the product of 5 × 7, they can simply add 2 more groups of 7 to it.

Big Idea
When multiplying, you can think about equal groups or repeated jumps on a number line. You can use what you know about some combinations to solve others. You might add or subtract equal groups to use known combinations like 5 × 7 to solve unknown combinations like 7 × 7. You might also see that a particular combination, like 7 × 7, can be decomposed into other combinations you already know, like 3 × 7 and 4 × 7.</td></tr>
<tr><td>9 × 7

7 × 9</td><td>Students might add 2 more jumps of 7 to 7 × 7 to find 9 × 7. They might also subtract a group of 7 from 10 × 7.

The second problem, 7 × 9, emphasizes the commutative property. If students skip-count from zero, ask them if they really needed to do that to solve the problem. Then, show 7 groups of 9 on a number line and have students compare it to 9 groups of 7.

 
</td><td>Big Idea
When multiplying, you can use what you know about some combinations to solve others. You might add or subtract equal groups to use known combinations like 7 × 7 or 10 × 7 to solve unknown combinations like 9 × 7.

Because of the commutative property, the product is the same no matter what order you multiply numbers. Therefore, 7 × 9 = 9 × 7. If you have already found the product of 9 × 7, you know the product of 7 × 9 as well.</td></tr>
<tr><td>12 × 7</td><td>Model students’ strategies on the number line. They might find the product of 12 × 7 in the following ways (or in other ways):
• Start at 9 × 7 (63) and jump ahead by 7 three more times.
12 × 7 = (9 × 7) + 7 + 7 + 7
• Find the sum of the products of 9 × 7 (63) and 3 × 7 (21).
12 × 7 = (9 × 7) + (3 × 7)
• Start at 10 × 7 (70) and jump ahead by 7 two more times.
12 × 7 = (10 × 7) + 7 + 7
• Find the sum of the products of 5 × 7 (35) and 7 × 7 (49).
12 × 7 = (5 × 7) + (7 × 7)</td><td></td></tr>
</table>

4 Wrap up today’s string by giving students a few minutes to study the number lines and then talk about what they noticed, learned, or thought was important about today’s problem string.

Activity 2

Problem String 8 Day 11

1 Open today's activity by gathering students in the discussion area with their Number Corner Student Books and a pencil.

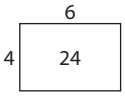
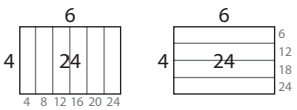
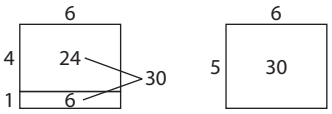
2 Have students turn to the next unused Problem String Workspace page in their Number Corner Student Books. Have them write the date and get ready for the first problem of today's string.

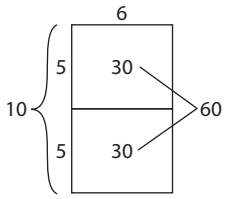
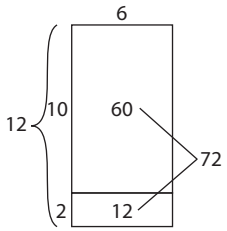
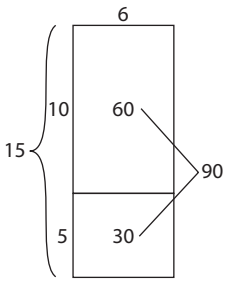
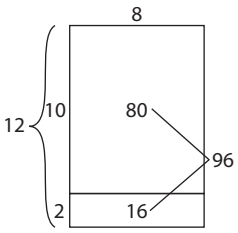
3 Deliver the problem string shown in this table.

- Model students' strategies for solving the problems on an array.
- Encourage students to build on the arrays used in previous problems. In Activity 1, you showed how to add on to known facts with equal jumps on the number line. In this activity, that adding on is shown by adding rows or columns onto arrays and by combining smaller arrays to create larger arrays.
- Label the arrays with numbers and equations to make the connections between the problems explicit.

SUPPORT There is no context built in to this string, but if you think it would help, offer students a context, such as boxes of chocolate or crates of fruit to help them visualize the problems in a meaningful way. Make sure students are not sketching and counting by 1s; encourage them to use more effective and efficient strategies.

Problem String 8

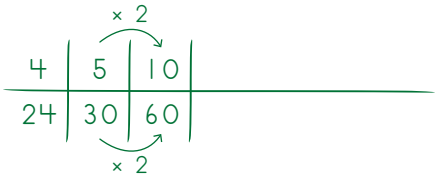
Problems	Sample Strategies & Recording	Connections
4 × 6	Depending on how comfortable students are with the multiplication facts, they might say they "just knew" that 4 × 6 is 24. If so, model their thinking with an open array.  You can use rows and columns to model skip-counting strategies on an array as well. 	Students can solve 5 × 6 by adding another row or column of 6 to the 4 × 6 array from the first problem. **Big Idea** You can add on to known products to find unknown products.
5 × 6	 5 × 6 = (4 + 1) × 6 = (4 × 6) + 6 = 24 + 6 = 30	

Problems	Sample Strategies & Recording	Connections
10 × 6	If students say they just know that the product is 60, model it on an open array so they can use it in future problems. You can use the array model to show that 10 × 6 is twice 5 × 6.  	The array model can help students see how these combinations are related to one another. Specifically, the arrays are an elegant way to show how one combination like 12 × 6 might be decomposed into related combinations, such as 10 × 6 and 2 × 6. By modeling these problems with the array, you are helping students make sense of the distributive property of multiplication. This builds students' understanding of multiplication and contributes to their developing computational fluency.
9 × 6	Students might see that 9 × 6 is the sum of 4 × 6 and 5 × 6: 24 + 30 = 54. They might also subtract 1 group of 9 from 10 × 6 because 9 × 6 = (10 – 1) × 6 = (6 × 10) – (6 × 1) = 60 – 6.	
12 × 6	Students might add 2 more groups of 6 on to 10 × 6.  	
15 × 6	Students might add 10 × 6 and 5 × 6.  	
12 × 8	Students can find the product of 12 × 8 by finding the sum of 10 × 8 and 2 × 8. This can be modeled by dividing a 12-by-8 array into a 10-by-8 and 2-by-8 array.  	By starting with a challenging combination, 12 × 8, we are inviting students to think about which known facts might help them solve the problem. We want the connections they drew between the earlier problems in the string to inform their choices about how to solve this final problem. **Big Idea** When finding the product of two numbers, you can decompose the product into smaller, known products and then find their sum.

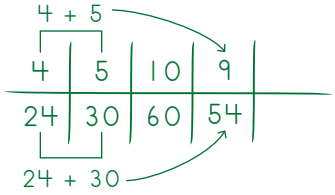
4 After the string, begin a ratio table to show the relationships between the problems the students just solved.

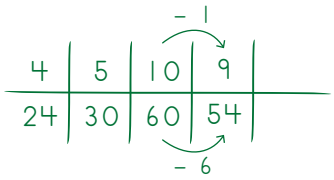
SUPPORT If you have not done any work with ratio tables before, you want to skip this step or use it as a way to familiarize students with the ratio table model.

- Show 4 × 6, 5 × 6, and 10 × 6. Ask students if they see a connection between 5 times 6 and 10 times 6.

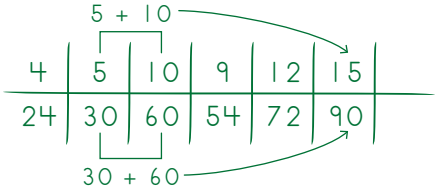


- Continue the ratio table with 9 times 6. Ask students how this problem connects to previous problems (either 4 × 6 and 5 × 6 or 10 × 6 minus one group of 6).

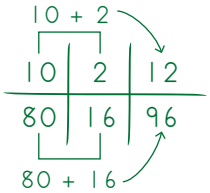




- Continue the ratio table with 12 × 6 and 15 × 6. Ask students if they see a connection between 15 times 6 and any other problems in the string.



5 If you have time, ask students how they could use a ratio table to solve 12 times 8. An example is shown below.



6 Wrap up the string by recognizing students for their effort and participation. Encourage them to use relationships between problems and numbers when solving multiplication problems.

Day 1

Date:

Calendar Grid	Calendar Collector	Computational Fluency
Activity 1 – Introducing the December Calendar Grid (pg. 8)		
Number Line	**Solving Problems**	**Assessment**

Activity 1

Introducing the December Calendar Grid — Day 1

1 Have students gather in front of the Calendar Grid with their whiteboards and markers.

2 Reveal the first marker and give students a moment of quiet think time before asking them to share observations as a class.

3 Ask students to take a few quiet moments to draw on their whiteboards what the whole, of which this triangle is half, might look like.

4 Have all students hold up their whiteboards for everyone to see. Build discussion by asking students to share observations or questions about each other's drawings.

ELL Use the Word Resource Cards to help clarify key terms such as *numerator, denominator, fraction,* and *whole*.

5 Wrap up your Calendar Grid work by having students turn to a partner to make a prediction about what the next day's calendar marker will look like. Invite a few students to share their partner's predictions.

Asking students to share their partners' predictions, rather than their own, is an effective way to hold students accountable for listening to each other. When they know they will have to be able to describe their partners' ideas, students listen more carefully to one another and ask clarifying questions to better understand others' thinking.

Note Even if it is past the first day of the month, do not reveal any more calendar markers. Also, note that students will not begin updating until after you post the Observations Chart in Activity 2.

Key Questions

Use these questions to help guide students' discussion this month.

- This is what ½ (or ⅓, ¼, ⅙, 1/12) looks like. What would the whole look like?
- What is a unit fraction?
- Can you think of an equation for ¾? (or any other fraction)
- What fractions are equal to ½? ⅔? ¾? (and other fractions)
- Why are there no fractions equal to ⅝ on the Calendar Grid?
- If the month continued, what would the 33rd day look like? What about the 36th day?
- On what day will we see the next fraction that is equal to 1 whole?
- On what day will we see the next fraction that is equal to ½?
- What are some of the fractions we'll see that don't have equivalent fractions on the calendar? On what date will each appear?
- CHALLENGE If the pattern kept going forever, what other denominators would we see? On what date would each new denominator appear for the first time?

Day 2

Date:

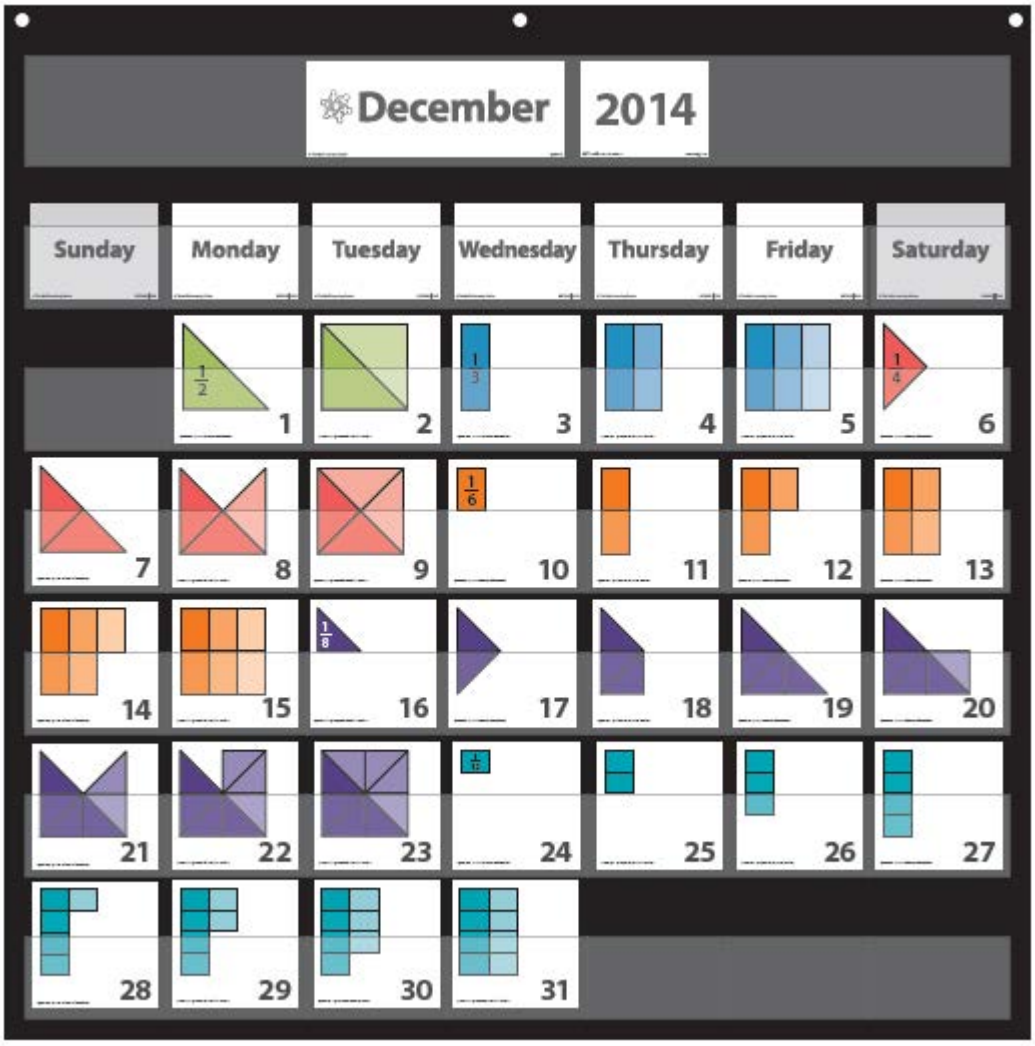
Calendar Grid	Calendar Collector	Computational Fluency
Update	**Activity 1 –** Introducing the December Calendar Collector (pg. 17)	
Number Line	**Solving Problems**	**Assessment**

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- After Activity 2, update the Calendar Grid Observations Chart as well.



Activity 1

Introducing the December Calendar Collector Day 2

1 Open today's activity by gathering students in front of the Number Corner display and introducing the word *mass*, using the Word Resource Card as needed.

- Post or hold up the *mass* Word Resource Card so that all students can see it. Explain that this month they will explore mass.
- Ask students to raise their hands if they have heard this word before. Remind them that words often have more than one meaning and that this month, they will focus on the scientific definition of mass.
- Explain that when scientists use the word *mass*, they are talking about a measure of how much matter an object has. Everything is composed of matter, from tables to books to cars to living things. Some things have more matter than others, which means they have greater mass than other things.
- Point out that mass is different from *weight*. Weight is how heavy something is, or, to be more specific, a measure of the gravitational pull on an object. An object's mass never changes, but weight can change in different locations. For example, on the moon, there is less gravitational pull, so objects have less weight.

2 Introduce the balance scale.

- Show students the scale, and tell them it is called a pan balance or balance scale and is used to measure the mass of objects.
- Explain that they can find an object's mass by putting it on one side and then balancing it with items of known mass on the other side.
- Show students the gram masses that came with the balance scale. Explain that the mass of each piece is shown on it, and they can use these pieces to balance the scale to find the mass of other objects.

3 Work with the class to find the mass of two different objects in your classroom.

- Place an object, for example a crayon or an eraser, on one side.
- Then add masses to the other side until the two sides are balanced.
- Show students how to work carefully to keep the two sides of the balance from moving a lot. Show them how to steady the two sides if they begin to teeter too much.
- As you work, talk about how you can tell which side of the balance scale is holding more mass. Talk about how you can add and subtract masses from one side to balance it with the side holding the object.
- Count the total number of grams with students: you'll need to count by 10s, 5s, and 1s to find the total.
- Then invite a volunteer to help find the mass of the second object.
- Ask the volunteer to hold the object for which you just found the mass in one hand and the new object in the other hand and report to the class whether the second object feels like it has a greater, smaller, or roughly similar mass to the first object.
- Then work with the volunteer to find the mass of the second object.

4 Introduce this month's collection.

- Explain that each day, the student helper will find an object to add to the collection. The object must:
  - » Fit on one side of the balance scale
  - » Be available to sit as part of the collection for the month
  - » Have a mass that can be measured using the gram masses provided with the balance scale

- They will record the object and an estimate of its mass on the record sheet.
- Then they will find the exact mass of the object and record it on the record sheet.

Explain that students can add only one kind of object to the collection, but they can decide to add as many of that kind of object as they like. For example, if they found that a single crayon has a mass of 4 grams, they might decide to add 10 crayons so that they are adding 40 grams to the mass of the collection, rather than only 4 grams.

5 Explain that the challenge this month is to accumulate a collection of objects that together have a mass as close as possible to 1,000 grams, or 1 kilogram.

6 Ask students to make some conjectures about the collection, using questions like the following to elicit discussion.

- We're in school for 15 days this month. About how many grams should we collect each day to meet our goal? [About 66 grams]
- What objects in our classroom might be good choices to add to the collection?
- When it is your turn to add an object to the collection, you will need to look at the objects that have been added to the collection already to see how close we are to our goal. How could you do that? [Estimation, using a calculator to find the exact total so far, thinking about how close each object's mass is to the target mass for each day—66 grams per day in the example above]

7 Add to the record sheet the two objects for which you found the mass in step 3. Invite students to consider whether they would like to add more than one of each kind of object to increase the amount of mass they are adding to the collection.

8 Then ask a volunteer to place the objects in the plastic bag where you will be storing the growing collection of objects this month.

9 Close the activity by asking students to estimate or find the exact sum of their masses and consider how many more grams they need to get to 1,000.

Day 3

Date:

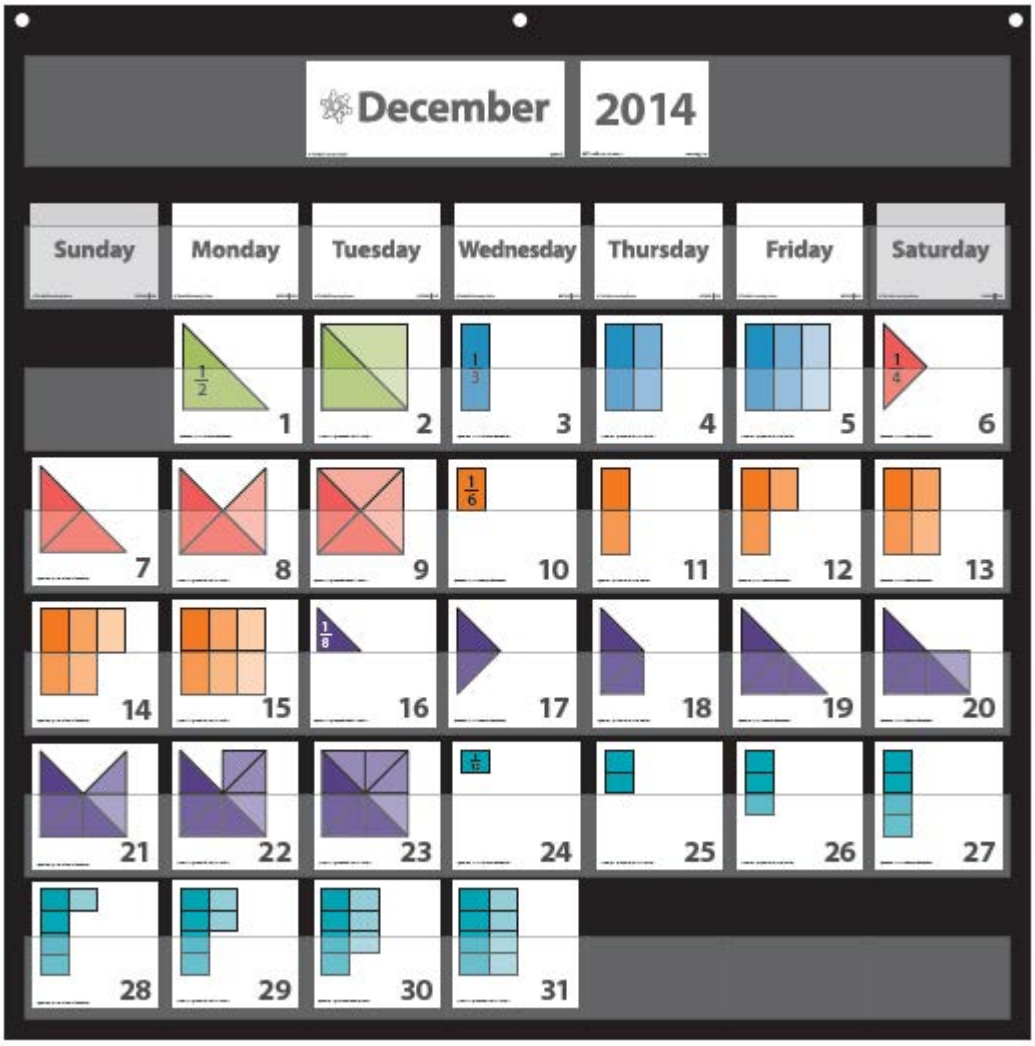
Calendar Grid	Calendar Collector	Computational Fluency
Update	*Update*	**Activity 1 –** Multiplying by Zero & One (pg. 24)
Number Line	**Solving Problems**	**Assessment**

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- After Activity 2, update the Calendar Grid Observations Chart as well.



Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll update the Calendar Collector as part of Activities 2 and 3 as well.

Procedure

- The student helpers select an object to add to the collection.
- They estimate the mass of the object and record their estimate on the record sheet.
- They find the exact mass of the object using the balance scale.
- They add the object to the collection in the bag.

Key Questions

Use these questions to help guide students' discussion this month.

- What do you estimate the mass of this object is?
- How can you estimate the total mass of the objects we have collected so far this month? Do you think it is more than 500 grams? More than a kilogram? How can you tell?
- How many more grams do we need to get to 1 kilogram (1,000 grams) exactly?

Literature Connections

Use the following books as read-alouds this month.

The Hundred Pound Problem
by Jennifer Dussling

How Much, How Many, How Far, How Heavy, How Long, How Tall Is 1,000?
by Helen Nolan

Activity 1

Multiplying by Zero & One — Day 3

1 Explain to students that they will spend the next few months focusing on mastering the multiplication facts through 10 × 10.

2 Invite students to come to the Number Corner area. They will each need a whiteboard, whiteboard pen, and eraser.

3 Spend some time discussing each story problem on the Zero Facts Teacher Master one at a time.

- Display just one of the story problems on the teacher master.
- Read it out loud, and then give students a moment to think silently about how they would represent the problem with a picture, equation, or some combination of sketches and numbers.
- Invite students to represent the problem on their whiteboards and then talk about them in pairs.
- Select a few students to share their work with the whole class.

4 Ask students to talk to a partner about how they would describe in their own words what happens when you multiply any number by 0. Then invite a volunteer or two to share with the class.

Ask students to give a thumbs up if their ideas were similar to what the volunteer describes.

5 Review the top of the Zero Facts Teacher Master and let students know that the zero property of multiplication states that the product of 0 and any number is 0.

6 Repeat steps 3–5 with the Ones Facts Teacher Master.

7 In conclusion, you'll let students know that according to the identity property of multiplication, the product of any number and 1 is that number.

8 If you have time, invite students to discuss problems like the following:

0 × 45 = ___	3 × 0 = ___	10 × 0 = ___	0 × 328 = ___	0 × 1/2 = ___
1 × 5 = ___	32 × 1 = ___	105 × 1 = ___	1 × 6 = ___	1 × 1/4 = ___

Key Questions

These questions guide students to think about the operation of multiplication.

- What patterns do you see on the multiplication table?
- If you skip-count by ___, will you ever land on ____? Why or why not?
- When you multiply 2 by another number, will the product be odd or even? Why?
- Does 7 times 2 have the same product as 2 times 7? Why?
- How can addition help you with multiplication?
- What model or strategy do you think will help you solve this problem?

Literature Connections

Use the following books as read-alouds this month.

Even Steven and Odd Todd by Kathryn Cristaldi

Two of Everything by Lily Toy Hong

Day 4

Date:

Calendar Grid	Calendar Collector	Computational Fluency
Activity 2 – Introducing the December Calendar Grid Observations Chart (pg. 9)	*Update*	
Number Line	**Solving Problems**	**Assessment**

Activity 2

Introducing the December Calendar Grid Observations Chart — Day 4

1 Open today's activity by having students gather in front of the Calendar Grid display with their whiteboards and markers. Ask them to think back to the predictions they made for the second calendar marker, and then invite a student to reveal or post the second calendar marker.

2 Ask students to share their observations about the marker. If it doesn't come up naturally, ask them how they would label what they see on the second marker, and ask them to write more than one equation that describes the marker.

Elicit and record the following equations: ½ + ½ = 1 and ½ + ½ = ⅔. Students might also mention that 2 × ½ = 1 or 2 × ½ = ⅔.

> ***Students*** *I see another half, but it is another color of green.*
>
> *Why isn't it labeled, like the first one? Is it really half?*
>
> *I think so because it makes a square!*
>
> *That's what I thought it would look like. The two halves make a whole.*
>
> ***Teacher*** *I hear people saying they see another half or the other half. Can anyone think of an equation to describe what you are seeing?*
>
> ***Students*** *Yes—½ plus ½ equals one whole.*
>
> *Really, ½ plus ½ equals two halves? That doesn't sound right.*
>
> *I think it is right. Remember the other month when we talked about how sometimes fractions are equal to whole numbers? ⅔ is the same as 1.*
>
> *Oh yeah, when we were doing the fraction race, when we put two half pieces in a row, it made exactly 1. Two halves are equal to one whole.*

3 Ask students to turn to a partner to make a prediction about what the next calendar marker will look like. Invite a few students to share their predictions.

4 Then, invite a student to post or reveal the third marker, and give students a moment of quiet think time before inviting them to share their observations.

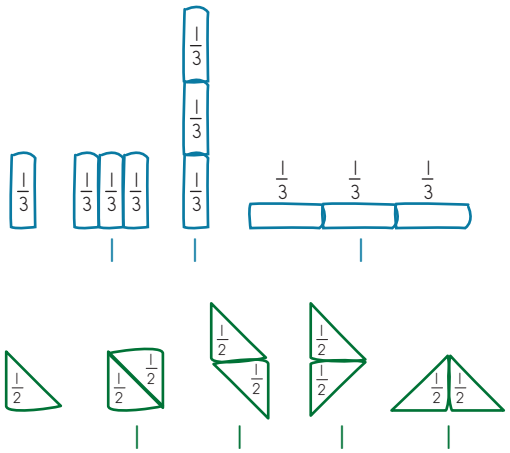
> ***Students*** *Now it's ⅓! And it's blue!*
>
> *I think it will go ⅔ and then ⅓.*

5 Have students make and discuss predictions about what the whole will look like, based on the shape that is identified as ⅓.

- Ask students to imagine what the whole will look like, based on what they see on the third marker.
- Ask students to draw their predictions on their whiteboards.
- Have all students hold up their whiteboards for everyone to see.
- Build discussion by asking students to share observations or questions about each other's drawings.

You will probably see more diversity in students' ideas today than you did on Day 1. Encourage students to explain their thinking. Some students may draw the whole as a square divided into two parts, with the one-third as one piece and then the rest. Others may draw the square in three equal parts. As the question asks only what the whole would look like, both sketches are fine, but the discussion may produce important information about how students are thinking about fractions. Use this conversation as an opportunity for informal assessment.

CHALLENGE Invite students to sketch a variety of figures that could represent the whole. In this set of calendar markers, the whole is always represented using the same square. This makes it easy for students to recognize that the wholes are always equal, which also makes it possible for them to compare fractions. However, the whole certainly does not have to be a square. Rather, the whole could be any figure that is twice the size of the half, three times the size of the third, and so on.



6 Invite students to reveal the next three markers, one at a time. For each marker, give students a moment to examine the marker and make a few observations.

7 Then, post the Calendar Grid Observations Chart, read each column heading out loud, and talk with students about what each heading means.

8 Elicit student participation as you fill in the chart together to bring it up to date.

- Model using vocabulary such as numerator, denominator, fraction, and whole, and encourage students to use specific math vocabulary when they share input.
- In the third column, students will generate equivalent fractions. They do not need to generate equivalent fractions in the first 5 days unless they happen to know some.
- In the fourth column, students will generate equations for the calendar markers. Using each different colored portion will help generate additive equations (⅓ + ⅓ = ⅔), but they can also create other equations if they think of them (3 × ⅓ = ⅓ = 1). They do not need to generate equations on days when there are unit fractions, but a discussion about why it might be harder to generate equations for unit fractions will help deepen their understanding of unit fractions in general.

Calendar Grid Observations

Date	Fraction Shaded	Equivalent Fractions	Equations	Observations
1	$\frac{1}{2}$			Another equivalent triangle would make a whole.
2	$\frac{2}{2}$ or 1		$\frac{1}{2} + \frac{1}{2} = \frac{2}{2}$ or 1	Tomorrow there will be 3 halves.
3	$\frac{1}{3}$			The pattern is starting again.
4	$\frac{2}{3}$		$\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$	Each day adds a new fraction.
5	$\frac{3}{3}$ or 1		$\frac{1}{3} + \frac{1}{3} + \frac{1}{3} = \frac{3}{3}$ or 1 $\frac{1}{3} \times 3 = \frac{3}{3}$	We made another whole.

9 Explain that from now on students will update the Calendar Grid on days when the Calendar Grid is not a main activity by posting the next marker and filling in the Observations Chart for that day.

10 Ask students if they have any questions. Then, wrap up today's activity by asking them to predict what the next marker will look like.

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll update the Calendar Collector as part of Activities 2 and 3 as well.

Procedure

- The student helpers select an object to add to the collection.
- They estimate the mass of the object and record their estimate on the record sheet.
- They find the exact mass of the object using the balance scale.
- They add the object to the collection in the bag.

Key Questions

Use these questions to help guide students' discussion this month.

- What do you estimate the mass of this object is?
- How can you estimate the total mass of the objects we have collected so far this month? Do you think it is more than 500 grams? More than a kilogram? How can you tell?
- How many more grams do we need to get to 1 kilogram (1,000 grams) exactly?

Literature Connections

Use the following books as read-alouds this month.

The Hundred Pound Problem
by Jennifer Dussling

How Much, How Many, How Far, How Heavy, How Long, How Tall Is 1,000?
by Helen Nolan

Day 5

Date:

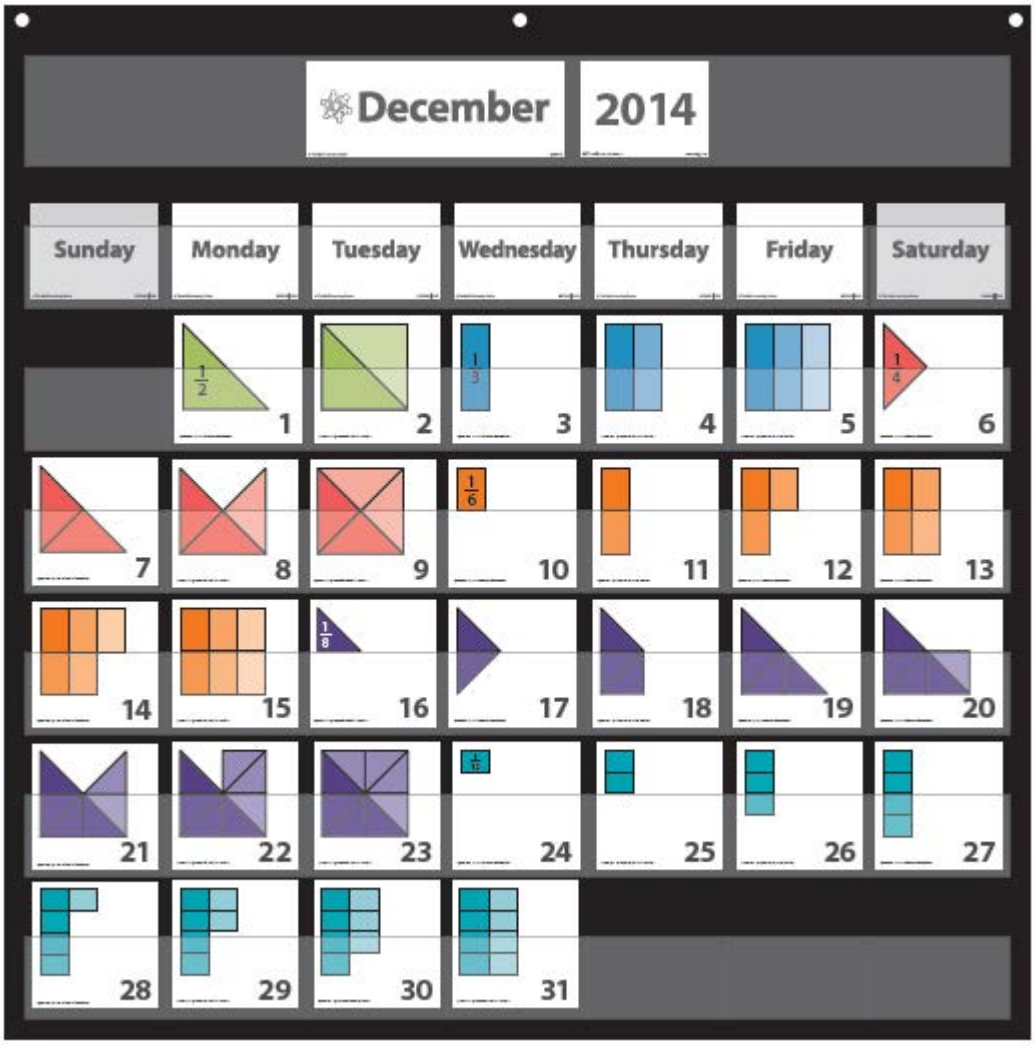
Calendar Grid	Calendar Collector	Computational Fluency
Update	*Update*	
Number Line	**Solving Problems**	**Assessment**
Activity 1 – Rounding to the Nearest Hundred (pg. 28)		

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- After Activity 2, update the Calendar Grid Observations Chart as well.



Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll update the Calendar Collector as part of Activities 2 and 3 as well.

Procedure

- The student helpers select an object to add to the collection.
- They estimate the mass of the object and record their estimate on the record sheet.
- They find the exact mass of the object using the balance scale.
- They add the object to the collection in the bag.

Key Questions

Use these questions to help guide students' discussion this month.

- What do you estimate the mass of this object is?
- How can you estimate the total mass of the objects we have collected so far this month? Do you think it is more than 500 grams? More than a kilogram? How can you tell?
- How many more grams do we need to get to 1 kilogram (1,000 grams) exactly?

Literature Connections

Use the following books as read-alouds this month.

The Hundred Pound Problem
by Jennifer Dussling

How Much, How Many, How Far, How Heavy, How Long, How Tall Is 1,000?
by Helen Nolan

Activity 1

Rounding to the Nearest Hundred — Day 5

1 Display the Number Line Teacher Master and ask students to study it quietly for a moment.

2 Then ask students to turn and talk to a partner about what they notice about this number line.

- Ask students to share observations with each other.
- Ask students to talk to each other about how they would label the rest of the markings on the number line.
- Can they think of any numbers they could place on this number line with absolute confidence?

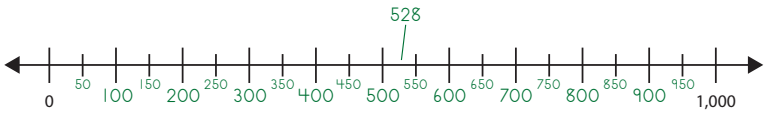
3 Label the markings with input from the class.

- Ask a volunteer to help label one of the markings. Which one do they feel certain about? How can they tell what number to place there?
- Continue to get input from students about how to mark the number line. Write the multiples of 100 in larger numbers and the multiples of 50 between them in smaller numbers.

4 When the number line has been labeled, ask students to talk in pairs about where they would place the number 536 and why.

5 Invite a pair of students to share with the group where they would place 528 and explain how they figured it out. Use a pencil to label 528 on the number line.

> ***Hannah*** *We said we'd put it between 500 and 550.*
>
> ***Teacher*** *Can you and Miguel come up and show us where?*
>
> ***Miguel*** *Right here.*
>
> ***Teacher*** *How do you know that?*
>
> ***Miguel*** *Well, 528 is more than 500 but less than 550.*
>
> ***Hannah*** *And we knew that 525 would be halfway between 500 and 550, so we thought 528 would be just a little bit more than halfway between them because it's so close to 525.*



6 Introduce the idea of rounding to the nearest hundred by connecting it to the work students just did.

> ***Teacher*** *When you were thinking about where to put 528 on the number line, you were thinking about how close 528 is to the other numbers on the line. When we round numbers, we can use the number line to help. If we were rounding 528 to the nearest hundred, we can think about whether it is closer to the two multiples of one hundred that it is between: is 528 closer to 500 or to 600?*
>
> ***Students*** *It's a lot closer to 500!*

Key Questions

- What comes before ___?
- What comes after ____?
- What is between ___ and ____?
- What is ___ rounded to the nearest hundred?

Literature Connections

Use the following books as read-alouds this month.

Further Adventures of Penrose the Mathematical Cat by Theoni Pappas

The 500 Hats of Bartholomew Cubbins by Dr. Seuss

> ***Teacher*** *Right, you can see that on the line pretty easily, huh? So 528 rounded to the nearest hundred is 500. We can round numbers when we just need an estimate, not an exact number. So if we have 528 students in our school, we might say, "We have about 500 students in our school." That would give someone a much better idea of how many kids are in our school. And since some students are absent pretty much every day, saying that there are about 500 kids in our school is about right on any given day.*

7 Now invite students to practice rounding the following numbers to the nearest hundred, using the number line to help: 287, 113, 995.

SUPPORT If students seem to need quite a bit of scaffolding to get comfortable with rounding to the nearest hundred, structure your questions in a deliberate and sequenced way. For example: Between which multiples of 100 would we put 230 on the number line? [200 and 300] Which multiple of 100 is 230 closer to? [200] So what is 230 rounded to the nearest hundred? [200] You might also mark each number on the number line to provide a visual scaffold. Additionally, you might begin with multiples of 10 so that students won't be distracted by the number in the ones place, which is irrelevant when rounding to the nearest hundred. For example, you might begin with 230 and then discuss rounding 234 and 239 to the nearest hundred: all three numbers round to 200.

CHALLENGE Invite students to think of some examples of when they might round these numbers to the nearest hundred. For example, if there were 113 students in the third grade, they might say that there are about 100 students in the third grade. You might also ask students to think of other numbers that round to the same hundred. For example, 820 rounded to nearest hundred is 800. What are some other numbers that round to 800? [770, 843, 818, 792]

8 Finally, review rounding numbers with a 5 in the tens place to the nearest hundred.

- Ask students how they would round 650 to the nearest hundred.
- Give them a moment to talk in pairs and then have a few students share.
- After students have shared a few ideas, let them know that mathematicians decided that if a number is exactly halfway between two multiples of 100, we round it up to the higher multiple of 100, so 650 rounded to the nearest hundred is 700. (So are 653 and 659.)
- Then ask students what 350 is rounded to the nearest hundred. [400]

9 Conclude the activity by explaining that in the next Number Line activity, they will play a game that will give them practice rounding to the nearest hundred.

Note Save the Number Line Teacher Master for use again in Activity 3. You might choose to keep the numbers labeled in pencil, or you might decide to erase them.

Day 6

Date:

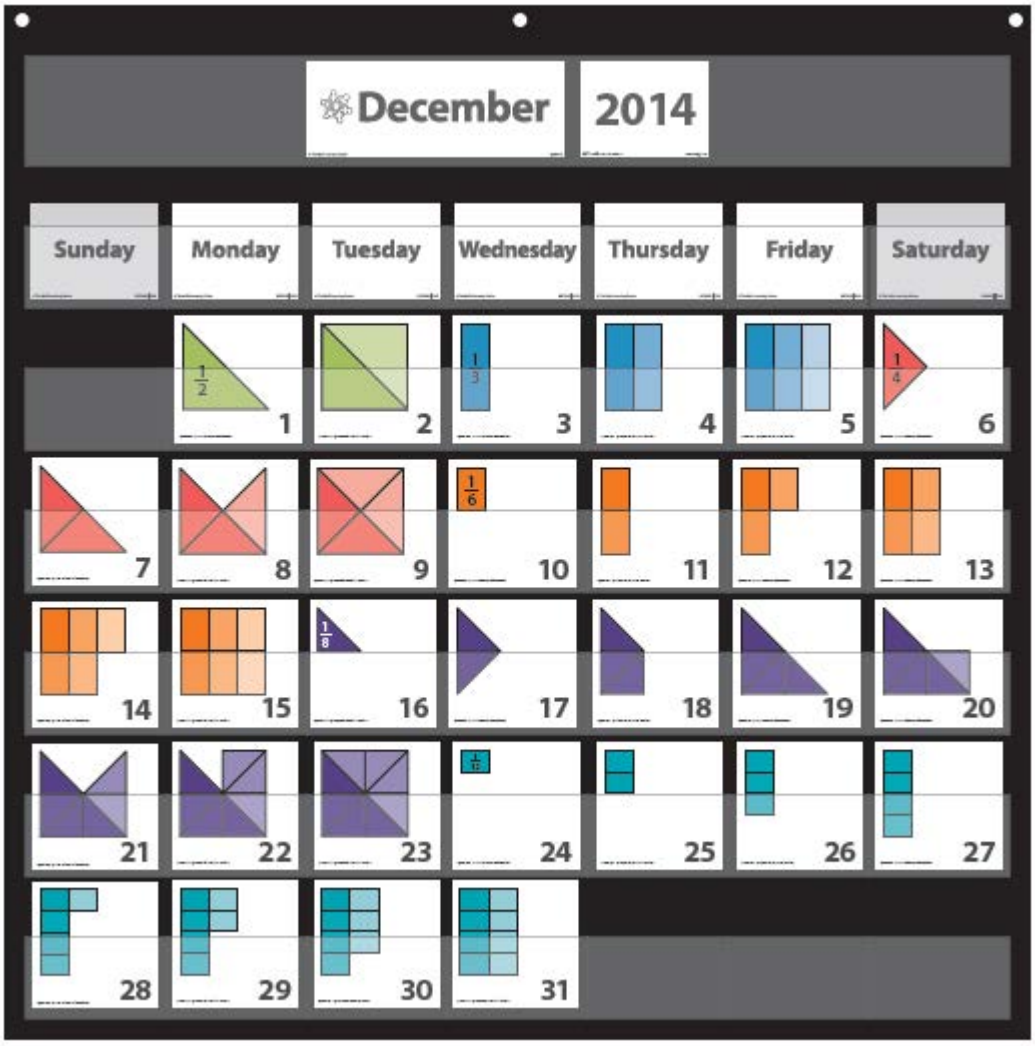
Calendar Grid	Calendar Collector	Computational Fluency
Update	**Activity 2 –** Making Estimates & Predictions (pg. 18)	
Number Line	**Solving Problems**	**Assessment**

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- After Activity 2, update the Calendar Grid Observations Chart as well.



Activity 2

Making Estimates & Predictions — Day 6

1 Open today's activity by updating the collection with another object.

2 Then gather students in front of the Calendar Collector Record Sheet and ask them to study it quietly for a minute or so. Then, invite them to share any comments or questions they have.

Students will probably notice that if they have added multiple objects of the same kind, the total mass for those objects might not exactly match what they would have expected if they simply multiplied the mass of a single object by the number of objects added. Help them make sense of why this is so. You might invite them to remove the objects from the collection and find the exact mass of each one. They might find that the exact mass varies slightly from object to object. They might also see that a single object appears to balance with slightly different collections of weights and that as the collection of objects grows, the difference of a gram or two does not appear to matter as much. Different measuring tools are capable of measuring with different degrees of precision, and this balance scale is not as precise as others that can be used to measure mass. Help them see that while there are situations—for example, pharmacy work—that call for extremely precise measurements, in other situations, less precision is perfectly acceptable.

Collecting Grams Record Sheet

Day	Object	Mass	How Many?	Total Mass Added
1	crayon	4 g	10	40 g
2	marker	8 g	5	40 g
3	scissors	21 g	3	64 g
4	calculator	99 g	1	99 g
5	pencil sharpener	17 g	3	50 g
6	sunscreen	66 g	1	66 g
7				

3 Work together to generate estimates of the total mass of the collection so far.

- Ask students to think quietly for a moment about what the total mass of the collection might be so far.
- Then invite them to talk in pairs about their estimates, or about their thinking if they have not yet generated an estimate.
- Call on students to share their estimates. Write about 5 different estimates where everyone can see them. Record the estimates from least to greatest if you can.

320 350 354 360 400

- Then invite students, one at a time, to explain how they arrived at their estimates. They might share a number of strategies for estimating the total mass, including:
  - » Rounding the mass added each day and then finding the sum of those rounded numbers
  - » Finding pairs of masses that about add up to 100 grams and then adjusting as needed
  - » Considering the approximate difference between each pair of masses and 100 and using those approximate differences to adjust from 300

> ***Teacher*** *Hmm, we have some different estimates here. Do our estimates have anything in common? What do you notice about them as a group?*
>
> ***Students*** *They're all more than 300. That's the first thing we noticed: it was going to have to be more than 300.*
>
> *They're all between 300 and 400.*
>
> *There are a lot that are pretty close to 350.*
>
> ***Teacher*** *So let's start with the lowest estimate, 320. Tana, can you tell us how you got 320 grams for your estimate? Please come point to the numbers on the record sheet while you talk.*
>
> ***Tana*** *OK. First I just looked at the masses in pairs. So 40 and 40 is 80. That's pretty close to 100. Also, 48 and 66 is pretty close to 100 because 40 plus 60 is 100. But 99 is almost 100 more and then 64 is another 64. So I thought, OK, it's kind of about 300 and a little more. So the 20 was the little more. I just kind of guessed.*
>
> ***Teacher*** *Tana mentioned that she kind of guessed, but a guess can be pretty random sometimes. She made an estimate based on information and some really good mathematical thinking. Thanks for telling us about that thinking, Tana. How about you, Juan? Can you tell us how you got 350 as an estimate?*
>
> ***Juan*** *Sure, I rounded all the numbers to the nearest 10. So it's 40 + 40 + 60 + 100 + 50 + 60. Then I saw that I could make 100 if I put the 40s and 60s together. So I did that twice and then added the last 50. I had 3 hundreds, plus 50. So, 350.*

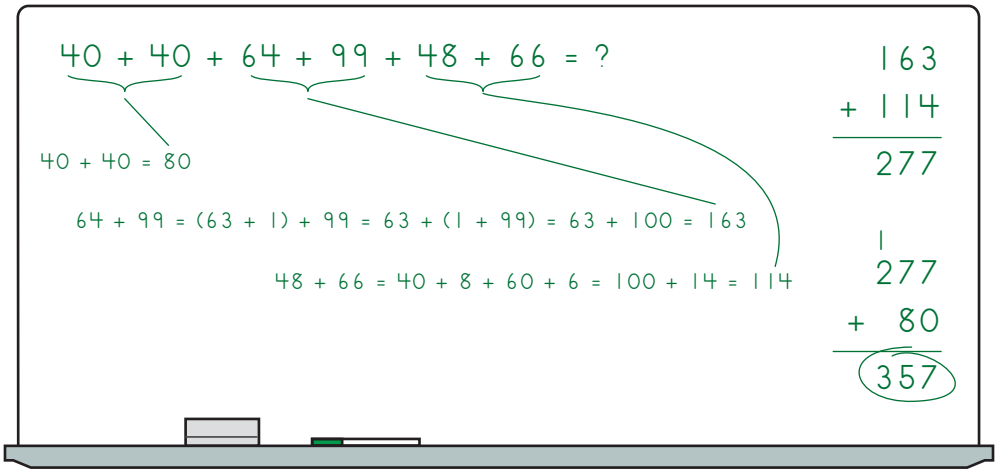
4 Now work together as a class to find the exact mass of the collection. You can accomplish this in a number of ways, depending on the needs and skills of your students.

SUPPORT Work together to find the sum of the six masses.

SUPPORT Identify pairs of addends. Ask students to find the sums of as many pairs as they can, and then reconvene to share the three sums and then find their total together.

SUPPORT Invite students to use a calculator as another way to find the sum.

CHALLENGE Invite students to work independently or in pairs to find the sum and then share their strategies and results as a group.



This is just one way students might find the total mass of the collection of objects in the example.

Note that a wide variety of computational strategies will make sense to students, according to their comfort level with each strategy and with the combinations of multi-digit numbers you are working with. This is a wonderful opportunity to talk with students about selecting the strategies that make the best sense to them based on the numbers at hand. Note with them that all strategies, if performed correctly and with care, will result in the same sum: although there is only one correct sum, there are many valid ways to calculate it.

5 Use a sticky note or post a piece of paper beside the record sheet to show the total mass on day 6.

6 Then ask students to talk about what they will need to do to accumulate a total of 1,000 grams to make a total of 1 kilogram by the end of the month.

- How many more grams do they need to collect to get to 1,000?
- How many more days do they have to add to their collection?
- About how many grams will they need to collect each day to get to that total?
- What objects in the room might be good choices to add to the collection?

7 Conclude today's activity by inviting students to come lift the bag that holds their collection to feel what this total number of grams feels like.

You might have them to do this one at a time on their way out to lunch and then later in the day when they are doing centers, work stations, or independent reading. Invite them to think about how the bag feels compared with other objects in the room. For example, how does the mass of the book they are reading for independent reading compare to the mass of this collection? They might use the balance scale to compare the mass of the collection with the mass of their book after estimating which has a greater mass.

Day 7

Date:

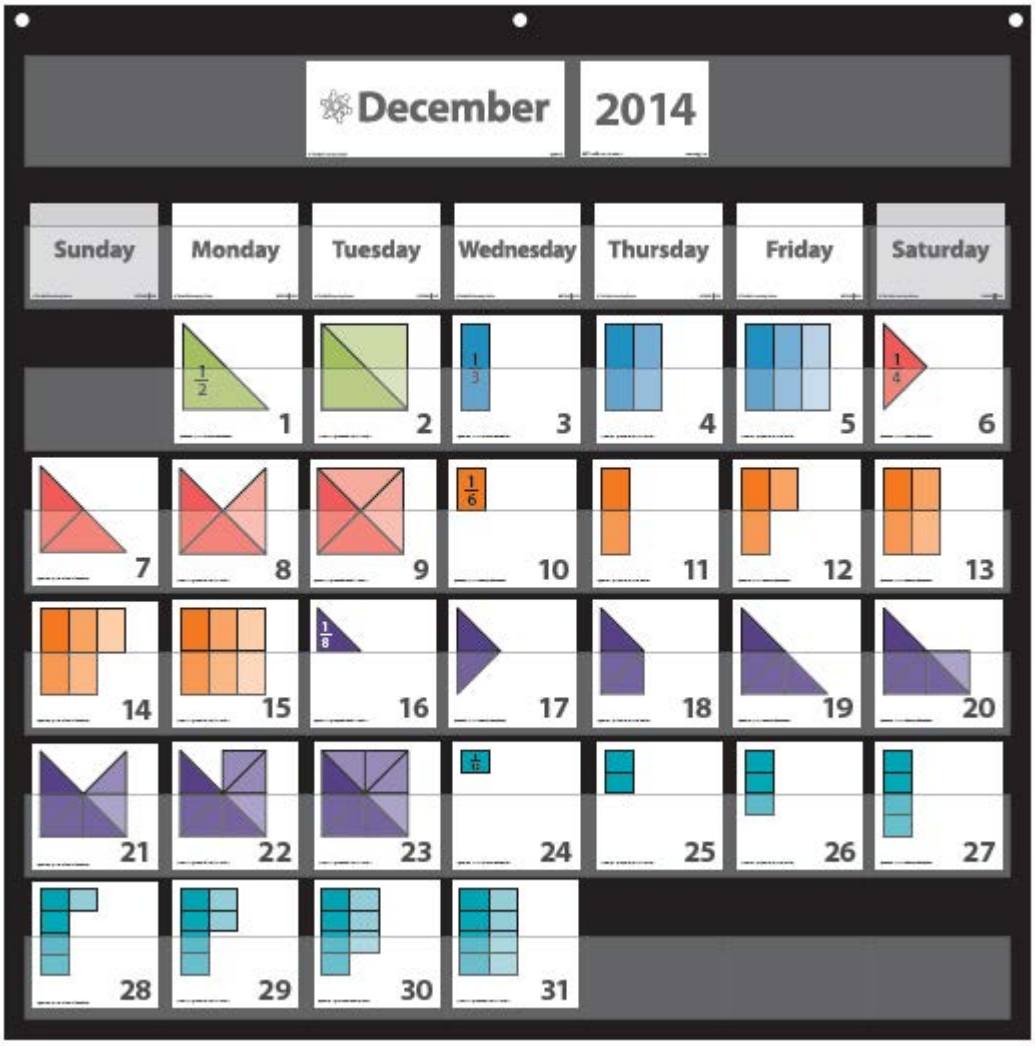
Calendar Grid	Calendar Collector	Computational Fluency
Update	*Update*	**Activity 2 –** The Doubles Facts (pg. 24)
Number Line	**Solving Problems**	**Assessment**

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- After Activity 2, update the Calendar Grid Observations Chart as well.



Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll update the Calendar Collector as part of Activities 2 and 3 as well.

Procedure

- The student helpers select an object to add to the collection.
- They estimate the mass of the object and record their estimate on the record sheet.
- They find the exact mass of the object using the balance scale.
- They add the object to the collection in the bag.

Key Questions

Use these questions to help guide students' discussion this month.

- What do you estimate the mass of this object is?
- How can you estimate the total mass of the objects we have collected so far this month? Do you think it is more than 500 grams? More than a kilogram? How can you tell?
- How many more grams do we need to get to 1 kilogram (1,000 grams) exactly?

Literature Connections

Use the following books as read-alouds this month.

The Hundred Pound Problem
by Jennifer Dussling

How Much, How Many, How Far, How Heavy, How Long, How Tall Is 1,000?
by Helen Nolan

Activity 2

The Doubles Facts — Day 7

1 Invite students to come to the Number Corner area. They will each need a whiteboard, whiteboard pen, and eraser.

- Display the Doubles Facts Teacher Master, and then ask students to count off by 1s and 2s.
- Have all the 1s solve the first problem at the bottom of the teacher master and all the 2s solve the second problem.
- Have them record their work using any combination of words, pictures, and numbers on their whiteboards.
- Ask students to share their solutions with an elbow partner and talk about what the problems, and their solutions, had in common.
- Call on several to share with the class what they talked about with their partners.

2 Review the top of the master with students and talk about these ideas. Did they notice any of the same things when they talked in pairs?

Build conversation around the idea that the product of 2 and any number is always even. Encourage students to think about why this is true. (All multiples of 2 can be divided into 2 equal groups.)

3 Display your copy of the Multiplying by Two page in the Number Corner Student Book, read the poem out loud one time, and then ask the class to join you while you read/recite it a second time.

Tell students that from now on, they will have poems to help review the multiplication strategies they will be learning.

4 Give students time to complete the page independently. Emphasize that they should complete items 1 and 2. If they have time, they can move on to item 3.

5 When there are just a few minutes left in the period, review the products for item 2 so that students can check their own work. Ask them to circle any products they could not recall or that they recalled incorrectly.

6 Let students know that they will have plenty of time to practice these facts and more in the months to come.

Key Questions

These questions guide students to think about the operation of multiplication.

- What patterns do you see on the multiplication table?
- If you skip-count by ___, will you ever land on ____? Why or why not?
- When you multiply 2 by another number, will the product be odd or even? Why?
- Does 7 times 2 have the same product as 2 times 7? Why?
- How can addition help you with multiplication?
- What model or strategy do you think will help you solve this problem?

Literature Connections

Use the following books as read-alouds this month.

Even Steven and Odd Todd by Kathryn Cristaldi

Two of Everything by Lily Toy Hong

Day 8

Date:

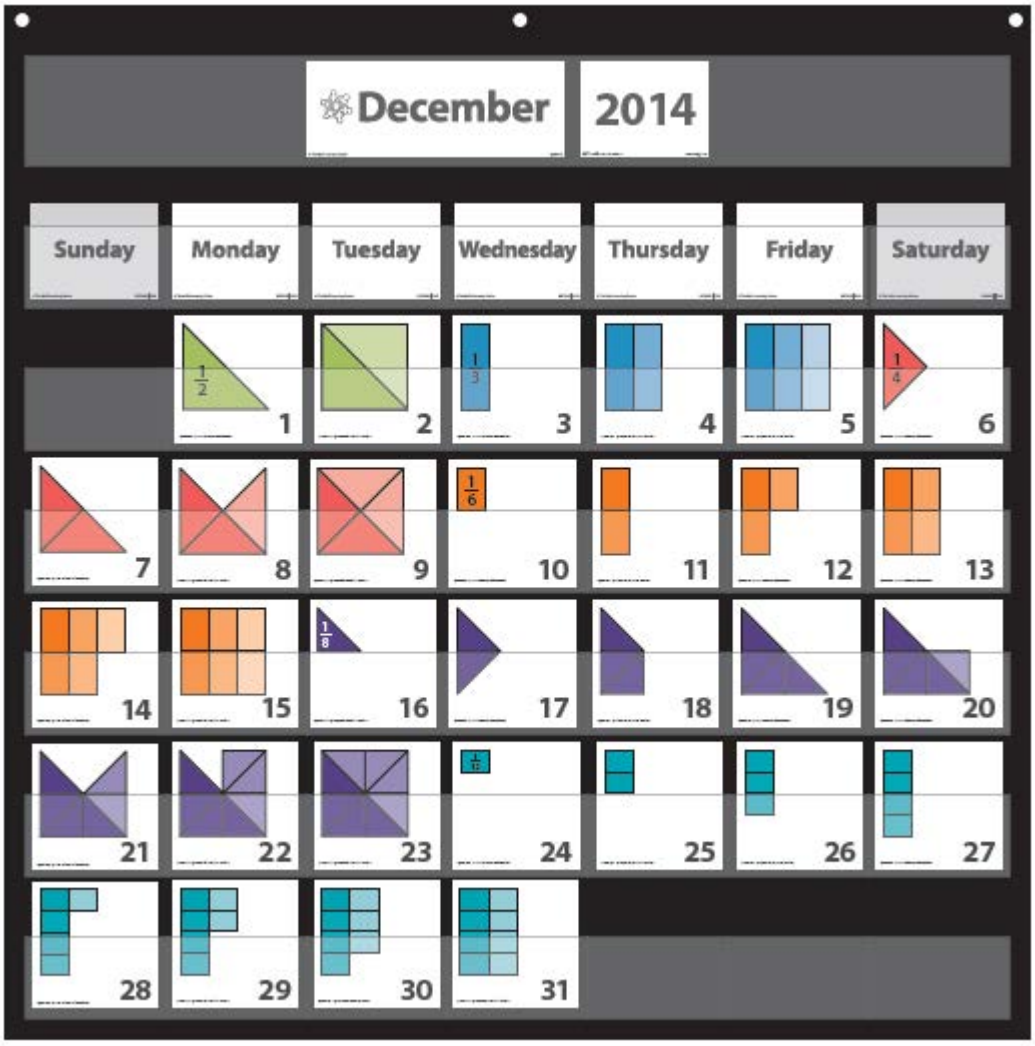
Calendar Grid	Calendar Collector	Computational Fluency
Update	*Update*	
Number Line	**Solving Problems**	**Assessment**
Activity 2 – Playing Round & Add Hundreds as a Class (pg. 29)		

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- After Activity 2, update the Calendar Grid Observations Chart as well.



Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll update the Calendar Collector as part of Activities 2 and 3 as well.

Procedure

- The student helpers select an object to add to the collection.
- They estimate the mass of the object and record their estimate on the record sheet.
- They find the exact mass of the object using the balance scale.
- They add the object to the collection in the bag.

Key Questions

Use these questions to help guide students' discussion this month.

- What do you estimate the mass of this object is?
- How can you estimate the total mass of the objects we have collected so far this month? Do you think it is more than 500 grams? More than a kilogram? How can you tell?
- How many more grams do we need to get to 1 kilogram (1,000 grams) exactly?

Literature Connections

Use the following books as read-alouds this month.

The Hundred Pound Problem
by Jennifer Dussling

How Much, How Many, How Far, How Heavy, How Long, How Tall Is 1,000?
by Helen Nolan

Activity 2

Playing Round & Add Hundreds as a Class — Day 8

1 Display the Round & Add Hundreds Teacher Master, and give students a moment to study it quietly.

2 Then ask students to share what they notice about it.

They will probably notice that the number line looks very similar to the one they marked last week. They might also notice that this number line does not include marks for the multiples of 50 that fall between each multiple of 100. Most will recognize that they'll once again be playing Round & Add, this time with numbers in the hundreds.

3 Work with students to mark the multiples of 100 on the number line.

4 Explain that they will use this number line to play Round & Add again. This month, they will focus on rounding and adding with numbers in the hundreds.

- The first player begins by rolling three dice, two marked 1–6 and the other marked 4–9.
- The player arranges the three numbers rolled to form a 3-digit number.
- The player marks the number on the number line and then circles the multiple of 100 to which it rounds using their color (red or blue).
- Players take turns rolling the dice, arranging the digits, marking the 3-digit number they created, and claiming the multiple of 100 to which their number rounds.
- Once a multiple of 100 has been claimed, it cannot be claimed again.
- Either player can decide to use just one or two dice if they want to claim the 0 or the 100.
- Once all the multiples of 100 on the line have been claimed, players predict who will have the highest sum by finding the sum of the rounded numbers for each player.
- Then players find their exact sums and the difference between their exact sums and their estimated sums. The player with the lower difference wins the game. Note for students that this is different from how they determined the winner in last month's version of Round & Add, in which the player with the highest sum won the game. This variation changes the objective of the game: they will be trying to create numbers that are as close as possible to the numbers they round to.
- Let students know that toward the end of the game there might be lots of opportunity for practicing rounding skills without being able to claim any of the multiples of 100.

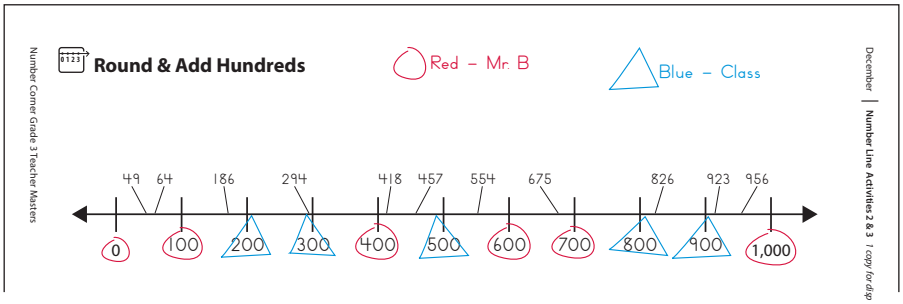
ELL Model how to play the game with gestures as you state the directions. If possible and if necessary, have a bilingual student translate or explain the rules for the game. While playing, encourage ELL students to participate as much as possible.

SUPPORT Encourage students to use the number line to help see which multiple of 100 their number is closer to. You may also want to review the rule for numbers with a 5 in the tens place. Circles and triangles, in addition to colors, can be used to distinguish the teacher's and students' numbers in case students have difficulty distinguishing colors.

5 Play the game teacher versus students. Take the first turn to model how the game is played.

CHALLENGE Give any students you think might be ready their own copies of the Number Line Teacher Master if you think the process of recording will be beneficial or increase their involvement in the game.

6 After all the multiples of 100 have been claimed, ask students to predict who will have the higher sum. Invite them to consider whether it's necessary to add up all the numbers actually rolled by each team to make such a prediction. Why or why not?



Students *We think your sum will be highest because you got the 1,000.*

We used the rounded numbers and we said the kids got 200 plus 300, and that's 500. The kids also got the 500, so now we're up to 1,000. Then we got the 800 and the 900, and that's 1,700, so now we're up to 2,700. You got the 400 and the 600. That's 1,000, plus your other 1,000 makes 2,000. Then add your 700 and your 100, and you have 2,800.

Teacher *Would you all be willing to stake your noontime recess on that estimate?*

Students *No way! Let's add the real numbers.*

I think it works to use the rounded numbers for a prediction if the real numbers are pretty close to the rounded ones. Like where we got 294, that's really close to 300. But some of the numbers are pretty far away, like you can round 554 to 600, but it's almost 50 away.

key

10 Take a moment to explain that rounding can be very helpful when you don't need an exact calculation. For example, students might feel comfortable declaring a winner after finding the sums of each team's rounded numbers. In and of itself, rounding is a trivial skill, but it is very helpful when used in conjunction with computation: children and adults with strong number sense do it all the time.

11 Before you have students find the actual sums for you and for their team, spend a minute or two discussing the pros and cons of using rounding as technique for making estimates.

- Ask student how close they think the total of the rounded numbers will be to the actual score for each team.
- Students may note that sometimes the total of the rounded scores is quite close to the actual total, and sometimes it's off by quite a bit. Ask students to consider why this happens.
- You might pose the following questions to begin the conversation:
  - » How close do you think the total of the rounded numbers will be to the actual score for each team?
  - » Are you willing to bet your next recess on an estimate based upon adding the rounded numbers for each team? Why or why not?
  - » When does rounding work, and when is it more appropriate to either make a more accurate estimate or find the actual solution?

12 Finally, have students find the actual scores (using efficient mental strategies, paper/pencil methods, or calculators) and then find the difference between their estimates and the exact scores. In this game, the team with the smallest difference between their rounded and actual scores wins. Be sure to point out that this is a change in the rules from last month's game.

SUPPORT Invite students to use a calculator to find the exact sums.

CHALLENGE Invite students to use mental or paper-and-pencil strategies to find the exact sums.

.....

.....

Day 9

Date:

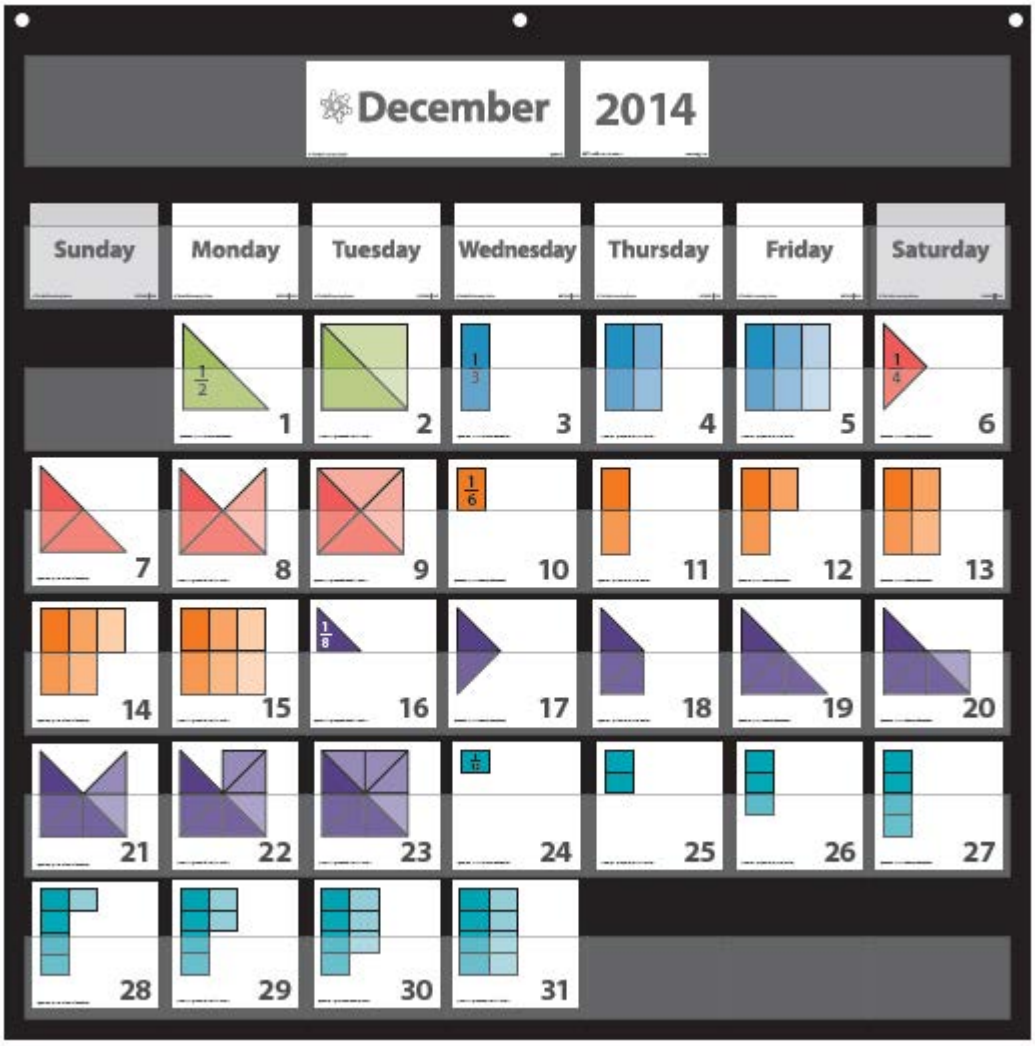
Calendar Grid	Calendar Collector	Computational Fluency
Update	*Update*	
Number Line	**Solving Problems**	**Assessment**
	Activity 3 – Problem String 7 (pg. 34)	

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- After Activity 2, update the Calendar Grid Observations Chart as well.



Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll update the Calendar Collector as part of Activities 2 and 3 as well.

Procedure

- The student helpers select an object to add to the collection.
- They estimate the mass of the object and record their estimate on the record sheet.
- They find the exact mass of the object using the balance scale.
- They add the object to the collection in the bag.

Key Questions

Use these questions to help guide students' discussion this month.

- What do you estimate the mass of this object is?
- How can you estimate the total mass of the objects we have collected so far this month? Do you think it is more than 500 grams? More than a kilogram? How can you tell?
- How many more grams do we need to get to 1 kilogram (1,000 grams) exactly?

Literature Connections

Use the following books as read-alouds this month.

The Hundred Pound Problem
by Jennifer Dussling

How Much, How Many, How Far, How Heavy, How Long, How Tall Is 1,000?
by Helen Nolan

Activity 1

Problem String 7 — Day 9

1 Open today's activity by gathering students in the discussion area and reviewing the process of doing a problem string.

- Remind students to bring their Number Corner Student Books and a pencil.
- Ask students to turn to the person sitting next to them and summarize how a problem string works.
  - » Problems are delivered one at a time.
  - » Students solve the problem independently and then give a silent thumbs up to show when they are done.
  - » Students share their strategies for solving the problem.
  - » Generally, the earlier problems are easier and the later problems more difficult. Students should try to use the solutions to the earlier problems to help solve the later ones.
- Give students an opportunity to ask any questions they have about problem strings.

2 Have students turn to the next blank page of Problem String Workspace in their Number Corner Student Books. Have them write the date and get ready for the first problem of today's string.

3 Deliver the problem string shown in this table.

- Model students' strategies for solving the problems on a number line.
- Encourage students to build on the number lines used in previous problems.
- Use arrows and labels to make the connections between problems shown on the number line explicit.

SUPPORT Help students use skip-counting on the number line more effectively by asking them how they knew when to stop skip-counting and how they kept track of how many times they had skip-counted.

CHALLENGE If the problems are too easy for some students, have them explore 20×7, 19×7, and 21×7. Ask them to generalize what they notice about these problems. For example:

- $20 \times 7 = (10 + 10) \times 7 = 140 + 140 = 280$
- $19 \times 7 = (20 - 1) \times 7 = (20 \times 7) - (1 \times 7) = 280 - 7 = 273$
- $21 \times 7 = (20 + 1) \times 7 = 280 + 7 = 287$

Key Questions

Use these questions to help guide students' discussion this month.

- What do you know that could help you solve this problem?
- What strategy could you use?
- How can you show your thinking?
- What model could you use to show your thinking?
- How can solving one problem in a string help you solve another problem, later in the string?
- What is the big idea of this string?
- How can your work with this string help you with other problems?

Problem String 7

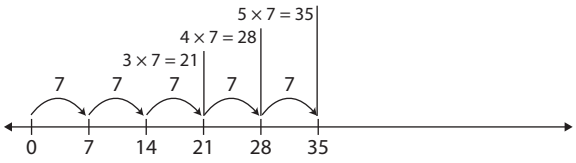
<table>
<tr><th>Problems</th><th>Sample Strategies & Recording</th><th>Connections</th></tr>
<tr><td>4 × 7

3 × 7

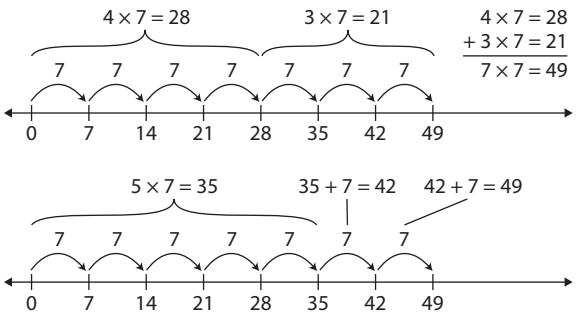
5 × 7</td><td>Some students may skip-count by 4s. If so, draw a number line showing 7 jumps of 4 (4, 8, 12, 16, 20, 24, 28). Then, compare that to a number line with jumps of 7, as shown here. Ask students which looks more efficient.

If students say they “just know it,” acknowledge that being able to recall facts from memory is very useful, and then draw the number line as a foundation for future problems.

Model each problem one at a time on the same number line so that it looks like this after all 3 problems are finished.

 
</td><td>Students may see on the first number line that 3 × 7 is 1 group of 7 less than 4 × 7.

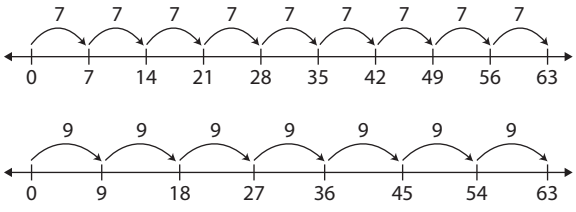
You can add 1 more jump of 7 on to the number line to show that 7 × 5 is 1 more group of 7 than 4 × 7, which is equal to 28 + 7 or 35.

Big Idea
When multiplying, you can think about equal groups or repeated jumps on a number line. You can use what you know about one combination to solve another, for example, by adding or subtracting equal groups to use known combinations like 4 × 7 to solve unknown combinations like 3 × 7 and 5 × 7.</td></tr>
<tr><td>7 × 7</td><td> 
</td><td>Students might see that the product of 7 × 7 is equal to the sum of the products of 3 × 7 and 4 × 7. Calculating the product in this way is fairly straightforward, because they have already found those products. Other students might see that 7 × 7 = (5 + 2) × 7 = 5 × 7 + 2 × 7. Since they already found the product of 5 × 7, they can simply add 2 more groups of 7 to it.

Big Idea
When multiplying, you can think about equal groups or repeated jumps on a number line. You can use what you know about some combinations to solve others. You might add or subtract equal groups to use known combinations like 5 × 7 to solve unknown combinations like 7 × 7. You might also see that a particular combination, like 7 × 7, can be decomposed into other combinations you already know, like 3 × 7 and 4 × 7.</td></tr>
<tr><td>9 × 7

7 × 9</td><td>Students might add 2 more jumps of 7 to 7 × 7 to find 9 × 7. They might also subtract a group of 7 from 10 × 7.

The second problem, 7 × 9, emphasizes the commutative property. If students skip-count from zero, ask them if they really needed to do that to solve the problem. Then, show 7 groups of 9 on a number line and have students compare it to 9 groups of 7.

 
</td><td>Big Idea
When multiplying, you can use what you know about some combinations to solve others. You might add or subtract equal groups to use known combinations like 7 × 7 or 10 × 7 to solve unknown combinations like 9 × 7.

Because of the commutative property, the product is the same no matter what order you multiply numbers. Therefore, 7 × 9 = 9 × 7. If you have already found the product of 9 × 7, you know the product of 7 × 9 as well.</td></tr>
<tr><td>12 × 7</td><td>Model students’ strategies on the number line. They might find the product of 12 × 7 in the following ways (or in other ways):
• Start at 9 × 7 (63) and jump ahead by 7 three more times.
12 × 7 = (9 × 7) + 7 + 7 + 7
• Find the sum of the products of 9 × 7 (63) and 3 × 7 (21).
12 × 7 = (9 × 7) + (3 × 7)
• Start at 10 × 7 (70) and jump ahead by 7 two more times.
12 × 7 = (10 × 7) + 7 + 7
• Find the sum of the products of 5 × 7 (35) and 7 × 7 (49).
12 × 7 = (5 × 7) + (7 × 7)</td><td></td></tr>
</table>

4 Wrap up today’s string by giving students a few minutes to study the number lines and then talk about what they noticed, learned, or thought was important about today’s problem string.

Day 10

Date:

Calendar Grid	Calendar Collector	Computational Fluency
Activity 3 – Equivalent Fractions (pg. 11)	*Update*	**Activity 3 –** Zeroes, Ones & Doubles Facts on the Multiplication Table (pg. 25)
Number Line	**Solving Problems**	**Assessment**

Activity 3

Equivalent Fractions — Day 10

1 Begin by updating the Calendar Grid and Observations Chart together as a class.

- Gather students in front of the Calendar Grid display with their whiteboards and markers.
- Invite students to examine the Calendar Grid and Observations Chart, which have been updated quite a few times since they last discussed the pattern as a class.
- Invite students to share comments and questions, including some predictions about what the new marker will look like today.
- Invite a student volunteer to reveal the new marker and update the Observations Chart, with input from other students.

6	$\frac{1}{4}$			There will be 4 days of fourths.
7	$\frac{2}{4}$ or $\frac{1}{2}$		$\frac{1}{4} + \frac{1}{4} = \frac{1}{2}$	It looks like the first day. Half is shaded, so $\frac{1}{2} = \frac{1}{4} + \frac{1}{4}$.
8	$\frac{3}{4}$		$\frac{1}{4}+\frac{1}{4}+\frac{1}{4}=\frac{3}{4}$ $\frac{1}{4} \times 3 = \frac{3}{4}$ $\frac{1}{2}+\frac{1}{4}=\frac{3}{4}$	One more fourth will make a whole.
9	$\frac{4}{4}$ or 1		$\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{1}{4}=\frac{4}{4}=1$ $\frac{3}{4}+\frac{1}{4}=\frac{4}{4}$ $\frac{1}{2}+\frac{1}{4}+\frac{1}{4}=1$	It takes longer to get to a whole when the fractions are smaller.
10	$\frac{1}{6}$		$\frac{1}{6} \times 1 = \frac{1}{6}$	The sixths should take 6 days to get them all.
11	$\frac{2}{6}$ or $\frac{1}{3}$		$\frac{1}{6}+\frac{1}{6}=\frac{2}{6}$ $\frac{1}{6} \times 2 = \frac{2}{6}$	It looks like the third day.
12	$\frac{3}{6}$ or $\frac{1}{2}$		$\frac{1}{6}+\frac{1}{6}+\frac{1}{6}=\frac{3}{6}$ $\frac{1}{6} \times 3 = \frac{3}{6}$	It's a different shape than any others so far.

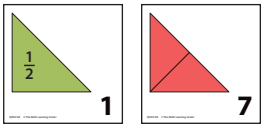
2 Draw students' attention to the Equivalent Fractions column, which has not been filled in yet, and then using the Word Resource Card, review the term *equivalent fraction*.

- Explain that equivalent fractions are two fractions that represent the same amount of the same whole.
- Equivalent fractions look different numerically, but pictures can make it easy to compare them and recognize their equivalence.

3 Invite students to look at the markers that have been posted so far and try to find any that represent the same amount of the whole square.

4 When students identify two fractions that they think are equivalent, prompt them to justify their thinking and record the information in the Equivalent Fractions column of the Observations Chart.

Students are likely to notice that markers 1 and 7 show equivalent fractions (½ = ²⁄₄). Some might notice that markers 2, 5, and 9 all represent 1 whole (1 = ²⁄₂ = ³⁄₃ = ⁴⁄₄) and that the fractions on markers 3 and 11 are also equivalent (⅓ = ²⁄₆). A few students might also see that the ³⁄₆ shown on marker 12 is equivalent to ½ (shown on markers 1 and 7), although the fact that the ³⁄₆ is not represented by the same isosceles right triangle might make it hard for them to recognize that: it will be easier for them to see that ³⁄₆ = ½ when they see ⁶⁄₆ on marker 15.



Students *Look! Markers 1 and 7 are the same. Even if they are different colors, they show the same amount.*

One-fourth is half of half. So when you put ¼ and ¼ together, it makes a half.

6	$\frac{1}{4}$			There will be 4 days of fourths.
7	$\frac{2}{4}$ or $\frac{1}{2}$	$\frac{2}{4} = \frac{1}{2}$	$\frac{1}{4} + \frac{1}{4} = \frac{1}{2}$	It looks like the first day. Half is shaded, so $\frac{1}{2} = \frac{1}{4} + \frac{1}{4}$.
8	$\frac{3}{4}$		$\frac{1}{4}+\frac{1}{4}+\frac{1}{4}=\frac{3}{4}$ $\frac{1}{4}\times 3=\frac{3}{4}$ $\frac{1}{2}+\frac{1}{4}=\frac{3}{4}$	One more fourth will make a whole.
9	$\frac{4}{4}$ or 1	$\frac{4}{4}=1$ $\frac{4}{4}=\frac{2}{2}$	$\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{1}{4}=\frac{4}{4}=1$ $\frac{3}{4}+\frac{1}{4}=\frac{4}{4}$ $\frac{1}{2}+\frac{1}{4}+\frac{1}{4}=1$	It takes longer to get to a whole when the fractions are smaller.
10	$\frac{1}{6}$		$\frac{1}{6}\times 1=\frac{1}{6}$	The sixths should take 6 days to get them all.
11	$\frac{2}{6}$ or $\frac{1}{3}$	$\frac{2}{6}=\frac{1}{3}$	$\frac{1}{6}+\frac{1}{6}=\frac{2}{6}$ $\frac{1}{6}\times 2=\frac{2}{6}$	It looks like the third day.
12	$\frac{3}{6}$ or $\frac{1}{2}$	$\frac{3}{6}=\frac{1}{2}$	$\frac{1}{6}+\frac{1}{6}+\frac{1}{6}=\frac{3}{6}$ $\frac{1}{6}\times 3=\frac{3}{6}$	It's a different shape than any others so far.

5 Wrap up today's activity by asking students whether there is anything they would like to add to the Observations Chart, and what they predict the next marker will look like.

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll update the Calendar Collector as part of Activities 2 and 3 as well.

Procedure

- The student helpers select an object to add to the collection.
- They estimate the mass of the object and record their estimate on the record sheet.
- They find the exact mass of the object using the balance scale.
- They add the object to the collection in the bag.

Key Questions

Use these questions to help guide students' discussion this month.

- What do you estimate the mass of this object is?
- How can you estimate the total mass of the objects we have collected so far this month? Do you think it is more than 500 grams? More than a kilogram? How can you tell?
- How many more grams do we need to get to 1 kilogram (1,000 grams) exactly?

Literature Connections

Use the following books as read-alouds this month.

The Hundred Pound Problem
by Jennifer Dussling

How Much, How Many, How Far, How Heavy, How Long, How Tall Is 1,000?
by Helen Nolan

Activity 3

Zero, Ones & Doubles Facts on the Multiplication Table Day 10

1 Display your copy of the Multiplication Table Number Corner Student Book page, and ask students to turn to the same in their own books.

You might want to skip step 2 if students have already spent time studying the multiplication table during your regular math instruction.

2 Give them a few minutes to study the table silently and then talk in pairs about what they notice.

Use questions like the following to draw out discussion:

- What patterns do you notice?
- What do you notice about the combinations in each row? in each column?
- Where do you see the facts we've already discussed: the Zero facts, Ones facts, and Doubles?

3 Take some time together as a class to mark the three categories of facts you have discussed already: Zeroes, Ones, and Doubles.

You'll color in the row and column for Doubles yellow. You can leave the other two categories blank, or you might draw a line through them to indicate that they have been addressed.

4 Then ask students to take some time to consider how many facts they have to master and what fraction of those facts are represented by these three categories. Challenge students to use strategies other than counting by 1s to figure this out.

- How many facts are on this table altogether? (121)

Students might calculate the total number of facts by seeing the 10-by-10 array of facts made up of the facts with factors from 1 to 10. Then they can add the 11 facts in the top row of Zero facts and the column of 10 additional Zero facts for a total of 121.

- How many facts are in these three categories? (57)

Students might calculate the number of facts in these three categories by seeing 3 rows of 11 facts and 3 columns of 8 facts: 33 + 24 = 57.

- Do the facts in these categories represent about half, less than half, or more than half of the facts? (a bit less than half)
- If you're pretty comfortable with all of these facts, how many do you have left to master? (64, but if you consider that many of the facts are simply reversals like 4×7 and 7×4, there are actually only 36 combinations left to master)

If students leave out the duplicate combinations, they can see that for the remaining facts with factors from 3 to 10, there is a row of 8, a row of 7, a row of 6, a row of 5, and so on, down to 1. The sum of 8 + 7 + 6 + 5 + 4 + 3 + 2 + 1 is equal to 36. Students might add all the numbers, or they might see that they can make 4 pairs of addends, each of which has a sum of 9 (8 + 1, 7 + 2, 6 + 3, 5 + 4). Four groups of 9 is equal to 36.

5 Wrap up today's activity by asking students to show you a thumbs up if they are pretty confident and comfortable with their 0s, 1s, and 2s multiplication facts.

6 You might take a little time to have students circle any doubles combinations that are challenging for them, and then let them know that they will have opportunities to practice these facts in the coming weeks.

Day 11

Date:

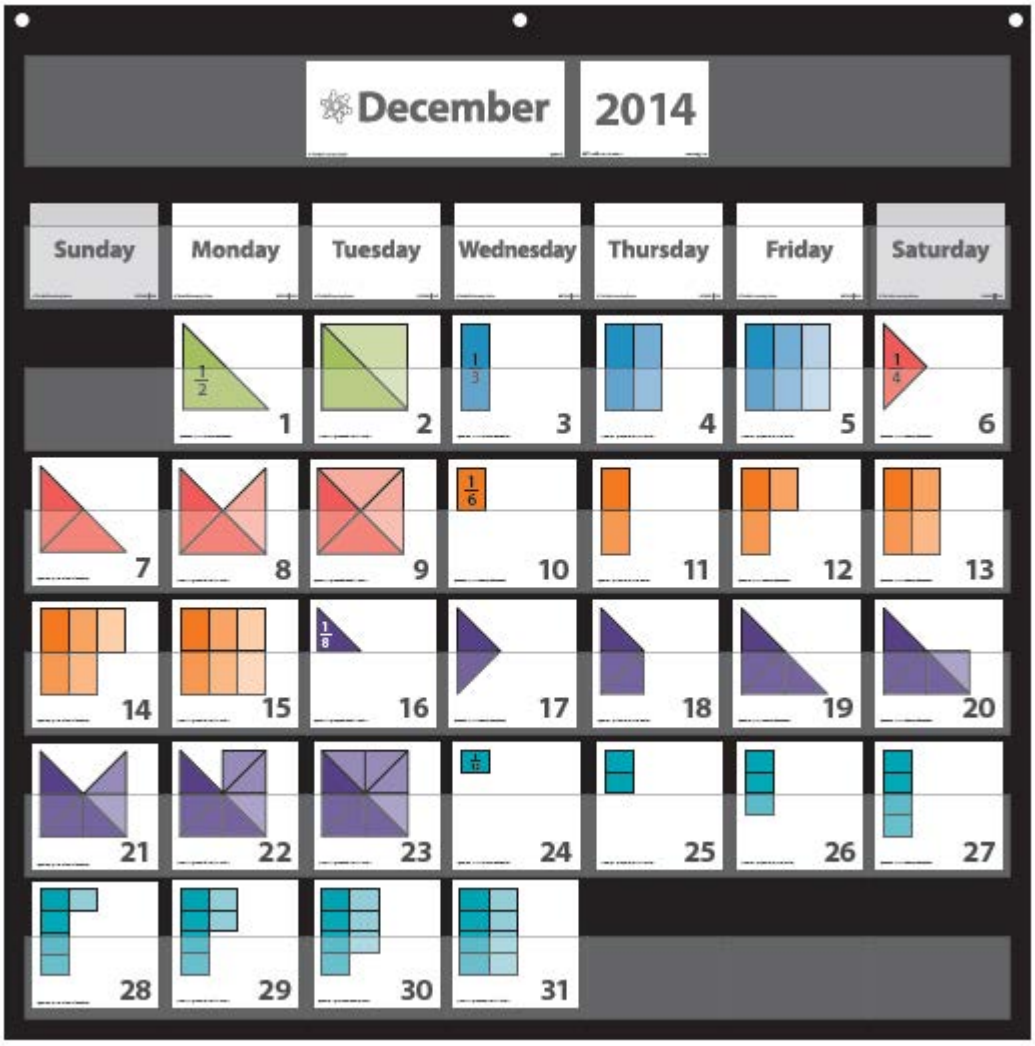
Calendar Grid	Calendar Collector	Computational Fluency
Update	*Update*	
Number Line	**Solving Problems**	**Assessment**
	Activity 2 – Problem String 8 (pg. 36)	

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- After Activity 2, update the Calendar Grid Observations Chart as well.



Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll update the Calendar Collector as part of Activities 2 and 3 as well.

Procedure

- The student helpers select an object to add to the collection.
- They estimate the mass of the object and record their estimate on the record sheet.
- They find the exact mass of the object using the balance scale.
- They add the object to the collection in the bag.

Key Questions

Use these questions to help guide students' discussion this month.

- What do you estimate the mass of this object is?
- How can you estimate the total mass of the objects we have collected so far this month? Do you think it is more than 500 grams? More than a kilogram? How can you tell?
- How many more grams do we need to get to 1 kilogram (1,000 grams) exactly?

Literature Connections

Use the following books as read-alouds this month.

The Hundred Pound Problem
by Jennifer Dussling

How Much, How Many, How Far, How Heavy, How Long, How Tall Is 1,000?
by Helen Nolan

Activity 2

Problem String 8 Day 11

1 Open today's activity by gathering students in the discussion area with their Number Corner Student Books and a pencil.

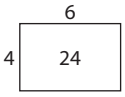
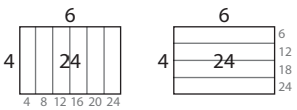
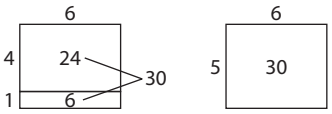
2 Have students turn to the next unused Problem String Workspace page in their Number Corner Student Books. Have them write the date and get ready for the first problem of today's string.

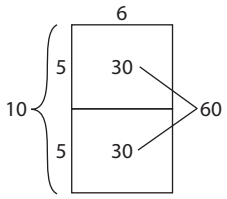
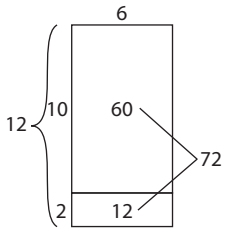
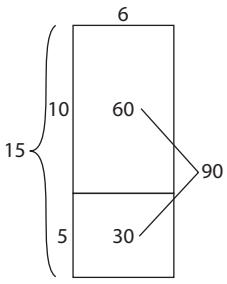
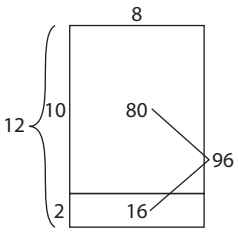
3 Deliver the problem string shown in this table.

- Model students' strategies for solving the problems on an array.
- Encourage students to build on the arrays used in previous problems. In Activity 1, you showed how to add on to known facts with equal jumps on the number line. In this activity, that adding on is shown by adding rows or columns onto arrays and by combining smaller arrays to create larger arrays.
- Label the arrays with numbers and equations to make the connections between the problems explicit.

SUPPORT There is no context built in to this string, but if you think it would help, offer students a context, such as boxes of chocolate or crates of fruit to help them visualize the problems in a meaningful way. Make sure students are not sketching and counting by 1s; encourage them to use more effective and efficient strategies.

Problem String 8

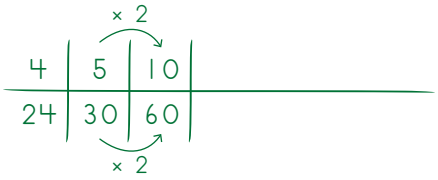
Problems	Sample Strategies & Recording	Connections
4 × 6	Depending on how comfortable students are with the multiplication facts, they might say they "just knew" that 4 × 6 is 24. If so, model their thinking with an open array.  You can use rows and columns to model skip-counting strategies on an array as well. 	Students can solve 5 × 6 by adding another row or column of 6 to the 4 × 6 array from the first problem. **Big Idea** You can add on to known products to find unknown products.
5 × 6	 5 × 6 = (4 + 1) × 6 = (4 × 6) + 6 = 24 + 6 = 30	

Problems	Sample Strategies & Recording	Connections
10 × 6	If students say they just know that the product is 60, model it on an open array so they can use it in future problems. You can use the array model to show that 10 × 6 is twice 5 × 6.  	The array model can help students see how these combinations are related to one another. Specifically, the arrays are an elegant way to show how one combination like 12 × 6 might be decomposed into related combinations, such as 10 × 6 and 2 × 6. By modeling these problems with the array, you are helping students make sense of the distributive property of multiplication. This builds students' understanding of multiplication and contributes to their developing computational fluency.
9 × 6	Students might see that 9 × 6 is the sum of 4 × 6 and 5 × 6: 24 + 30 = 54. They might also subtract 1 group of 9 from 10 × 6 because 9 × 6 = (10 – 1) × 6 = (6 × 10) – (6 × 1) = 60 – 6.	
12 × 6	Students might add 2 more groups of 6 on to 10 × 6.  	
15 × 6	Students might add 10 × 6 and 5 × 6.  	
12 × 8	Students can find the product of 12 × 8 by finding the sum of 10 × 8 and 2 × 8. This can be modeled by dividing a 12-by-8 array into a 10-by-8 and 2-by-8 array.  	By starting with a challenging combination, 12 × 8, we are inviting students to think about which known facts might help them solve the problem. We want the connections they drew between the earlier problems in the string to inform their choices about how to solve this final problem. **Big Idea** When finding the product of two numbers, you can decompose the product into smaller, known products and then find their sum.

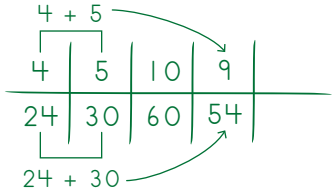
4 After the string, begin a ratio table to show the relationships between the problems the students just solved.

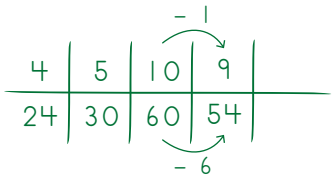
SUPPORT If you have not done any work with ratio tables before, you want to skip this step or use it as a way to familiarize students with the ratio table model.

- Show 4 × 6, 5 × 6, and 10 × 6. Ask students if they see a connection between 5 times 6 and 10 times 6.

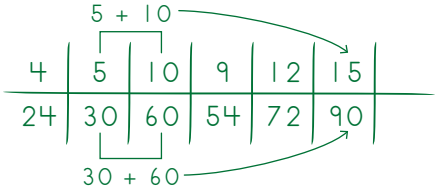


- Continue the ratio table with 9 times 6. Ask students how this problem connects to previous problems (either 4 × 6 and 5 × 6 or 10 × 6 minus one group of 6).

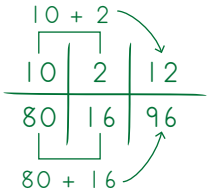




- Continue the ratio table with 12 × 6 and 15 × 6. Ask students if they see a connection between 15 times 6 and any other problems in the string.



5 If you have time, ask students how they could use a ratio table to solve 12 times 8. An example is shown below.



6 Wrap up the string by recognizing students for their effort and participation. Encourage them to use relationships between problems and numbers when solving multiplication problems.

Day 12

Date:

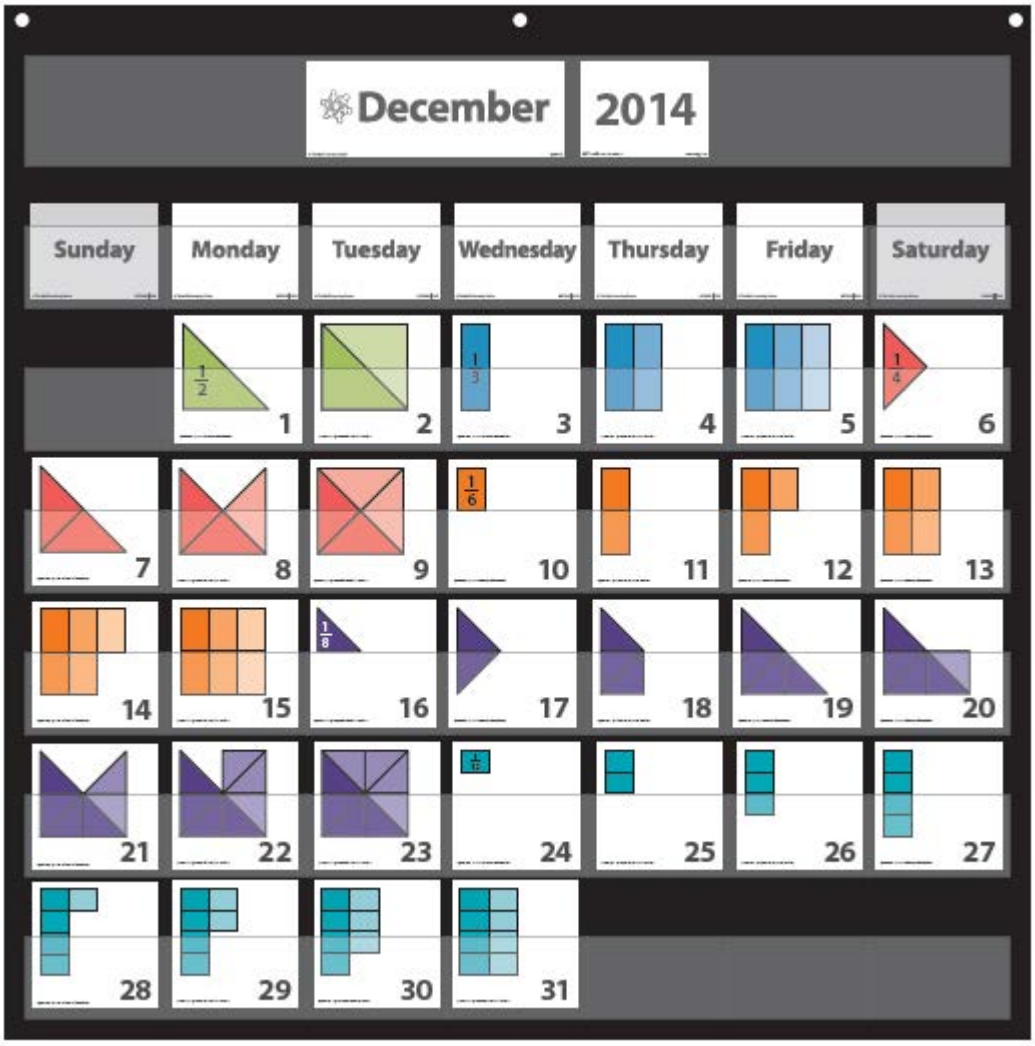
Calendar Grid	Calendar Collector	Computational Fluency
Update	**Activity 3 –** Finding the Total Mass of the Collection (pg. 21)	
Number Line	**Solving Problems**	**Assessment**
Activity 3 – Playing Round & Add Hundreds in Pairs (pg. 32)		

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- After Activity 2, update the Calendar Grid Observations Chart as well.



Activity 3

Finding the Total Mass of the Collection — Day 12

1 Open today's activity by adding an object, or objects, to the collection. Work with students to find its mass and add the information to the record sheet before moving on to step 2.

2 Direct students' attention to the record sheet, and work together as a class to find the total mass of the objects collected so far. You can accomplish this in a number of ways, depending on the needs of your students.

SUPPORT Work together to find the sum of the six masses collected from day 7 to today. Then add the sum to the total mass from day 6.

Identify pairs of addends. Ask students to find the sums of as many pairs as they can, and then reconvene to share the three sums and then find their total.

Invite students to use a calculator as another way to find the sum.

CHALLENGE Invite students to work independently or in pairs to find the sum and then share their strategies and results as a group.

Note that a wide variety of computational strategies will make sense to students, according to their comfort level with each strategy and with the combinations of multi-digit numbers you are working with. This is a wonderful opportunity to talk with students about selecting the strategies that make the best sense to them based on the numbers at hand. Note with them that all strategies, if performed correctly and with care, will result in the same sum: although there is only one correct sum, there are many valid ways to calculate it.

3 Use a sticky note or post a piece of paper beside the record sheet to show the total mass on day 12.

4 Then ask students to talk about what they will need to do to accumulate a total of 1,000 grams to make a total of 1 kilogram by the end of the month.

- How many more grams do they need to collect to get to 1,000?
- How many more days do they have to add to their collection?
- About how many grams will they need to collect each day to get to that total?
- What objects in the room might be good choices to add to the collection?

5 Conclude today's activity by inviting students to come lift the bag that holds their collection to feel what this total number of grams feels like. You might have them do so now or at a later time, as described at the end of Activity 2.

Activity 3

Playing Round & Add Hundreds in Pairs — Day 12

1 Open today's activity by letting students know that they will work on a Number Corner Student Book page and then play Round & Add Hundreds with a partner.

2 Use your display copy to introduce the More Rounding Practice page from the Number Corner Student Book.

- Give students a moment to look over the page.
- Read the directions aloud.
- Ask students if they have any questions about what to do.

3 Have students turn to the page and start working. Circulate around the room to make observations, answer questions, and provide differentiated instruction as needed.

ELL Help ELL students understand the directions. Work through 1a and 2a with students so they know how to complete the rest of items 1 and 2. Review any important vocabulary that may have been challenging.

SUPPORT Identify students who have struggled with rounding this month and meet with them in a small group. Encourage these students to use a number line and to ask questions or to explain what is challenging to them about rounding so you can help clarify any confusion. You might want to suggest that for each number, they write the two multiples of 10 or of 100 that the number lies between and then circle the one it is closest to. If students need to use a number line to do this, make one available.

CHALLENGE Have students round 4- and 5-digit numbers to the nearest hundred. Also have students figure out the highest and lowest numbers that round to certain hundreds. For example, what is the highest number that rounds to 600? the lowest? How about 7,300?

CHALLENGE Have students keep track of the 3-digit numbers they got and round each to the nearest ten, as well as the nearest hundred. Then, invite them to find the sums of each set of numbers: the exact numbers, the numbers rounded to the nearest ten, and the numbers rounded to the nearest hundred. Which sum is closest to the exact sum? Why? Do the sums of the numbers rounded to the nearest ten and to the nearest hundred accurately predict the winner every time? Why or why not?

4 After most students have finished the Number Corner Student Book page, review the rules for Round & Add Hundreds (see Activity 2 if necessary) and help them get ready to play.

- Have them open their Number Corner Student Books to the Round & Add Hundreds page.
- Explain that they will play in pairs, using just one partner's Student Book page; they can use the other partner's page if they have time to play another round of the game.
- Assign pairs or invite students to pair up.
- Give each pair of students three dice: two marked 1–6 and one marked 4–9.

5 Give students all but the last 5 minutes of the period to play.

6 About 5 minutes before the end of the period, ask students to stop playing and determine who won their games (even all the multiples of 100 have not been claimed).

Day 13

Date:

Calendar Grid	Calendar Collector	Computational Fluency
Activity 4 – Updating the Calendar Grid (pg. 13)	*Update*	**Activity 4 –** Scout Them Out (pg. 26)
Number Line	**Solving Problems**	**Assessment**

Activity 4

Updating the Calendar Grid — Day 13

1 Gather students in front of the Calendar Grid and work together to update the grid and Observations Chart.

- Invite them to make observations and ask questions about the markers and information that have been posted since the previous Calendar Grid discussion.
- Invite a student volunteer to reveal the new calendar marker and update the Observations Chart, with input from other students.
- If the marker shows a unit fraction or a day or two after a unit fraction was shown, invite students to imagine what the whole looks like.

2 Spend some time focusing on the Equivalent Fractions column.

- Have students study the Equivalent Fractions column to see if they can add any additional equivalent fractions. Encourage them to justify their thinking.
- Ask students to consider and discuss, in pairs and as a class, questions like the following.
  - » Are there any fractions for which we don't see equivalent fractions on the Calendar Grid?
  - » Even though we don't have fractions on the calendar that are equivalent to this fraction, does that mean that there are no fractions equivalent to this one?
  - » Can you think of some fractions that would be equivalent to this one? Make a sketch on your whiteboard.

This discussion may not take off with your students, and if that's the case, feel free to move on to the next step.

3 Have students use the calendar markers to compare different pairs of fractions.

- Write each pair of fractions one at a time.
  $\frac{1}{3}$ ___ $\frac{1}{6}$, $\frac{3}{8}$ ___ $\frac{3}{4}$, $\frac{2}{4}$ ____ $\frac{2}{6}$, $\frac{3}{4}$ ___ $\frac{6}{8}$, $\frac{2}{6}$ ___ $\frac{2}{3}$, $\frac{1}{12}$ ___ $\frac{1}{6}$
- Ask students to talk in pairs about which fraction is larger and which fraction is smaller, using the calendar markers to justify their thinking.
- Ask students to help you write a <, >, or = symbol to show how the fractions compare.

CHALLENGE/SUPPORT Think about your students' understanding of fractions so far and adjust the examples above to be easier or more difficult. If students need more challenge, you can have them compare fractions with different numerators and denominators. If they are unsure, use easier fractions (perhaps with the same denominators or unit fractions) and be sure to have to look at the calendar markers to help them understand and explain why one is bigger or smaller than the other.

> ***Students*** *Well, $\frac{1}{3}$ is bigger than $\frac{1}{6}$ because there are 2 sixths in one-third.*
>
> *I agree. If you look at the markers, $\frac{1}{6}$ is smaller than $\frac{1}{3}$.*
>
> *And $\frac{3}{8}$ is smaller than $\frac{3}{4}$. Even though the numerators are the same, the amounts are different. Eighths are smaller than fourths so $\frac{3}{8}$ is less than $\frac{3}{4}$.*

4 Wrap up today's activity by having students make a prediction about the next marker or future markers.

Unlimited Equivalent Fractions

It is possible to generate an infinite number of fractions that are equivalent to a given fraction by multiplying or dividing the numerator and denominator by the same number: $a/b = a \times n/b \times n$ and $a/b = a \div n/b \div n$.

Because we are not asking students to generate equivalent fractions, only to recognize them, this might be a stretch for many. For example, they might not see a fraction equivalent to $\frac{3}{8}$, because $\frac{3}{8}$ cannot be simplified any further (reduced by dividing the numerator and denominator by the same number). However, we can multiply the numerator and denominator by 2 to generate the equivalent fraction $\frac{6}{16}$.

Because we have not represented sixteenths on the calendar markers, students will not find this fraction in the collection; instead, they would need to understand fractions well enough to arrive at this equivalent fraction on their own, most likely through sketching. Students in need of a challenge might enjoy playing with this idea.

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll update the Calendar Collector as part of Activities 2 and 3 as well.

Procedure

- The student helpers select an object to add to the collection.
- They estimate the mass of the object and record their estimate on the record sheet.
- They find the exact mass of the object using the balance scale.
- They add the object to the collection in the bag.

Key Questions

Use these questions to help guide students' discussion this month.

- What do you estimate the mass of this object is?
- How can you estimate the total mass of the objects we have collected so far this month? Do you think it is more than 500 grams? More than a kilogram? How can you tell?
- How many more grams do we need to get to 1 kilogram (1,000 grams) exactly?

Literature Connections

Use the following books as read-alouds this month.

The Hundred Pound Problem
by Jennifer Dussling

How Much, How Many, How Far, How Heavy, How Long, How Tall Is 1,000?
by Helen Nolan

Activity 4

Scout Them Out — Day 13

1 Begin today's activity by using the Multiplication Table page to review the Zero, Ones, and Doubles facts.

- Ask students to talk in pairs, and then as a class, about what the facts in each category have in common.
  - » The Zero facts all have 0 as a product.
  - » For the Ones facts, any number multiplied by 1 is equal to itself.
  - » The products for the Doubles facts are all even, all multiples of 2, and all part of the count-by-2 sequence.

2 Display a copy of the Scout Them Out (0, 1, 2) page where all students can see it, and have students turn to that page in their Number Corner Student Books. Explain that they are about to go on a scavenger hunt for multiplication facts.

3 Read the directions out loud, and work with students to circle each kind of fact in the specified color.

4 Then give students time to work on the page independently.

5 Once students have finished the page, have them share their work with a partner. If students have different answers, encourage them to justify their thinking or rethink the problem together.

Note
Keep your copy of the Multiplication Table page for display in future months.

Day 14

Date:

Calendar Grid	Calendar Collector	Computational Fluency
Activity 5 – Completing the Thinking About Fractions Page (pg. 14)	*Update*	
Number Line	**Solving Problems**	**Assessment**

Activity 5

Completing the Thinking About Fractions Page Day 14

1 Introduce the Thinking About Fractions page of the Number Corner Student Book, using your display copy of the page.

- Explain to students that they're going to do an assignment in their Number Corner Student Book today, rather than meeting in the discussion area.
- Have students get out their books and pencils and find the Thinking About Fractions page as you place a copy of the page on display.
- Give students a few moments to examine the page quietly.
- Review the questions on the page with the class.

2 When students understand what to do, give them most of the rest of the workout to complete the assignment.

- Circulate as students are working to observe and provide assistance as needed.
- As students finish the assignment, have them share and compare their answers with a classmate. Encourage them to work together to re-examine problems for which they got different answers, or consult with another classmate to resolve their differences.

SUPPORT Encourage students to refer to the Calendar Grid and Observations Chart for help.

CHALLENGE Ask to imagine the pattern for several more days. What would come after all of the twelfths? Why?

CHALLENGE If the pattern went on forever, on what days would they see the next three fractions that were equal to 1 whole?

3 Toward the end of the activity, gather students to the discuss the Calendar Grid one last time.

- Invite students to share any final observations about the pattern.
- Ask them to share some of the big ideas they learned about fractions from the pattern this month.

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll update the Calendar Collector as part of Activities 2 and 3 as well.

Procedure

- The student helpers select an object to add to the collection.
- They estimate the mass of the object and record their estimate on the record sheet.
- They find the exact mass of the object using the balance scale.
- They add the object to the collection in the bag.

Key Questions

Use these questions to help guide students' discussion this month.

- What do you estimate the mass of this object is?
- How can you estimate the total mass of the objects we have collected so far this month? Do you think it is more than 500 grams? More than a kilogram? How can you tell?
- How many more grams do we need to get to 1 kilogram (1,000 grams) exactly?

Literature Connections

Use the following books as read-alouds this month.

The Hundred Pound Problem
by Jennifer Dussling

How Much, How Many, How Far, How Heavy, How Long, How Tall Is 1,000?
by Helen Nolan

Day 15

Date:

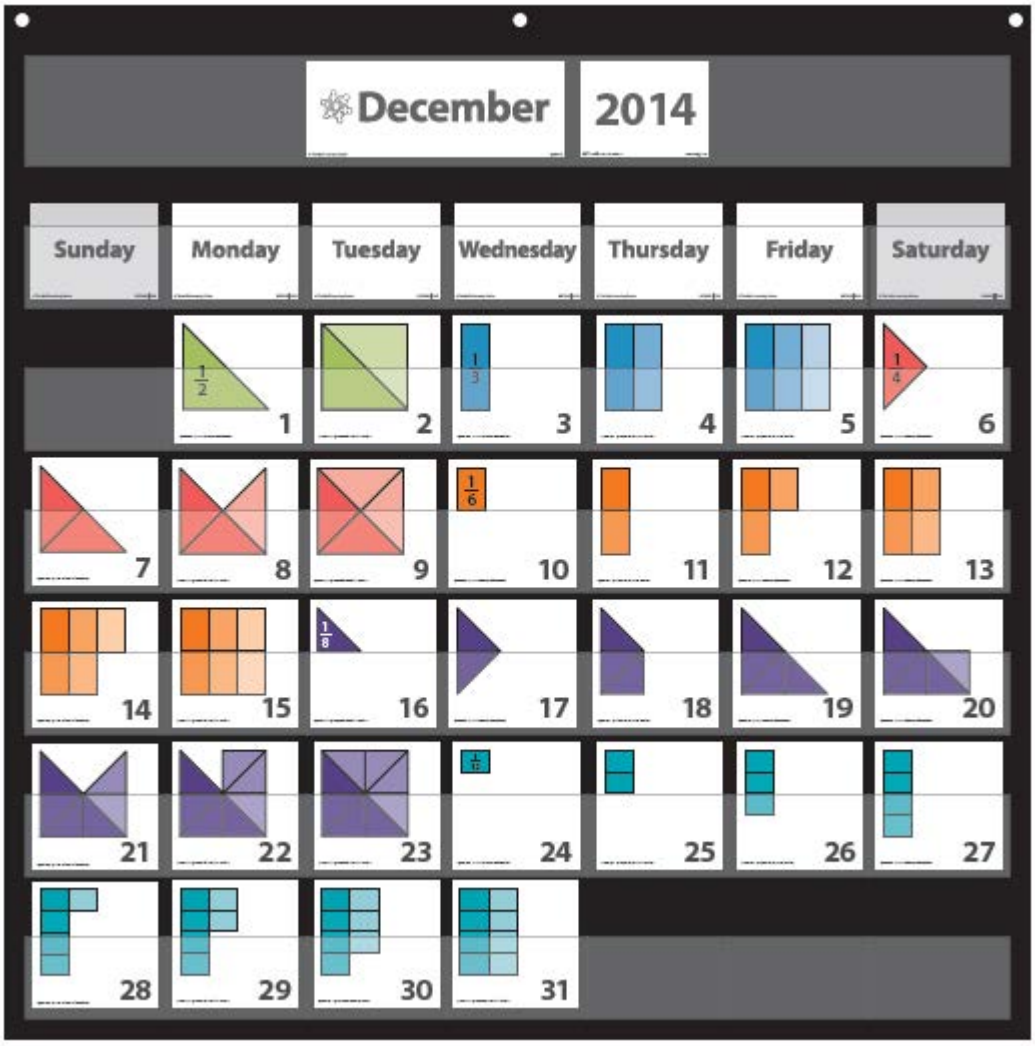
Calendar Grid	Calendar Collector	Computational Fluency
Update	**Activity 4 –** Comparing the Collection to a Kilogram (pg. 22)	
Number Line	**Solving Problems**	**Assessment**

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- After Activity 2, update the Calendar Grid Observations Chart as well.



Activity 4

Comparing the Collection to a Kilogram — Day 15

1 Open today's activity by adding one last object to the collection and adding information about it to the record sheet.

2 Ask students to look at the record sheet and think quietly to themselves for a moment. Do they think their collection has a mass that is pretty close to 1,000 grams or 1 kilogram?

3 Invite students to talk in pairs, and then ask them to give a thumbs up if they think the collection has a mass that is pretty close to 1,000 grams and thumbs down if they think it's a lot more or a lot less than 1,000 grams.

4 Introduce the kilogram, and invite some students to informally compare its mass to the mass of your collection.

- Show students the bag you prepared ahead of time that has a collection whose mass is exactly 1 kilogram.
- Ask a few students to come up and pick up the kilogram bag and then their collection bag. They can also hold the kilogram bag with one hand and the collection bag with the other.
- Ask the students to report to the class which bag feels like it has a greater mass: their collection or the kilogram? They might also report that the two feel about the same.
- Based on their reports, invite students to revise their predictions about the mass of their collection.

5 Use the balance scale to determine whether the collection is about equal to 1 kilogram.

- Place the kilogram bag on one side of the scale and the collection bag on the other side of the scale.
- As students to talk in pairs about what the balance scale shows. Is the collection about equal to 1 kilogram? If not, is it greater or less than a kilogram? How can they tell?
- Then invite students to talk about it as a class.

If the two roughly balance, the class met the challenge. If the collection has a mass greater than 1 kilogram, the collection side of the balance scale will fall. If the collection has a mass less than 1 kilogram, the kilogram side of the balance scale will fall.

CHALLENGE You might invite students to use the weights provided with the balance scale to balance the two sides. You might not have enough weights to balance the two sides. If this is the case, ask students to think of other ways to balance the two sides. For example, if the collection is greater than 1 kilogram, they might remove objects until the two sides balance: since the mass of each object has been recorded, they can then add the total of the masses of the objects they removed to 1,000 grams to find the total mass of their collection.

6 Spend some time finding the exact sum of the masses of all the objects that students added to the collection this month. (See Activity 2, step 4 for suggestions about how to go about this in a way that meets your students' needs for support or challenge with these kinds of calculations.)

7 After they have found the total mass based on the record sheet, compare it to the results of the balance scale.

- If the sum was quite a bit greater than 1,000, the collection side of the balance scale should have fallen.
- If the sum was quite a bit smaller than 1,000, the kilogram side of the balance scale should have fallen.
- If the sum was pretty close to 1,000, the two sides of the balance scale should have about balanced with each other.

8 Leave the two bags out, and invite students to pick them up when they have some time so that they can develop a sense of what 1 kilogram feels like.

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