NUMBER CORNER®

SECOND EDITION

TEACHERS GUIDE

JANUARY

GRADE 3

Published by The MATH LEARNING CENTER Salem, Oregon

Number Corner January

Teacher Masters

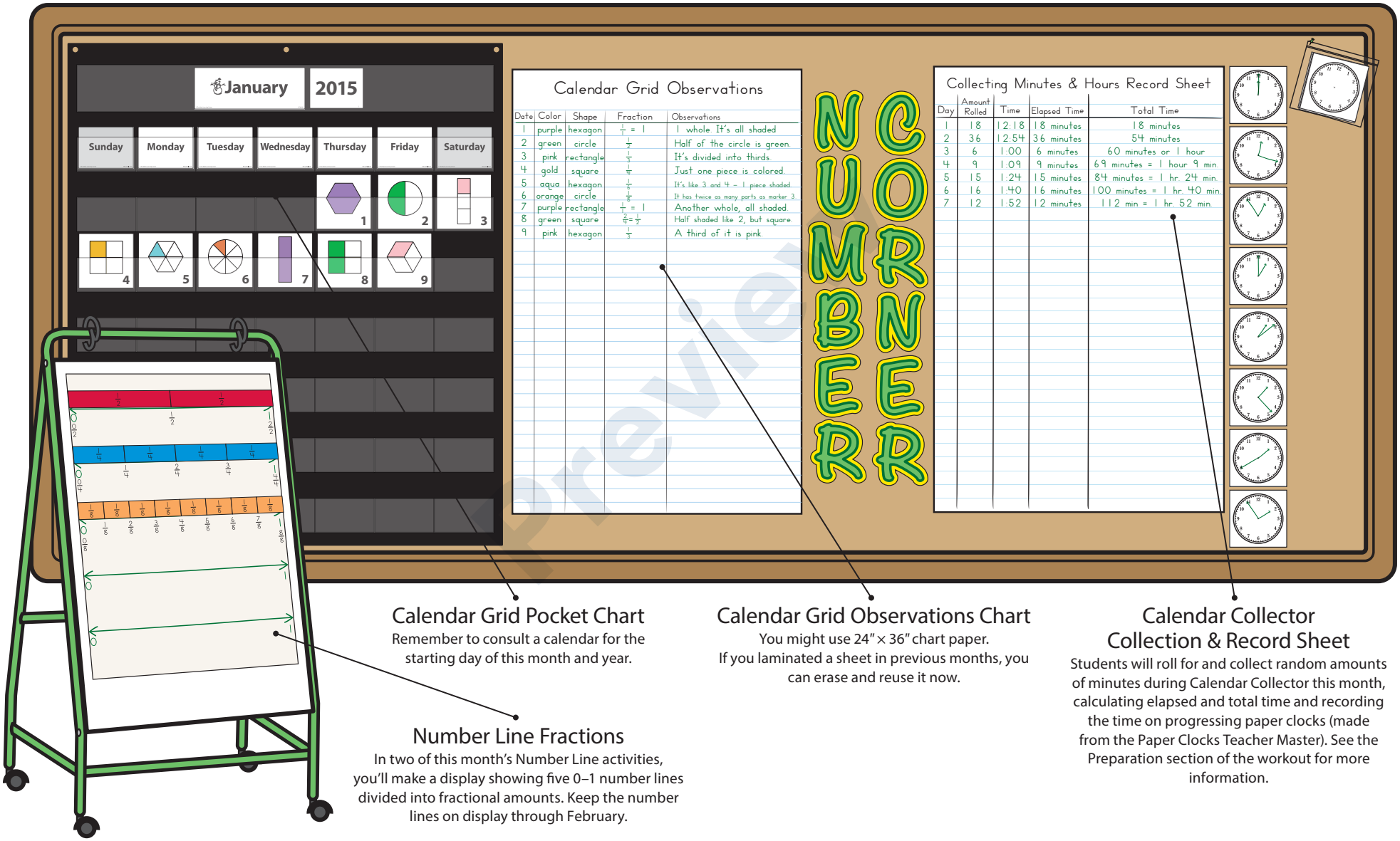
Pages renumber each month.

Number Corner Student Book Pages

Page numbers correspond to those in the consumable books.

January 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

Students will roll for and collect random amounts of minutes during Calendar Collector this month, calculating elapsed and total time and recording the time on progressing paper clocks (made from the Paper Clocks Teacher Master). See the Preparation section of the workout for more information.

Number Line Fractions

In two of this month's Number Line activities, you'll make a display showing five 0–1 number lines divided into fractional amounts. Keep the number lines on display through February.

☑ January Daily Planner

Day	Date	Calendar Grid	Calendar Collector	Computational Fluency	Number Line	Solving Problems	Assessment
1		**Activity 1** Introducing the Calendar Grid (p. 8)					
2		*Update*	**Activity 1** Introducing the January Calendar Collector (p. 16)				
3		*Update*	*Update*	**Activity 1** Multiplying by Ten (p. 24)			
4		*Update*	*Update*		**Activity 1** Marking Fractions on a Number Line (p. 28)		
5		*Update*	*Update*			**Activity 1** Multi-Step Story Problems (p. 34)	
6		*Update*	**Activity 2** Making Observations (p. 19)				
7		**Activity 2** Comparing Fractions of the Same Whole (p. 10)	*Update*				
8		*Update*	*Update*		**Activity 2** Making Fraction Comparisons on the Number Line (p. 30)		
9		*Update*	*Update*			**Activity 2** Estimating & Reasoning (p. 36)	
10		*Update*	*Update*	**Activity 2** Multiplying by Five (p. 25)			
11		**Activity 3** Comparing & Ordering Fractions (p. 12)	*Update*				
12		*Update*	**Activity 3** Completing the Time Page (p. 21)				
13		*Update*	*Update*		**Activity 3** Freddie the Fraction Frog (p. 32)		
14		*Update*	*Update*			**Activity 3** Equations (p. 38)	
15		*Update*	*Update*	**Activity 3** Scout Them Out (p. 26)			
16		*Update*	*Update*		**Activity 3** Freddie the Fraction Frog (p. 32)		
17		*Update*	**Activity 4** Concluding the January Calendar Collector (p. 22)				
18		*Update*	*Update*				Number Corner Checkup 2, Part 1 (p. 42)
19		*Update*	*Update*				Number Corner Checkup 2, Part 2 (p. 43)
20		**Activity 4** Equivalent Fractions (p. 13)	*Update*				

Note *Calendar Grid and Calendar Collector are updated by student helpers, except when the workout is the subject of an activity. Computational Fluency, Problem Strings, and Solving Problems do not have updates. Update routines are explained in detail in the workout text. 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 updates the chart as well.
Calendar Collector – The student helper rolls dice to find out how many minutes to add to the collection, draws a clock face to represent the new time and posts it with the collection, and updates the record sheet.

Number Corner
January

Overview

This month's collection of workouts offers exposure to and experience with a variety of skills and concepts. Students continue to develop their understanding of fractions in both the Calendar Grid and the Number Line workouts. They think about time as they collect minutes and hours in the Calendar Collector. The Computational Fluency workout is very similar to last month's, but this month students think about multiplying by 5 and 10. The Solving Problems workout offers new challenges with solving multi-step story problems. Finally, there is a checkup this month which is one means of assessing where your students are at this time.

Activities

Workouts	Day	Activities	D	G	SB
Calendar Grid Equivalent Fractions This month's calendar markers feature fractions represented as parts of a whole rectangle, square, hexagon, or circle. In their search for patterns, students will make observations about equivalent fractions and will compare different fractions of the same whole.	1	**1** Introducing the Calendar Grid	●		
	7	**2** Comparing Fractions of the Same Whole	●		
	11	**3** Comparing & Ordering Fractions	●		
	20	**4** Equivalent Fractions	●		●
Calendar Collector Collecting Minutes & Hours In this month's Calendar Collector, students roll two dice numbered 1–6, multiply the two numbers shown, and then add that number of minutes (between 1 and 36 minutes) to a clock face. They track the total number of minutes on a record sheet.	2	**1** Introducing the January Calendar Collector	●		
	6	**2** Making Observations	●		
	12	**3** Completing the Time Page	●		●
	17	**4** Concluding the January Calendar Collector	●		
Computational Fluency Fact Fluency for Multiplying by Ten & Five Students review how to multiply by 10 and by 5. They use the multiplication table to consider patterns among these multiplication facts and complete Scout Them Out activities, as they did last month, for practice.	3	**1** Multiplying by Ten	●		●
	10	**2** Multiplying by Five	●		●
	15	**3** Scout Them Out	●		●
Number Line Benchmark Fractions on a Number Line In the same way the number line was used in previous workouts to model the relationships between and ordering of whole numbers, the Number Line Workout will now shift to using the number line to model, iterate, and compare fractions.	4	**1** Marking Fractions on a Number Line	●		
	8	**2** Making Fraction Comparisons on the Number Line	●		
	13, 16	**3** Freddie the Fraction Frog	●	●	
Solving Problems Multi-Step Problems & Equations Students tackle more multi-step story problems this month. Before solving each problem, they estimate what a reasonable answer would be, using their number sense and reasoning skills. They also work together to select and discuss equations to represent multi-step problems.	5	**1** Multi-Step Story Problems	●		●
	9	**2** Estimating & Reasoning	●		●
	14	**3** Equations	●		
Assessment Number Corner Checkup 2 During the last week of the month, the teacher administers a written assessment to the entire class, half in place of Number Corner workouts one day, and the other half in place of workouts the following day. Number Corner Checkup 2 is designed to help teachers ascertain students' current understandings and skills in the areas of multiplication concepts, rounding, fractions, time and measurement, and multi-step story problems.	18	**1** Completing Pages 1 & 2			
	19	**2** Completing Pages 3 & 4			

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

Teaching Tips

January is a great time for learning. Students can extend and solidify the skills and concepts they have been working on this year. Look for areas of growth as well as areas where students may need extra support. There are opportunities to support students by working with them in small groups. Use these opportunities, and if possible, work in more times to engage students on areas of need.

The Number Corner Checkup 2 will provide a glimpse of where students are with many key skills and concepts. Use the results of this assessment to help guide your Number Corner planning in the months to come.

Evaluate the pace of Number Corner; how is it going? Do you need to speed up or slow down? Can you make any changes in pacing to boost student engagement?

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.6 Solve division problems by finding an unknown factor (e.g., solve 32 ÷ 8 by finding the number that makes 32 when multiplied by 8)			●		
3.OA.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations.			●		
3.OA.8 Solve two-step story problems using addition, subtraction, multiplication, and division					●
3.OA.8 Write equations with a letter standing for the unknown quantity to represent two-step story problems					●
3.OA.8 Assess the reasonableness of answers to story problems using mental computation					●
3.OA.8 Assess the reasonableness of answers to story problems using rounding and other estimation strategies					●
3.OA.9 Identify patterns among basic multiplication facts			●		
3.OA.9 Identify patterns in the multiplication table			●		
3.OA.9 Explain patterns among basic multiplication facts by referring to properties of the operation			●		
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.2 Locate fractions on a number line			●	●	
3.NF.2 Place fractions in their correct positions on a number line			●	●	
3.NF.2a Show a unit fraction 1/*b* on a number line by defining the interval from 0 to 1 as the whole and then partitioning it into *b* equal parts			●		
3.NF.2a Locate 1/*b* on the number line after partitioning the interval from 0 to 1 into *b* equal parts			●		
3.NF.2b Show a fraction *a/b* on a number line by marking off, starting at 0, *a* lengths of 1/*b* each and labeling the resulting interval *a/b*			●		
3.NF.3a Understand two fractions as equivalent (equal) if they are the same size	●				
3.NF.3b Recognize and generate simple equivalent fractions, e.g., ½ = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model	●				
3.NF.3c Recognize & write fractions that are equivalent to whole numbers	●		●		
3.NF.3d Compare two fractions with the same numerator or the same denominator by reasoning about their size	●		●		

Major Skills/Concepts Addressed	CG	CC	CF	NL	SP
3.NF.3d Demonstrate that comparisons are valid only when the two fractions refer to the same whole	●		●		
3.NF.3d Explain why one fraction must be greater than or less than another fraction			●		
3.NF.3d Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model	●				
3.MD.1 Tell and write time to the nearest minute and measure time intervals in minutes; solve story problems involving addition of time intervals in minutes		●			
3.MP.1 Make sense of problems and persevere in solving them		●			
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

Assessments

Toward the end of the month, you will administer a four-page written assessment—Number Corner Checkup 2— in two parts: the first two sheets during Number Corner on Day 18, and the last two during Number Corner the following day. The checkup replaces regular workouts on both days.

Number Corner Checkup 2 provides a snapshot of individual students' current skills in areas that have been emphasized over the past few months—multiplication concepts, rounding, fractions, time and measurement, and multi-step story problems. While this paper and pencil assessment is only one form of assessing student understanding, it can be useful to have assessment data for this midpoint of the school year. You may want to share results with families, assistant teachers or other support staff, and students themselves. You can also use the results to help make adjustments to your teaching for the second half of the year.

Comprehensive Growth Assessment

If you want to gauge students' growth and progress over time with regard to the entire set of Common Core State Standards, you can use the optional Comprehensive Growth Assessment, located in the Grade 3 Assessment Guide.

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–T10 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 24–30.	
	Run a single display copy of Number Corner Student Book pages 24–30.	
Charts	Prepare the Calendar Grid Observations Chart, Calendar Collector Record Sheet, and the chart for this month's Number Line activities according to preparation instructions in each workout.	
Paper Cutting	Before Calendar Grid Activity 2, cut apart strips of shapes from copies of the Wholes Teacher Master.	
	Before Calendar Collector Activity 1, run copies of the Paper Clock Faces Teacher Master and cut out the clock faces. On one clock face, draw minute and hour hands pointing to the 12 for 12:00. Post the clock with the record sheet. Save room for about 15-16 more clock faces below or next to this one. You might store the remaining clock faces in a plastic bag pinned nearby.	
	Before Number Line Activity 1, cut and label construction paper strips according to preparation instructions in the workout.	
	Before Number Line Activity 3, copy and cut out Freddie the Fraction Frog and prepare a number line, according to preparation instructions in the workout.	

January Calendar Grid

Equivalent Fractions

Overview

This month's calendar markers feature fractions represented as parts of a whole rectangle, square, hexagon, or circle. In their search for patterns, students will make observations about equivalent fractions and will compare different fractions of the same whole.

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)
- Represent fractions that have denominators of 2, 3, 4, 6, and 8 as parts of a whole (supports 3.NF)
- Identify equivalent fractions by comparing their sizes (3.NF.3a)
- Recognize and generate simple equivalent fractions, and explain why the fractions are equivalent, for example by using a visual fraction model (3.NF.3b)
- Write a whole number as a fraction and recognize fractions that are equivalent to whole numbers (3.NF.3c)
- Compare two fractions with the same numerator or with the same denominator; use the symbols >, =, or > to record comparisons of two fractions; and explain why one fraction must be greater or less than another fraction (3.NF.3d)
- Demonstrate an understanding that fractions can only be compared when they refer to the same whole (3.NF.3d)
- Look for and make use of structure (3.MP.7)
- Look for and express regularity in repeated reasoning (3.MP.8)

Materials

Activities	Day	Copies	Kit Materials	Classroom Materials
Activity 1 Introducing the Calendar Grid	1		• Calendar Grid pocket chart • Day, Month, and Year markers • Fraction Calendar Markers	Used in all Calendar Grid activities this month: • Calendar Grid Observations Chart (see Preparation) • erasable markers
Activity 2 Comparing Fractions of the Same Whole	7	**TM T1** Wholes (see Preparation)		• colored pencils
Activity 3 Comparing & Ordering Fractions	11			• student whiteboards, markers, and erasers
Activity 4 Equivalent Fractions	20	**NCSB 24*** Fraction Concepts Review		

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.

comparison
denominator*
divide*
equal*
equivalent fractions*
fraction*
greater than
less than
numerator*
ordering
part
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 re-use the chart each month. Post the chart before the first activity.

Calendar Grid Observations

Date	Color	Shape	Fraction	Observations

Before the second activity, cut apart the strips of shapes from the copies of the Wholes Teacher Master. That way, you can give each student a strip that features only the whole you decide to talk about.

Mathematical Background

This month's calendar markers represent fractions as some number of equal parts of a whole area. In other activities in third grade, including this month's Number Line workout, students use the number line to represent fractions as points on the line between 0 and 1. Seeing fractions as part of a whole shape can be more intuitive for third graders because it connects to their personal life experiences of sharing a whole thing (a sandwich, a cookie, a piece of paper) equally, of dividing a whole into equal parts and counting out those parts. We use the area model for fractions (the representation of a fraction as part of some defined area) to connect to students' prior knowledge and experiences, while also building more general understanding and facility with models like the number line that will be used more extensively as students get older and begin calculating with fractions.

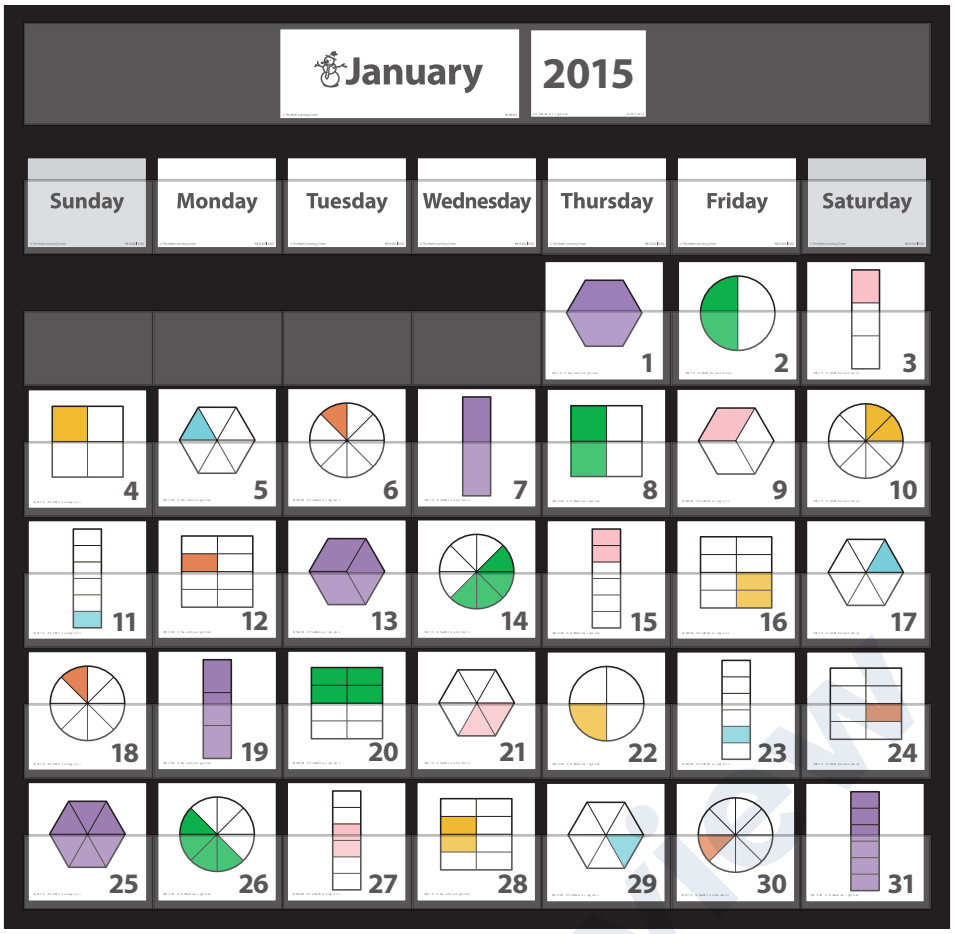
About the Pattern

There is a repeating pattern in the shapes—hexagon, circle, rectangle, square—and in the colors—purple, green, gold, pink, aqua, and orange. The fractions also repeat: 1, ½, ⅓, ¼, ⅙, and ⅛. Each fraction is represented in a variety of ways so that students have the opportunity to recognize equivalent fractions, for example ¼ = ⅜. The color pattern supports the repeating fraction, so that, for example, every marker that depicts ½ is also green.

Key Questions

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

- When will we see the next ¼?
- When we see ⅓ again, what shape do you think it will be?
- Will the rest of the calendar markers include a marker that is pink and shows ½? How do you know?
- What shape, color, and fraction will the 21st (the 18th, the *x*th) marker show?
- Will the rest of the calendar markers this month include a marker that shows ⅛ on a square? How do you know?
- This marker shows ⅔, and you determined that ⅔ is equal to ½. Can you think of any other fractions that would be equal to ½? How can you tell? Do you see any of them on the calendar?



Literature Connections

Here are a couple of good books to share with your students this month. You might enjoy them with the class or make them available for students to read on their own.

- *The Lion's Share* by Matthew McElligott
- *The Wishing Club: A Story about Fractions* by Donna Jo Napoli
- *Full House: An Invitation to Fractions* by Dayle Ann Dodds
- *Polar Bear Math* by Ann Whitehead Nagda
- *Apple Fractions* by Jerry Pallotta

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 update the Calendar Grid as part of Activities 2, 3, and 4 as well.

Procedure

The student helper:

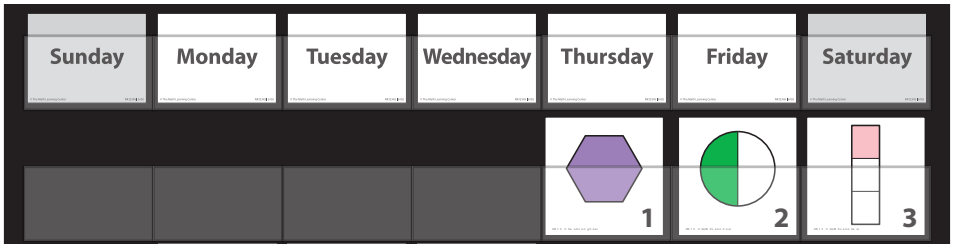
- Posts one or more calendar markers so that the Calendar Grid is complete up to the current date.
- Updates the Observations Chart with the required information.

Activity 1

Introducing the Calendar Grid — Day 1

1 Open today's activity by gathering students in front of the Calendar Grid. Post today's marker as well as any markers that come before it if you are not starting on the first of the month.

If today is the 1st, you might display the next two markers. Explain that you are giving students a "sneak peak" in order to help them make observations about the pattern.



2 Give students a minute or so to study the markers. Then, invite students to share their observations first with a partner and then with the class.

> ***Students*** *I see a hexagon and a circle.*
>
> *The hexagon is all filled in but the circle is only half.*
>
> *The third one is a rectangle. One part is shaded and two are not.*
>
> ***Teacher*** *Do you know another way to explain your thinking? How else can we say that one part is shaded and two are not?*
>
> ***Students*** *One out of 3 are shaded?*
>
> *Two out of 3 are not shaded.*
>
> *I think the pink part is one-third.*

3 Ask students if they can make a generalization or prediction about what the main theme of this month's calendar pattern will be.

4 Then, direct students' attention to the Observations Chart you prepared and posted earlier. Explain that students will record the date, the color shaded in, the shape name, the fraction shaded, and any observations.

5 Model how to fill in the chart for the first day, eliciting input from students. When asking for observations, encourage students to make mathematical observations by only writing down observations that are mathematical.

Calendar Grid Observations

Date	Color	Shape	Fraction	Observations
1	purple	hexagon	$\frac{1}{1} = 1$	1 whole. It's all shaded

> ***Teacher*** *Look at the first marker. What color is it?*
>
> ***Students*** *Purple.*
>
> ***Teacher*** *And the shape.*
>
> ***Student*** *It's an octagon.*

Now, it's a hexagon. Look, it has 6 sides, not 8.

Oh yeah, it is a hexagon!

Teacher *Great. What fraction of the hexagon is filled in?*

Students *Huh?*

Isn't a fraction like a part of something? The whole thing is filled in.

I don't think that is a fraction.

A fraction has two numbers, one on top of the other with a bar in the middle. How could we write a fraction for that?

Teacher *Sometimes when we think about fractions, we use the words "out of." Another way to say half is 1 out of 2. So, now, we only have 1 hexagon and the whole thing is shaded. One way to say that is 1 out of 1 or ¹⁄₁.*

Students *That is a little weird.*

We talked about that before. A whole number can be a fraction.

Teacher *What observations do you have?*

Students *Day 1 is 1 whole.*

One out of 1 equals 1.

I have a hexagon on my notebook.

Teacher *I am glad you are making a connection, but since that does not really connect to our pattern, I'm not going to write that down. Is that OK with you?*

6 Invite one student for each day that has passed after the 1st to demonstrate how to fill in the Observations Chart. Encourage these students to elicit participation from their peers.

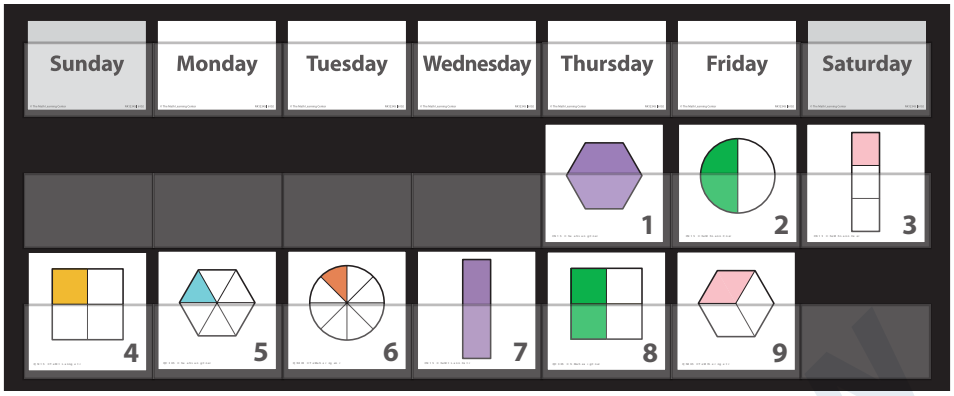
7 Let students know that when it is their turn to update the Calendar Grid, they will post a new marker and fill in the Observations Chart. Ask students if they have any questions about the new pattern or about updating the Observations Chart.

8 Wrap up today's activity by asking students to make predictions about the next day's marker.

Activity 2

Comparing Fractions of the Same Whole — Day 7

1 Open today's activity by drawing students' attention to the Calendar Grid Observations Chart and asking them to look at the fractions column for a moment and to double-check those written fractions against the pictures on the calendar markers. Have they all been recorded correctly?



2 Discuss whether each fraction recorded on the Observations Chart is correct and where they see the numerator and denominator for each fraction in the model on the calendar marker. Use the Word Resource Cards to review the terms *numerator* and *denominator.*

Note that the eighth marker could be represented by ½ or ⁲⁄₄. Make sure both equivalent fractions are recorded on the Observations Chart, and be sure students understand that ⁲⁄₄ = ½. If you are doing this on or after the 10th of the month, students will also see ¼ represented as 2 of 8 equal parts shown on the circle.

Most of these fractions earlier in the month are unit fractions. A unit fraction is expressed in the form 1/b, or 1 of b equal parts of a whole. Students might notice that most of these fractions have 1 as the numerator. Let them know that is because they are unit fractions, which means they are just 1 of some number of equal parts of a whole.

3 Now work with the whole class to compare pairs of fractions that are shown on the same whole.

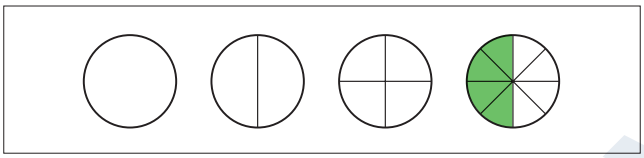
- Focus on these pairs of fractions:
  - » ½ and ⅛ shown on the circle on markers 2 and 6
  - » ¼ and ½ shown on the square on markers 4 and 8
  - » ⅙ and ⅓ shown on the hexagon on markers 5 and 9
- In the course of the discussion, bring up the fact that these comparisons are only valid because the fractions are shown on the same whole. You might show students markers 3 and 9, both of which show the fraction ⅓. Marker 3 shows ½ of the rectangle and marker 9 shows ⅓ of the hexagon; explain that these thirds are not equal because they are thirds of different wholes.
- Help students record the comparisons with mathematical symbols.
  - » ½ > ⅛ and ⅛ < ½
  - » ¼ < ½ and ½ > ¼
  - » ⅙ < ⅓ and ⅓ > ⅙

- Students might more specific observations about how these fractions are related to each other. For example, the might notice that ⅙ is half of ⅓ or that ¼ is half of ½. If you feel it's appropriate, you can show students how to use equations to express these ideas. ⅓ ÷ 2 = ⅙ or ⅓ × ½ = ⅙ or ⅙ × 2 = ⅓. There is no expectation that third graders be able to write such equations themselves, so this is not necessary.

4 Give each student a strip of circles from the Wholes Teacher Master. Ask them to use these circles to show how many eighths they would need to fill in to make a fraction that is exactly equal to the ½ circle shown on marker 2.

5 Give students a moment to work and then share their fractions with a partner. Then discuss their work as a class, inviting students to share and explain their ideas. If students share a variety of ways to represent ⅝ to demonstrate that it is equal to ½, invite them to consider what their different representations have in common.

During the discussion, introduce the term *equivalent fractions* and use the Word Resource Card to clarify the term.



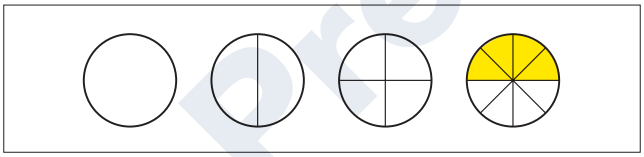
Amalia *I did it like this so that it would look exactly like the half on marker 2.*

Teacher *So how many eighths are equal to 1 half?*

Amalia *1, 2, 3, 4. Four eighths are equal to 1 half.*

Teacher *Did anyone do it differently?*

Cedric *I did. I also colored in 4 eighths, but I did it on the top, like this.*



Teacher *What do you all think? Are these both ways to show that four-eighths and one-half are equal?*

Students *Well, yeah, I mean, they both show 4 eighths. It's easier to see that Amalia's is the same as the one are marker 2, though, because the 4 eighths are in the same place on the circle.*

That's true, but either way, you can see pretty easily that they both fill up half the circle and that means that ⅝ is equal to ½.

6 Finally, write an equation to express that these fractions are equal: ⅝ = ½.

7 If you have time, repeat steps 4–6 with markers 5 and 9. (How many sixths are equal to ⅓?)

8 Conclude the activity by asking students to make some predictions about how the pattern will continue this month. See the Key Questions at the beginning of this workout for some ideas about how to draw out more sophisticated predictions and ideas from students.

Activity 3

Comparing & Ordering Fractions — Day 11

1 Open today's activity by gathering students in front of the Calendar Grid. Have them bring their whiteboards, whiteboard markers, and erasers with them and set them down for now. Give them a few minutes to look it over and then invite students to share any observations, predictions, or questions they may have.

2 Invite a student to post the marker for today and to elicit input from the class to update the Calendar Grid Observations Chart.

3 Introduce today's activity.

- Tell students that once again they are going to think about fractions that are shown on the same whole.
- On their whiteboards, they will write comparison statements using the >, <, and = signs, and then they will work together to place the markers in order from least to greatest.
- Review how to use the inequality symbols to compare numbers.

SUPPORT If students are having difficulty remember which sign to use, the following review might be helpful.

» Ask students to write the numbers 2 and 4 on the board horizontally.

» In between the two numbers, place two dots aligned vertically next to the number with the greater value.

» In between the two numbers, place one dot next to the number with the lesser value.

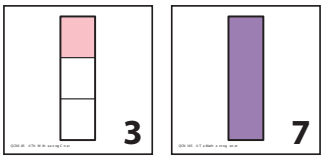
» Then have students connect the dots and practice reading the comparison statement, "Two is less than 4."

» Repeat with the 4 on the left and the 2 on the right, and help students write the other inequality symbol to compare them.

» Ask students what they would write on their whiteboards if the numbers had been 3 and 3 instead of 2 and 4.

» Show them how both numbers could get two dots since they are the same. If they connect those dots, they would have a statement of equality. The equal sign is used to show that relationship.

4 Ask a student volunteer to remove all the markers with the rectangle on them and place them on the whiteboard tray.



5 Then tell students that because these markers all use the same whole (the rectangle), the fractions shown on the markers can be compared. Ask them to select any pair of fractions and write a comparison statement about them.

If they finish early, they can do this for more than one pair of fractions.

6 After students have had a few moments to write, reconvene the group to discuss their comparison statements and then place the markers in order from smallest to greatest.

- As students share their statements, invite them to come up and use the markers to explain why the two fractions are equal or why one is greater or less than the other.
- You'll need to discuss equivalent fractions explicitly when you place the markers in order from smallest to greatest. Use the Word Resource Card to review the term if needed.

7 Repeat with as many of the other shapes (circle, hexagon, and square) as you have time for.

8 Close the activity by having a student replace the markers on the Calendar Grid.

Activity 4

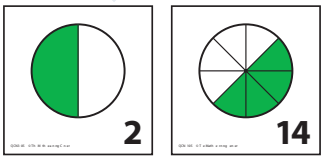
Equivalent Fractions — Day 20

1 Ask students to bring their Number Corner Student Books and a pencil and come to the Number Corner gathering spot.

2 Tell students that today they are going to do a page that will give them the chance to show what they understand about fractions.

3 Before they get started, give students time to review the calendar markers and look for examples of equivalent fractions.

- Review what the term *equivalent fractions* means.
- Ask students to search the calendar markers for examples of equivalent fractions shown on the same whole.



Jade *Half the pieces on marker 14 are green, because there are 8 all together and 4 are green. That's half. So 4/8 is equal to 1/2. You can see that the green part on marker 14 is equal to the green part on marker 2.*

- In the course of this exploration, students will probably notice that 3 thirds (3/3) and 6 sixths (6/6) are both equal to 1. Explain that fractions can be equal to whole numbers, and invite students to talk about how many thirds it would take to make 2 (6/3 = 2) and how many sixths it would take to make 2 (12/6 = 2).

4 Have the students find the Fraction Concepts Review page as you place your copy on display.
- Give students a few moments to examine the page quietly.
- Ask students if there are any words they are having trouble reading.

5 Review the instructions at the top of the page with the class, and call on a volunteer to explain why ¼ was written under the first example problem.
- Give students a few minutes to complete this section independently.
- Then call on volunteers to supply the correct answer for each fraction picture.

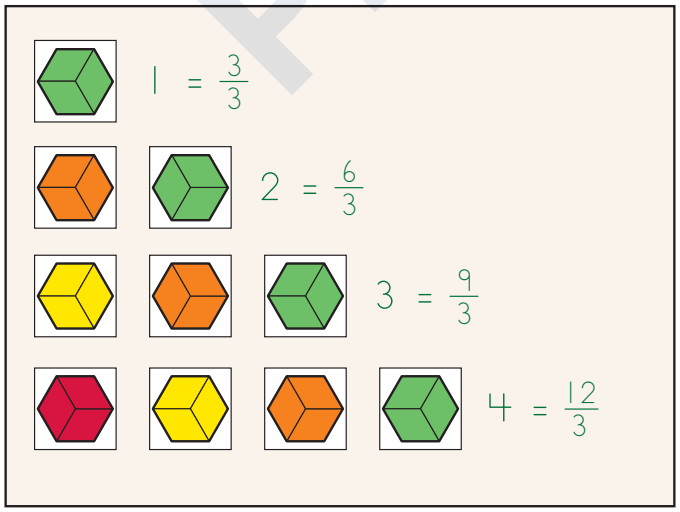
6 Ask another volunteer to read the directions for question 2 at the bottom of the page.
- Ask students to label each of the two circle drawings.
- Remind students that the directions say they need to create two equivalent fractions in each column.
- Suggest to students that if they get stuck they can use the calendar markers as a reference.
- Allow students to work independently to complete the rest of the table.

7 Ask students if they have any questions. Then, have students work independently to finish the page.

8 Wrap up the activity by encouraging students to continue to look for patterns over the last few days of the month (if there are any left). Recognize students for their work with fractions this month.

Extension

You might give students a chance to pursue the idea that a whole number can be expressed as a fraction. For example, using enlargements of the wholes on the Wholes Teacher Master, you might ask students to all shade in a whole hexagon that is divided into thirds. Then create a collection of these hexagons and figure out how many thirds are in the entire collection. ⅓ = 1, ⅔ = 2, ⅓ = 3, ¹²⁄₃ = 4, and so on. You might want to have students create a chart showing this pattern.



January Calendar Collector

Collecting Minutes & Hours

Overview

In this month's Calendar Collector, students roll two dice numbered 1–6, multiply the two numbers shown, and then add that number of minutes (between 1 and 36 minutes) to a clock face. They track the total number of minutes on a record sheet.

Skills & Concepts

- Fluently multiply with products to 100 using strategies and recall from memory all products of two 1-digit numbers (3.OA.7)
- Fluently add with sums 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 (3.NBT.2)
- Multiply whole numbers from 1–9 by multiples of 10 from 10–90 using strategies based on place value and properties of operations (3.NBT.3)
- Tell and write time to the nearest minute and measure time intervals in minutes (3.MD.1)
- Solve story problems involving addition of time intervals in minutes (3.MD.1)
- Make sense of problems and persevere in solving them (3.MP.1)
- Use appropriate tools strategically (3.MP.5)

Materials

Activities	Day	Copies	Kit Materials	Classroom Materials
Activity 1 Introducing the January Calendar Collector	2	**TM T2** Paper Clock Faces	• student clock dials, 10 • two 1–6 dice	• Collecting Minutes & Hours Record Sheet (see Preparation) • erasable markers
Activity 2 Making Observations	6			
Activity 3 Completing the Time Page	12	**NCSB 25*** Time		
Activity 4 Concluding the January Calendar Collector	17	**TM T3** Hector Goes to the Fair		

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.

A.M.
analog
day
digital
elapsed time*
hour (hr.)
minute (min.)
P.M.
second (sec.)
week

Preparation

- Erase the entries on the Calendar Collector Record Sheet from last month. Draw lines to create 5 columns. Label them as shown here and post the sheet before Activity 1. Have two 1–6 dice nearby so that students can roll to determine how many minutes to add each day.

- Run copies of the Paper Clock Faces Teacher Master and cut out the clock faces. On one clock face, draw minute and hour hands pointing to the 12 for 12:00. Post the clock with the record sheet. Save room for about 15–16 more clock faces below or next to this one. You might store the remaining clock faces in a plastic bag pinned nearby.

Mathematical Background

This month's workout focuses on time concepts. Students practice telling time, determining elapsed time, and solving story problems about time. By simply collecting a bit of time each day, students practice and make familiar many important skills and concepts.

Elapsed time will most likely be a new term for students. The term refers to the amount of time that passes between two moments in time. For example, sprinters calculate the elapsed time it took to run between the starting point and the finish line. We estimate elapsed time when we anticipate how much time will pass between two events. Being able to budget time wisely and stick to a schedule requires an estimation of reasonable amounts of time needed to complete certain tasks.

This month's Calendar Collector gives students hands-on experience telling time. Working with clock dials can help them understand the relationship between the minute hand and hour hand, and using an open number line can help them calculate elapsed time. Students will also contemplate multi-step time questions, often working backward from a certain time. For example: *Sarah's bus leaves at 8:00. It takes her 10 minutes to get dressed, 20 minutes to eat breakfast, and 5 minutes to walk to the bus. If Sarah gets up at 7:30, will she get to her bus on time?*

Key Questions

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

- What time is it now?
- What time will it be in 15 minutes?
- It is 7:20. What time was it 15 minutes ago?
- How many minutes are in an hour? two hours? three hours?
- If we move the minute hand ahead to show that 21 minutes have passed, where will the minute hand end up? What about the hour hand? What time will the clock show then?

Literature Connections

Use the following books as read-alouds this month.

How to Tell Time on Digital and Analog Clocks! by Jules Older

Time (Math Counts) by Henry Pluckrose

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 Grid as part of Activities 2, 3, and 4 as well.

Procedure

The student helper:

- Rolls two 1–6 dice and multiplies the two resulting numbers to find out how many minutes to add to the collection.
- Posts a new paper clock face and draws minute and hour hands on it to show the new time.
- Updates the record sheet to show the day, number of minutes added, the resulting time, and the amount of time that has elapsed since the previous day and since the first day of the month.

Activity 1

Introducing the January Calendar Collector — Day 2

1 Open today's activity by brainstorming and collecting information about what students know about time. Ask students the following questions, pausing from time to time to allow students to add on or to turn and talk with the person next to them.

This process, sometimes called *activating schema*, has two purposes: to help you informally assess what students know about time and to provide a collection of ideas about time that can be developed and refined over the course of the month.

- What time is it right now?
- How can we find out what time it is?
- What does it mean to be "on time?"
- How long is a minute? How long is an hour? How many hours are in a day?

2 Continue gathering information by asking students to think of activities that would take a few minutes, an hour, and several hours. Have students talk to the person next to them about each amount of time, and then invite a few students to share with the whole group.

3 Then, explain that students will collect time for this month's Calendar Collector. Show students the paper clock face you posted earlier.

4 Show students how they will collect minutes and hours this month.

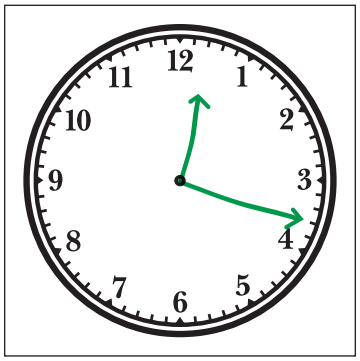
SUPPORT It is likely that some of your students won't know how to tell time or can't tell time very accurately. Figure out who these students are, and look for opportunities to teach the basics of telling time.

- Ask students what time is shown on the paper clock face. Use a projector to make the clock bigger if necessary.
- Invite a student to come up and roll two 1–6 dice and multiply the numbers shown on the dice. Ask students what time it would be if they added the amount rolled to the clock. In other words, what time would it be this number of minutes after 12:00?

> ***Teacher*** *It was 12:00. Lois just rolled a 3 and a 6. She multiplied them to get 18 minutes. What time is it now?*
>
> ***Frank*** *I think it is 12:18.*

- Then, post a new paper clock face and ask students how to show the new time on it.

> ***Teacher*** *How can we show 12:18? What does that look like?*
>
> ***Tasha*** *I think the hour hand goes on the 12 and the minute hand goes on the 18.*
>
> ***Brent*** *But there is no 18 on the clock.*
>
> ***Tasha*** *I know, but each number really means 5 minutes. When the minute hand points to the 1, that really means 5 minutes after the hour. When it points to the 3, it's 15 minutes after.*
>
> ***Brent*** *Oh right, so we get to the 3, which is 15 minutes, and then count 1, 2, 3 little marks. That's 18.*
>
> ***Teacher*** *Raise your hand if you agree that this is where the minute hand should point in order to show the time 12:18.*
>
> ***Rashawn*** *I think the minute hand should point there. That's right. But the hour hand needs to move away from the 12.*
>
> ***Natalie*** *I agree. It's not 12:00 anymore. It's a little past 12, so the hour hand needs to move too.*
>
> ***Teacher*** *Great point. We can draw the minute hand here and draw the hour hand a little further away from the 12. Does anyone have a question about why we need to move the hour hand too?*



5 Introduce the Calendar Collector Record Sheet for this month, and elicit student participation to fill out the first three columns.

The day will be 1, the amount rolled is whatever the student rolled (in the example it was 18 minutes), and the time is the number of minutes after 12 that were rolled.)

6 Introduce elapsed time.

- Explain that *elapsed time* means how much time has passed between two points in time.
- Show students the *elapsed time* Word Resource Card.
- Give an example from your school day.

> ***Teacher*** *You arrived at school at 8:00. Now it is 10:30. You have been here for 2 ½ hours. 10:30 is 2 ½ hours later than 8:00, so 2 ½ hours is the elapsed time between when you arrived at school and now.*

7 Then, show students how to fill out the fourth column of the record sheet.

Students should see that the elapsed time is the same as what they rolled.

8 For the fifth column, explain that students will keep track of how much time passed between each day and how much time has passed over all. For today, they can leave the fifth column blank or they can enter the same amount as the fourth column.

Tomorrow, they will add the amount of time rolled from today and the next day to find the total amount of elapsed time.

9 Conclude the activity by making sure everyone understands how to complete the update procedure.

- Answer any questions students have about this month's Calendar Collector.
- Explain that what they just did is what students will do when it is their turn to update the record sheet.
- Invite a student to summarize the steps for updating.
- If you have time, you may want to spin and record for Day 2 to help students better understand how to update the Calendar Collector.
- If students are concerned about not being able to tell time, assure them that they will get practice this month!

Activity 2

Making Observations — Day 6

1 Open today's activity by reviewing what time it is right now.

- Direct students' attention to the classroom clock.
- Ask them to talk to a partner about what time it is right now.
- Then share ideas together as a group and be sure one or more students explain how they can tell what time it is based on the position of the hour hand and the minute hand.

2 Then, invite students to bring their whiteboards, markers, and erasers to gather in front of the Calendar Collector materials in the Number Corner area. Ask students to take a minute or two to study the record sheet quietly.

Collecting Minutes & Hours Record Sheet

Day	Amount Rolled	Time	Elapsed Time	Total Time
1	18	12:18	18 minutes	18 minutes
2	36	12:54	36 minutes	54 minutes
3	6	1:00	6 minutes	60 minutes or 1 hour
4	9	1:09	9 minutes	69 minutes = 1 hour 9 min.
5	15	1:24	15 minutes	84 minutes = 1 hr. 24 min.

3 Invite students to share any observations or questions they have at this time.

4 Then, invite a student to roll the dice and find the product to determine how many minutes they will add today. Have that student elicit participation from the rest of the students to update the record sheet.

Encourage students to use their whiteboards to determine the time for today or elapsed time since yesterday or since the first day. Also, use this time to figure out and address any confusions or misconceptions students are having about telling time or updating the record sheet.

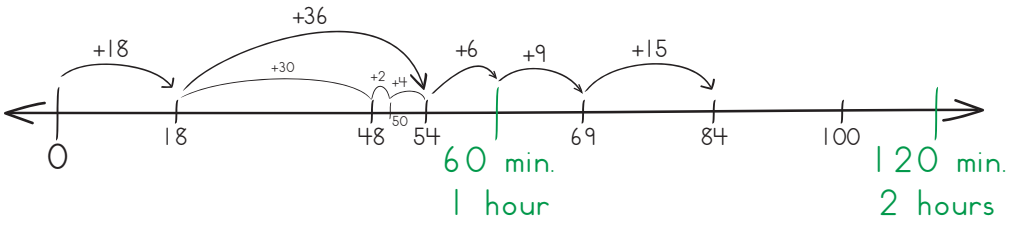
5 After updating for today, ask students if they notice any patterns on the record sheet. Give students a minute to look and think quietly. Then, have them share with a partner, and finally, have a few students share with the whole class.

> ***Students*** *The elapsed time since the day before is always the same as the time rolled.*
>
> *Oh yeah! Why is that?*
>
> *I guess that makes sense. We roll and multiply to see how much time has gone by and that's what elapsed time is.*
>
> *To find the total elapsed time, you just have to add the amount rolled that day. The elapsed time since the beginning is always the amount rolled for that day more than the last total elapsed time.*

6 Draw an open number line with a zero at the left and work with students to use it to show the number of minutes they added each day.

7 Discuss and add one increment at a time.

Be sure to note where the hours are, as shown below.



Listen for students who think that they will reach an hour at 100 minutes. Being accustomed to our base ten system can make understanding units of time challenging. Remind students that there are 60 minutes in an hour.

SUPPORT You can also show the number line with increments of 5 or 15 to help students add the numbers more easily.

8 Wrap up today's activity with a quick challenge. Have students look at the classroom clock and determine what time it is now. Then, ask them what time it will be in 15 minutes and what time it was 15 minutes ago.

SUPPORT For students struggling to tell time, just have them figure out what time it is. Give them student clock dials to help. Have them make their clocks look like the classroom clock. Setting the minute and hour hands will help them figure out the time.

CHALLENGE Offer different increments of time to make the challenge more difficult such as 27 minutes from now and 27 minutes ago.

9 Conclude today's activity by recognizing students for their work with time and for keeping the record sheet up to date.

Activity 3

Completing the Time Page — Day 12

1 Open today's activity by inviting a student to roll and multiply to determine the number of minutes they will add today. Have that student elicit participation from the rest of the students to update the record sheet.

2 Give students a minute to share any new observations or questions they have at this point.

3 Then, explain that students will complete a Number Corner Student Book page today as you display your copy of the Time page. Have students open their own books to the same page.

4 Give students a minute to look over the page. Then, review the directions for each problem.

5 Ask students if they have any questions, and then have them get started.

6 As students work, circulate around the room to make observations, answer questions, and provide differentiated instruction.

This page differentiates itself nicely. Do not be alarmed if not all students finish the page. Students who need help telling time can focus mostly on the first problem. For students who know how to tell time, you might have them only write the time for Clock D and then focus on the rest of the page.

ELL Read questions aloud. For the first problem, model writing the time for the first clock and tell students they will do the same for the next three clocks. For the last problem, draw a quick sketch to show Paula's journey and how long she spend at each place.

SUPPORT Make sure students have clock dials. Have them set their clocks to the times shown on each clock in problem 1. Then, have them use their clocks to change the time to 15 minutes earlier and later to help in question 2.

7 As students finish, have them compare their work with a partner. If they have different answers, encourage them to justify their thinking or to rework the problems.

8 Wrap up today's activity by asking students to think about what they have learned about time this month.

Activity 4

Concluding the January Calendar Collector Day 17

1 Open today's activity by gathering students in front of the Number Corner display and inviting them to share any observations or questions they have at this time.

2 Then, have a student volunteer roll and multiply for the number of minutes they will add today. Have that student elicit participation from the rest of the students to update the record sheet.

3 Next, draw a number line as you did in Activity 2 and use it to add on the number of minutes you added over the past 5 days.

- Start at however many minutes you had collected 5 days ago.
- Have a discussion with students in which they add the number of minutes they rolled for the last 5 days to the number line.
- Remember to consider the hour landmarks (180 minutes = 3 hours, 240 minutes = 4 hours, and so on).

SUPPORT If necessary, draw the number line with increments of 5 or 15 to help students add the numbers more easily.

4 Then, show students the Hector Goes to the Fair Teacher Master. Read the story aloud, and then answer any questions students have about the story.

5 Ask students to pair up and choose one of the options below the story and figure out how long Hector spent visiting certain places at the fair.

6 After pairs have had a chance to solve the problem they selected, invite them to share with the class. Encourage students to justify their thinking.

7 As students share, encourage them to think about what happens when they multiply a number by 10. Make sure students don't say that they are "adding a zero" but rather that the value of the number is 10 times as much.

> ***Teacher*** *What do you notice about what happens when you multiply a number by 10?*
>
> ***Janelle*** *It's like you just add a zero to whatever you are multiplying. Like 5 times 10 is 5 with a zero.*
>
> ***Teacher*** *I'm confused. When I add a zero to 5, I get 5. Right? 5 plus 0 is 5.*
>
> ***Janelle*** *No, no no. I mean, you write a zero.*
>
> ***Teacher*** *Can anyone say this in a different way so I can understand this thinking?*
>
> ***Juan*** *I don't think you are adding a zero. I think the number is 10 times as much. So, the 5 moves to the tens place and there is a zero in the ones place.*
>
> ***Teacher*** *Oh that makes more sense to me. When we shift the 5 to the tens place, I know it means 5 tens. Does anyone have a question about this?*

8 Wrap up today's activity by recognizing students for their thinking and participation in this month's Calendar Collector. Encourage them to keep looking for patterns in the last few days of the month.

January Computational Fluency

Fact Fluency for Multiplying by Ten & Five

Overview

Students review how to multiply by 10 and by 5. They use the multiplication table to consider patterns among these multiplication facts and complete Scout Them Out activities, as they did last month, for practice.

Skills & Concepts

- Solve division problems by finding an unknown factor (e.g., Solve 32 ÷ 8 by finding the number that makes 32 when multiplied by 8) (3.OA.6)
- Fluently multiply with products to 100 using strategies (3.OA.7)
- Identify patterns among basic multiplication facts (3.OA.9)
- 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 Ten	3	**TM T4** Tens Facts **NCSB 20** Multiplication Table (from December) **NCSB 26*** Multiplying by Ten		• 1 blue colored pencil per student
Activity 2 Multiplying by Five	10	**TM T5** Half-Tens Facts **NCSB 20** Multiplication Table **NCSB 27*** Multiplying by Five		• 1 green colored pencil per student
Activity 3 Scout Them Out	15	**NCSB 28** Scout Them Out (10, 5)		• blue and red crayons or colored pencils

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.

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

Mathematical Background

In the December Computational Fluency Workout, students focused on multiplying by 0, 1, and 2. This month, they focus on multiplying by 10 and by 5. First, they consider what they know about multiplying by 10, and then they use that knowledge to multiply by 5: the product of any number and 5 is half the product of that number and 10. With solid place value understandings, many students find it fast and easy to multiply by 10 and then to divide the resulting number in half. To multiply by 5, students might also count by 5s or think about the clock face to recall products up to 5 × 12. The strategy involving first multiplying by 10 and then dividing in half is not only efficient, but also generalizable, meaning it can be used to multiply any number (not just numbers from 1 to 12) by 5. These are the kinds of strategies we want to help students become familiar with. Arrays are used to demonstrate why this strategy for multiplying by 5, which capitalizes on number relationships, place value understandings, and the properties of multiplication, works. As they did last month, students use the Multiplication Table to keep track of the categories of multiplication facts they have studied and to consider patterns and relationships among those facts.

Activity 1

Multiplying by Ten — Day 3

1 Open today's activity by explaining that in Computational Fluency this month, students will practice multiplying by 10 and by 5. Today they will focus on multiplying by 10.

2 Display the Tens Facts Teacher Master and use it to review multiplying by 10.

- Ask students to look at the arrays, which show $7 \times 10 = 70$ and $10 \times 9 = 90$.
- Ask them to talk in pairs briefly about where they see the parts of each multiplication problem. For example, where do they see 7, 10, and 70 in the first array?
- Read the paragraph above the two arrays.
- Then talk as a class about where they see the parts of the problems in the arrays. Draw out the idea that the 10 is the number of squares in each row or column and the other number says how many rows or columns of 10 there are.
- Then discuss the problems at the bottom of the page one at a time. You might practice counting together by 10s to arrive at the total for each problem.

3 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 steps 3–5 if students have already spent time studying the multiplication table during your regular math instruction.

4 Ask students to look for the Tens facts on the table. Where do they see these facts? What patterns do they notice?

5 Take some time together as a class to mark the Tens facts by coloring them lightly in blue and marking them in the legend.

6 Display your copy of the Multiplying by Ten Page, read the poem out loud one time, and then ask the class to join you while you read/recite it a second time.

7 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.

CHALLENGE Invite students who finish early to multiplying the numbers in the grid by 100 and look for patterns.

8 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.

9 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.

- Where do you see the parts of the multiplication problem in this array?
- What patterns do you see in the digits in the ones place?
- What patterns do you see in the digits in the tens place?
- If you skip-count by ___, will you ever land on ____? Why or why not?

Literature Connections

Use the following books as read-alouds this month.

- *Lots of Ladybugs: Counting by Fives* by Michael Dahl
- *Toasty Toes: Counting by Tens* by Michael Dahl

Activity 2

Multiplying by Five — Day 10

1 Open today's activity by explaining that today students will practice multiplying by 5. They will use what they know about multiplying by 10 to help.

2 Display the Half-Tens Facts Teacher Master and use it to review multiplying by 5.
- Let students know that we call the ×5 facts Half-Tens facts.
- Ask them to look at the arrays, which show 5 × 6 = 30 and 8 × 5 = 40.
- Ask them to talk in pairs briefly about where they see the parts of each multiplication problem in the arrays, as well as why we might call these facts Half-Tens facts.
- Read the paragraph above the two arrays.
- Then talk as a class about where they see the parts of the problems in the arrays. Draw out the idea that the product of each number and 5 is half the product of that same number and 10: the arrays for each ×5 fact are half the size of the corresponding ×10 arrays.
- Then discuss the problems at the bottom of the page one at a time. You might practice first counting together by 5s to arrive at the total for each problem and then using the related to ×10 problem to solve it.

3 Display your copy of the Multiplication Table page, and ask students to turn to the page in their Number Corner Student Books.

You might want to skip step 3–5 if students have already spent time studying the multiplication table during your regular math instruction.

4 Ask students to look for the Half-Tens facts on the table. Where do they see these facts? What patterns do they notice?

5 Take some time together as a class to mark the Half-Tens facts by coloring them lightly in green and marking them in the legend.

6 Display your copy of the Multiplying by Five page, read the poem out loud one time, and then ask the class to join you while you read/recite it a second time.

7 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.

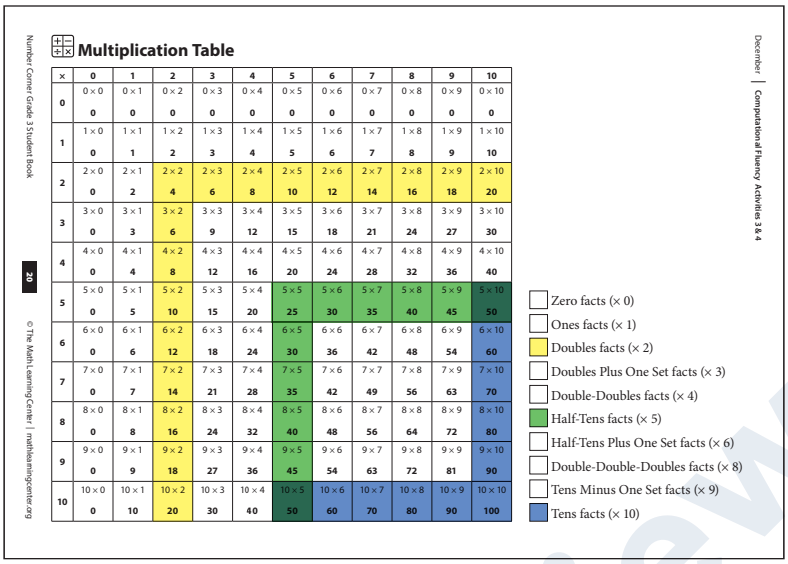
8 When there are just a few minutes left in the period, review the products for item 2 so that students can check their own work. Ask them to circle any products they could not recall or that they recalled incorrectly.

9 Let students know that they will do some Scout Them Out activities in a few days to practice multiplying by 10 and by 5.

Activity 3

Scout Them Out — Day 15

1 Open today's activity by displaying your copy of the Multiplication Table page, which should have the ×2, ×10, and ×5 facts colored in.



Multiplication Table

×	0	1	2	3	4	5	6	7	8	9	10
0	0 × 0 **0**	0 × 1 **0**	0 × 2 **0**	0 × 3 **0**	0 × 4 **0**	0 × 5 **0**	0 × 6 **0**	0 × 7 **0**	0 × 8 **0**	0 × 9 **0**	0 × 10 **0**
1	1 × 0 **0**	1 × 1 **1**	1 × 2 **2**	1 × 3 **3**	1 × 4 **4**	1 × 5 **5**	1 × 6 **6**	1 × 7 **7**	1 × 8 **8**	1 × 9 **9**	1 × 10 **10**
2	2 × 0 **0**	2 × 1 **2**	2 × 2 **4**	2 × 3 **6**	2 × 4 **8**	2 × 5 **10**	2 × 6 **12**	2 × 7 **14**	2 × 8 **16**	2 × 9 **18**	2 × 10 **20**
3	3 × 0 **0**	3 × 1 **3**	3 × 2 **6**	3 × 3 **9**	3 × 4 **12**	3 × 5 **15**	3 × 6 **18**	3 × 7 **21**	3 × 8 **24**	3 × 9 **27**	3 × 10 **30**
4	4 × 0 **0**	4 × 1 **4**	4 × 2 **8**	4 × 3 **12**	4 × 4 **16**	4 × 5 **20**	4 × 6 **24**	4 × 7 **28**	4 × 8 **32**	4 × 9 **36**	4 × 10 **40**
5	5 × 0 **0**	5 × 1 **5**	5 × 2 **10**	5 × 3 **15**	5 × 4 **20**	5 × 5 **25**	5 × 6 **30**	5 × 7 **35**	5 × 8 **40**	5 × 9 **45**	5 × 10 **50**
6	6 × 0 **0**	6 × 1 **6**	6 × 2 **12**	6 × 3 **18**	6 × 4 **24**	6 × 5 **30**	6 × 6 **36**	6 × 7 **42**	6 × 8 **48**	6 × 9 **54**	6 × 10 **60**
7	7 × 0 **0**	7 × 1 **7**	7 × 2 **14**	7 × 3 **21**	7 × 4 **28**	7 × 5 **35**	7 × 6 **42**	7 × 7 **49**	7 × 8 **56**	7 × 9 **63**	7 × 10 **70**
8	8 × 0 **0**	8 × 1 **8**	8 × 2 **16**	8 × 3 **24**	8 × 4 **32**	8 × 5 **40**	8 × 6 **48**	8 × 7 **56**	8 × 8 **64**	8 × 9 **72**	8 × 10 **80**
9	9 × 0 **0**	9 × 1 **9**	9 × 2 **18**	9 × 3 **27**	9 × 4 **36**	9 × 5 **45**	9 × 6 **54**	9 × 7 **63**	9 × 8 **72**	9 × 9 **81**	9 × 10 **90**
10	10 × 0 **0**	10 × 1 **10**	10 × 2 **20**	10 × 3 **30**	10 × 4 **40**	10 × 5 **50**	10 × 6 **60**	10 × 7 **70**	10 × 8 **80**	10 × 9 **90**	10 × 10 **100**

- Zero facts (× 0)
- Ones facts (× 1)
- Doubles facts (× 2)
- Doubles Plus One Set facts (× 3)
- Double-Doubles facts (× 4)
- Half-Tens facts (× 5)
- Half-Tens Plus One Set facts (× 6)
- Double-Double-Doubles facts (× 8)
- Tens Minus One Set facts (× 9)
- Tens facts (× 10)

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December | Computational Fluency Activities 3 & 4

2 Give students a minute to study the page in silence and then share what they notice about the facts they have addressed already.

> ***Students*** *We've already colored in so many, and a lot of them are pretty easy!*
>
> *The row and column for the Ones facts go up by 1, and the row and columns for Doubles facts go up by 2.*
>
> *All of the Tens facts end in 0.*
>
> *Some facts are more than one kind. Like 2 times 5 is 10. That can be a Double or a Half-Tens fact.*

3 Then, have students get out their Number Corner Student Books, a pencil, and a red and blue crayon. Let them know they may stay at their desks for today's activity.

4 Display a copy of the Scout Them Out (10, 5) page and have them turn to that page in their books.

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

- Let students know that they might have an easier time if they do all the problems in one category first and then all the problems in the other category afterward.
- Tell students they have a few minutes to complete this section of the page independently.

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

7 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.

January Number Line

Benchmark Fractions on a Number Line

Overview

In the same way that the number line was used in previous workouts to model the relationships between and ordering of whole numbers, the Number Line workout will now shift to using the number line to model, iterate, and compare fractions.

Skills & Concepts

- Locate fractions on a number line (3.NF.2)
- Place fractions in their correct positions on a number line (3.NF.2)
- Show a unit fraction 1/*b* on a number line by defining the interval from 0 to 1 as the whole and then partitioning it into *b* equal parts (3.NF.2a)
- Locate 1/*b* on the number line after partitioning the interval from 0 to 1 into *b* equal parts (3.NF.2a)
- Show a fraction a/*b* on a number line by marking off, starting at 0, a lengths of 1/*b* each and labeling the resulting interval *a/b* (3.NF.2b)
- Write a whole number as a fraction and recognize fractions that are equivalent to whole numbers (3.NF.3c)
- Compare two fractions with the same numerator or the same denominator (3.NF.3d)
- Explain why one fraction must be greater than or less than another fraction (3.NF.3d)
- 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 Marking Fractions on a Number Line	4			• 1 piece of blank 24″ by 36″ chart paper (see Preparation) • fraction strips (see Preparation) • black marker • tape or glue • student whiteboards with pens and erasers
Activity 2 Making Fraction Comparisons on the Number Line	8			
Activity 3 Freddie the Fraction Frog	13, 16	**TM T6** Freddie the Fraction Frog		• 1 piece of blank 24″ by 36″ chart paper (see Preparation) • black marker • tape or glue • sticky notes

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

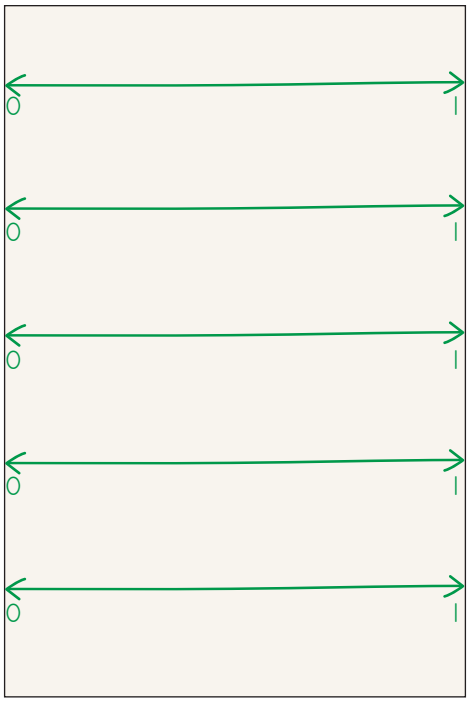
Vocabulary

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

denominator*
fraction*
number line*
numerator*
part
whole

Preparation

- Before Activity 1, cut and label the following strips of construction paper. Each should be 2″ wide. Store safely for use this month and next.
  - » 2 red strips, each 12″ long
  - » 3 yellow strips, each 8″ long
  - » 4 blue strips, each 6″ long
  - » 6 green strips, each 4″ long
  - » 8 orange strips, each 3″ long
- Prepare a piece of blank 24″ by 36″ chart paper by drawing 5 lines that are exactly 24 inches long. Leave at least 2″ above each line and 2″ below each line. Label the left of each line 0 and the right of each line 1. Post it before Activity 1.



- Before Activity 3, run a copy of the Freddie Frog Teacher Master on card stock and cut him out. You could ask a student volunteer to color him. Also draw a 0 to 1 number line on a piece of 24″ by 36″ chart paper. Draw a line that is exactly 24 inches long. Label the left of the line 0 and the right of the line 1. Very lightly in pencil, mark the line in halves, thirds, fourths, and sixths. Post it before Activity 3.

Mathematical Background

In this month's workout, students explore fractions on a number line. While students have experience thinking about fractional quantities of objects (half a watermelon, half a dozen eggs, or half of a dollar), they may be less familiar with the idea of determining fractions as parts of a unit of length. This month, students focus on fractions between 0 and 1 on a number line model.

The number line model consists of a line that is divided by small vertical line segments that are labeled to show given lengths or distances between the starting point and the ending point. Students begin with a number line with the labels 0 and 1. Students look at several fractions (½s, ⅓s, ¼s, ⅙s, and ⅛s) one at a time and determine how many will fit on a 0 to 1 number line. They are shown an unidentified fractional amount and asked to imagine how many of those pieces fit on the number line. They then add the pieces to the number line on at a time to see how many fit. This physical iteration of fractions helps them understand fractions as units of length.

Students should begin their exploration of fractions on the number line by modeling and learning about fractions between 0 and 1. A solid conceptual understanding of the fractions less than one is an important building block to students' understanding for fractions greater than or equal to 1. Students also compare fractions on the number line, determining which fractions are greater than or less than others.

Activity 1

Marking Fractions on a Number Line — Day 4

1 Open today's activity by drawing students' attention to the piece of chart paper on which you drew the five 0 to 1 number lines.

Key Questions

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

- What are some fractions are between 0 and ½?
- What are some fractions are between ½ and 1?
- If you divide a length into 3 equal parts, what fractional name could you use for each part?
- If you divide a two halves in half, how many pieces do you have? What are they called?
- Which is greater, ½ or ⅝? Why?
- Which is smaller, ⅛ or ⅓? Why?
- Can you name some equivalent fractions?

Literature Connections

Use the following books as read-alouds this month.

- *Inchworm and a Half* by Elinor J. Pinczes
- *Length* by Henry Arthur Pluckrose

2 Ask students to take a moment to study the chart in silence and then share, as a class, what they notice.

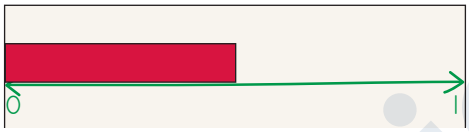
> ***Students*** *There are 5 lines.*
>
> *The lines are all the same. They start at 0 and end at 1.*
>
> *It looks like a number line, but usually we have a lot more numbers on a number line.*

3 Ask students to think about what other numbers they could write on these number lines. Is there any way to add to them?

Students might suggest that you could add fractions to the number lines. Others might suggest that the lines are complete and cannot be added to.

4 Explain that these number lines can be used to show numbers that are greater than 0 and less than 1 and that they are going to work together as a class this month to do just that.

5 Hold up just one of the two red strips of paper you cut out ahead of time and ask a student to come tape it right above the top number line. Ask them to line it up carefully at the 0.



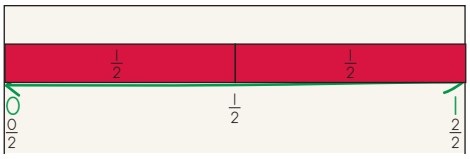
6 Make a mark on the number line at the end of the red strip (the halfway point) and ask students to talk in pairs for a moment about how they could label this point on the number line. Then talk about it together as a class.

Students might puzzle over how to label the point on the line, in part because they have not had many experiences thinking about fractions on a number line. If it doesn't come from the students, you might invite students to think about the number line as a distance or a length: say, the distance from one place to another.

> ***Students*** *Well, it pretty much looks like it's halfway: look, it breaks the line into 2 equal parts.*
>
> *So should we label it 2?*
>
> *No, I think we should label it ½ because it's halfway.*
>
> *I don't get it. Half of what? Like on the Calendar Grid you can see the circle is half green to show a half, but I don't get this.*
>
> *Well, it's half of the line. Right?*
>
> *It has to be a half. It's between 0 and 1. That means it's less than 1, so it can't be 2.*
>
> *It's half the distance. Like if you think about this number line like it's a mile or something, and you walked halfway, it would be half a mile. So ½.*

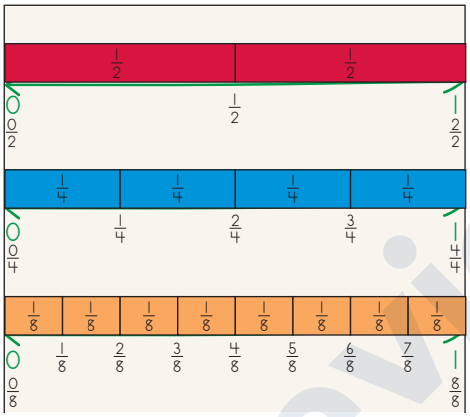
7 Label the point ½ and invite another student to add the second red strip to the line. Also label each strip itself ½.

If it seems appropriate to do so at this time, you might invite students to think about another way to label the points at 0 and 1. (The model shows clearly that 0 = 0/2 and 1 = 2/2, though students might not yet make that connection. You'll revisit this in Activity 2.)



8 Repeat this process first with the blue strips of paper and then with the orange strips of paper. (Each blue strip is 6″ long and represents ¼ of the distance from 0 to 1. Each orange strip is 3″ long and represents ⅛ of the distance from 0 to 1.)

- Begin by starting with 1 strip and labeling the point on the number.
- Each time the students add another strip, make a mark on the number line and ask for students' help to label it with a fraction.
- Help students be clear that they are marking either fourths or eighths: that is always the denominator. And they are counting those fourths and eighths: the number of fourths or eighths is the numerator.



9 Wrap up today's activity asking a student to point to the point on the third line that shows ⅜. Ask students to talk, first in pairs and then as a group, about where they see, on all three lines, fractions that are less than ⅜ and fractions that are greater than ⅜.

10 Let students know that they will label the other two number lines next time.

Activity 2

Making Fraction Comparisons on the Number Line Day 8

1 Open today's activity by directing students' attention to the chart of 0 to 1 number lines you began in Activity 1, and let them know they will label the other two number lines today.

2 Ask a student volunteer to come to the chart and hand them one of the yellow strips you prepared before the first activity.

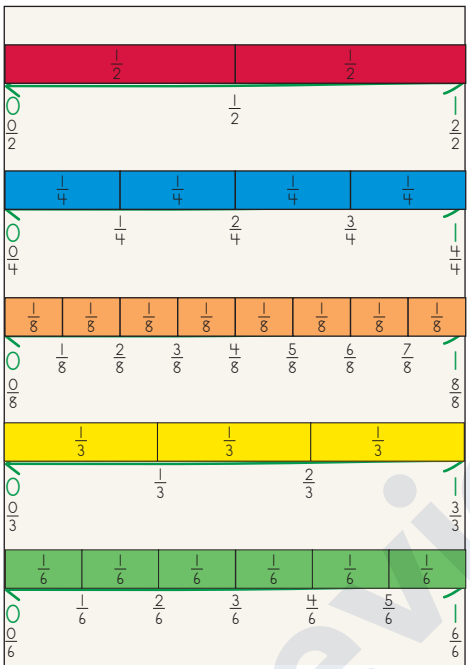
3 Ask students to estimate what fraction this yellow strip represents and then label the next empty number line with it.

- Have the volunteer hold the strip up to the number and ask the class to share estimates for what fraction this strip represents.

- Invite them to share and explain their estimates.
- Ask how they could use this strip to mark the next empty number line.
- Work with the student volunteer, and input from the class, to add the three yellow strips to the number line, label each of them ⅓, and label the points on the number line 0/3, ⅓, ⅔, and 3/3.

SUPPORT/ELL If necessary, you may want to review fraction vocabulary such as *numerator* and *denominator*.

4 Repeat step 3 with the green strips, each of which represents ⅙.



5 When the number lines are complete, have students compare some fractions. Use questions like those below, and record students' comparisons symbolically.

SUPPORT Select fractions on adjacent number lines to facilitate students' comparisons.

- Which is greater, 2/4 or 5/8? How can you tell? (5/8 > 2/4)
- Which is smaller, 1/4 or 3/8? How can you tell? (1/4 < 3/8)
- Identify a fraction and ask students to name fractions (from any number line) that are less than that fraction. (Have students write the fractions on their whiteboards privately and then share as a group.)
- Ask them to justify their thinking, using the number lines and fraction strips.
- Record their comparisons using > and > symbols, and have them do the same on their whiteboards.
- Repeat by naming a fraction and asking for fractions that are greater than that fraction. Then ask for fractions that are equal to that fraction.

6 Wrap up today's activity by asking students to make more observations about the fractions on the chart. What relationships do they see? What equivalencies do they see?

Activity 3

Freddie the Fraction Frog — Days 13, 16

1 Open the activity with a warm-up in which students compare fractions on the 0 to 1 number lines you labeled as a class in Activities 1 and 2.

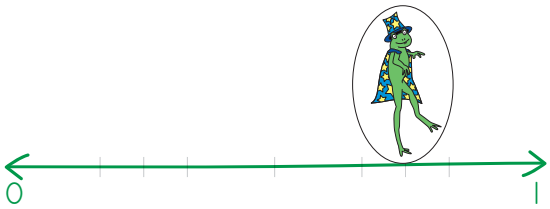
- Name a pair of fractions and ask students to write a comparison statement showing which is less and which is greater (or that they are equal). Focus on fractions with the same numerator and different denominator, as well as fractions with the same denominator and different numerators. Here are some examples:
  - » ½ and ⅓, ⅙ and ⅛, ⅚ and ⅝, ¾ and ⅚
  - » ⅔ and ⅓, ¾ and ¼, ⅝ and ⅝, ⅚ and ⅚
- Identify a fraction and ask students to:
  - » Name a fraction from any number line that is less than that fraction.
  - » Name a fraction with the same numerator and tell whether it is greater or less than the fraction.
  - » Name a fraction with the same denominator and tell whether it is greater or less than the fraction.
  - » Name a fraction from any number line that is greater than that fraction.
  - » Name a fraciton from any number line that is equal to that fraction .

2 Introduce Freddie the Fraction Frog.

- Show students the new, empty 0 to 1 number line you prepared and posted.
- Show they Freddie the Frog and explain that he likes to play games with students by popping up at random on this line.
- They're going to play the game with him by figuring out exactly where he is on the line. He will always be on a point that has a denominator of 2, 3, 4, or 6. (You might let students know that they won't play this game with eighths.)

3 Then, play a sample round.

- Place Freddie on the ¾ mark on the number line.
- Take turns calling on students to guess the location.
- Respond only by saying whether Freddie is higher or lower than their guess. ("You guessed ⅔. Freddie is on a fraction that is greater than ⅔.")
- Encourage them to look at their collection of 0 to 1 number lines to help think about fractions that might identify Freddie's location.
- When students guess Freddie's location, the round is finished.



4 Answer questions students have about the game and play a few more rounds, until the Number Corner period is over.

Note Keep the five 0 to 1 number lines posted in your classroom through this month and into the next. Do take down the Freddie the Frog number line when you are not using it so that students can't look at the fractions you labeled lightly in pencil.

January Solving Problems

Multi-Step Problems & Equations

Overview

Students tackle more multi-step story problems this month. Before solving each problem, they estimate what a reasonable answer would be, using their number sense and reasoning skills. They also work together to select and discuss equations to represent multi-step problems.

Skills & Concepts

- Solve two-step story problems using addition, subtraction, multiplication, and division (3.OA.8)
- Write equations with a letter standing for the unknown quantity to represent two-step story problems (3.OA.8)
- Assess the reasonableness of answers to story problems using mental computation, as well as rounding and other estimation strategies (3.OA.8)
- Reason abstractly and quantitatively (3.MP.2)
- Construct viable arguments and critique the reasoning of others (3.MP.3)

Materials

Activities	Day	Copies	Kit Materials	Classroom Materials
Activity 1 Multi-Step Story Problems	5	**NCSB 29*** Making Cookies		
Activity 2 Estimating & Reasoning	9	**NCSB 30*** Food Drive: Estimating & Reasoning		
Activity 3 Equations	14	**TM T7** Equations for Multi-Step Story Problems		

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.

equation*
estimate*
unknown

Preparation

Decide if you want students to solve problem independently or with a partner, or a combination of the two. If students work in pairs, you might want to assign partners to support successful problem-solving experiences.

Mathematical Background

In November, students solved single-step story problems and wrote equations to represent them. This month, they solve multi-step problems and explore how such problems can be represented by equations in which a letter stands for the unknown quantity. Though the problems typically only require what might look like two steps to adults, we are referring to these problems as multi-step problems. Students may have a variety of interpretations for what a step is. For example, some students might consider the initial reading of the problem a step. Others might solve "one step" of the problem with a strategy that requires more than one step, such as thinking about 6 times 15 as 6 times 10 plus 6 times 5.

These Solving Problems activities emphasize many of the CCSS Mathematical Practice skills. Students work through problems abstractly and concretely, debating and discussing strategies and solutions with peers. They use models to solving problems and to represent their thinking. They select and use tools—including manipulatives and computational strategies—that seem most appropriate to them to solve each problem. They communicate their thinking, look for patterns and structure, and use these patterns to support the reasonableness of their thinking.

Activity 1

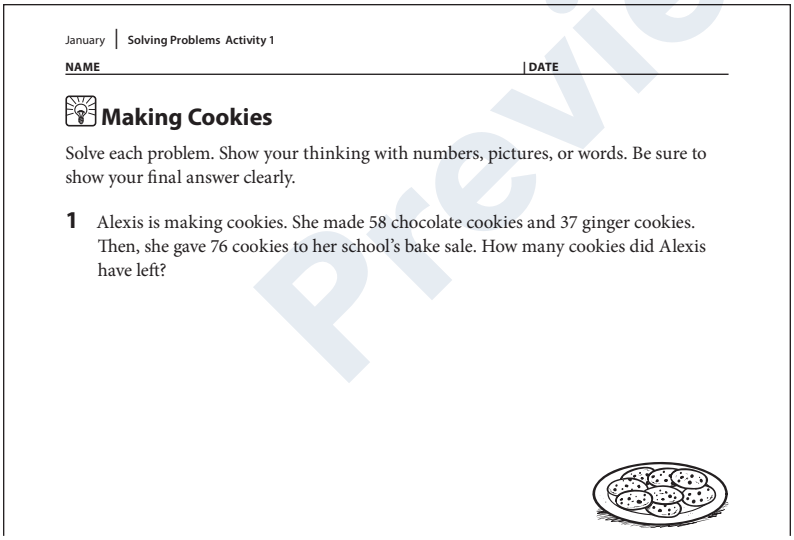
Multi-Step Story Problems — Day 5

1 Open today's activity by introducing the January Solving Problems workout.

- Let students know that they will work on solving story problems this month, just as they did in November.
- They will continue to focus on figuring out what the problem is asking, making estimates, checking their work, and writing equations.

2 Display your copy of the Making Cookies page, revealing only the first problem. Read the problem aloud. Give students a minute to think about it and then ask students what they notice about the problem. Is there anything different from other story problems they have solved?

> ***Students*** *I'm confused. What is the problem asking?*
>
> *Why do they tell you about how many she made if they want to know how many she has left?*
>
> *It starts out like an addition problem and ends like a subtraction problem.*
>
> *I think we have to add first and then subtract.*
>
> *Oh yeah, like figure out how many cookies she made in all and then what she has left after she gives away 76.*



January | Solving Problems Activity 1

NAME | DATE

Making Cookies

Solve each problem. Show your thinking with numbers, pictures, or words. Be sure to show your final answer clearly.

1 Alexis is making cookies. She made 58 chocolate cookies and 37 ginger cookies. Then, she gave 76 cookies to her school's bake sale. How many cookies did Alexis have left?

3 Help students work together as a group to determine what operations they need to perform in order to answer the question (solve the problem).

> ***Teacher*** *You all noticed that there is more than one question or more than one part to this problem. What do you think we should do first in order to answer the question?*
>
> ***Kendall*** *I think we have to add the 58 and the 37.*
>
> ***Hannah*** *But it doesn't say how many in all or anything like that.*
>
> ***Kendall*** *I know, but we need to know how many cookies she made to figure out how many she has left.*
>
> ***Teacher*** *I'm going to write that down. "How many cookies did Alexis make?" OK, after we figure that out, what would you do next?*

Key Questions

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

- What is the problem asking?
- What do you need to do to answer the question?
- What are the problems within the problems that you need to solve?
- What picture could you draw to represent the problem?
- What equation can you write to represent this problem?
- What do you estimate the answer will be? Will it be more than ___? Less than ___? How do you know?
- How can you tell when you are done solving the problem?
- Is your answer reasonable? How can you tell?
- How can you check your work after you have solved the problem?

> ***Tim*** *I think if you know that, you can figure out how many she has left.*
>
> ***Teacher*** *How can you figure that out, Tim?*
>
> ***Tim*** *Well, it says she gave away 76 cookies. So whatever the total is, we should take 76 away from it.*
>
> ***Teacher*** *OK, now I'll write "How many cookies does Alexis have left?" and underline that in the problem. That's what the questions is really asking, isn't it? But, you can't figure it out until you know how many she has made. It's like there is a question inside the question. I'm going to underline "She made 58 chocolate cookies and 37 ginger cookies," to remind me that I need to solve that too.*

4 After confirming that this problem involves more than question (or more than one step or operation), ask students to work with a partner to solve the problem.

- Have students find the Making Cookies page in their Number Corner Student Books.
- Have students work with a partner to solve the problem.
- Have both students show their work in their own books.

5 As students work, circulate around the room to observe, answer questions, and differentiate instruction.

ELL/SUPPORT If students are having trouble reading the problem, read it aloud to them, and help them underline the parts they need to focus on. The math is the focus here, and we don't want difficulty reading English to limit students' access to the problem.

CHALLENGE You can increase the numbers to make the problem more challenging for students or ask them to begin thinking about their own multi-step story problem.

6 After students have solved the problem with a partner, invite them to share their thinking with the class. Focus the conversation on the multiple steps students took to solve the problem: first finding the total number of cookies and then subtracting 76.

7 Clarify and extend students' understanding that multi-step problems involve answering more than one question in order to arrive at the final solution.

Ask students to identify what questions they had to answer—and what calculations they had to perform in order to answer them—to be able to solve the problem. Also ask them to describe how they could be certain they were finished solving the problem.

> ***Teacher*** *So, what did you have to do to be able to solve this problem?*
>
> ***Students*** *First we had to add, then we had to subtract.*
>
> *We added 58 and 37 to find how many cookies she made in all. Then, we subtracted 76 from the total amount of cookies.*
>
> ***Teacher*** *Hmm, you had to quite a few things before you solved the problem. How did you know when you were done?*
>
> ***Students*** *Well, we had to think about what the problem was asking.*
>
> *Yeah, we had to add to find the total, but the problem wasn't asking about that. We just had to do that before we can answer the real problem, which was how many did she have left?*
>
> *You're not done until you can answer the question the problem was asking: how many cookies did she have left?*

8 Introduce the second problem and give students time to solve it.

- Reveal the next problem on your display copy of the Number Corner Student Book page.
- Read the problem aloud.
- Before they start to work, ask students to think about the steps they will need to carry out to solve the problem, as well as how they will know when they have finished solving the problem.
- Tell students if they are working with a partner or independently. Assign partners if you pre-selected partners.
- Answer questions students have about the task, and then give them time to work.
- While the work, circulate to make observations and provide differentiated instruction as needed.

9 Spend the last few minutes of the period discussing students' strategies and solutions.

As you did when discussing the first problem ak students to identify what questions they had to answer—and what calculations they had to perform in order to answer them—to be able to solve the problem. Also ask them to describe how they could be certain they were finished solving the problem.

10 Let students know they will keep working with this kind of problem in the next Solving Problems activity.

Activity 2

Estimating & Reasoning — Day 9

1 Open today's activity by explaining what students will do today and discussing why estimating before solving a problem might be useful.

- Let students know that they will solve story problems that require multiple steps, just like they did last time.
- Today, they will also estimate the solution before calculating and then compare their solutions to those estimates when they are finished.
- Ask students why it is useful to make an estimate before working on a problem.

> ***Teacher*** *Before we get started on today's problems, let's talk about estimating for a minute. What is an estimate? What does the word estimate mean?*
>
> ***Students*** *It's like a prediction about the answer.*
>
> *I think it's like when you make a guess.*
>
> *Not any old guess though. You have to have a reason.*
>
> *When you make an estimate, you could round the numbers to get a number close to what the answer is.*
>
> ***Teacher*** *I can see you all have some experience with this, that you've made estimates before. How would making an estimate help you know if your answer is reasonable? And what does it mean to have a reasonable answer?*
>
> ***Students*** *A reasonable answer is one that makes sense for the problem, like for the numbers in the problem. If I subtracted 37 from 85 and got a number bigger than 85, that would not be reasonable.*

If you make an estimate and your answer is really different from your estimate, then you might need to try the problem again.

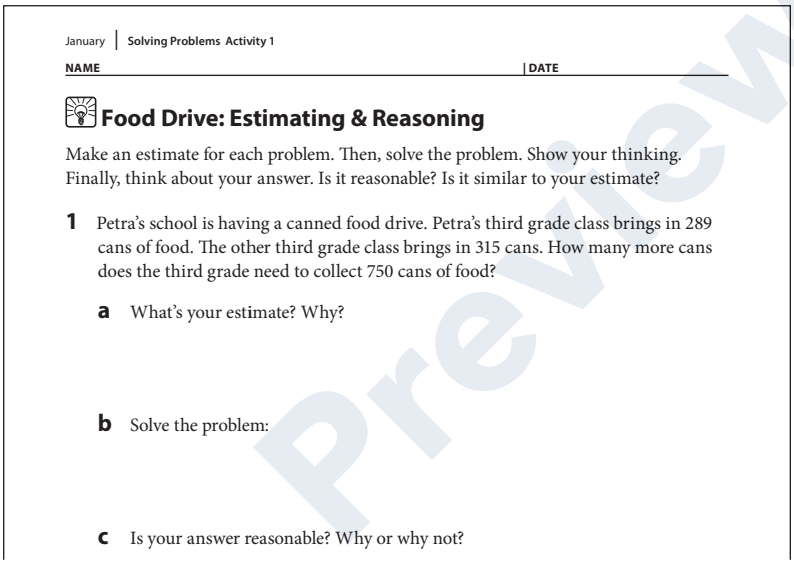
An estimate can help you see if your answer makes sense.

2 Display your copy of the Food Drive: Estimating & Reasoning page from the Number Corner Student Book and review it together as a class.

- Read the directions aloud to the class.
- Invite a student to read the first problem aloud, including parts a, b, and c.
- Ask students what the problem is asking and what they need to solve in order to answer the question, just as you did in the first activity.
- Then, ask students to turn to a partner to make a reasonable estimate. Invite a few partners to share their thinking.

Students *We thought of 289 like 300. And 315 is also close to 300, so we added 300 and 300 to get 600.*

But that is not all you need to do. They still need more cans because they want to have 750. So, if they have about 600, it is not too hard to figure out how many more they need. They need about 150 more.



January | Solving Problems Activity 1

NAME | DATE

Food Drive: Estimating & Reasoning

Make an estimate for each problem. Then, solve the problem. Show your thinking. Finally, think about your answer. Is it reasonable? Is it similar to your estimate?

1 Petra's school is having a canned food drive. Petra's third grade class brings in 289 cans of food. The other third grade class brings in 315 cans. How many more cans does the third grade need to collect 750 cans of food?

a What's your estimate? Why?

b Solve the problem:

c Is your answer reasonable? Why or why not?

3 Have students open their Number Corner Student Books to the same page, record their estimates in part a, and then solve parts b and c of the first problem.

4 Give students time to work. When most have arrived at a solution and determined whether or not it is reasonable, discuss the problem as a class. Focus the discussion on how students used their estimates to determine whether or not their answers were reasonable.

5 Review the second problem as a class, and then give students all but the last few minutes of the period to work on the problem.

Students can work independently or with partners. As students work, circulate around the room, to make observations, answer questions, and provide differentiated instruction.

SUPPORT Many students will want to solve this problem by performing the same calculations they did to solve the first problem. Be prepared to help them understand that they will need to multiply twice rather than adding once: comparing $6 \times 8 \times 10$ to 500 rather than comparing $389 + 315$ to 750.

ELL/SUPPORT Read the question aloud again. Help students visualize the problem with sketches and more discussion. Help students see what they have to solve first to be able to figure out what the question is answering.

CHALLENGE Have students answer the question assuming that Marcos had nine 6-by-8 arrays plus eleven 6-by-8 arrays. How would those numbers change the problem? How is this problem similar to and different from the first problem?

6 Wrap up today's number corner activity by having students share their work with another student or pair of students.

Activity 3

Equations — Day 14

1 Open today's activity by displaying your copy of the Equations for Multi-Step Story Problems Teacher Master and using it to introduce what students will do today.

- Display the first problem.
- Let students know they have seen this problem before and that they are going to use it to practice thinking about how equations can be used to represent problems.
- Read the problem aloud and ask students which equation best fits the problem.

Both b and d are acceptable equations for this problem.

SUPPORT If necessary review what equations and unknowns are.

January | Solving Problems Activity 3 *1 copy for display*

Equations for Multi-Step Story Problems

For each problem, choose the equation that best matches the problem.

1 Brian has 24 dollars. He wants to buy a new game that costs $50. How much money does Brian need to be able to buy the game?

a $24 \times m = 50$

b $24 + m = 50$

c $24 + 50 = m$

d $50 - m = 24$

2 Display the second problem and read it aloud. Ask students to think about which equations best fits the problem. Then, have them turn and talk with a partner to share their thinking.

2 Maliya's photo album holds 100 pictures. She has 37 pictures from her birthday party, 28 pictures from summer camp, and 32 pictures from her soccer team. How many more pictures can Maliya put in her photo album?

a $37 + 28 + 32 = p$

b $100 - (37 + 28 + 32) = p$

c $37 + 28 + 32 + p = 100$

d $37 \times 28 \times 32 = p$

3 Invite students to share their thinking about which equation best represents the problem.

Students *It seems complicated with so many numbers. I'm not sure how to write an equation for a problem like that or which equation makes sense.*

We knew that the last one was wrong for sure. There is no multiplication in this problem.

At first we thought the first one could work, but there was not enough there. So, we thought the third one was right because it looked like how we would solve the problem.

We though the second one was right. We knew you had to subtract all the pictures she had from 100.

So which is it? The second one or the third one?

I think it could be both. Two equations worked before. Can two equations work now?

I think so.

4 Display the next problem and invite a student to read it aloud. Then, have students turn to a partner and decide which equation best fits the problem.

3 Emmett has a tray of cookies. The cookies are in a 4-by-7 array. He also has a plate of brownies. The brownies are in a 6-by-3 array. How many cookies and brownies does Emmett have in all?

a $(4 \times 7) + (6 \times 3) = f$

b $(4 \times 7) - (6 \times 3) = f$

c $(4 + 7) + (6 + 3) = f$

d $f - (4 \times 7) + (6 \times 3) = 4$

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5 Invite students to share their thinking.

Students *This one seemed a little easier.*

The letter f was at the end of most equations. This time, the unknown was the final answer instead of part of the problem. I think that was easier.

I only found one equation for this one. Did anyone find two that worked?

No. I think only A works. The rest of them don't match the problem.

I agree. A really shows the problem. You have the 4-by-7 array of cookies plus the 6-by-3 array of brownies and that equals the total. That's what you need to find.

6 If you have any time left, have students look back at the two Number Corner Student Book pages they completed in Solving Problems this month: Making Cookies and Food Drive: Estimating & Reasoning. Have them try to write an equation for one or more of the problems on these pages.

Encourage students to think about what they did to solve the problems as they write equations.

7 At the end of your Number Corner time, have students share any equations they wrote with a partner. Have them explain and justify their choices.

8 Finally recognize students for their work with these sophisticated challenges. Let them know they will see multi-step story problems again throughout the rest of the school year.

January Assessment

Number Corner Checkup 2

Overview

During the last week of the month, the teacher administers a written assessment to the entire class, half in place of Number Corner workouts one day, and the other half in place of workouts the following day. Number Corner Checkup 2 is designed to help teachers ascertain students' current understandings and skills in the areas of: multiplication concepts, rounding, fractions, time and measurement, and multi-step story problems.

Skills & Concepts

- Solve multiplication story problems with products to 100 involving situations of arrays (3.OA.3)
- Fluently multiply with products to 100 using strategies (3.OA.7)
- Recall from memory all products of two 1-digit numbers (3.OA.7)
- Solve two-step story problems using addition, subtraction, and multiplication (3.OA.8)
- Write equations with a letter standing for the unknown quantity to represent two-step story problems (3.OA.8)
- Assess the reasonableness of answers to story problems using rounding and other estimation strategies (3.OA.8)
- Identify patterns among basic multiplication facts (3.OA.9)
- Round whole numbers to the nearest ten and to the nearest hundred (3.NBT.1)
- Place fractions in their correct positions on a number line (3.NF.2)
- Recognize and generate simple equivalent fractions (3.NF.3b)
- Tell time to the nearest minute (3.MD.1)
- Solve story problems involving addition and subtraction of time intervals in minutes (3.MD.1)
- Make a line plot to show measurement data, with a horizontal scale marked in whole, half, and quarter inches (3.MD.4)

Materials

Assessments	Day	Copies	Kit Materials	Classroom Materials
Number Corner Checkup 2, Part 1 Completing Pages 1 & 2	18	**TM T8–T9** Number Corner Checkup 2, pages 1 & 2		• colored pencils, 1 for each student
Number Corner Checkup 2, Part 2 Completing Pages 3 & 4	19	**TM T10** Number Corner Checkup 2, page 3		

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

Mathematical Background

After reviewing and scoring students' work on this assessment, you will be in a better position to plan daily instruction and make the minute-to-minute instructional decisions so crucial to good teaching. On the basis of students' strengths and weaknesses, you may decide to emphasize certain aspects of Number Corner instruction while minimizing others, and will have more of the information needed to pitch questions and prompts at levels appropriate to different students. The results of this second Number Corner Checkup will also reflect, to some extent, how effective the instruction has been for each student, and provide information that might be shared with parents, administrators, para-professionals, and resource room teachers) about each student's current proficiency with key grade level skills.

Vocabulary

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

array*
equation*
equivalent fraction*
feet
foot (ft.)*
fraction*
grams
hour (hr.)
hundreds
line plot*
minute (min.)
round
tens
time

Number Corner Checkup 2, Part 1

Completing Pages 1 & 2 — Day 18

1 Open the session by reminding students what a Number Corner Checkup is and describing how you'd like them to work on the assessment they will start today during Number Corner and complete on the next day.

A checkup is a way to help you and the students spot their strengths and weaknesses with respect to the skills and concepts that have been covered so far this year. It will help you do a better job of teaching because you'll see more clearly what each student already knows, and what they still need to work on.

Explain that you would like students to do the following things as they work on the checkup:

- Listen carefully to the instructions for each problem.
- Stay with the class; don't move ahead to the next problem until instructed to do so.
- Work independently.
- Raise your hand if you have a question.
- Try to answer all of the problems, even those you don't fully understand.
- Explain how you solved a problem when the directions ask you to. You can use pictures, numbers, and words in your explanations.

2 Display your copy of the first two pages of Number Corner Checkup 2, and give each student a copy.

- Give students a few moments to examine both sheets quietly.
- Using your copy of the first sheet, show students how to write their name and date at the top on the lines provided.

SUPPORT Apart from the first item, this assessment does not need to be timed. If there are students who are unable to complete the assessment in the given amount of time, have them do it later, perhaps during math stations or a seatwork period.

3 Focus on the first item, the timed collection of multiplication problems, and then give students the rest of the period to complete the rest of the first two pages of the checkup.

- Give each student a colored pencil, and ask them to use this pencil for the first item only.
- Tell students they will have one minute to complete as many of the multiplication problems as they can.
- Tell them when to begin and give them 1 minute to complete as many multiplication facts as possible.
- When 1 minute has passed, have students put down their colored pencils and pick up their regular pencils. Give them the rest of the time to finish pages 1 and 2 of the assessment.
- While they work, collect the colored pencils. If students are anxious about not completing many facts, assure them they will keep working on them for the rest of the year.

4 At the end of Number Corner period, have students stop working. Remind them that an assessment like this is only one way of showing their understanding. Let them know they will finish the assessment in the next Number Corner session.

Assessment Guide

See the Grade 3 Assessment Guide for scoring and intervention suggestions.

Number Corner Checkup 2, Part 2

Completing Pages 3 — Day 19

Let students know that they are going to do the second part of the checkup today, and ask them to take out a pencil. If any students didn't complete Part 1 in the previous activity, let them complete it now.

5 Display your copy of page 3 of Number Corner Checkup 2 and give each student a copy. Give students a few moments to examine both sheets quietly.

6 Then, have students get started and give them the entire period to finish the assessment.

SUPPORT Remember that this is not a reading test. If students are struggling to read any part of the assessment, you can read the problems aloud for them. Also remember that besides the multiplication facts on page 1, this is not timed test. If students need extra time, they can have it at another time that works for you.

7 At the end of Number Corner time today, have students stop working on their assessment. Recognize them for their effort and remind them the assessment will help you help them. Let them know they will have another checkup in a few months.

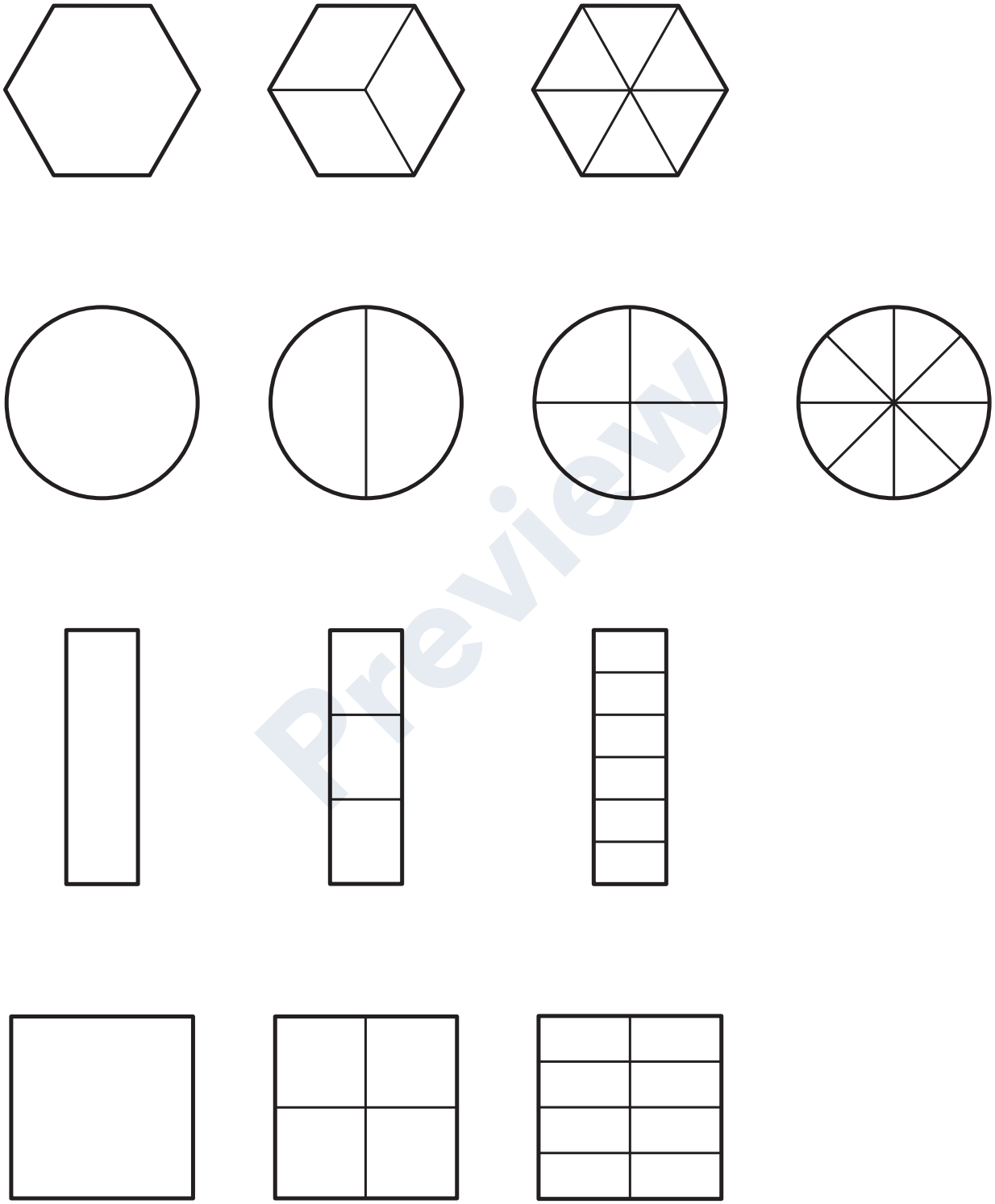
Teacher Masters

GRADE 3 – JANUARY

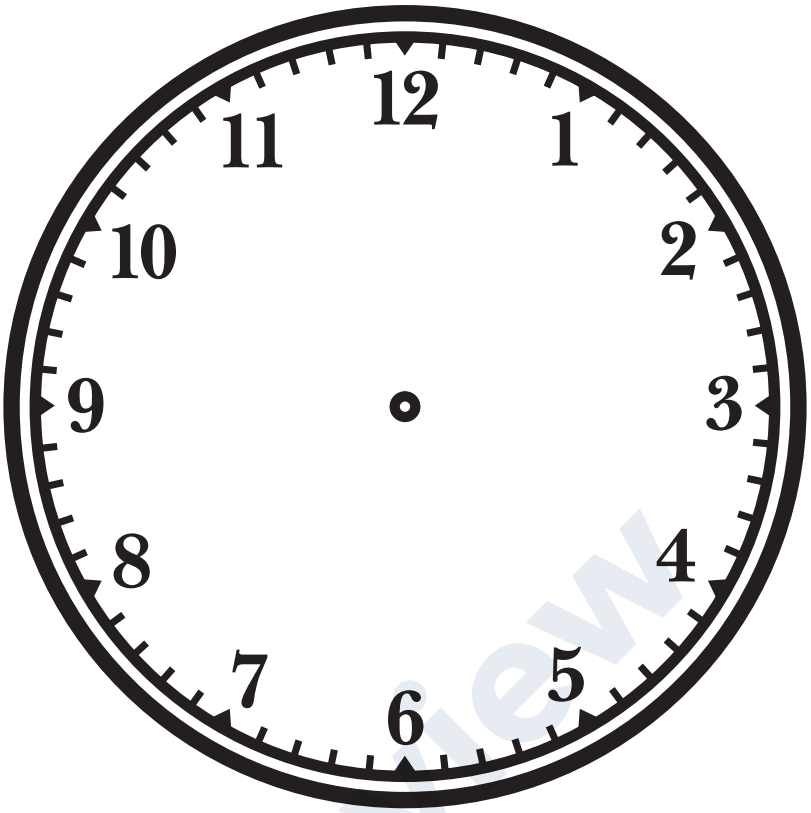
NUMBER® CORNER

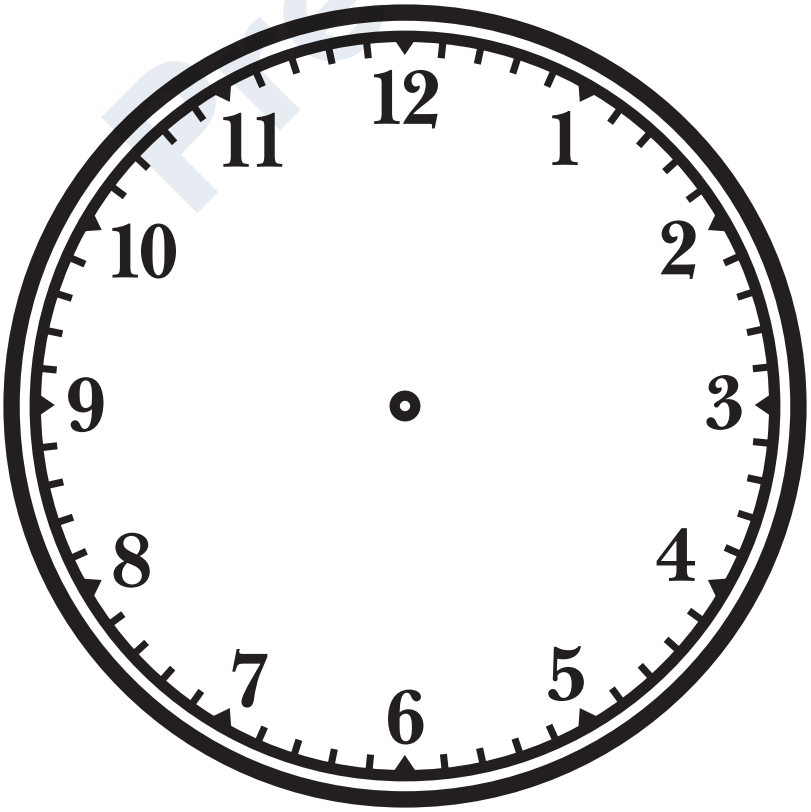
NAME | **DATE**

Wholes



Paper Clock Faces





Hector Goes to the Fair

Hector loves going to the County Fair every year. He rides the ferris wheel, plays games, eats snacks, and more. This year, Hector spent about 10 minutes each time he did an activity at the fair. Figure out how long Hector spent on various activities at the fair.

1 Hector rode the ferris wheel 4 times. How long did Hector spend at the ferris wheel?

ex 4 times 10 minutes = 4 × 10

10 + 10 + 10 + 10 = 40

Hector spent 40 minutes on the ferris wheel.

2 Hector did the go-carts 6 times. How long did Hector spend at the go-carts?

3 Hector went on the merry-go-round 3 times and visited the arcade 5 times. How long did Hector spend on the merry-go-round and the arcade together?

4 Hector went on a hayride 2 times and played field games 9 times. How long did Hector spend on the hayride and playing field games together?

5 Solve:

7 × 10 = _____

8 × 10 = _____

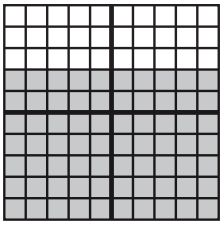
(4 × 10) + (5 × 10) = _____

(7 × 10) + (8 × 10) = _____

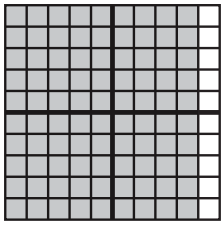
NAME | **DATE**

Tens Facts

Multiplying is easy when one of the factors is 10! We call these decade facts, because a decade is a group of 10. Where do you see the groups of 10 in the arrays below?



$7 \times 10 = 70$



$10 \times 9 = 90$

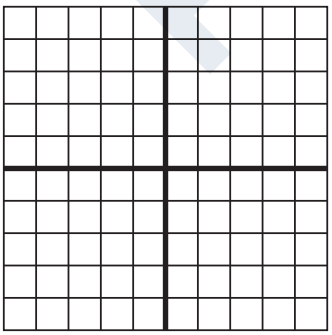
When you understand place value, multiplying larger numbers by 10 can be easy too.

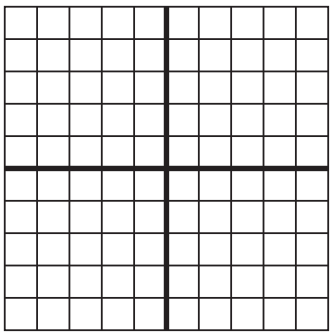
$10 \times 25 = 250$ $670 \times 10 = 6700$

1 Max had 6 dimes in his pocket. How much money did he have?

2 If Jan bought 5 bags that each had 10 apples, how many apples did she buy?

What are some other decade facts you know? Can you draw them or show them using equations? Can you write a story problem about a decade fact?

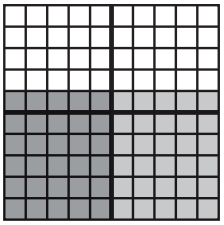




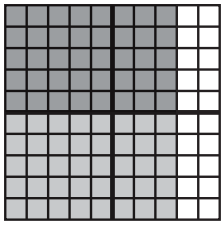
NAME | **DATE**

Half-Tens Facts

When one of the factors is 5, you can think about multiplying the other number by 10 and cutting the result in half. You could also count by 5s if that is easy for you.



$5 \times 6 = 30$

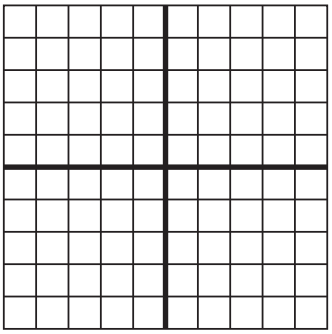


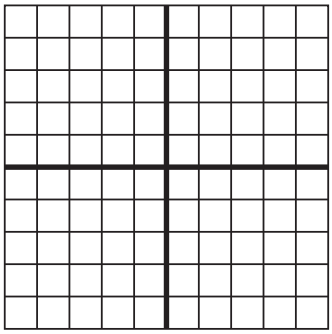
$8 \times 5 = 40$

1 Joe had 7 nickels in his pocket. How much money did he have?

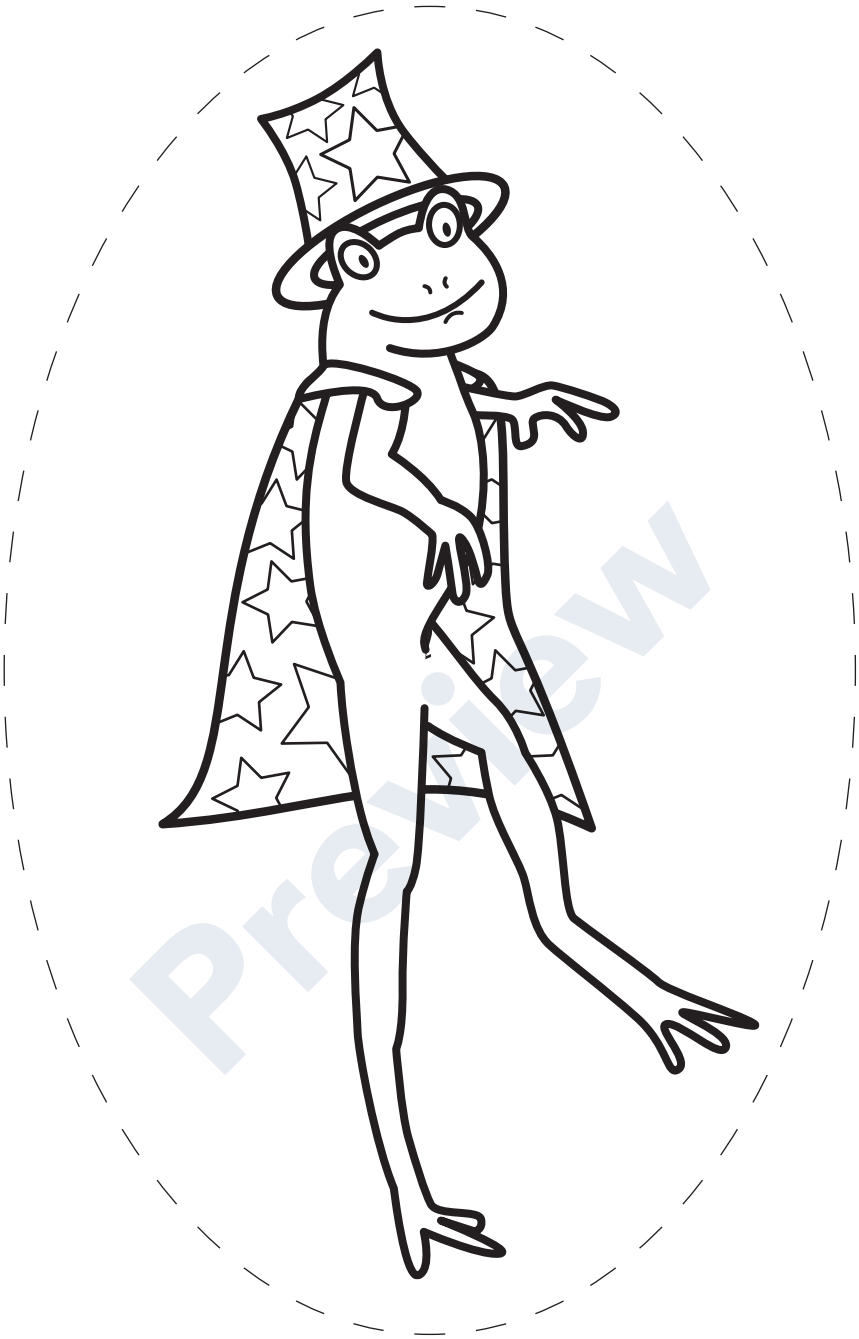
2 If Suzie bought 9 baskets with 5 peaches in each basket, how many peaches did she buy?

What are some other Half-Tens set facts you know? Can you draw them or show them using equations? Can you write a story problem about a Half-Tens set fact?





Freddie the Fraction Frog



Equations for Multi-Step Story Problems

For each problem, choose the equation that best matches the problem.

1 Brian has 24 dollars. He wants to buy a new game that costs $50. How much money does Brian need to be able to buy the game?

a $24 \times m = 50$

b $24 + m = 50$

c $24 + 50 = m$

d $50 - m = 24$

2 Maliya's photo album holds 100 pictures. She has 37 pictures from her birthday party, 28 pictures from summer camp, and 32 pictures from her soccer team. How many more pictures can Maliya put in her photo album?

a $37 + 28 + 32 = p$

b $100 - (37 + 28 + 32) = p$

c $37 + 28 + 32 + p = 100$

d $37 \times 28 \times 32 = p$

3 Emmett has a tray of cookies. The cookies are in a 4-by-7 array. He also has a plate of brownies. The brownies are in a 6-by-3 array. How many cookies and brownies does Emmett have in all?

a $(4 \times 7) + (6 \times 3) = f$

b $(4 \times 7) - (6 \times 3) = f$

c $(4 + 7) + (6 + 3) = f$

d $f - (4 \times 7) + (6 \times 3) = 4$

NAME | **DATE**

Number Corner Checkup 2 page 1 of 3

1 Solve as many of these multiplication problems as you can in one minute.

5 × 4	3 × 2	2 × 4	2 × 2	1 × 5	3 × 5	5 × 0
10 × 3	5 × 2	6 × 2	4 × 2	5 × 8	6 × 10	9 × 5
5 × 6	2 × 6	2 × 3	5 × 4	3 × 10	10 × 4	

2 Round to the nearest ten.

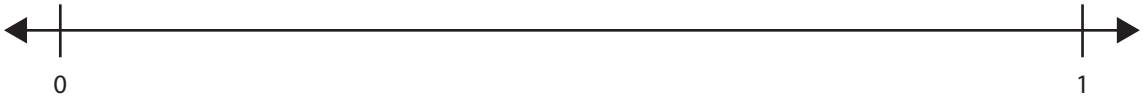
a 5 ____ **b** 103 ____ **c** 67 ____

3 Round to the nearest hundred.

a 149 ____ **b** 871 ____ **c** 250 ____

4 Put the following fractions where they go and in order on the number line:

$\frac{3}{8}$ $\frac{1}{2}$ $\frac{3}{3}$ $\frac{1}{4}$ $\frac{5}{6}$



5 Use the >, =, and < signs to compare each pair of fractions.

a $\frac{1}{2}$ ____ $\frac{1}{3}$ **b** $\frac{3}{6}$ ____ $\frac{5}{6}$ **c** $\frac{4}{8}$ ____ $\frac{4}{6}$ **d** $\frac{2}{4}$ ____ $\frac{1}{2}$

(continued on next page)

NAME | **DATE**

Number Corner Checkup 2 page 2 of 3

6 Sam is very puzzled about fractions. He thinks that $\frac{2}{8}$ of something must be more than $\frac{2}{4}$ of the same thing because 8 is more than 4. Use labeled sketches and words to tell Sam why $\frac{2}{8}$ of something is less than $\frac{2}{4}$ of the same thing.

7 One day, Henry saw 5 cars and 3 trucks in the parking lot. Each car had 4 tires, and each truck had 6 tires.

a How many tires in all? Use numbers, labeled sketches, or words to help solve this problem.

b Which equation matches this problem? (The letter *t* stands for tires.)

- ◯ $(5 + 4) + (3 + 6) = t$
- ◯ $(5 \times 4) + (3 \times 6) = t$
- ◯ $(5 \times 3) + (4 \times 6) = t$
- ◯ $(5 - 3) \times (6 - 4) = t$

8 Pia read for 35 minutes, listened to music for 15 minutes, and rode her bike for 40 minutes. How long did Pia spend reading, listening to music and riding her bike? Show all your work.

9 Richard left school at 3:15. He went to the library and the store. Then, he went home. He got home at 4:20. How much time passed between the time Richard left school and got home? Show all your work.

(continued on next page)

NAME | **DATE**

Number Corner Checkup 2 page 3 of 3

10 Cleo says that 8 times 5 is the same as half of 10 times 8. Do you agree or disagree with Cleo? Explain.

11 Ellie bought 303 grams of apples, 485 grams of grapes, and 218 grams of plums. When Ellie got home, she wondered how many grams of fruit she bought in all.

a Which equation could Ellie use to find out how many grams of fruit she bought in all? (The letter *g* stands for grams.)

- ◯ $(303 + 485) - 218 = g$
- ◯ $(485 - 218) + 303 = g$
- ◯ $303 + 485 + 218 = g$
- ◯ $303 + 450 + 108 = g$

b When Ellie solved the problem, she got 1,411 grams in all. Is her answer reasonable? Use rounding to explain why or why not. Show your work.

12 How many stars are in the array below? How did you figure it out? Explain your thinking.

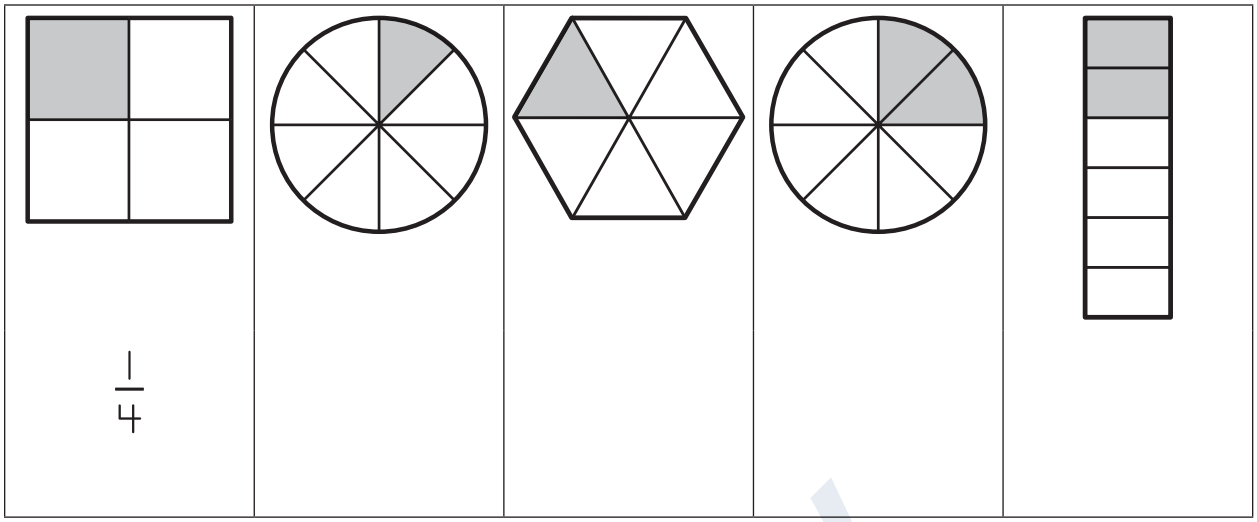
Student Book

GRADE 3 – JANUARY

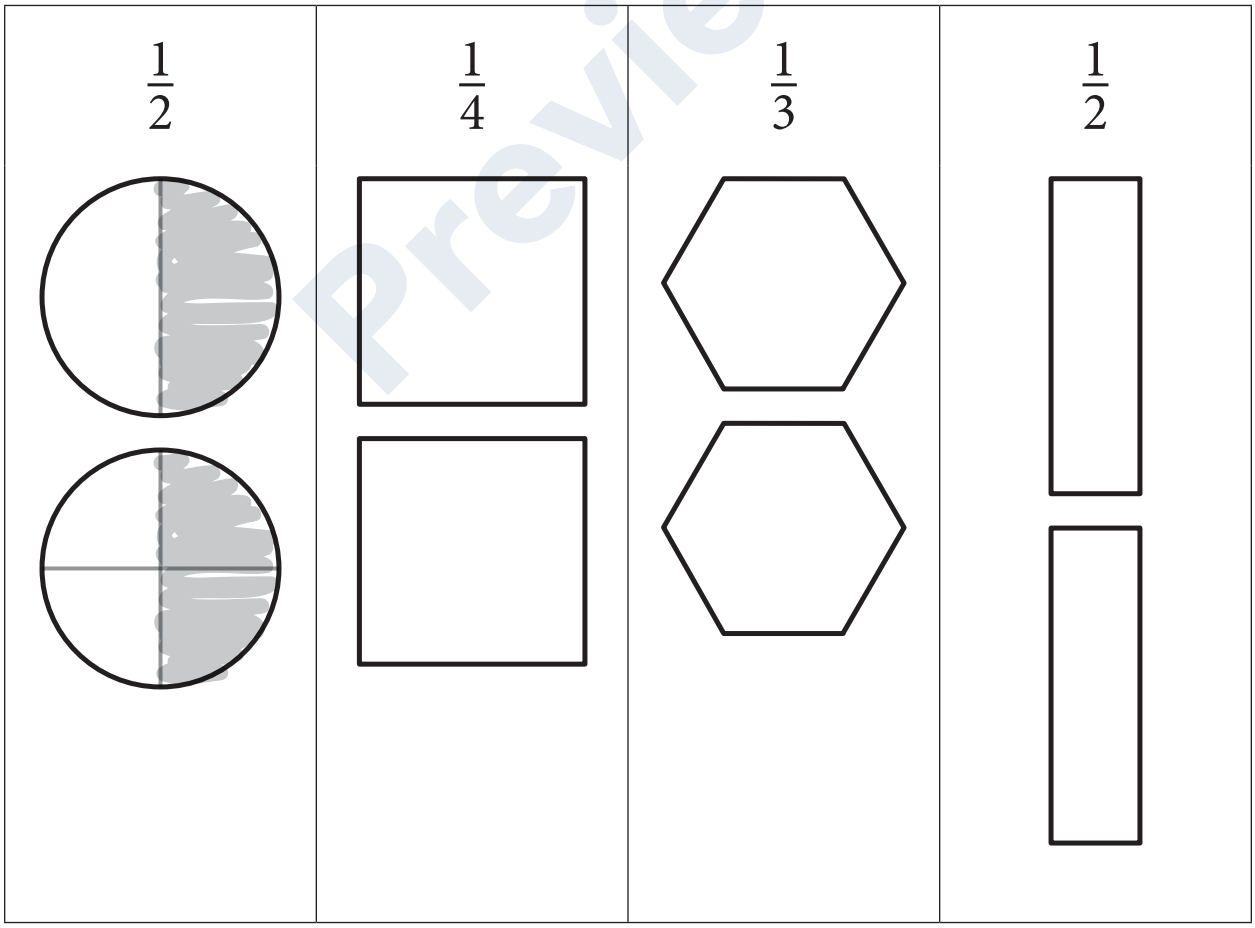
NUMBER® CORNER

Fraction Concepts Review

1 Label each fraction.



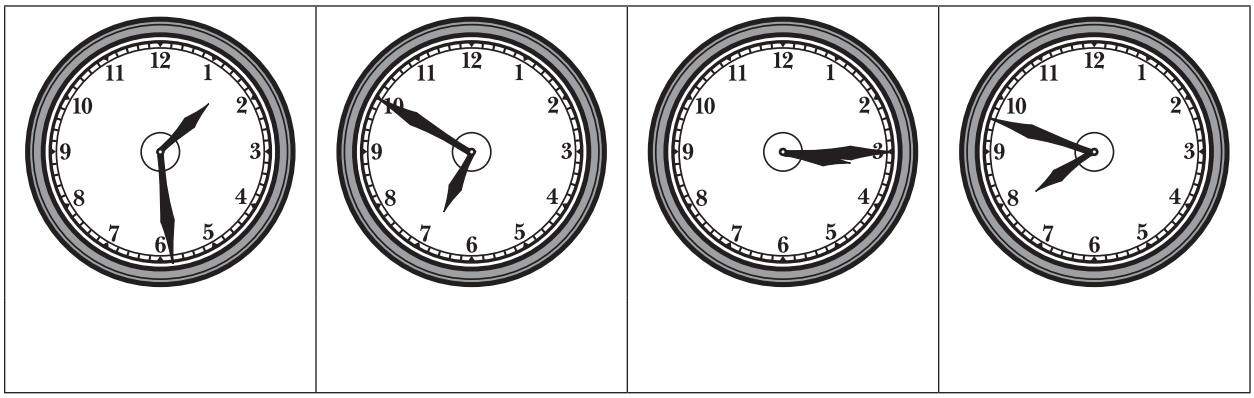
2 Shade in the shapes to show the fraction above. Show two different ways to create each fraction.



NAME | DATE

Time

1 What time is it?



2 Choose one of the clocks above and figure out what time it was 15 minutes ago and what time it will be 15 minutes from now. Circle the clock you chose.

a 15 minutes ago: _____

b 15 minutes from now: _____

3 Paula went to the library at 3:15. She left the library at 3:50 and went outside to go to the park. She stayed at the park for 20 minutes and then left to go home. It took her 15 minutes to walk home.

a How long did Paula stay at the library? Explain your thinking.

b What time did Paula get home? Explain your thinking.

4 Max's bus leaves at 8:05. It takes him 5 minutes to get dressed, 15 minutes to eat breakfast, and 10 minutes to walk to the bus. If Max gets up at 7:30, will he get to his bus on time?

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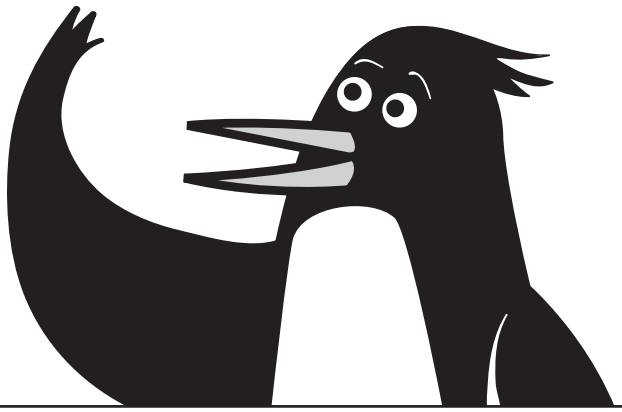
Multiplying by Ten

"Perfect Ten" by Greg Tang

Ten is such a breeze to do,
all because of place value.
To quickly multiply by 10,
put a zero at the end.



What is 10 × 9? It's 9 with a zero on the end.

10 × 9 = 90

1 Show your own example of the "add a zero to the end of the number" strategy.

2 Multiply each number in the grid by 10. Write each answer in the box. The first one is done for you.

5 50	7	3	1	11	8	12	6	2
10	8	11	0	9	5	0	12	4

3 Use the strategy of adding a zero to the end of the number, or your own strategy, to help solve these combinations:

10 × 15 = _____ 10 × 25 = _____ 10 × 31 = _____ 10 × 59 = _____

$$\begin{array}{r} 14 \\ \times\ 10 \\ \hline \end{array} \qquad \begin{array}{r} 20 \\ \times\ 10 \\ \hline \end{array} \qquad \begin{array}{r} 35 \\ \times\ 10 \\ \hline \end{array} \qquad \begin{array}{r} 40 \\ \times\ 10 \\ \hline \end{array}$$

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Multiplying by Five

"Five Alive" by Greg Tang

Five will yield the right amount
if by 5s you always count.
Or else just multiply by 10,
half will get you there again!

What is 5 × 8? It's ten 8s divided in half.

$$5 \times 8 = (10 \times 8) \div 2$$
$$= 80 \div 2$$
$$= 40$$

1 Show your own example of multiplying by 10 and dividing in half to multiply by 5.

2 Multiply each number in the grid by 5. Write each answer in the box. The first one is done for you.

5 25	7	3	1	11	8	12	6	2
10	8	11	0	9	5	0	12	4

3 Use the strategy of multiplying by 10 and dividing in half, or your own strategy, to help solve these combinations:

5 × 15 = _____ 5 × 20 = _____ 5 × 25 = _____ 5 × 50 = _____

$$\begin{array}{r} 16 \\ \times\ 5 \\ \hline \end{array} \qquad \begin{array}{r} 100 \\ \times\ 5 \\ \hline \end{array} \qquad \begin{array}{r} 30 \\ \times\ 5 \\ \hline \end{array} \qquad \begin{array}{r} 200 \\ \times\ 5 \\ \hline \end{array}$$

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Scout Them Out (10, 5)

Multiplication

1 Circle all the Tens facts (× 10) in red. Then go back and solve them.

2 Circle all the Half-Tens facts (× 5) in blue. Then go back and solve them.

9 × 10	7 × 5	10 × 4	9 × 5	5 × 5	6 × 5
8 × 5	5 × 3	10 × 10	10 × 8	4 × 5	6 × 10
3 × 10	5 × 7	4 × 10	5 × 10	8 × 10	7 × 10
1 × 10	1 × 5	2 × 10	3 × 5	2 × 5	3 × 10

Division

3 Solve the following division problems if you like. Can you use what you know about multiplication to help?

$10\overline{)80}$	$10\overline{)40}$	70 ÷ 10 = _____	$5\overline{)45}$	30 ÷ 5 = _____
$5\overline{)40}$	$5\overline{)50}$	30 ÷ 10 = _____	$10\overline{)70}$	25 ÷ 5 = _____
$10\overline{)90}$	$\overline{)100}$ 10	60 ÷ 10 = _____	$5\overline{)5}$	10 ÷ 5 = _____
$10\overline{)20}$	$10\overline{)30}$	15 ÷ 5 = _____	$10\overline{)10}$	50 ÷ 10 = _____

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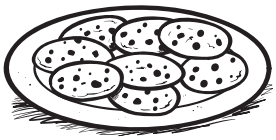
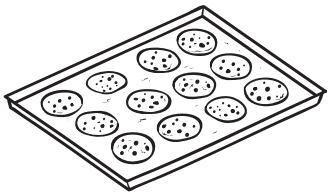
Making Cookies

Solve each problem. Show your thinking with numbers, pictures, or words. Be sure to show your final answer clearly.

1 Alexis is making cookies. She made 58 chocolate cookies and 37 ginger cookies. Then, she gave 76 cookies to her school's bake sale. How many cookies did Alexis have left?



2 Max has 2 cookie trays. He can put 4 rows of 6 cookies on one cookie tray and 7 rows of 8 cookies on another cookie tray. How many cookies can he put on his 2 cookie trays?



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Food Drive: Estimating & Reasoning

Make an estimate for each problem. Then, solve the problem. Show your thinking. Finally, think about your answer. Is it reasonable? Is it similar to your estimate?

1 Petra's school is having a canned food drive. Petra's third grade class brings in 289 cans of food. The other third grade class brings in 315 cans. How many more cans does the third grade need to collect 750 cans of food?

a What's your estimate? Why?

b Solve the problem:

c Is your answer reasonable? Why or why not?

2 Marcos is in charge of counting cans for the food drive. He organizes the cans in 6-by-8 arrays, and he has 10 of these arrays. Does he have at least 500 cans?

a What's your estimate? Why?

b Solve the problem:

c Is your answer reasonable? Why or why not?