number corner®

Teachers Guide | Grade 5
September

The MATH LEARNING CENTER

Number Corner® Third Edition
Grade 5 Teachers Guide Volume 1

The Number Corner Grade 5 package consists of:

- Number Corner Grade 5 Teachers Guide Volumes 1–3
- *Number Corner Grade 5 Print Originals*
- Number Corner Grade 5 Student Book
- *Number Corner Grade 5 Print Originals Answer Key*
- *Number Corner Grade 5 Student Book Answer Key*
- Number Corner Grade 5 Components & Manipulatives
- Word Resource Cards
- *Bridges Educator Site*

Digital resources noted in italics.

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Prepared for publication using Mac OS X and Adobe Creative Suite.
Printed in the United States of America.

RBN5801-1
First published 2023.

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

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

ISBN 978-1-60262-721-5

Number Corner September

☑ September Daily Planner

Day	Page	Date	Activities	Updates
Day 1	19		**Number Strings** Number String 1	
Day 2	23		**Computational Fluency** Introducing Claim the Factors	
Day 3	27		**Calendar Grid** Introducing the Calendar Grid	
Day 4	31		**Calendar Collector** Introducing the Calendar Collector	CG
Day 5	35		**Solving Problems** Introducing Solving Problems	CG, CC
Day 6	37		**Calendar Grid** Equations & Equivalencies, Part 1	CC
Day 7	39		**Number Strings** Number String 2	CG, CC
Day 8	43		**Computational Fluency** Partner Claim the Factors, Part 1	CG, CC
Day 9	45		**Calendar Collector** Revisiting the Collection	CG
Day 10	49		**Solving Problems** Discussing Rock Hopping	CG, CC
Day 11	53		**Number Strings** Number String 3	CG, CC
Day 12	57		**Computational Fluency** Partner Claim the Factors, Part 2	CG, CC
Day 13	59		**Calendar Grid** Equations & Equivalencies, Part 2	CC
Day 14	61		**Calendar Collector** What's Missing?	CG
Day 15	63		**Computational Fluency** Factors & Multiples	CG, CC
Day 16	65		**Solving Problems** Solving Another Problem	CG, CC
Day 17	67		**Number Strings** Number String 4	CG, CC
Day 18	71		**Calendar Grid** Discussing Predictions & Patterns	CC
Day 19	73		**Calendar Collector** Analyzing Layers	CG
Day 20	75		**Solving Problems** Discussing Field Trip Snacks	CG

Updates

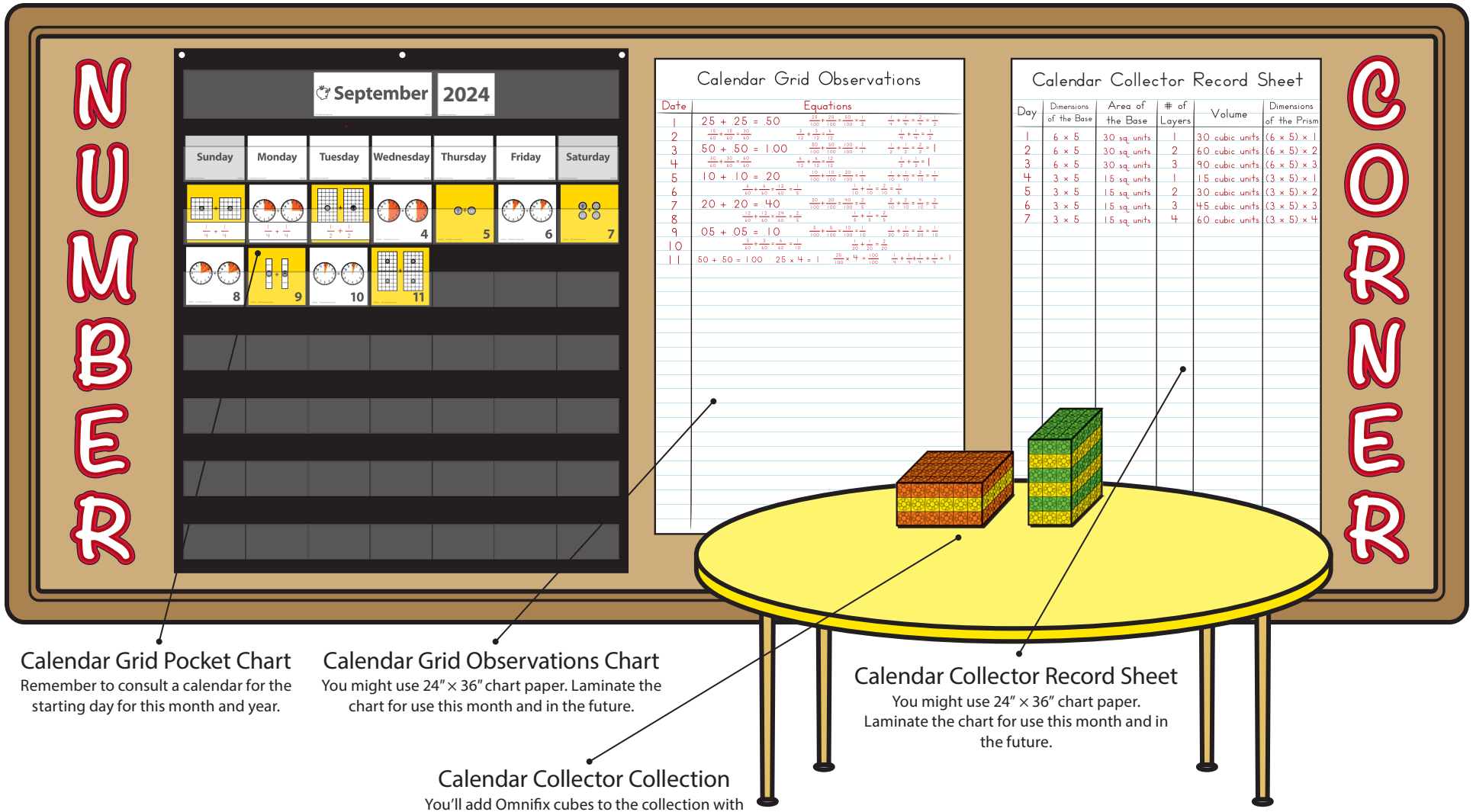
On days when Calendar Grid and Calendar Collector are not a featured workout, student helpers will update them. Summaries of the updates appear below; see the Update Routines section for details.

Calendar Grid The student helper turns one or more calendar markers so that the Calendar Grid is complete up to the current date, then updates the information on the Calendar Grid Observations chart.

Calendar Collector The student helper constructs a new layer for the rectangular solid already formed, then fills in the information on the Calendar Collector record sheet.

September 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 print originals. 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.



SAMPLE 0922

Calendar Grid Pocket Chart
Remember to consult a calendar for the starting day for this month and year.

Calendar Grid Observations Chart
You might use 24″ × 36″ chart paper. Laminate the chart for use this month and in the future.

Calendar Collector Record Sheet
You might use 24″ × 36″ chart paper. Laminate the chart for use this month and in the future.

Calendar Collector Collection
You'll add Omnifix cubes to the collection with each update. Keep the cubes on display near the record sheet.

Number Corner September
Workouts

Overview

September's workouts focus on addition and subtraction of whole numbers, decimals and fractions; multiples and factors; and volume. Over the course of the month, students review, revisit, and extend fourth grade skills and concepts as they begin to move into fifth grade content.

Copies & Display

- ☐ Visit the Bridges Educator Site to review the Interactive Display Materials for this month of Number Corner. Decide whether you will use digital materials for display or copies of print originals and student book pages. Make copies as needed.
- ☐ If students do not have Number Corner Student Books, run a class set of pages 1–8.
- ☐ Additional resources, including printable sets of key questions for each September workout, are available on the Bridges Educator Site.

Teaching Tips

- Plan to spend more time on the Number Corner workouts this month. Establish procedures that ensure Number Corner runs smoothly all year, such as:
  - » Moving quietly between tables and the Number Corner discussion area
  - » Picking up and putting away materials
  - » Responding to one another's thinking respectfully
  - » Think-pair-sharing effectively
- Don't worry too much if students are not getting all the math in this month's workouts, nor if it seems too easy.
- Try to have all students participate as much as possible during Number Corner.
  - » Do encourage students to ask questions, summarize one another's ideas, and make connections to the conversation.
  - » Do ask them to explain their thinking and to share their strategies.
  - » Don't explain it for them or to them.
  - » Don't identify student mistakes right away — let them or their classmates catch errors.

Calendar Grid: Fractions & Decimals

Overview

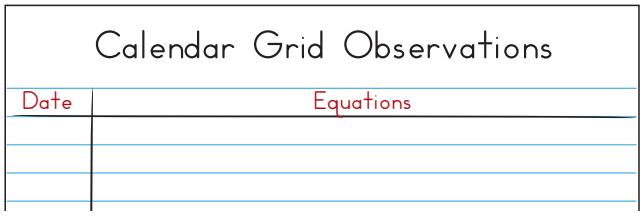
This month's Calendar Grid focuses on fraction and decimal equivalencies, adding fractions with like denominators, and adding decimals (tenths and hundredths). Each day, a student helper reveals the next marker on the Calendar Grid and records information on the Calendar Grid Observations chart. On days when Calendar Grid is featured, students share observations about the markers, generate equivalent expressions to match the visuals on the markers, search for and describe emerging patterns in the sequence, and make predictions about future markers based on their observations.

Preparation

Kit Materials	• Calendar Grid pocket chart • Month, Day, and Year Cards • Fractions & Decimals calendar markers • money value pieces
Classroom Materials	• chart paper, lined • 3″ × 5″ index cards (15) • envelope or ziptop bag

☐ **Prepare the Calendar Grid display**
Post the Calendar Grid pocket chart in your Number Corner display area. Add the month card for September and the current year card to the top pocket. Post the days of the week cards in the second row of pockets. Place the Fractions & Decimals calendar markers face-down in number order in the pocket chart, so the visuals are hidden from students.

☐ **Prepare the Calendar Grid Observations chart**
Draw a two-column chart on lined chart paper. Title the chart *Calendar Grid Observations*. Label the columns in order, left to right: *Date* and *Equations*. You might laminate the chart for use this month and in the future. Post the chart near the Calendar Grid pocket chart.



☐ **Prepare fraction expression label cards**
Cut each of the 15 index cards in half lengthwise to create 1½″ × 5″ strips. Store the 30 strips in an envelope or ziptop bag; pin the bag near the Calendar Grid display. You will need these each time you conduct a Calendar Grid activity with the class, but the student helpers updating the calendar each day will not.

☐ Store the money value pieces set near the Calendar Grid display or otherwise make it easy for students to access the set throughout the month.

Vocabulary

**Word Resource Card available*

denominator*
equivalent expressions*
equivalent fractions*
improper fraction*
mixed number*
numerator*
unit fraction*

☐ Develop a system for having students update the Calendar Grid on days when you are not doing a Calendar Grid activity as a class. For example, if you have a helper of the day, it can be the helper's job to turn over the day's calendar marker, sometime other than during Number Corner. If you have time, another way to handle updating the Calendar Grid is to take a minute or two to update the grid as a class by having a student turn over the day's calendar marker right before or after you do the featured workout. Encourage students to save their observations and ideas about the markers until the next time you do a Calendar Grid activity as a class.

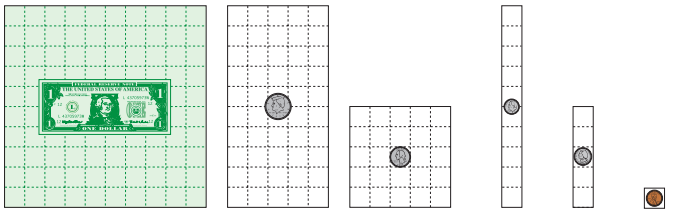
Mathematical Background

Understanding equivalence is critical to adding and subtracting fractions. We want students to have a variety of meanings come to mind when they see a fraction. For example, when students encounter ¼, they might think of 1 quarter, 25 cents, $0.25, half of ½, double ⅛, 25%, dividing something by 4, ¼ of an hour, 15 minutes out of 60 minutes, a distance ¼ of a unit from 0, and so on. Then, when students see ¼ added to another fraction, they can use the meaning that is most helpful, given the denominator of the other fraction. By using money and time as referents, students begin to create connections between those models and fractions, and can use them to solve problems. As they work with these ordinary, everyday denominators of 100 (money) and 60 (time), they build intuition about finding common denominators to add or subtract fractions.

In the problem ¼ + 1/10, students might think of the fractions in terms of money: $0.25 + $0.10 = $0.35, so ¼ + 1/10 = 35/100. Also, 35 cents is 7 nickels, so 35/100 is equivalent to 7 nickels out of 20 nickels. The use of pennies and nickels allows students to see and understand that 35/100 = 7/20. If the problem is ¼ + ⅓, students might think of the fractions in terms of time: 15 minutes and 20 minutes is 35 minutes out of 60 minutes, therefore, ¼ + ⅓ = 35/60. Since there are 7 five-minute chunks in 35 minutes and 12 five-minute chunks in 60 minutes; students can see and understand that 35/60 = 7/12.

Money Value Pieces

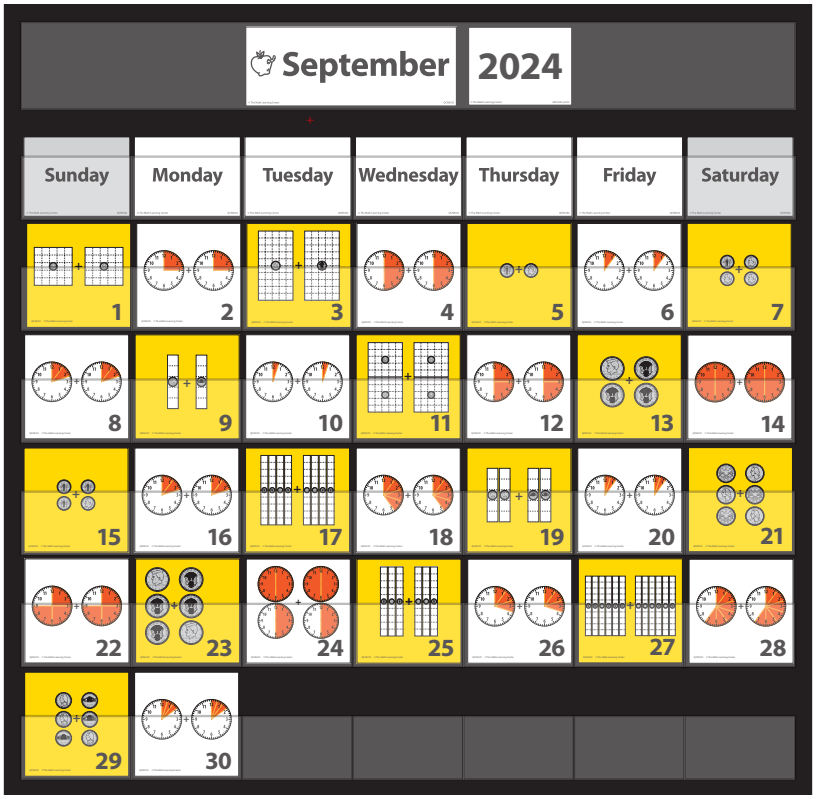
Some of the markers this month feature pictures of money value pieces. These are similar to base ten number pieces, with a mat of 100 small squares representing a dollar, a half mat representing 50 cents (literally, a half-dollar), a quarter mat representing 25 cents, and so on. The visuals on these markers are designed to support students' understanding of the fraction of a dollar represented by each coin in our monetary system. You will find a set of money value pieces in your Number Corner kit to support students who might not already know that a nickel is 1/20 of a dollar.



About the Pattern

Revealing one calendar marker each day allows students to make and test predictions. They can discover patterns as new markers are added and their predictions are confirmed or proven false. Don't tell them what the patterns are; instead, allow them to pursue their own ideas and investigations. Don't worry if their ideas seem off base early in the month; as they accumulate information, discuss their observations, and justify their predictions, they will revise and refine their thinking. Here is a description of the patterns featured in this month's sequence of markers:

- Markers alternate between money and clock models, as well as between goldenrod and white backgrounds.
- Money markers alternate between pictures of money value pieces and pictures of coins in an AABB pattern.
- Pairs of consecutive markers have identical fraction expression labels.
- Markers 1–10 are unit fractions, markers 11–20 have numerators of 2 and represent doubles of markers 1–10, and markers 21–30 have numerators of 3 and represent triples of markers 1–10.
- The denominators feature a repeating pattern of 4, 4, 2, 2, 10, 10, 5, 5, 20, 20.



Fraction Expression Labels

Each time you conduct a Calendar Grid activity with your class, you will work with their input to write a fraction expression label to represent the visual on each marker that has been turned over since the previous activity. For your own reference, here is a list of the expressions you will write through the month:

Markers 1–10	
Marker	**Label**
1	$\frac{1}{4} + \frac{1}{4}$
2	$\frac{1}{4} + \frac{1}{4}$
3	$\frac{1}{2} + \frac{1}{2}$
4	$\frac{1}{2} + \frac{1}{2}$
5	$\frac{1}{10} + \frac{1}{10}$
6	$\frac{1}{10} + \frac{1}{10}$
7	$\frac{1}{5} + \frac{1}{5}$
8	$\frac{1}{5} + \frac{1}{5}$
9	$\frac{1}{20} + \frac{1}{20}$
10	$\frac{1}{20} + \frac{1}{20}$

Markers 11–20	
Marker	**Label**
11	$\frac{2}{4} + \frac{2}{4}$
12	$\frac{2}{4} + \frac{2}{4}$
13	$\frac{2}{2} + \frac{2}{2}$
14	$\frac{2}{2} + \frac{2}{2}$
15	$\frac{2}{10} + \frac{2}{10}$
16	$\frac{2}{10} + \frac{2}{10}$
17	$\frac{2}{5} + \frac{2}{5}$
18	$\frac{2}{5} + \frac{2}{5}$
19	$\frac{2}{20} + \frac{2}{20}$
20	$\frac{2}{20} + \frac{2}{20}$

Markers 21–31	
Marker	**Label**
21	$\frac{3}{4} + \frac{3}{4}$
22	$\frac{3}{4} + \frac{3}{4}$
23	$\frac{3}{2} + \frac{3}{2}$
24	$\frac{3}{2} + \frac{3}{2}$
25	$\frac{3}{10} + \frac{3}{10}$
26	$\frac{3}{10} + \frac{3}{10}$
27	$\frac{3}{5} + \frac{3}{5}$
28	$\frac{3}{5} + \frac{3}{5}$
29	$\frac{3}{20} + \frac{3}{20}$
30	$\frac{3}{20} + \frac{3}{20}$
31	$\frac{4}{4} + \frac{4}{4}$

Key Questions

Learning to search for, describe, and extend patterns facilitates algebraic thinking and builds students' awareness of the structures within our number system. Use these questions to help your students investigate this month's pattern.

- What will today's marker look like? What number and model will it show? How do you know?
- What equivalencies can be recorded?
- What patterns can you see so far?
- Does the pattern remain constant, or does it change over time? If so, how does it change?
- How are non-unit fractions related to unit fractions?

Calendar Collector: Layer a Day

Overview

This month, students collect data about rectangular prisms as they are built one layer at a time. Students explore the relationships among dimensions, area, and volume, and have opportunities to apply the associative and commutative properties of multiplication in the process.

Preparation

Kit Materials	Omnifix cubes (340 plus extras)
Classroom Materials	chart paper, lined

☐ **Prepare the Calendar Collector record sheet**
Draw a six-column chart on lined chart paper. Title the page *Calendar Collector Record Sheet*. Label the columns in order, left to right: *Day, Dimensions of the Base, Area of the Base, # of Layers, Volume*, and *Dimensions of the Prism*. Post the record sheet in your Number Corner display area.

Calendar Collector Record Sheet

Day	Dimensions of the Base	Area of the Base	# of Layers	Volume	Dimensions of the Prism

☐ **Prepare the Omnifix cubes**

- This month, students use Omnifix cubes to build rectangular prisms. If you aren't familiar with these cubes, you'll find that they come packaged as flat nets that must be snapped together to form cubes. Consider having the students or parent volunteers do this for you before the first Calendar Collector activity (Day 4). You need a total of 340 cubes for the month, and it would be helpful to have a few extras on hand.
- Prior to Day 4, construct a 6-by-5-by-1 rectangular prism from a single color of Omnifix cubes. Place the prism near the record sheet, where it can remain on display throughout the month.

Mathematical Background

By building rectangular prisms one layer at a time and noting the relationships among the dimensions, the area of the base, and the number of layers, students develop understandings about volume as an attribute and measure of three-dimensional space. Initially, the group collects layers that are 6 cubes by 5 cubes. Each layer is added to the previous layer, until the class has built a rectangular prism with three 6-by-5 layers: $(6 \times 5) \times 3 = 90$ cubic units. Over the next six days in class, students build a second rectangular prism, collecting layers that are 3 cubes by 5 cubes to create a prism that is $(3 \times 5) \times 6$. Comparing the two prisms they have collected by the ninth day in class, students discover that the volumes of the two are equal, because although they are oriented differently, the two prisms are congruent; they have the same dimensions.

Vocabulary

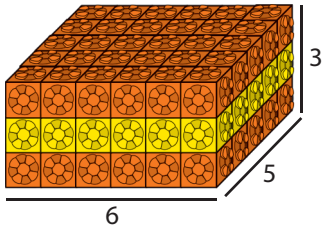
**Word Resource Card available*

area*
associative property of multiplication*
base*
commutative property of multiplication*
cubic unit*
dimension*
face*
parentheses*
prism*
volume*

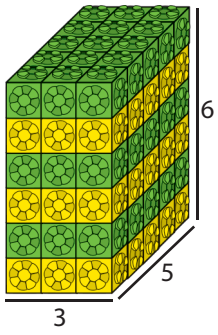
Math Teaching Practice

Develop procedural fluency from conceptual understanding

In writing expressions to represent the dimensions and number of each layer in each arrangement, students are developing a conceptual understanding of the formula for finding the volume of a rectangular prism by multiplying the area of the base by the height. For the purpose of notation during this exploration, we write the measurements of the base in parentheses, using the expression of the formula, $V = (l \times w) \times h$.

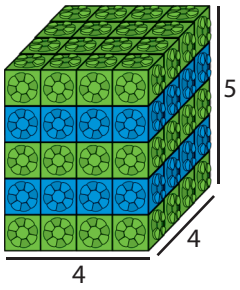


Prism 1: $(6 \times 5) \times 3 = 90$ cubic units

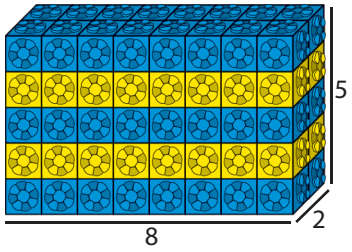


Prism 2: $(3 \times 5) \times 6 = 90$ cubic units

Over the next five days in class, students collect layers that are 4 cubes by 4 cubes, each layer added to the previous to form a third rectangular prism that is $(4 \times 4) \times 5$. For the remaining five days, students collect layers that are 8 cubes by 2 cubes, to form a fourth prism that is $(8 \times 2) \times 5$. When they compare prisms 3 and 4, they will notice that the length of the fourth prism is double that of the third, the width is half, and the heights of the two are the same. Thus, even though these two prisms are not congruent, they both have a volume of 80 cubic units.



Prism 3: $(4 \times 4) \times 5 = 80$ cubic units



Prism 4: $(8 \times 2) \times 5 = 80$ cubic units

Key Questions

Use the following questions to guide students' discussion this month:

- How is the volume of the prism related to the volume of one layer?
- How is the volume of the prism related to the number of layers?
- What happens when you double one dimension of a prism, halve another, and keep the third dimension the same?
- How can we use the dimensions of a prism to determine its volume in ways that are efficient and effective?

Computational Fluency: Claim the Factors

Overview

To open the first Computational Fluency activity this month, the teacher introduces the game Claim the Factors. Students play with the teacher on Day 2, then play with a partner on Days 8 and 12. On Day 15, students complete a student book page about the game, multiples, products, primes, and composite numbers.

Preparation

- [ ] Familiarize yourself with Claim the Factors by playing at least one round before introducing it to the class.

Mathematical Background

This workout provides a game environment that allows students to review factor pairs and practice basic multiplication facts in an engaging context. There is ample opportunity for developing winning strategies, ensuring that all students are challenged. The review in this month's Computational Fluency workout sets the stage for upcoming work with division. It also prepares the class for addition and subtraction of fractions with unlike denominators, where students must identify common multiples and factors to find equivalent fractions.

Key Questions

Use the following questions to guide students' discussion this month:

- What is a multiple?
- What is a factor?
- How are factors and multiples related?
- What do you notice about the multiples of ____?
- What do you notice about the factors of ____?
- What are prime and composite numbers?
- What strategies can you use when playing Claim the Factors to ensure a winning score?

Vocabulary

**Word Resource Card available*

composite number*
factor*
multiple*
prime number*

Solving Problems: Using Multiples & Factors to Solve Problems

Overview

The Solving Problems workout this month features two sets of problems. Students are given time to solve the problems, then discuss their solutions and problem-solving strategies as a class. The mathematical content focuses mainly on using multiples and factors, particularly common multiples and common factors. In addition, the problems themselves almost certainly help students identify diagrams and organized lists as useful problem-solving tools.

Preparation

☐ Between Days 5 and 10 and between Days 16 and 20, look at student work and decide which students you'll ask to share their work. See Days 10 and 20 for guidance in selecting student work to feature during discussions.

Mathematical Background

This month's problems focus on factors and multiples. The first set of problems uses a scenario of frogs jumping onto successive rocks; each frog lands on a multiple of a number, with one frog landing on every second rock and a frog friend landing on every third rock. Students are asked to investigate which rocks both frogs would land on. Since the numbers 2 and 3 share no common factors other than 1, the frogs will both land on each number that has both 2 and 3 as factors. Six is a common multiple of 2 and 3, and all of the rocks that both frogs will land on are multiples of 6. This kind of thinking about the common multiples of two numbers helps students create a structure of number relationships that is helpful in multiplication in general, and also in finding equivalent fractions and common denominators for fractions.

The second set of problems uses the context of setting up snack bags for a class where there are different numbers of ingredients: 36 fruit cups and 24 bananas. Students investigate the different numbers of snack bags that can be made if each bag includes the same quantities of fruit cups and bananas as all the other bags. Since neither ingredient can be cut in pieces and stored, students will find you can make 12 snack bags with 3 fruit cups and 2 bananas, 6 snack bags with 6 fruit cups and 4 bananas, 4 snack bags with 9 fruit cups and 6 bananas, 3 snack bags with 12 fruit cups and 8 bananas, 2 snack bags with 18 fruit cups and 12 bananas, or the unreasonable case of 1 snack bag with 36 fruit cups and 24 bananas. Since 12 is the greatest common factor of 36 and 24, the maximum number of identical snack bags that can be created is 12. As students investigate the different possibilities, they build intuition about common factors, including greatest common factors, of numbers.

The student book pages for this workout include a couple of main problems and a few related problems. This helps ensure all students will be able to finish the main problems, but also keeps all students engaged for the entire activity. It is likely that not all students will finish every problem, and you will probably not discuss every problem.

Vocabulary

**Word Resource Card available*

factor*
factor pair*
multiple*
composite number*
prime number*

Math Practices in Action

Make sense of problems and persevere in solving them

Problems in this month's workout are authentic problem-solving opportunities, as students will likely not know a solution strategy in advance. Students will make sense of the problems, persevere, and through their problem solving, identify how factors and multiples connect to these unusual problem contexts.

Key Questions

- What is the problem asking?
- What information in the problem will help you figure it out?
- What strategy can you use to figure it out?
- What visual representation can you use to represent your thinking?
- How do you know your answer is reasonable?
- How can you check your work after you have solved the problem?
- Can you write a problem that uses the same math skills and concepts?

Number Strings: Addition & Subtraction Strategies

Overview

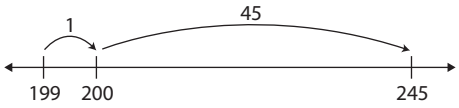
This month, students solve and discuss number strings designed to elicit efficient strategies for adding and subtracting whole numbers and decimal numbers.

Mathematical Background

The first two number strings this month invite students to consider taking some amount from one of the addends in a multidigit addition problem and giving it to the other addend to solve the problem more efficiently. The third string deals with the fact that subtraction can be thought of as taking away one number from another but also as a finding the difference between two numbers. The fourth string builds on finding the difference for subtraction. For each string, you will use equations to represent students' thinking. You'll also use the open number line, which is a particularly effective tool for modeling and solving multidigit addition and subtraction problems.

Give and Take

Certain addition problems lend themselves to taking some from one addend and giving it to the other to create an easier problem. For example, in solving 199 + 46, taking 1 from 46 and giving it to 199 makes an equivalent problem of 200 + 45. Students might use a get to a friendly number strategy, as shown on the number line on the left. They first add 1 to get to the friendly number 200, and then add the rest. The give and take strategy builds on this idea by changing both numbers at once, as show in the equations on the right.



$$\begin{array}{r} 199 + 46 \\ +\ 1 \quad -\ 1 \\ \hline 200 + 45 = 245 \end{array}$$

The give and take strategy works equally well with certain decimal problems. For example, to solve 4.8 + 2.9, take 1 tenth from 4.8 and give it to 2.9. This strategy results in 4.7 + 3. This line of thinking can be modeled with equations:

$$\begin{array}{r} 4.8 + 2.9 \\ -\ 0.1 \quad +\ 0.1 \\ \hline 4.7 + 3.0 = 7.7 \end{array}$$

Take Away vs. Find the Difference

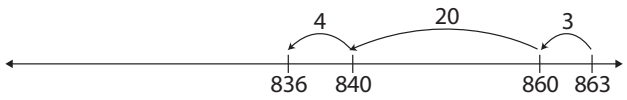
The problems in the third string alternate between those that are more efficiently solved using a take away strategy and those that are more efficiently solved by finding the difference. Students might find that the take away and find the difference strategies can each be efficient under different conditions.

Both strategies are easily modeled on the open number line. The take away strategy involves hopping backward the amount specified by the subtrahend, perhaps to a friendly number first, and then by efficient chunks. For example, to solve 863 – 27, one might take 3 away to get to 860, then remove 20 more, and finally remove the last 4 to get an answer of 836.

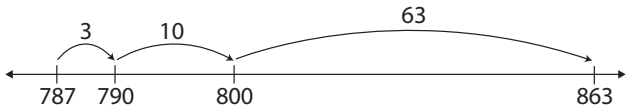
Vocabulary

**Word Resource Card available*

decimal number
decimal point
difference*
hundredth*
tenth*
whole number*



The take away strategy becomes less efficient when the minuend and the subtrahend are close. Consider 863 – 787. Starting at 863 and removing 787, no matter how large the increments, is tedious. On the other hand, the find the difference strategy, which involves finding the difference between the subtrahend and the minuend, is easier.

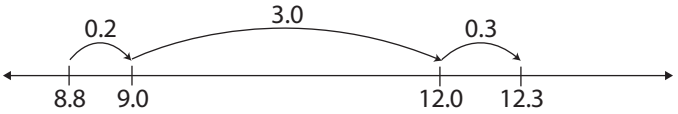


3 + 10 + 63 = 76, so 863 – 787 = 76

Constant Difference

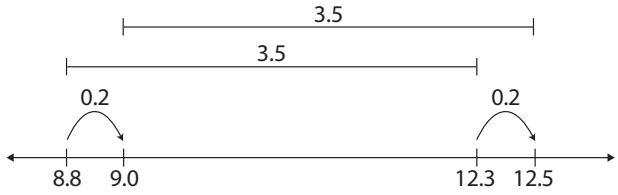
The fourth number string features the constant difference strategy, which involves creating an equivalent problem that is easier to solve than the original problem. It works by shifting each of the numbers by the same amount. Students will discover that this strategy is most effective when the subtrahend can be shifted to a "friendly number" (i.e., a whole number or a multiple of 10, 100, 1,000, and so on).

The open number line serves as a particularly effective tool for demonstrating why the constant difference strategy works. Consider the problem 12.3 – 8.8, which can be solved by finding the difference between the subtrahend and the minuend:



0.2 + 3.0 + 0.3 = 3.5, so 12.3 – 8.8 = 3.5

The problem becomes even easier to solve if one shifts 8.8 by 2 tenths to become 9.0. Make the same shift to 12.3 so the difference between the subtrahend and the minuend remains constant. The resulting problem, 12.5 – 9.0, is easier to compute mentally than 12.3 – 8.8.



$$\begin{array}{r} 12.3 + 0.2 = 12.5 \\ \underline{- 8.8 + 0.2 = - 9.0} \\ 3.5 \end{array}$$

Key Questions

Use these questions to help your students investigate this month's strings.

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

Number Corner September
Update Routines

You'll usually update Calendar Grid or Calendar Collector, or both, before moving on to the day's featured activity. These updates are brief and create consistency for students as they practice noticing and predicting patterns and explore the month's mathematics.

Calendar Grid

After Day 3, have student helpers complete this update procedure every day that the Calendar Grid is not a featured workout.

Procedure

1. Turn over one or more calendar markers so that the Calendar Grid is complete up to the current date.
2. Update the information on the Calendar Grid Observations chart.

Let students know that if they are called upon to update the grid and chart on a Monday, they're responsible for revealing the markers for three days rather than one (Saturday, Sunday, and Monday) and recording equations for each of them on the observations chart.

Calendar Collector

After Day 4, have student helpers complete this update procedure every school day that the Calendar Collector is not a featured workout, through Day 19.

Procedure

1. Add a new layer to the rectangular solid already formed, then fill in the information on the Calendar Collector record sheet.
2. Keep each prism intact and on display next to the record sheet for other students to view. Prisms collected earlier in the month should also stay intact so by the end of the month, there are four different prisms on display.

Layers are collected only on school days, so helpers making the updates on Mondays are only responsible for adding one layer to the prism in process and recording the information. Also, the days that feature Calendar Collector are scheduled so that the class will either start building each of the new prisms together, or the teacher will give the student helper for the following day instructions about how to start the next prism in the series.

Number Corner September

Focus Standards

Calendar Grid Fractions & Decimals

4.NF.1	Recognize equivalent fractions
4.NF.4a	Demonstrate an understanding that a fraction *a*/*b* is a multiple of the unit fraction 1/*b*
4.NF.6	Write fractions with denominators 10 or 100 in decimal notation
5.NBT.7	Add and subtract decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and the relationship between addition and subtraction
5.MP.2	Reason abstractly and quantitatively
5.MP.3	Construct viable arguments and critique the reasoning of others

Calendar Collector Layer a Day

5.OA.1	Write and evaluate numerical expressions with parentheses
5.OA.2	Interpret numerical expressions without evaluating them
5.MD.4	Measure the volume of a solid figure by counting the number of cubic units that fill it, with no gaps or overlaps
5.MD.5a	Show that the volume of a right rectangular prism with whole number edge lengths can be found by multiplying the edge lengths or by multiplying the area of the base by the height
5.MP.7	Look for and make use of structure
5.MP.8	Look for and express regularity in repeated reasoning

Computational Fluency Claim the Factors

4.OA.4	Find all factor pairs for a whole number from 1 to 100
4.OA.4	Demonstrate an understanding that a whole number is a multiple of each of its factors
5.MP.6	Attend to precision
5.MP.7	Look for and make use of structure
5.MP.8	Look for and express regularity in repeated reasoning

Solving Problems Using Multiples & Factors to Solve Problems

4.OA.4	Find all factor pairs for a whole number between 1 and 100
4.OA.4	Demonstrate an understanding that a whole number is a multiple of each of its factors
5.MP.1	Make sense of problems and persevere in solving them
5.MP.3	Construct viable arguments and critique the reasoning of others
5.MP.4	Model with mathematics

Number Strings Addition & Subtraction Strategies

5.NBT.7	Add and subtract decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and the relationship between addition and subtraction
5.MP.5	Use appropriate tools strategically
5.MP.8	Look for and express regularity in repeated reasoning

Day 1

Number Strings: Number String 1

Copies & Display	**NCSB Appendix** Number String Summary Space
Classroom Materials	whiteboard or chart paper

1 Gather students in your discussion area and tell them that they will have a Number Strings workout as part of Number Corner this year. Briefly review number strings and how they work:

- A number string is a series of related problems that students solve mentally and discuss one at a time.
- Sometimes, number strings start with easier problems and then the problems get more challenging as the string continues.
- The problems or strategies from the beginning of the number string often can be used to help solve the problems later in the number string.
- Solving the problems in a number string involves thinking like a mathematician, because students want to find powerful strategies that work for lots of problems.
- The class will follow a process to solve each problem, share strategies and answers, and discuss each other's thinking.
- When students explain their thinking, the teacher usually represents their work for everyone to see.
- After the number string, students often record a summary and example in the Number String Summary Space of their Number Corner Student Books.

2 Introduce the number string by posing and writing the first problem from the table below, 99 + 87, on the board or a piece of chart paper:

- Ask students to solve the problem mentally and put their thumb up in front of their chest when they have an answer.
- Students can show additional fingers if they think of additional strategies for solving the problem.

3 When most students show thumbs-up, invite a few to share the answer.

Record all answers without comment or indication that any are correct or incorrect.

4 Ask several volunteers to explain how they figured it out.

- Record students' thinking on the board or chart paper for everyone to see. Use equations and number line diagrams to represent students' thinking.
- When a student shares a strategy that aligns with the goals of the number string, ask the class to reflect on the student's thinking. For example:
  - » *Why does it make sense to _____?*
  - » *How does _____'s thinking connect to the (representation)?*
  - » *Does anyone have a question for _____?*
  - » *What connections do you notice among the strategies shared?*

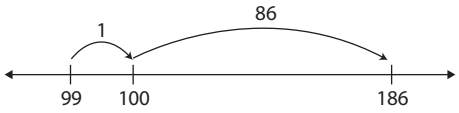
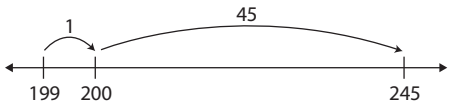
5 Deliver the rest of the number string shown in the following table.

Instructional Routine

Number string

Often, number strings begin with accessible problems for which students should have multiple entry points. This intentional design feature provides entry for students with a range of skills and a basis for all to solve other problems in the number string.

Sample strategies are shown and explained in detail in the sample dialogue. Problems and answers are provided for your convenience. When you present the problems to students, do not include the answers.

Problems	Sample Strategies & Recording	Connections
99 + 87 = 186	 99 + 87 + 1 – 1 100 + 86 = 186	These problems are selected to elicit the give and take strategy. The strategy of getting to a friendly number can be used to show how both addends in the problem can be changed to make a problem that is easier to solve. **Big Idea** The give and take strategy for addition changes a problem by *taking* a number from one addend and *giving* it to the other addend. Changing one of the addends to a friendly number makes the problem easier to solve.
199 + 46 = 245	 199 + 46 + 1 – 1 200 + 45 = 245	
292 + 68 = 360	292 + 8 = 300 + 68 – 8 = 60 360	
1,992 + 2,996 = 4,988	1,992 + 8 = 2,000 + 2,996 – 8 = 2,988 4,988 or 1,992 – 4 = 1,988 + 2,996 + 4 = 3,000 4,988	

SUPPORT If students are unfamiliar with notating computation on the number line, take time to talk about how the number line works. Also, the give and take can be notated using equations vertically (first and second problem) or horizontally (third and fourth problem). Unpack each notation to ensure students understand how the changes to each addend are recorded.

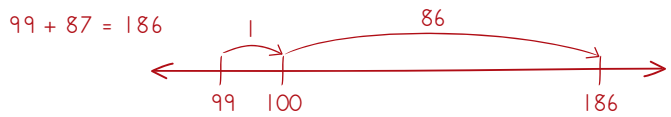
Teacher *Sam, can you explain what you did?*

Sam *I saw that 99 was really close to 100, so I added 1 more to 99 to get 100. Then, since I already added 1, I just made a jump of 86.*

Teacher *Where did the 86 come from?*

Sam *I used 1 from the 87 to get from 99 to 100, so I only needed to add 86 more.*

Teacher *Oh, OK. Thank you. Let me model what you said for everyone to see.*



Mei *I also thought about how 99 was close to 100, but I changed both numbers at the same time. I guess it's kind of like making a new problem. I knew that I needed to find 99 + 87, but if you take one from 87 and give it to 99, you have made a new problem 100 + 86. And that's easy to do in your head.*

Teacher *And you can do that? Make a new problem?*

Mei *Sure. You are adding it all together anyway, so you would get the same thing.*

Teacher *Let me record your thinking. I'll write this equation to show how you changed both numbers simultaneously, or at the same time.*

$$\begin{array}{r} 99 + 87 \\ +\ 1 \quad -\ 1 \\ \hline 100 + 86 = 186 \end{array}$$

Teacher *That's pretty efficient, isn't it? Just take some from one of the numbers and give it to the other number so that you are left with numbers that can be added easily in your head. I wonder whether anyone else can think about an addition problem in that way.*

6 Send students back to their seats and pass out their Number Corner Student Books. Ask students to find the first Number String Summary Space at the back of their books.

7 Explain that when the class does a number string during a Number Corner session, they often will summarize the number string. When class summaries happen, students should find the next unused Number String Summary Space page and write the date.

8 Ask students to explain in their own words the give and take strategy that many of them used with whole numbers in today's number string. Have students share their thoughts and together generate a class summary.

Sample Summary: Give and Take with Whole Numbers

When you add two numbers, you can take a number from one of the addends and give it to the other addend. We call this the give and take strategy. If you use this strategy to make one of the addends a friendly number, the numbers are easier to add.

$$\begin{array}{r} 199 + 46 \\ +\ 1 \quad -\ 1 \\ \hline 200 + 45 = 245 \end{array}$$

9 Have students record the summary and example problem in the first Number String Summary Space of their student books.

10 Conclude by telling students they will work through many number strings this year. In the next one, they will look at how they might apply addition strategies for whole number to adding decimals.

Day 2

Computational Fluency: Introducing Claim the Factors

Copies & Display	**NCSB 1** Claim the Factors Game Board
Kit Materials	Word Resource Cards for *composite number*, *factor*, *multiple*, and *prime number*
Classroom Materials	colored pencils in red and blue(1 of each color)

1 Introduce the workout by name — Computational Fluency.

- Explain that someone with computational fluency is able to work efficiently and easily with numbers.
- Let students know they will work with a variety of Computational Fluency activities throughout the year, all designed to encourage efficient and effective strategies for solving number problems.

2 Review key vocabulary (*multiple*, *factor*, *prime number*, and *composite number*) by asking students to turn and talk to a neighbor about their own definitions of the words. Elicit examples for each term.

MLL & SUPPORT Display the Word Resource Cards for each term, and leave them posted in or near the Number Corner area through the month.

3 Introduce Claim the Factors to the class, summarizing the directions and object of the game.

- Player 1 chooses a target number on the Claim the Factors Game Board and circles it with a colored pencil.
- Player 2 identifies all the numbers on the game board which are factors of the target number. They circle those numbers with a different colored pencil. Each number may be circled only once.
- If a player chooses a target number for which there are no factors left to circle, that number must be crossed out and the player gets no points for that turn.
- Players alternate turns until the numbers remaining on the sheet do not have any uncircled factors.
- Players then find the sum of their circled numbers to determine a winner.

4 Display the Claim the Factors Game Board page in the Number Corner Student Book. Give students a moment to look it over, and then explain how the class is going to play the game today.

- Let them know that they'll play as one team, and you'll play as the other today.
- Explain that each team will work in a different color, either red or blue. Decide with the class which color each team will use.

5 Use the Claim the Factors display to begin the game.

- Take the first turn: choose a target number on the game board, and circle it with your color.

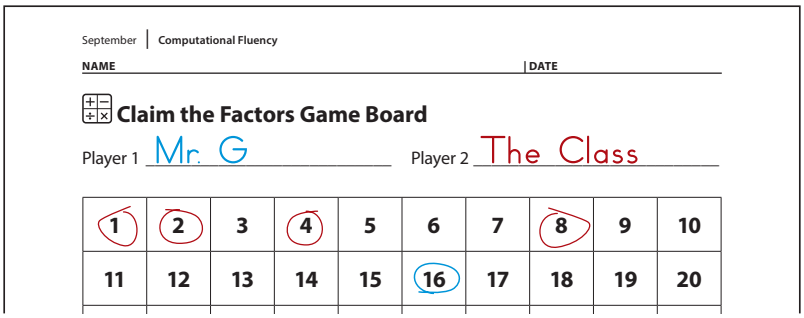
Equity-Based Practice

Drawing on multiple resources of knowledge

This review of vocabulary is an early opportunity to invite students to share their own understanding of key mathematical vocabulary from earlier grades. Some of these terms might be similar in other languages spoken by your students. If so, use this discussion to support and affirm your multilingual learners' understandings of these terms.

- Invite at least one student up to the display and have them use their team's color to circle all the factors of the target number, not including the target number itself.
- Have a student circle a target number for the class. Then use your color to circle all the factors of the target number.
- Take turns with the class to choose target numbers and circle factors.

Teacher *I choose 16, and I'm going to circle it with my color — blue. Now it's your job to find all the numbers on the sheet that are factors of 16. Who can come up and circle a factor of 16 in red?*



September | Computational Fluency

NAME | DATE

Claim the Factors Game Board

Player 1 Mr. G Player 2 The Class

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

DJ *But what about 16? Isn't 16 a factor of 16?*

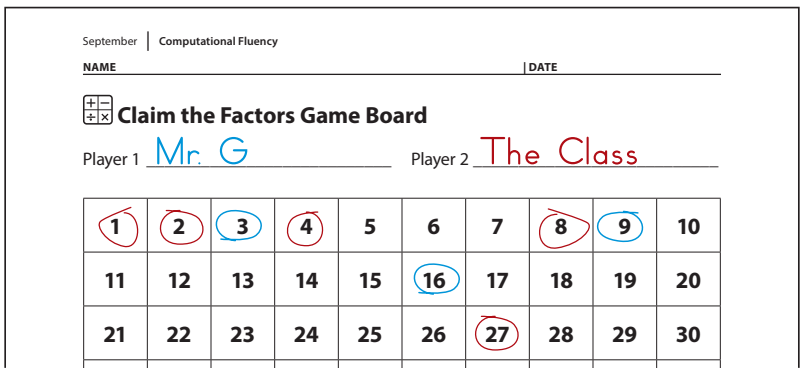
Teacher *Good thinking! Yes, it is. But since I circled the 16 already, and each number is used only one time, you aren't able to circle it. Is 16 a prime or composite number? How do you know?*

Jade *It has to be composite. We found more than just two factors. If it was prime, it would have only 1 and itself for factors.*

Teacher *Now it's your turn to circle a target number, and my turn to circle any factors of that number I can find. Would anyone like to propose a target number for the class?*

Craig *Let's pick 27 as our target number. Can I circle it?*

Teacher *Sure! So I need to find the factors of 27. I know that 1 × 27 is 27, but they already are circled. I also know that 3 × 9 is 27. I'll circle those. You picked a composite number also!*



September | Computational Fluency

NAME | DATE

Claim the Factors Game Board

Player 1 Mr. G Player 2 The Class

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30

Xavier *So who is winning so far?*

Teacher *The score for your team is the sum of the numbers that are circled in your color. So you have 1, 2, 4, 8, and 27. That's how much?*

Students *42!*

Teacher *And I have 16, 3, and 9. How much is that?*

Students *28. We're ahead!*

6 While playing, elicit student participation, and generate conversation about factors, multiples, prime numbers, and composite numbers.

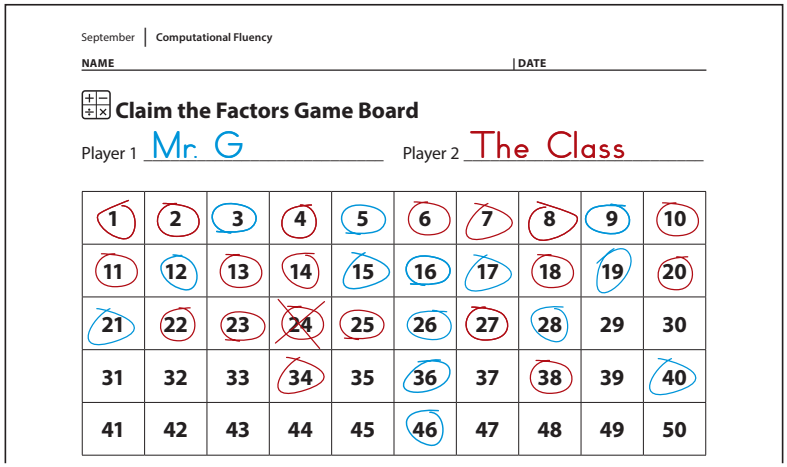
Pose questions like these to promote discussion of factors and multiples:

- » *If you are not sure what numbers to circle, what can you do?*
- » *How can writing multiplication facts help determine the factors?*
- » *How can you be sure you circled all the factors for the target number?*
- » *What can you do to get a better score than your opponent?*

7 Continue to take turns choosing target numbers and circling factors until no further plays can be made.

If a team chooses a target number for which no more factors can be circled, that number must be crossed out and the team gets no points for that turn.

8 When the numbers remaining have no more factors that can be circled (i.e., when no further plays can be made), the game is over.



September | Computational Fluency

NAME | DATE

Claim the Factors Game Board

Player 1 Mr. G Player 2 The Class

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

Students *I think we're stuck.*

I don't see a number we can choose that has factors left to circle. Like 29, 31, 37, 41, 43… none work because they're prime. If we circle any of them, we won't get points.

What about 32?

I think all the factors for 32 are already circled. Let's see… 1 and 32, 2 and 16, 4 and 8… yep, they're all taken.

Teacher *What about 42 or 48? Those both have lots of factors.*

Students *OK, for 42 it would be 2 and 21, 3 and 14, or 6 and 7… all gone. For 48, you'd need 2 and 24, 3 and 16, 4 and 12, 6 and 8, and those are gone too. We're stuck.*

Teacher *That means it's my turn, but there's nothing I can circle for a target number either. The game is over when both teams are stuck.*

9 At the game's conclusion, have students find the sum of the numbers circled in the class color, while you find the sum of the numbers circled in your color.

The team with the greater sum is the winner.

10 Wrap up the activity by letting students know they will play Claim the Factors with a partner during the next Computational Fluency activity.

Day 3

Calendar Grid: Introducing the Calendar Grid

Copies & Display	**PO P1** Money & Clock Models
Kit Materials	• Calendar Grid display • money value pieces (1 set)
Classroom Materials	• prepared Calendar Grid Observations chart • prepared fraction expression label cards (3) • paper (1 sheet, for screen)

1 Begin by gathering students in front of the Calendar Grid pocket chart and Calendar Grid Observations chart. Introduce the Calendar Grid by explaining that the class will turn over a new marker for each day of the month, make and record observations and predictions, and look for patterns as the markers are revealed.

Connect to students' previous experience by asking what they remember about calendar patterns from previous years (if they have used the Bridges curriculum before).

2 Display the money portion of the Money & Clock Models print original. Give students a few moments to examine the display quietly, and then have them share their observations with a partner.

Note with students that each coin is pictured in regular form, as well as on a money value piece. Money value pieces, which students have encountered in earlier grades, are similar to base ten number pieces, and make it possible to easily see the fraction and decimal value of each coin in relation to a dollar.

3 Ask students how each coin can be represented both as a decimal and a fraction. Invite students to share their thinking, and record their suggestions.

Teacher *How can we record the value of each coin as both a decimal and a fraction?*

Akiko *It's just like when you write money amounts — .50, .25, .10, .05, and .01.*

Teacher *And how can we record a fraction for each coin?*

Students *The penny would be 1/100. It's 1 cent out of 100. You can see that it takes 100 of the little squares to fit into the dollar. That's just like with the units and the mats on the base ten number pieces.*

Yeah and the quarter is 25/100.

Or it can be ¼, can't it?

Teacher *Which is it? 25/100 or ¼?*

Sam *It's both. If you look at the money value pieces, it's easy to see that the quarter piece is 25 little boxes, which is ¼ of 100. You can also see that it would take exactly 4 of those quarter squares to fit into the dollar square.*

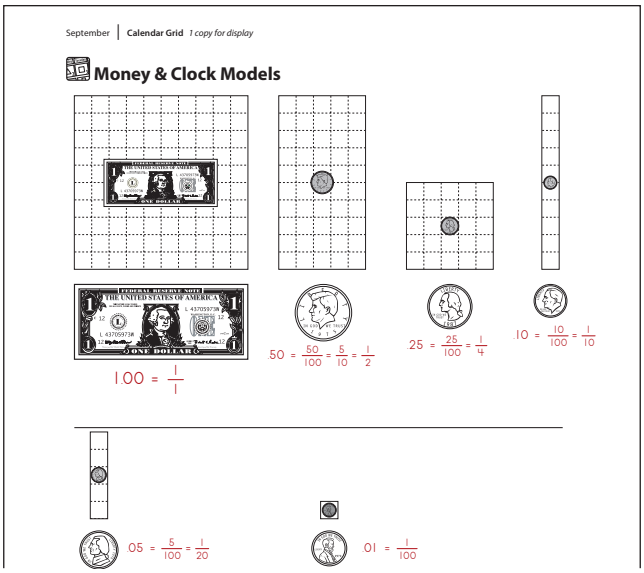
Teacher *So, 25/100 and ¼ are equivalent, then? I'll write them both. Anything else?*

Whitney *You can put 10/100 or 1/10 under the dime. It's 10 cents out of 100, plus you can see that it would take 10 of the dime strips to fit into the dollar square.*

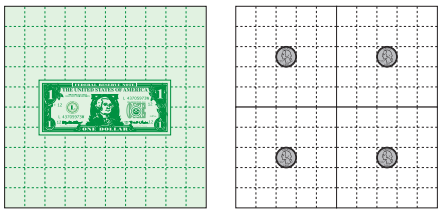
Math Teaching Practice

Use and connect mathematical representations

The visual models used in this month's Calendar Grid provide opportunities for students to make connections among familiar tools and representations (money, base ten number pieces, and analog clocks) and less familiar numbers (fractions and decimals). Over time, these meaningful representations deepen students' conceptual understanding of fractions and decimal numbers.



SUPPORT Have the money value pieces from your Number Corner Kit out and available throughout the month. Support students in their assertions that (for example) a quarter is one-fourth of a dollar by inviting a volunteer to use the quarter pieces to form a square the same size as the dollar mat, or even set the quarter pieces directly on top of the dollar mat.



While many students might already know that a quarter is one-fourth of a dollar, and a dime is one-tenth of a dollar, they might need to use the money value pieces to determine that a nickel is one-twentieth of a dollar.

4 Reveal the clock portion of the Money & Clock Models print original and draw students' attention to the first clock.

- Have students share ideas, first in pairs and then as a whole group, about the fraction of the clock face that is shaded in.
- Press the students to generate all the equivalent fractions they can justify, given the structure of the clock face.
- Record students' thinking.

Teacher *What are you thinking?*

David *Well, half of the clock is shaded in. So you could write ½.*

Teacher *I'll write ½ below the clock. You were thinking about the portion of the entire clock. What if I asked about the fraction of minutes that are shaded in on the clock?*

Briana *Um, it's shaded to 30 minutes. So, 30/60?*

Teacher *Any other fractions I could record? What about if I was thinking about hours that have passed since noon?*

Darius *Oh, you could also write 6/12. For 6 out of 12 hours on the face of the clock.*

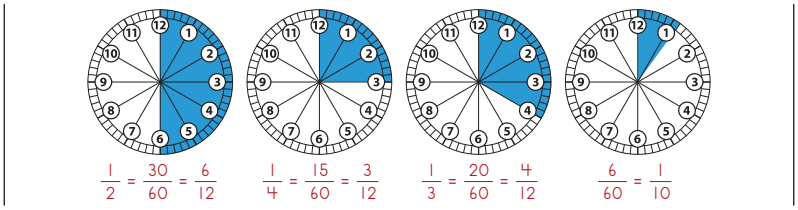
Teacher *So, again, lots of equivalent fractions represented by this one clock model.*

Digital Resources

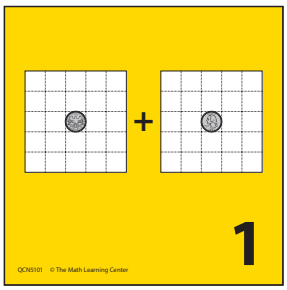
The Math Clock app can display analog clocks partitioned into fractional pieces. Enter the share code 1RSK-SU56 in the app to display clocks in 2, 3, 4, 6, 12, and 60 equal parts and justify equivalent fractions.

Apps are available at apps.mathlearningcenter.org.

5 Discuss and record fractions that represent the other three clock models on the print original.



6 Invite a volunteer to turn the first marker face-up in the pocket chart. Have students study the marker quietly for a moment, and then ask them to suggest equations that represent the visual on the card.



Students *There are 2 quarters.*

You could write 25 cents plus 25 cents equals 50 cents.

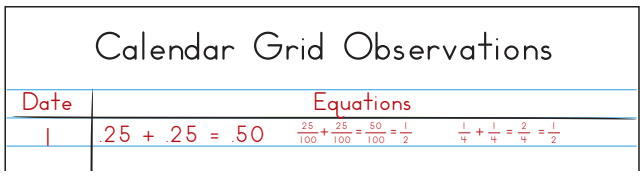
Or 0.25 + 0.25 = 0.50.

Teacher *Anything else? Could I record a fraction equation that represents this picture?*

Students *You could write ¼ + ¼ = ¾, and that equals ½.*

You could also write ²⁵⁄₁₀₀ + ²⁵⁄₁₀₀ = ⁵⁰⁄₁₀₀ because each quarter is 25 out of 100 cents that make a dollar.

7 Record students' equations on the Calendar Grid Observations chart, suggesting and supplying any that are not mentioned.

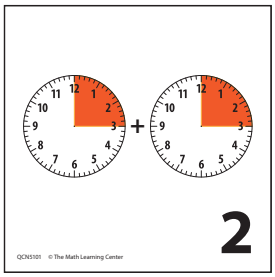


8 Let students know that one expression to represent each marker will be recorded on a fraction expression label card and slid into the pocket chart in front of the marker.

Record the expression ¼ + ¼ on a label card, and place it in front of marker 1.

9 Invite a volunteer to reveal the second marker and then ask students to study the marker quietly for a few moments.

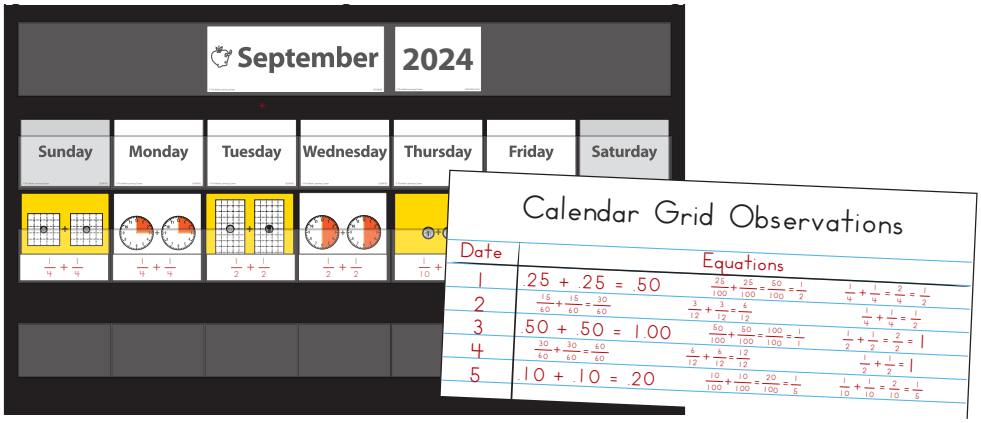
Discuss the clock model represented; then ask students to share what equations could be recorded on the Calendar Grid Observations chart.



10 Record the expression ¼ + ¼ on a fraction expression label card, and place it in front of marker 2. Invite volunteers to describe what they see, including any relationships they notice between the markers.

11 Invite students to turn over calendar markers one by one until the calendar shows a marker for each day of September that has passed so far. Each time, pause to allow students to make observations and generate equations that can be recorded on the observations chart.

For marker 3, add a fraction expression label that shows ½ + ½. Do not add labels to additional markers, as they will be the focus of discussion the next time Calendar Grid is the featured workout.



12 Wrap up Calendar Grid today by explaining how students will update the Calendar Grid when it is not a featured workout.

- Each day, one student will turn over a calendar marker and record on the Calendar Grid Observations chart any decimal and fraction equations that represent the visual on the marker. These students will not be responsible for creating a fraction expression label to add to the Calendar Grid pocket chart.
- Explain the system you have set up to identify which student is responsible for updating the Calendar Grid.

Note

Post the Money & Clock Models print original you filled in with the class today near the Calendar Grid display for students' reference during the month.

Day 4

Updates

Complete the update routine for Calendar Grid.

Calendar Collector: Introducing the Calendar Collector

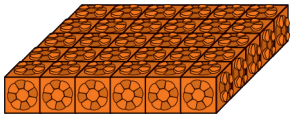
Kit Materials	• Omnifix cubes • Word Resource Cards for *area*, *base*, *dimension*, and *volume*
Classroom Materials	• prepared Calendar Collector record sheet • prepared (6 × 5) × 1 rectangular prism

1 To introduce the Calendar Collector, explain that this year, just as they might have done in earlier grades, students will make a new collection each month. This month, they will collect a layer of cubes each day they're in class. The layers will be added to one another to build a set of four rectangular prisms over the course of the month.

2 Ask students to join you in the Number Corner discussion area and seat themselves so they can see the Calendar Collector record sheet.

3 Hold up one Omnifix cube for students to see. Discuss the fact that the dimensions of the cube — the length, width, and height — are each one unit, and that the amount of space taken up by the cube, or its *volume*, is one cubic unit.

4 Display the (6 × 5) × 1 rectangular prism. Have students share observations about the prism, first in pairs and then as a whole class.



5 Draw students' attention to the Calendar Collector record sheet, and give them a moment to take note of the column headings.

6 Work with input from the students to collect and record information about the prism, emphasizing and defining terms such as *area*, *base*, *dimension*, and *volume* as they come up during your discussion.

MLL & SUPPORT Post Word Resource Cards for these terms near the discussion area.

Teacher *Since this is our first Calendar Collector activity, let's work together to fill in the information about this rectangular solid on our record sheet. The first column we need to fill in asks for the dimensions of the base of this prism.*

Kelsey *The base is the part it sits on, right? That's 6 × 5 or 5 × 6, depending on how you look at it.*

Equity-Based Practice

Leveraging multiple mathematical competencies

This Calendar Collector offers numerous entry points as students work to build rectangular prisms, count or calculate layers, and determine total volume. Asking students to imagine each new layer highlights the importance of spatial thinking, which may be a particular strength of some students. Picturing the overall shape also emphasizes the relationship between rectangular prisms and volume.

Teacher *Next, we need to record the area of the base. Can someone remind us what area is and how to find it?*

Brandon *Area is how many square units it takes to cover something. You get it by multiplying the length times the width — 6 × 5 = 30, so the area of the base is 30 square units.*

Teacher *This next column is interesting to me. It is asking for the number of layers. What do you think about that?*

Akiko *There's just one layer. We should write 1 for that question.*

Teacher *The next column asks for volume. Can anyone help us with the meaning of that word?*

Ivan *That's how many cubes you need to build the prism. You said that one cube has a volume of one … what did you call it?*

Teacher *One cubic unit.*

Ivan *Yeah, one cubic unit. So if you use 30 of them to make the prism, it has a volume of 30 cubic units.*

Teacher *OK, the last column asks for the dimensions of the rectangular prism.*

Sara *I think you should write 6 × 5 × 1, since it has one layer.*

Calendar Collector Record Sheet

Day	Dimensions of the Base	Area of the Base	# of Layers	Volume	Dimensions of the Prism
1	6 × 5	30 sq. units	1	30 cubic units	6 × 5 × 1

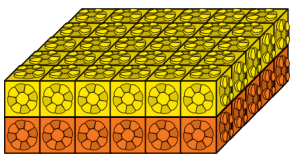
7 Let students know they will work together now to bring the collection up to date, given that this is the fourth instructional day of the month.

8 Invite a student to the front to add a second layer to the rectangular prism using a different color of Omnifix cubes. As the student is building, ask the rest of the class to view the chart and make predictions about the information that will be filled in for Day 2.

Before examining the dimensions and related information for the updated rectangular prism, allow students to share with a neighbor or with the whole class about their thinking.

MLL Listen for students who need support in using key vocabulary and direct them to Word Resource Cards.

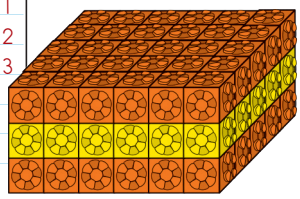
9 Display the rectangular prism and work with input from the class to enter the information for Day 2 on the Calendar Collector Record Sheet.



10 Invite another student volunteer to add a third layer to the rectangular prism while the rest of the class makes predictions about the missing information. Then, fill in the Day 3 data together.

Calendar Collector Record Sheet

Day	Dimensions of the Base	Area of the Base	# of Layers	Volume	Dimensions of the Prism
1	6 × 5	30 sq. units	1	30 cubic units	6 × 5 × 1
2	6 × 5	30 sq. units	2	60 cubic units	6 × 5 × 2
3	6 × 5	30 sq. units	3	90 cubic units	6 × 5 × 3



11 Before collecting and entering the information for Day 4, ask students to share observations about any patterns they notice so far on the record sheet.

Here are some questions you might use to spark students' thinking:

- *What happens to the dimensions of the base as layers are added?* (The dimensions remain the same.)
- *What happens to the area of the base as layers are added?* (The area of the base remains the same.)
- *How are the dimensions of the prism related to the dimensions of the base and the number of layers?*
- *By how much does the volume of this particular prism increase as each layer is added? Why?*

12 Let students know that on, or directly after, the days when Calendar Collector is the featured workout, they will start a rectangular prism with new dimensions.

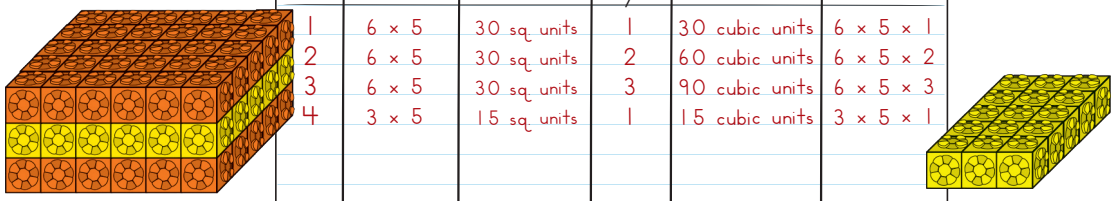
Explain that this is one of those days, so right now, you will leave the 6 × 5 × 3 prism intact for future reference, and start a new prism.

13 Invite a student volunteer to create a one-layer prism with the base dimensions 3 × 5.

Have the class provide the information for Day 4 as you enter it on the record sheet.

Calendar Collector Record Sheet

Day	Dimensions of the Base	Area of the Base	# of Layers	Volume	Dimensions of the Prism
1	6 × 5	30 sq. units	1	30 cubic units	6 × 5 × 1
2	6 × 5	30 sq. units	2	60 cubic units	6 × 5 × 2
3	6 × 5	30 sq. units	3	90 cubic units	6 × 5 × 3
4	3 × 5	15 sq. units	1	15 cubic units	3 × 5 × 1



14 Close the activity by letting students know that each day, a student helper will add another layer to the new rectangular prism and enter the information on the record sheet. The class will reconvene to discuss Calendar Collector again in a few days, at which time you will start a third rectangular prism together.

Day 5

Updates

Complete the update routines for these workouts:

- Calendar Grid
- Calendar Collector

Solving Problems: Introducing Solving Problems

Copies & Display	**NCSB 2–3** Rock Hopping
Classroom Materials	paper (1 sheet, for screen)

1 Open this activity by explaining the Solving Problems workout.

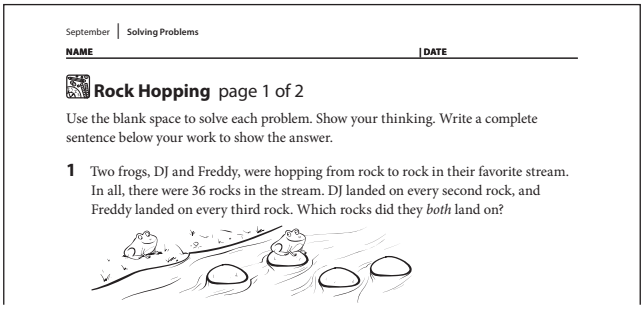
When students do Solving Problems activities, they will work on skills such as interpreting problems, identifying important information, and determining which strategy is best for solving the problem. They will also practice estimating and checking their work to make sure their answers are reasonable.

2 Ask students to think about what *problem solving* means. After a minute of quiet thinking, invite several students to share their ideas.

Students *I think it means to find an answer to something. We use problem solving when we play games. We use problem solving when we have to figure something out, even when we are not in math.*

3 Display the first Rock Hopping page from the Number Corner Student Book, revealing the first problem only.

Read the general instructions at the top of the page to the class, and then invite one of the students to read the problem aloud.



September | Solving Problems

NAME | DATE

Rock Hopping page 1 of 2

Use the blank space to solve each problem. Show your thinking. Write a complete sentence below your work to show the answer.

1 Two frogs, DJ and Freddy, were hopping from rock to rock in their favorite stream. In all, there were 36 rocks in the stream. DJ landed on every second rock, and Freddy landed on every third rock. Which rocks did they *both* land on?

4 Ask students to turn to a partner and talk about what the problem is asking them to figure out. Have them identify the important information that will help them solve the problem. Then, invite a few pairs to share their ideas.

If students jump right to figuring out the problem, refocus their attention to make sure they can verbalize what the problem is asking.

Math Teaching Practice

Implement tasks that promote reasoning and problem solving

The tasks presented in September's Solving Problems workout allow multiple entry points for students. Pairs may employ various solution strategies as they work with these tasks involving common multiples.

5 Once you are sure all students understand what the first problem is asking, have them find the Rock Hopping pages in their student books, and preview the rest of the problems.

6 Have students turn to a partner and begin thinking and talking about how they might go about solving these problems.

Encourage them to think about what strategies they would use and what they might put on their paper to show their thinking.

7 Tell students they will have the rest of today's workout time to solve the problems with their partner. Remind them to show their thinking. Ask them if they have any questions and then have them get started.

8 As students work, circulate to make observations, answer questions, and offer differentiated instruction.

MLL & SUPPORT Check with students to make sure they understand what the questions are asking. Help students with vocabulary such as "every third rock," as needed.

In the allotted time, most students should be able to finish problems 1 and 2. If students determine the answers quickly, showing adequate thinking and writing a sentence, ask them to solve the questions related to problem 3. Not all students will have enough time to solve problem 3 in its entirety. Have students complete what they can in the time left.

9 As students finish the problems, have them check their work. Encourage them to think about whether or not their answers are reasonable.

10 Wrap up this activity by letting students know they will discuss their work the next time they do a Solving Problems activity in a few days.

SUPPORT If some of your students weren't able to complete the first two problems on the sheet, give them additional time to finish before Day 10.

CHALLENGE Press students to complete the entire problem set, and give them extra time to do so before Day 10.

Day 6

Updates

Complete the update routine for Calendar Collector.

Calendar Grid: Equations & Equivalencies, Part 1

Kit Materials	• Calendar Grid display • money value pieces (1 set)
Classroom Materials	• Calendar Grid Observations chart • fraction expression label cards

1 Gather students in front of the Calendar Grid pocket chart and Calendar Grid Observations chart and set the goal for today's activity.

Let students know that today's activity will focus on the following:

- » Making predictions about today's marker based on patterns they have observed.
- » Looking at the equations recorded on the Calendar Grid Observations chart for the days of the month that have passed so far.
- » Discussing equivalencies among the markers and equations.
- » Looking for patterns across the Calendar Grid and adding a fraction expression label to each of the markers posted since Day 3.

2 Begin by asking students to share predictions about today's marker, first in pairs, and then as a whole group.

Press students to explain or justify their predictions.

Sergio *So far, it's a pattern with money and clocks. It goes back and forth. Yesterday was clocks, so today it has to be money.*

Kiara *I think it's going to be goldenrod with those money pieces on it instead of regular coins. We had two like that, and then two that had regular money.*

Xavier *Maybe it'll be pieces with nickels or pennies because we haven't had those yet.*

Lin *I'm trying to figure out what fractions we'll have, but I don't think you can tell yet.*

Kelsey *It was fourths and then halves on the first 4 markers, and a half is the same as two-fourths. Then on the next 4 markers, it was tenths, and then fifths, and a fifth is the same as two-tenths.*

Lin *Maybe it'll be something smaller than a tenth today.*

Raven *So maybe Xavier is right! Maybe it will be nickels or pennies today.*

3 When a few students have shared their predictions, have your helper reveal today's marker.

Ask students to study the marker quietly for a few seconds. Then ask them to share equations that could be recorded on the Calendar Grid Observations chart to represent the visual.

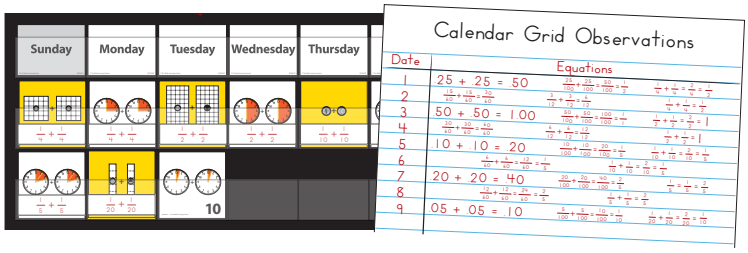
4 Ask students to spend a minute to quietly look at the calendar markers and the equations recorded on the Calendar Grid Observations chart.

Equity-Based Practice

Challenging spaces of marginality

Creating space for students to reason about patterns and share their predictions supports the development of students' mathematical identities through the distribution of mathematics authority. Be sure to encourage broad participation and interactions among students to support students in seeing themselves as integral participants in the classroom community.

Then ask them to comment on any incorrect equations or additional equations that could be added to the observations chart for previous markers.



5 Let students know that fraction expression labels need to be placed in the pocket chart for each day, and ask them to look carefully for any patterns that might help determine which expressions to write.

Teacher *We have a long list of equations to represent each of the markers, but we are only going to record one expression on marker 4. The first marker was labeled ¼ + ¼, and the second marker was also labeled ¼ + ¼. Then, the third marker was labeled ½ + ½. What do you think we should record on the label card?*

Max *Probably ½ + ½ again.*

Teacher *Why is that?*

Devon *The first two markers had the same label, so the next two markers might, too.*

Teacher *I'll write ½ + ½. Does that expression match the visual?*

6 Work with student input to create labels for markers 5 and 6.

7 Invite discussion about the label for marker 7 by wondering aloud about existing patterns.

If no students comment that all the fractions labeled so far are unit fractions, suggest it yourself in the discussion.

Teacher *So far, we have pairs of the same expression! And I also notice that they all seem to be unit fractions so far, fractions where the numerator is one. I'm looking at the next picture and I am wondering about the fraction expression label we should add. I see two dimes plus two dimes. What would that be?*

Brandon *⅒ + ⅒.*

Teacher *Is there an equivalent expression we could record that fits the pattern?*

Ivan *Two dimes is 20 cents and that's ⅕ of a dollar, so we could write ⅕ + ⅕.*

Teacher *What do you think, everyone?*

8 Continue creating fraction expression labels for the rest of the markers up to today's date, discussing equivalencies and patterns.

When discussing marker 9, be sure conversation occurs that solidifies why a nickel is called 1/20 rather than ⅕.

9 Wrap up by reminding students that someone will update the Calendar Grid each day. Ask students to make some final predictions about the next few markers and the patterns the labels will follow.

Day 7

Updates

Complete the update routines for these workouts:

- Calendar Grid
- Calendar Collector

Number Strings: Number String 2

Copies & Display	**NCSB Appendix** Number String Summary Space
Classroom Materials	whiteboard or chart paper

1 Gather students in your discussion area with their Number Corner Student Books. Briefly review number strings and how they work, using action step 1 from Day 1.

Advise students to keep their student books closed until the end of the number string, since they are going to do mental math.

2 Let students know that today's number string connects the strategies they learned for adding whole numbers to adding decimal values.

Students review the give and take strategy with whole numbers, and apply the strategy to decimals.

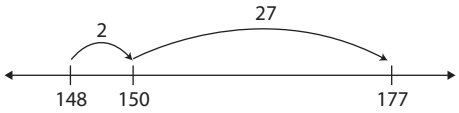
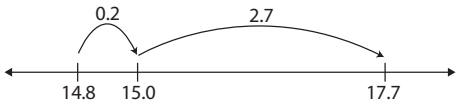
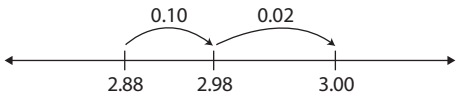
3 Deliver the number string shown in the following table.

- Sample strategies are shown and explained in detail in the sample dialogue. Problems and answers are provided for your convenience. When you present the problems to students, do not include the answers.
- Use number lines or equations to record students' strategies.
- When a student shares a strategy that aligns with the goals of the number string, ask the class to reflect on the student's thinking. For example:
  - » *Why does it make sense to _____?*
  - » *How does _____'s thinking connect to the (representation)?*
  - » *Does anyone have a question for _____?*
  - » *What connections do you notice among the strategies shared?*

Equity-Based Practice

Affirming mathematics learners' identities

Although number strings are often designed to elicit a particular strategy or to highlight a specific representation or tool, it is important to invite, welcome, and honor all student contributions and strategies. In doing so, you validate students' knowledge and experiences and support their development as capable and confident problem solvers.

Problems	Sample Strategies & Recording	Connections
148 + 29 = 177	 148 + 29 → + 2 − 2 → 150 + 27 = 177 148 + 29 → − 1 + 1 → 147 + 30 = 177	These problems are selected to quickly review the give and take strategy, and then apply it to addition with decimals. If students continue to use a get to a friendly number strategy, which also works well for these problems, highlight connections to give and take, where both addends are changed to make an easier problem. **Big Idea** Strategies for solving addition problems with whole numbers can be applied to addition problems with decimals. Changing one of the decimal addends to a friendly number (for example, a whole number) and adjusting the other addend by the same amount makes the problem easier to solve.
14.8 + 2.9 = 17.7	14.8 + 2.9 → + 0.2 − 0.2 → 15.0 + 2.7 = 17.7 14.8 + 2.9 → − 0.1 + 0.1 → 14.7 + 3.0 = 17.7 	
2.88 + 0.12 = 3	Students might naturally think of problems like this one in terms of money. Others will see combinations in the tenths and hundredths that can be combined to make 1. For example, they might add 0.88 and 0.12 to make one whole. 	
2.88 + 1.56 = 4.44	2.88 + 1.56 → + 0.12 − 0.12 → 3.00 + 1.44 = 4.44 2.88 + 0.12 = 3.00 → + 1.56 − 0.12 = 1.44 → 4.44	
2.99 + 3.65 = 6.64	2.99 + 3.65 → + 0.01 − 0.01 → 3.00 + 3.64 = 6.64 2.99 + 0.01 = 3.00 → + 3.65 − 0.01 = 3.64 → 6.64	

MLL & SUPPORT Model and encourage precise language for reading decimals: *two and eighty-eight hundredths* instead of *two point eight eight*. Using precise language based on place value will support students as they compose and decompose decimal numbers to create whole number addends.

CHALLENGE Encourage students who efficiently change one addend to a whole number to use give and take to change the other addend to a whole number.

4 Ask students to explain how the give and take strategy can be applied to adding with decimals. Have students share their thoughts and together generate a class summary.

Sample Summary: Give and Take with Decimals

When you add two decimals, you can take a number from one addend and give it to the other addend. If you use this to make one of the addends a friendly number like a whole number, the numbers are easier to add.

$$\begin{array}{r} 2.99 + 3.65 \\ +\,0.01\ -\,0.01 \\ \hline 3.00 + 3.64 = 6.64 \end{array} \qquad \begin{array}{r} 2.99 + 0.01 = 3.00 \\ +\,3.65 - 0.01 = 3.64 \\ \hline 6.64 \end{array}$$

5 Ask students to locate the next blank page in the Number String Summary Space in their student books. Have them write the date and record the summary and example problem.

Day 8

Updates

Complete the update routines for these workouts:

- Calendar Grid
- Calendar Collector

Computational Fluency: Partner Claim the Factors, Part 1

Copies & Display	**NCSB 1** Claim the Factors Game Board
Classroom Materials	crayons or colored pencils

1 Open today's activity by letting students know they will play Claim the Factors against a partner today.

2 Quickly review how to play Claim the Factors.

As you review the game instructions with the class, remind students of the following:

» Once a number on the game board has been circled, it can't be used again.

» If a player chooses a target number that has no factors left to circle, they must cross out the target number. The player loses their turn and does not get the points for the number selected.

» When the sheet has no more factors that can be circled (i.e., when no further plays can be made), the game is over.

3 Ask students to review the directions with a neighbor, and take a minute to answer any remaining questions they have about the game.

4 When students understand what to do, have them play the game in pairs.

- Give them a few moments to locate the Claim the Factors Game Board in their Number Corner Student Books and get a crayon or colored pencil.
- Assign or have students choose partners.
- Explain that each pair needs only one copy of the Claim the Factors Game Board.

5 As students play, circulate to make observations and offer differentiated instruction as needed.

MLL Review the game instructions by playing a round with multilingual students, modeling each step and emphasizing what to do on their game boards. Pair multilingual students with supportive partners.

SUPPORT Help students create an organized list of factor pairs for the target number. Encourage students to work together rather than competitively. Alternatively, suggest that players work on a board with numbers 1-30 only.

CHALLENGE Encourage students to talk about how they choose target numbers to keep their partner from scoring high amounts. Players can also challenge themselves on a board with numbers up to 100.

Digital Resources

The 100-chart on the Number Chart app can be used as a game board for Claim the Factors through 100. Students can create their own custom charts for additional variations.

Apps are available at apps.mathlearningcenter.org.

6 Conclude the activity by asking students to share any observations, insights, or tips they have for playing Claim the Factors.

Some students might note that it's a good idea to choose a prime number or a composite number with very few factors (such as 16 or 39) early in the game. Others might observe that it's wise to choose greater composite numbers later in the game, when many of the factors have already been crossed out.

Math Practices in Action

Look for and express regularity in repeated reasoning

Claim the Factors provides an opportunity for students to watch for overlap and repetition in their choices for target numbers and identification of the factors of the numbers. Through this analysis, students develop an understanding of common factors and common multiples and deepen their understanding of prime and composite numbers.

Day 9

Updates

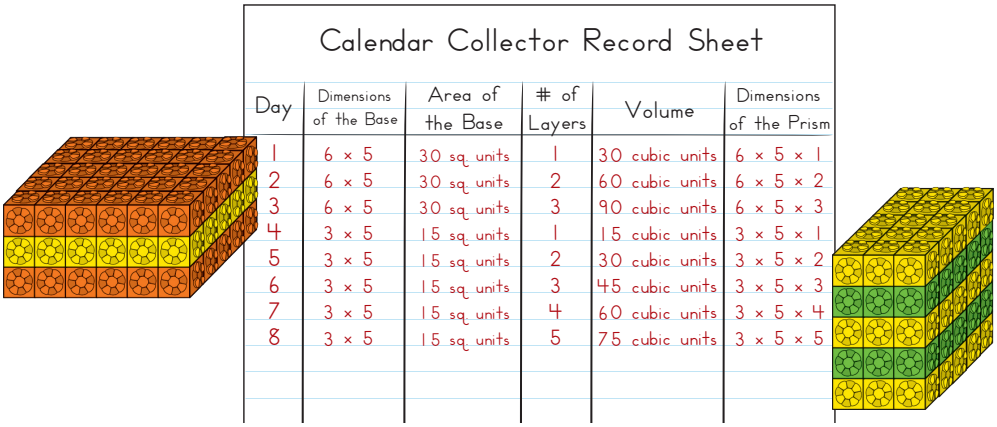
Complete the update routine for Calendar Grid.

Calendar Collector: Revisiting the Collection

Kit Materials	Omnifix cubes
Classroom Materials	Calendar Collector record sheet

1 Invite students to join you in the Number Corner discussion area. Give them a few moments to quietly examine the Calendar Collector record sheet and the two rectangular prisms that have been constructed so far.

At this point, the record sheet should have been updated daily through Day 8 by a student helper. If not, quickly build the prisms a layer at a time and fill in the chart with the class.



Calendar Collector Record Sheet

Day	Dimensions of the Base	Area of the Base	# of Layers	Volume	Dimensions of the Prism
1	6 × 5	30 sq. units	1	30 cubic units	6 × 5 × 1
2	6 × 5	30 sq. units	2	60 cubic units	6 × 5 × 2
3	6 × 5	30 sq. units	3	90 cubic units	6 × 5 × 3
4	3 × 5	15 sq. units	1	15 cubic units	3 × 5 × 1
5	3 × 5	15 sq. units	2	30 cubic units	3 × 5 × 2
6	3 × 5	15 sq. units	3	45 cubic units	3 × 5 × 3
7	3 × 5	15 sq. units	4	60 cubic units	3 × 5 × 4
8	3 × 5	15 sq. units	5	75 cubic units	3 × 5 × 5

2 Ask students to think-pair-share with a neighbor about any patterns they notice on the record sheet. Then invite volunteers to share their observations with the class.

- During discussion, draw out conversation about the relationship between the area of the base and the volume of the prism, and any connection students can make between prisms with the same volume but different dimensions.
- The following questions might spur conversation:
  - » *How can you find the volume of each prism?*
  - » *What connections can be made between the numbers on each row of the chart?*
  - » *What patterns do you notice in the information entered for Days 4–8? What about for Days 1–8?*
  - » *How might you use this information to make a prediction about today's prism?*

Max *The prism on Day 1 and the prism on Day 5 have the same volume. They must be the same size, sort of.*

Math Teaching Practice

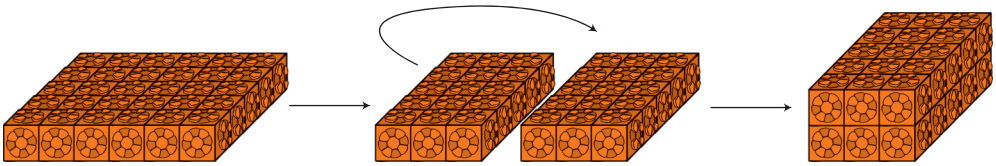
Elicit and use evidence of student thinking

These questions ask students to make connections and identify relationships not only across the columns of information for each day but among the rectangular prisms that are being constructed. The sample dialogue illustrates how one teacher uses students' contributions to assess their mathematical understanding and extend their learning.

Teacher *Talk to a neighbor about what Max just pointed out. Can anyone provide a suggestion about how these two prisms are the same size, sort of?*

Kiara *Well, the first prism has a 6 × 5 base, and just one layer, so that's 30 cubes on the bottom. The second prism only has 3 × 5 on the bottom, and that's 15 cubes. But it also has two layers, so that's 30 cubes.*

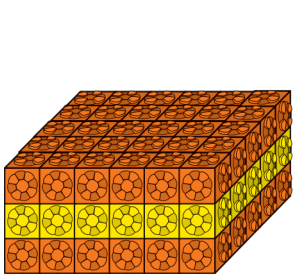
Carlos *Since the bottom layer isn't as big, you need two layers to make them match. See, if you break the 6 × 5 layer in half and stack the halves, it will look like the 3 × 5 × 2.*



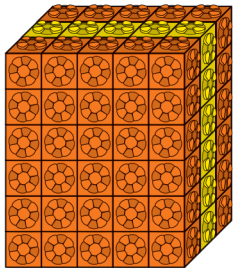
Teacher *Are there any other prisms that we might be able to match like this?*

Elisa *Well, the 6 × 5 × 2 and the 3 × 5 × 4 both use 60 cubes. The first one has a 6 × 5 base with two layers, and that's 30 twice. But since the 3 × 5 base is only 15 cubes, you need twice as many layers — 4 of them — to get the 60 cubes.*

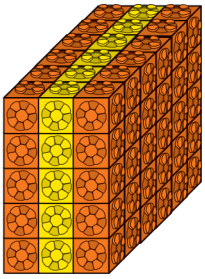
3 Hold up the (6 × 5) × 3 prism. Rotate the prism while students observe, so that they can view it as a (5 × 3) × 6 prism and a (3 × 6) × 5 prism.



(6 × 5) × 3



(5 × 3) × 6



(3 × 6) × 5

4 Ask students to turn and talk to a neighbor about whether or not any of the information on the record sheet would have to change if a prism were rotated or flipped, as you have just done.

Give student pairs a minute to discuss the question, and then invite volunteers to share their thinking with the class.

5 Introduce the use of parentheses as a way to represent the base and the height of a rectangular prism.

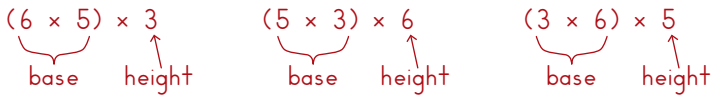
- Hold up the 6 × 5 × 3 prism positioned so that the base is 6 × 5 and the height is 3. Record the expression (6 × 5) × 3 on the board, and explain that you have placed parentheses around the numbers that show the dimensions of the base.
- Now rotate the prism so that the base is 5 × 3, and the height is 6, and work with student input to write the corresponding expression: (5 × 3) × 6.
- Finally, rotate the prism so that the base is 3 × 6 and the height is 5. Again, work with student input to write the corresponding expression: (3 × 6) × 5.

Math Practices in Action

Reason abstractly and quantitatively

Expressions for the different ways of positioning the same rectangular prism develop students' understanding of symbolic notation. These varying expressions also connect — both geometrically and symbolically — to the commutative and associative properties of multiplication.

As you work with the students to write an expression for each position, note with them that the numbers in the parentheses can be switched without altering the dimensions of the base or the height. In other words, the expression (6 × 5) × 3 represents a prism with the same base and height as a prism represented with the expression (5 × 6) × 3. On the other hand, the expression (5 × 3) × 6 represents a prism with a different base and height than one represented with the expression (3 × 6) × 5, even though the two are congruent.



6 Write parentheses on the record sheet to indicate the dimensions of the base for each of the prisms constructed by the class so far. Then invite a student to add one more layer to the (3 × 5) × 5 prism from Day 8, and have the student record the information for Day 9, with input from the class.

Invite conversation about which columns of information will not change as an additional layer is added. Be sure the student volunteer includes parentheses in the last column for Day 9.

Calendar Collector Record Sheet

Day	Dimensions of the Base	Area of the Base	# of Layers	Volume	Dimensions of the Prism
1	6 × 5	30 sq. units	1	30 cubic units	(6 × 5) × 1
2	6 × 5	30 sq. units	2	60 cubic units	(6 × 5) × 2
3	6 × 5	30 sq. units	3	90 cubic units	(6 × 5) × 3
4	3 × 5	15 sq. units	1	15 cubic units	(3 × 5) × 1
5	3 × 5	15 sq. units	2	30 cubic units	(3 × 5) × 2
6	3 × 5	15 sq. units	3	45 cubic units	(3 × 5) × 3
7	3 × 5	15 sq. units	4	60 cubic units	(3 × 5) × 4
8	3 × 5	15 sq. units	5	75 cubic units	(3 × 5) × 5
9	3 × 5	15 sq. units	6	90 cubic units	(3 × 5) × 6

7 Close the activity by asking students to consider the following questions:

- *What information do you need to determine the volume of a prism?*
- *If you were given the volume of the prism and the number of layers, would you be able to determine the area of the base?* (Yes)
- *If you were given the volume of the prism and the number of layers, would you be able to determine the dimensions of the base?* (Not necessarily)
- *If you were given the dimensions of the base and the total volume, would you be able to determine the number of layers?* (Yes)

8 Let students know that in future Calendar Collector activities, they will continue to explore the relationships on the record sheet.

Tell the next student helper in charge of updating Calendar Collector that they will start a new prism on Day 10. It will have a base of 4 × 4 and a height of 1. On Days 11–13, additional layers will be added to the new prism.

Day 10

Updates

Complete the update routines for these workouts:

- Calendar Grid
- Calendar Collector

Solving Problems: Discussing Rock Hopping

Classroom Materials	Rock Hopping (NCSB 2–3) with student work from Day 5

Review students' work from Day 5. Look for a student pair who listed the multiples of 2, 3, and 6 separately and found common multiples. Look for any students who used a sketch or diagram to model the problem. If no students did this, introduce the strategy yourself so that students can compare strategies for efficiency. Finally, look for student work that represents a more abstract understanding of the relationship between the multiples of 2, 3, and 6.

1 Open today's activity by letting students know that they are going to share and discuss their work on the Rock Hopping problems.

2 Display the first Rock Hopping student book page and ask students to find their work in their Number Corner Student Books.

Take a few moments to review the problems students solved during the first Solving Problems activity.

3 Let students know that you looked at their work and are anxious to have them share their thinking with the class. First, set a few guidelines for sharing:

- Some students, but not all, will share how they solved the problem.
- Each pair of students who shares will have a chance to explain and show their work.
- The rest of the class will have a chance to ask clarifying questions.
- The teacher might ask other students to summarize what the pair of students did.
- Then, another pair of students will present.
- As more students share, the dialogue will grow, and the class will collect and compare the strategies shared.
- All students are responsible for being respectful as they listen to others. They are also responsible for trying to understand their classmates' work. If they do not understand what other students did or why, they should ask a question.
- All students should read the ABCs of Math Talk on the inside cover of their student books. Ask what they notice and wonder about the prompts. Invite them to identify how the prompts might be useful when sharing or discussing their own or their classmates' work.

4 Answer any questions students have about the guidelines or ABCs of Math Talk prompts.

5 Invite the first pair of students who listed the multiples separately to display and present their work. Ask them to describe their strategy for solving the first problem.

Darius *We decided to make a list of all the rocks that each of the frogs landed on.*

Troy *So, first we made a list of DJ's rocks. We wrote 2, 4, 6, 8… and kept going until we got to 36.*

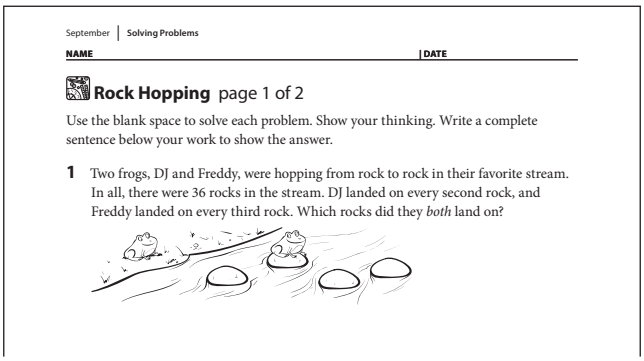
Darius *Then we made a list of Freddy's rocks, counting by 3s. So, 3, 6, 9, 12…*

Troy *And once we made our lists, we just circled the numbers that are on both lists.*

Darius *We got 6, 12, 18, 24, 30, and 36.*

Teacher *And what do those numbers mean?*

Troy *Those are the rocks that both frogs landed on.*



September | Solving Problems

NAME | DATE

Rock Hopping page 1 of 2

Use the blank space to solve each problem. Show your thinking. Write a complete sentence below your work to show the answer.

1 Two frogs, DJ and Freddy, were hopping from rock to rock in their favorite stream. In all, there were 36 rocks in the stream. DJ landed on every second rock, and Freddy landed on every third rock. Which rocks did they *both* land on?

Teacher *Does anyone have a question for Troy and Darius?*

Kendra *So, then, when you solved problem 2, what did you do?*

Darius *We made another list for Sue's rocks, counting by 6s. Then we just had to compare all three lists to see the rocks that everyone landed on.*

6 Invite a second pair of students, who used a model for both lists of multiples, to share. Then compare the two strategies for efficiency.

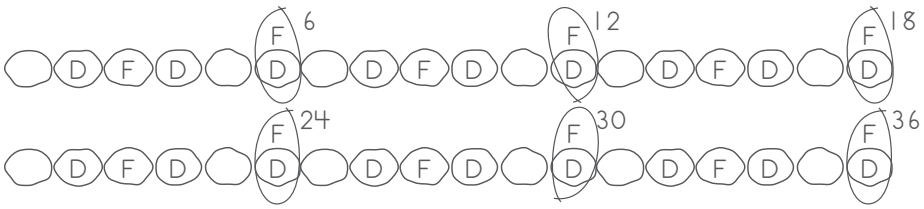
Teacher *OK, Elisa and Sara, please share with us what you did to solve this problem.*

Elisa *When we read this problem, the first thing we thought of was that we needed to be able to see the rocks that the frogs were hopping on. We decided to draw all 36 rocks.*

Sara *We labeled the rocks each frog landed on by writing D for DJ or F, for Freddy.*

Elisa *Then we just had to list the ones that both frogs landed on.*

Sara *We got the same answer as the first group.*



They both landed on 6, 12, 18, 24, 30, and 36.

Teacher *How does this strategy compare with the one Troy and Darius shared? How are the strategies alike, and how are they different?*

Math Teaching Practice

Facilitate meaningful mathematical discourse

The strategies suggested for sharing here are deliberately selected and sequenced from anticipated strategies. The sample dialogue below suggests ways in which a conversation about these strategies might unfold.

Sergio *They got the same answers.*

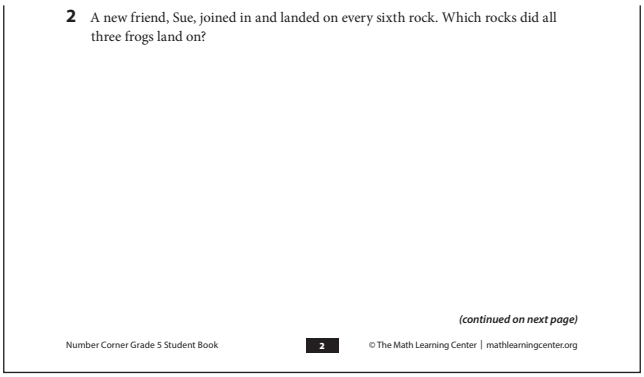
Carlos *The first group made a new list for each frog, but the second group used the same picture of rocks for both frogs.*

7 Invite one more pair of students to share, ideally students whose work indicated some understanding of the connection between the multiples of 2, 3, and 6.

Teacher *Darryl and Natalie, will you please talk to us about what you discovered?*

Natalie *We solved the first problem by drawing the rocks and making labels, kind of like Elisa and Sara. Then when we worked on the second problem, we noticed that Sue landed on the same rocks that DJ and Freddy both landed on.*

Darryl *Yeah, if DJ and Freddy both landed on a rock, then so did Sue.*



2 A new friend, Sue, joined in and landed on every sixth rock. Which rocks did all three frogs land on?

(continued on next page)

Number Corner Grade 5 Student Book 2 © The Math Learning Center | mathlearningcenter.org

Whitney *So, now that you say that, I can see it, but how did you know?*

Natalie *When we noticed it, we thought about 2 times 3 is 6, and so every time you would land on a sixth rock, you would also be landing on a second rock or a third rock.*

Darryl *So, any rock that is a multiple of both 2 and 3 is a multiple of 6, too!*

Teacher *Does anyone need more help understanding this strategy? Does anyone have a question or comment about it?*

8 Help students understand the connection between the first two problems and common multiples.

A common multiple of two numbers is a number that is a multiple of both numbers. Since 6, 12, 18, 24, 30, and 36 are all multiples of 2 and 3, they are common multiples of 2 and 3.

9 If you have time, invite students to use the strategies discussed to solve or reexamine problems 3 and 4, then share their thinking.

10 At the end of your Number Corner time today, summarize the first two Solving Problems activities, and explain that students will repeat this sequence of working on a problem set one day, and then sharing their work a few days later.

Digital Resources

The Number Line app is an effective tool for displaying multiples and common multiples. Enter the share code 1JS8-97ZE in the app to illustrate 6 as a common multiple of 2 and 3, and extend these multiples along the number line.

Apps are available at apps.mathlearningcenter.org.

Day 11

Updates

Complete the update routines for these workouts:

- Calendar Grid
- Calendar Collector

Number Strings: Number String 3

Copies & Display	**NCSB Appendix** Number String Summary Space
Classroom Materials	whiteboard or chart paper

1 Let students know that today's number string connects the strategies they learned for subtracting whole numbers to subtracting decimal values. If needed, review the number string routine.

Students review taking away and finding the difference with whole numbers and apply these strategies to decimals.

2 Deliver the number string shown in the following table.

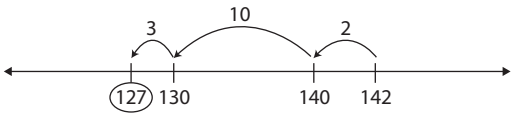
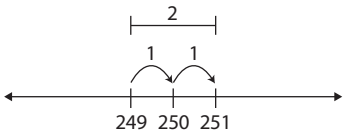
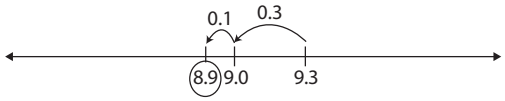
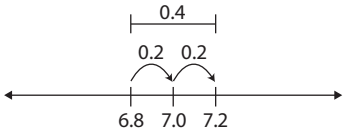
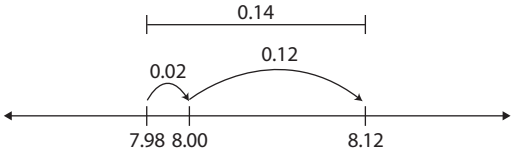
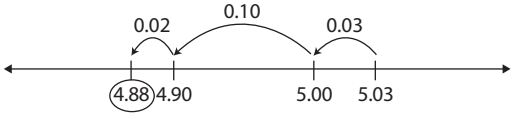
Students might share various strategies for solving these problems, including different jump intervals for take away and find the difference.

- Use number lines and equations to record students' strategies.
- Work with the class to think about combinations for which removal or take away — which can be represented using backward hops on the open number line — makes more sense than finding the difference, and vice versa.
- As students are developing their understanding of showing the take away and find the difference strategies on the number line, take time in your discussion to talk about how the number line works. When taking away, the answer is the final landing point on the number line. When finding the difference, the answer is the distance between the subtrahend and the minuend. Students might also find it helpful to see a subtraction equation rewritten as an addition equation with a missing addend (e.g., 7.2 – 6.8 = ____ rewritten as 6.8 + ____ = 7.2).

Math Practices in Action

Use appropriate tools strategically

The number lines suggested in this number string are particularly effective for illustrating the take away and find the difference strategies, and highlighting the differences between them. When you use a number line to take away, the answer is found at the final landing point. When you find the difference, the answer is found in the distance from the subtrahend to the minuend.

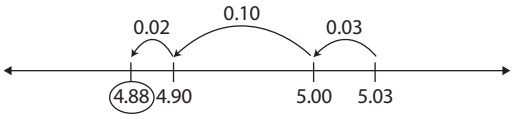
Problems	Sample Strategies & Recording	Connections
142 – 15 = 127	 142 – 2 = 140 140 – 10 = 130 130 – 3 = 127	By posing problems that are radically different in terms of how the subtrahend compares to the minuend, you invite the strategies of take away and find the difference. **Big Idea** When the subtrahend is a great deal less than the minuend it might be more efficient to use a take away strategy, which can be modeled using backward hops on an open number line. On the other hand, when the subtrahend is quite close to the minuend, it might be more efficient to find the difference between the two numbers. Invite generalizations about the two strategies by asking if anyone used a take away strategy to solve 7.2 – 6.8, or used find the difference for 9.3 – 0.4. Discuss why or why not, and ask students to begin thinking about when they might prefer one strategy over the other.
251 – 249 = 2	 249 + 1 = 250 250 + 1 = 251 1 + 1 = 2	
9.3 – 0.4 = 8.9	 9.3 – 0.3 = 9 9.0 – 0.1 = 8.9	
7.2 – 6.8 = 0.4	 6.8 + 0.2 = 7.0 7.0 + 0.2 = 7.2 0.2 + 0.2 = 0.4	
8.12 – 7.98 = 0.14	 7.98 + 0.02 = 8.0 8.00 + 0.12 = 8.12 0.02 + 0.12 = 0.14	Before students solve these problems, ask them to think about whether they would prefer to take away or to find the difference, and explain why.
5.03 – 0.15 = 4.88	 5.03 – 0.03 = 5.00 5.00 – 0.10 = 4.90 4.90 – 0.02 = 4.88	

3 Ask students to explain when and how they might use the take away and find the difference strategies for subtracting decimals. Have students share their thoughts and together generate a class summary.

Sample Summary: Take Away and Find the Difference with Decimals

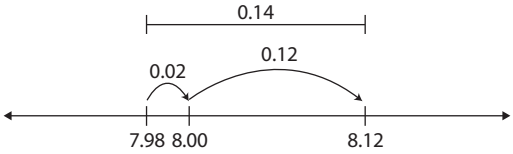
Strategies that work with whole numbers can also work with decimals. When the value of the second decimal in a subtraction problem is much less than the value of the first decimal in the subtraction problem, it might be more efficient to take away. When the two decimals in the subtraction problem are close together, it can be easier to find the difference between the two decimals.

Take away example:



5.03 – 0.15 = 4.88

Find the difference example:



8.12 – 7.98 = 0.14

SUPPORT As an alternative to recording lengthy number string summaries, have students record a single sentence or select diagrams. You can also print multiple copies of your class summary for students to paste into their student books.

4 Have students record the summary and example problems in the Number String Summary Space section of their Number Corner Student Books.

Math Teaching Practice

Support productive struggle in learning mathematics

The generation of a class summary is an invitation to describe a mathematical concept in words and diagrams, what would be a very challenging individual task. The collaborative nature of the class summary creates the space for shared productive struggle and perseverance.

Day 12

Updates

Complete the update routines for these workouts:

- Calendar Grid
- Calendar Collector

Computational Fluency: Partner Claim the Factors, Part 2

Copies & Display	**NCSB 1** Claim the Factors Game Board
Classroom Materials	crayons or colored pencils

1 Open today's activity by letting students know they are going to play Claim the Factors against a partner.

2 Quickly review how to play Claim the Factors.

As you review the game instructions with the class, remind students of the following:

» Once a number on the game board has been circled, it can't be used again.

» If a player chooses a target number that has no factors left to circle, they must cross out the target number. The player loses their turn and does not get the points for the number selected.

» When the sheet has no more factors that can be circled (i.e., when no further plays can be made), the game is over.

3 Ask students to review the directions with a neighbor, and take a minute to answer any remaining questions they have about the game.

4 When students understand what to do, have them play the game in pairs.

- Give them a few moments to locate the Claim the Factors Game Board page in their Number Corner Student Books and get a crayon or colored pencil.
- Assign or have students choose partners.
- Explain that each pair needs only one copy of the Claim the Factors Game Board.

5 As students play, circulate around the room, making observations and offering differentiated instruction as needed.

MLL Review the game instructions by playing a round with multilingual students, modeling each step and emphasizing what to do on their game boards. Pair multilingual students with supportive partners or allow them to play with a teammate.

SUPPORT Help students create an organized list of factor pairs for the target number. Encourage students to work together rather than competitively. Alternatively, suggest that players work on a board with numbers 1-30 only.

CHALLENGE Encourage students to talk about how they choose target numbers to keep their partner from scoring high amounts. Players can also challenge themselves on a board with numbers up to 100.

6 Conclude the activity by asking students to share any observations, insights, or tips they have for playing Claim the Factors.

Some students might note that it's a good idea to choose a prime number or a composite number with very few factors (such as 16 or 39) early in the game. Others might observe that it's wise to choose greater composite numbers later in the game, when many of the factors have already been crossed out.

Day 13

Updates

Complete the update routine for Calendar Collector.

Calendar Grid: Equations & Equivalencies, Part 2

Kit Materials	• Calendar Grid display • money value pieces (1 set)
Classroom Materials	• Calendar Grid Observations chart • fraction expression label cards

1 Gather students in front of the Calendar Grid pocket chart and Calendar Grid Observations chart and set the goals for today's activity.

Let students know that today's activity focused on the following:

- » Making predictions about today's marker based on patterns students have observed so far.
- » Looking at the equations recorded on the Calendar Grid Observations chart for the days of the month that have passed so far.
- » Discussing equivalencies among the markers and equations.
- » Looking for patterns across the Calendar Grid and adding a fraction expression label to each of the markers posted since the last time the class discussed the grid during Number Corner.

2 Begin by asking students to share predictions about today's marker, first in pairs, and then as a whole group.

Press students to explain or justify their predictions.

3 When a few students have shared their predictions, have your student helper reveal today's marker.

Ask students to study the marker quietly for a few seconds. Then invite them to share equations that could be recorded on the Calendar Grid Observations chart to represent the visual.

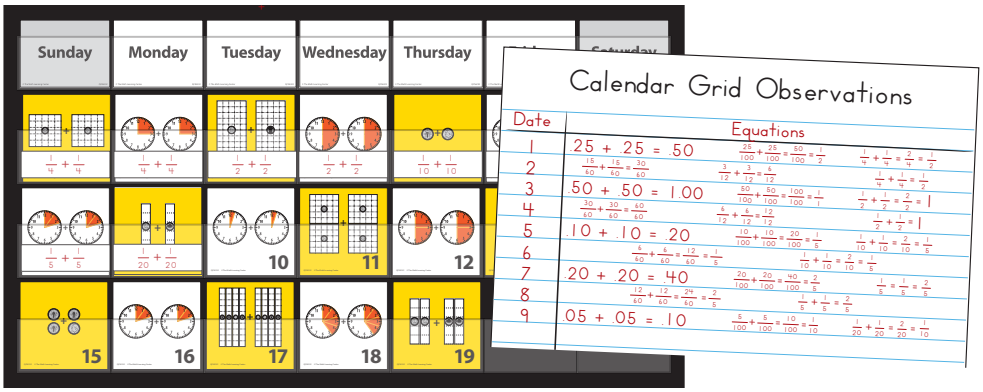
4 After recording students' suggestions, ask them to spend a minute taking a closer look at the Calendar Grid markers and the equations recorded on the Calendar Grid Observations chart.

Invite them to comment on any incorrect or additional equations that could be added to the observations chart for previous markers.

Math Practices in Action

Reason abstractly and quantitatively

As students work with equivalent equations this month, they move back and forth between contextualizing and decontextualizing the numbers and equations. This supports the development of students' quantitative reasoning as they attend to the meaning of quantities in relation to money and analog clocks.

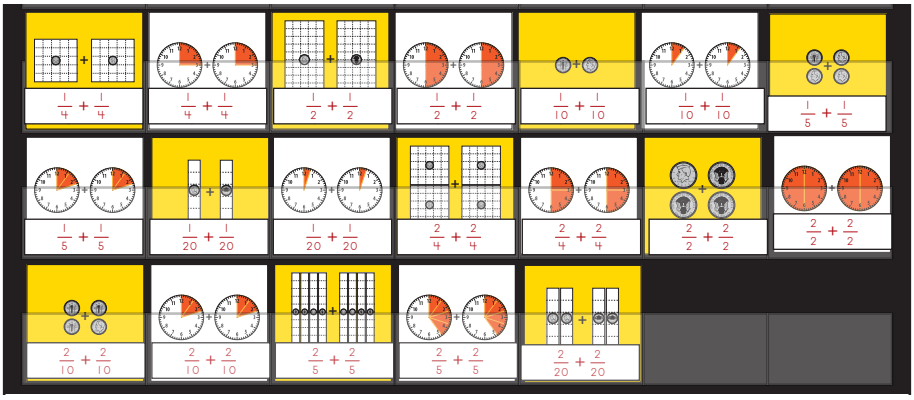


5 Invite students to look carefully for any patterns that might help determine expressions for the fraction expression labels.

6 Create fraction expression labels for the rest of the markers up to today's date, discussing equivalencies and patterns used to determine which expressions to write.

At marker 11, students should observe that the unit fractions double and change to fractions with a numerator of two.

7 Wrap up by reminding students that someone will update the Calendar Grid each day. Ask students to make some final predictions about the next few markers and patterns that the labels will follow.



Fraction expression labels for calendar markers 1–19.

Digital Resources

The Money Pieces app and the Math Clock app provide digital tools to reason about fractions and decimals, and to justify equivalencies.

Apps are available at apps.mathlearningcenter.org.

Day 14

Updates

Complete the update routine for Calendar Grid.

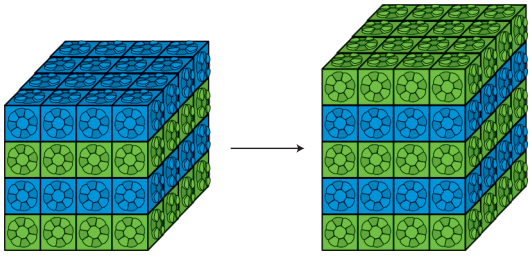
Calendar Collector: What's Missing?

Copies & Display	**NCSB 4** What's Missing?
Kit Materials	Omnifix cubes
Classroom Materials	Calendar Collector record sheet

If necessary, update Calendar Collector through Day 13 to allow enough time for students to complete today's activity.

1 Explain that students are going to quickly update the Calendar Collector for Day 14 and then do a page in their Number Corner Student Books today, rather than meeting in the discussion area.

2 Let students know that they are going to add another layer to the current prism for Day 14. Ask students to predict the dimensions and volume of the prism, as you add a layer to the existing $(4 \times 4) \times 4$ prism.



3 Invite a volunteer to describe the dimensions of the prism. Then ask students to consider how they would determine the total volume of the prism.

- During discussion, elicit efficient strategies including some or all of the following:
  - » Add 16 (the volume of the new layer) to the existing volume of the prism constructed on Day 13.
  - » Reassociate the numbers to make use of well-known combinations, e.g., $(4 \times 4) \times 5 = 4 \times (4 \times 5) = 4 \times 20 = 80$.
  - » Multiply 4×4, split 16 into 10 and 6, and multiply each of these numbers by five: $(4 \times 4) \times 5 = 16 \times 5 = (10 + 6) \times 5 = (10 \times 5) + (6 \times 5) = 50 + 30 = 80$.
- Ask students to consider similarities and differences between their calculations of the prism's total volume, and where the prism's dimensions appear in each strategy.

4 Work with the students to enter the information for Day 14 on the Calendar Collector record sheet.

Math Teaching Practice

Pose purposeful questions

Asking students to predict the dimensions and volume of the rectangular prism is an opportunity to assess students' thinking about these measurable attributes. Asking students to make connections among their strategies in the next action step provides an additional opportunity to advance students' reasoning about important relationships between the attributes and their strategies for calculating the new prism's volume.

Calendar Collector Record Sheet

Day	Dimensions of the Base	Area of the Base	# of Layers	Volume	Dimensions of the Prism
1	6 × 5	30 sq. units	1	30 cubic units	(6 × 5) × 1
2	6 × 5	30 sq. units	2	60 cubic units	(6 × 5) × 2
3	6 × 5	30 sq. units	3	90 cubic units	(6 × 5) × 3
4	3 × 5	15 sq. units	1	15 cubic units	(3 × 5) × 1
5	3 × 5	15 sq. units	2	30 cubic units	(3 × 5) × 2
6	3 × 5	15 sq. units	3	45 cubic units	(3 × 5) × 3
7	3 × 5	15 sq. units	4	60 cubic units	(3 × 5) × 4
8	3 × 5	15 sq. units	5	75 cubic units	(3 × 5) × 5
9	3 × 5	15 sq. units	6	90 cubic units	(3 × 5) × 6
10	4 × 4	16 sq. units	1	16 cubic units	(4 × 4) × 1
11	4 × 4	16 sq. units	2	32 cubic units	(4 × 4) × 2
12	4 × 4	16 sq. units	3	48 cubic units	(4 × 4) × 3
13	4 × 4	16 sq. units	4	64 cubic units	(4 × 4) × 4
14	4 × 4	16 sq. units	5	80 cubic units	(4 × 4) × 5

5 Display What's Missing?, and have students find the page in their Number Corner Student Books.

Read the directions, and then ask students to quietly examine the table of missing information.

6 Review the rest of the problems briefly with the class, and clarify as needed before having them go to work.

SUPPORT Encourage students to use Omnifix cubes to help solve some of the problems.

CHALLENGE Ask students to consider the minimum amount of information needed for each row in the chart.

7 As students complete the What's Missing? page, have them meet with a classmate to compare solutions and strategies.

You might not have time to discuss this sheet with the whole class, and some students might need more time to finish it. If you can find time to debrief the assignment with the class, here are some questions you might pose:

- *What information is necessary to determine the volume of a prism?*
- *If you were given the volume of the prism and the number of layers, would you be able to determine the area of the base? How?*
- *If you were given the volume of the prism and the number of layers, would you be able to determine the dimensions of the base? How?*
- *If you were given the dimensions of the base and the total volume, would you be able to determine the number of layers? How?*

8 Let students know that a student helper will continue to update the Calendar Collector each day.

Tell the next student helper in charge of updating the Calendar Collector that they will start a new prism on Day 15. It will have a base of 8 × 2, and a height of 1. On Days 16–19, additional layers will be added to the new prism.

Day 15

Updates

Complete the update routines for these workouts:

- Calendar Grid
- Calendar Collector

Computational Fluency: Factors & Multiples

Copies & Display	**NCSB 5–6** Factors & Multiples

1 Tell students they are going to do some work in their Number Corner Student Book today, based on their experience playing Claim the Factors.

2 Display the first page of Factors & Multiples, and have students locate the pages in their Number Corner Student Books.

3 Review the questions on both pages briefly with the class, and clarify as needed. When students understand what to do, have them go to work.

CHALLENGE After students complete question 3, ask them to consider which numbers on the Claim the Factors Game Board are the best and worst first moves.

4 As students complete the Factors & Multiples pages, have them meet with a classmate to discuss their responses and explain their thinking.

5 When the majority of students have completed the Factors & Multiples pages, or when there are a few minutes left in Number Corner time, revisit the following questions:

- *How are factors and multiples related?*
- *How do prime and composite numbers affect the Claim the Factors game?*
- *What strategies can be employed when playing Claim the Factors to result in a higher score?*

Math Practices in Action

Attend to precision

This month, students have been developing facility and accuracy with *factor* and *multiple*, terms that are often confused by children and adults. As students share and reflect on their work, continue to support their precision with these related terms.

Day 16

Updates

Complete the update routines for these workouts:

- Calendar Grid
- Calendar Collector

Solving Problems: Solving Another Problem

Copies & Display	**NCSB 7–8** Field Trip Snacks
Classroom Materials	paper (1 sheet, for screen)

1 Follow the procedure you established on Day 5 to introduce today's problem set.

- Display Field Trip Snacks in the Number Corner Student Book, revealing the first problem only. Read the general instructions at the top of the page to the class, and then invite a student to read the problem aloud.
- Ask students to turn to a partner and talk about what the problem is asking them to figure out. Have them identify the important information that will help them solve the problem. Then, invite a few pairs to share their ideas.
- Once you are sure all students understand what the first problem is asking, have students find the Field Trip Snacks pages in their student books and preview the rest of the problems.
- Have students turn to a partner and begin thinking and talking about how they might solve the problems in this set.
- Solicit any questions students might have before they get started.

2 When students understand what to do, give them the time remaining to solve the problems with their partner.

Remind them to show their work.

3 As students work, circulate to make observations, answer questions, and offer differentiated instruction.

MLL & SUPPORT Check with students to make sure they understand what the questions are asking. Help students with vocabulary, as needed. Make manipulatives available to students so they can create a model of identical bags.

In the allotted time, most students should be able to finish problem 1. As time allows, challenge students to complete problem 2, and to model an efficient way to create a list of the number of bags the teacher could make. Encourage these students to read question 3 and summarize their work.

CHALLENGE Have students come up with a general solution strategy that can help them solve another task like this one.

4 As students finish the problems, have them check their work. Encourage them to think about whether or not their answers are reasonable.

Math Practices in Action

Model with mathematics

Field Trip Snacks presents a situation that resembles an everyday context of sharing resources. It is not readily apparent to students that finding common factors is the key to solving problems like these. By working through solutions to these problems, students are constructing models that can be adapted to different quantities and situations.

Equity-Based Practice

Going deep with mathematics

The Field Trip Snacks problems provide an opportunity for students to go deep with mathematics, because they are open to multiple solution strategies and representations. Encourage pairs to analyze, compare, debate, and justify as they engage in these high cognitive demand tasks.

5 Wrap up this activity by letting students know they will discuss their work the next time they do the Solving Problems workout.

SUPPORT Give students who did not finish the Field Trip Snacks pages (particularly problem 1), additional time to work on the assignment before the next Solving Problems activity on Day 20.

Day 17

Updates

Complete the update routines for these workouts:

- Calendar Grid
- Calendar Collector

Number Strings: Number String 4

Copies & Display	**NCSB Appendix** Number String Summary Space
Classroom Materials	whiteboard or chart paper

1 Let students know that today's Number String connects the strategies they learned for subtracting whole numbers to decimal values. If needed, review the number string routine.

This number string develops the constant difference strategy as it applies to subtraction with decimals.

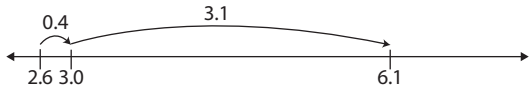
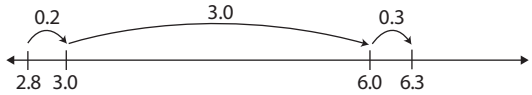
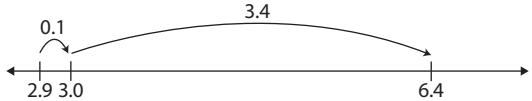
2 Deliver the number string shown in the following tables.

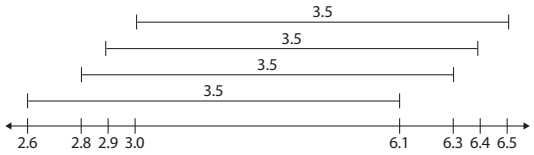
- Students might share various strategies for solving these problems. Use number lines and equations to record students' strategies.
- The number lines in the following table model finding the difference between the minuend and the subtrahend to lay the groundwork for understanding and justifying the constant difference strategy.

Math Teaching Practice

Establish mathematics goals to focus learning

Although students are familiar with the constant difference strategy from earlier work, applying this strategy to decimals might be new learning for them. Instead of revealing to students that they will be working with the constant difference strategy, let the choice of problems in this number string elicit the strategy so that students have an opportunity to develop their understanding.

Problems	Sample Strategies & Recording	Connections
6.1 – 2.6 = 3.5		The first four problems in this string all result in the same difference, 3.5. This is a deliberate move, designed to help the teacher introduce the idea of constant differences later in the string. After the third problem, draw students' attention to the number lines you've recorded and ask for observations. After students discuss the fact that the difference is the same in all three problems, introduce the idea of "constant difference" which involves shifting the subtrahend and the minuend by the same amount to create an easier problem.
6.3 – 2.8 = 3.5		
6.4 – 2.9 = 3.5		

Problems	Sample Strategies & Recording	Connections
6.5 – 3 = 3.5	Students will likely be able to solve this problem easily, either because of the constant difference relationships determined in the problems above or because it involves subtracting a whole number.  	Ask students to discuss which of the first four problems they would prefer to solve and why. Discuss the idea that shifting the position of both numbers by the same amount can be used to make an easier subtraction problem.
	The number string progression continues after the sample dialog	

Teacher *I'm thinking about what you said about the distance between the numbers being 3.5 for each of the problems so far.*

Students *It's almost like there's a line, or distance, of 3.5 that is sliding on the number line. The distance stays the same, 3.5, but it's moving so it has different start and end points.*

Teacher *I wonder why or when that might ever be useful? What can you say about all of these problems? Are they equivalent?*

Students *Yes, because the answers are the same.*
Yes, they are all the same distance apart.

Teacher *So, the problems are equivalent. I will write that:*
6.1 – 2.6 = 6.3 – 2.8 = 6.4 – 2.9. Let me give you another problem: 6.5 – 3.

Darryl *It has to be 3.5. I don't even have to work it out, because it's the same as the one we just did. You just added a tenth to both numbers.*

Jade *Also, I already know that 3 + 3.5 is 6.5, so it's easy to do the subtraction.*

Teacher *I'm looking back at the problems and wondering if there is one that you would prefer to solve over the others. David?*

David *The one we just did, for sure.*

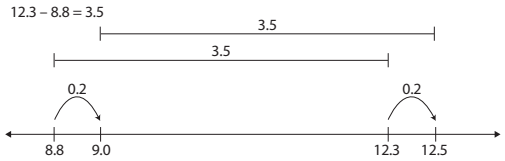
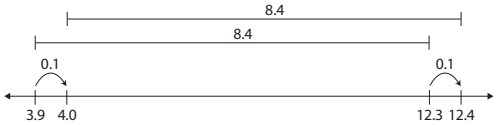
Teacher *You like 6.5 – 3 the most? Why is that?*

David *Because it's the easiest one to figure out.*

Teacher *So if I had given you the first problem and this problem at the same time, do you think you would have liked to solve this last one first? Could we use this idea to help us solve the less friendly problems?*

3 Pose the next two problems, 12.3 – 8.8 and 12.3 – 3.9.

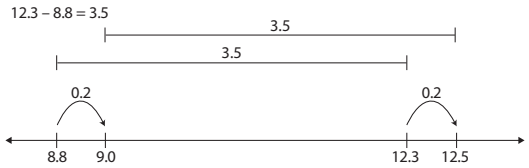
- Ask students to compare the first problem to the problems in the set above.
- The final problem results in a different answer, but can be made into an easier problem either by adding 0.1 to the minuend and subtrahend or by subtracting 0.3 from the minuend and subtrahend.
- Ask students to make a generalization about whether it's better to make the first or the second number in the problem an easier number to work with (i.e., a whole number).

Problems	Sample Strategies & Recording	Connections
12.3 – 8.8 = 3.5	12.3 – 8.8 + 0.2 + 0.2 12.5 – 9.0 = 3.5  12.3 – 8.8 – 0.3 – 0.3 12.0 – 8.5 = 3.5	**Big Idea** A problem might be easiest to solve mentally if you can shift the numbers so that the subtrahend is a whole number.
12.3 – 3.9 = 8.4	12.3 – 3.9 + 0.1 + 0.1 12.4 – 4.0 = 8.4 	

4 Ask students to explain how they could apply the constant difference strategy to subtracting decimals. Have students share their thoughts and together generate a class summary.

Sample Summary: Constant Difference with Decimals

The constant difference strategy is when you add or subtract the same number to the two numbers in a subtraction problem. This keeps the distance between the two numbers the same and can make it easier to subtract.



5 Give students time to record the summary and an example problem in the Number String Summary Space section of their Number Corner Student Books.

Day 18

Updates

Complete the update routine for Calendar Collector.

Calendar Grid: Discussing Predictions & Patterns

Kit Materials	• Calendar Grid display • money value pieces (1 set)
Classroom Materials	• Calendar Grid Observations chart • fraction expression label cards

1 Gather students in front of the Calendar Grid pocket chart and Calendar Grid Observations chart and review a few of the equations recorded on the chart in the previous days.

- Focus discussion on equivalencies listed for each marker.
- Take this opportunity to discuss any inaccuracies recorded or crucial equations missing for any markers.

If students are impatient to see today's marker, let them know that they'll make predictions and a classmate will reveal the marker for today a little later in the activity.

2 Work with input from the class to label each marker posted since your last Calendar Grid activity with a fraction expression that fits into the pattern established earlier in the month.

3 Challenge students to use any patterns they have found, and any that come to light in the next few minutes, to predict what some — or even all — of the remaining markers this month will look like.

- Ask students to share patterns they have noticed over the past few weeks.
- List students' suggestions on the board, and add some of your own if necessary, so that your list of patterns includes these:
  - » Markers alternate between money and clock models, as well as between goldenrod and white backgrounds.
  - » Coins appear on money value pieces twice, and then in isolation twice, in a repeating AABB pattern.
  - » Pairs of markers have identical fraction expression labels.
  - » The visuals on markers 1–10 can all be represented with unit fractions. The visuals on markers 11–20 can all be represented with fractions that have numerators of 2. The visuals on markers 21–30 can be represented with fractions that have numerators of 3.
  - » The denominators feature a repeating pattern of 4, 4, 2, 2, 10, 10, 5, 5, 20, 20.

4 Ask students to think quietly about the patterns listed and make a prediction about today's marker. Then ask them to turn and talk to a neighbor about their predictions.

Instructional Routine

Think-pair-share

Asking students to reason about their own predictions before sharing with a peer ensures that each student has an opportunity to engage in making sense of the patterns and justifying their reasoning

.

Here are some questions you might use to spark students' thinking:

- » *What model should we see, clock or money? If it's money, will it appear as money value pieces or as regular coins?*
- » *What might the model show?* (*How many coins might there be and what denomination? What fractional part or parts of the clocks might be shaded in?*)
- » *What equivalent fractions or decimals might we be able to list on the Calendar Grid Observations chart?*
- » *What will the fraction expression label likely be today?*

5 Allow students to share their predictions and justify their thinking. Then reveal today's marker, and ask students to compare the actual marker with their predictions.

6 Have students continue to make predictions about upcoming markers through the end of the month, or as far as time allows.

After a number of predictions have been shared for a marker, turn it over to confirm students' thinking.

7 Wrap up by asking students to summarize some of the things they learned about fractions this month.

Let them know a new pattern and set of markers will be introduced next month.

Note

Even though students will have seen some or all of the markers for the rest of the month, turn those for future dates face-down. Have a student helper update the Calendar Grid and the observations chart as usual through the end of the month.

Day 19

Updates

Complete the update routine for Calendar Grid.

Calendar Collector: Analyzing Layers

Kit Materials	Omnifix cubes
Classroom Materials	Calendar Collector record sheet

1 Invite students to join you in the Number Corner discussion area, and give them a few moments to examine the Calendar Collector record sheet quietly.

If the data through Day 18 has not been collected before meeting in the discussion area, quickly fill in the chart together.

Calendar Collector Record Sheet

Day	Dimensions of the Base	Area of the Base	# of Layers	Volume	Dimensions of the Prism
1	6 × 5	30 sq. units	1	30 cubic units	(6 × 5) × 1
2	6 × 5	30 sq. units	2	60 cubic units	(6 × 5) × 2
3	6 × 5	30 sq. units	3	90 cubic units	(6 × 5) × 3
4	3 × 5	15 sq. units	1	15 cubic units	(3 × 5) × 1
5	3 × 5	15 sq. units	2	30 cubic units	(3 × 5) × 2
6	3 × 5	15 sq. units	3	45 cubic units	(3 × 5) × 3
7	3 × 5	15 sq. units	4	60 cubic units	(3 × 5) × 4
8	3 × 5	15 sq. units	5	75 cubic units	(3 × 5) × 5
9	3 × 5	15 sq. units	6	90 cubic units	(3 × 5) × 6
10	4 × 4	16 sq. units	1	16 cubic units	(4 × 4) × 1
11	4 × 4	16 sq. units	2	32 cubic units	(4 × 4) × 2
12	4 × 4	16 sq. units	3	48 cubic units	(4 × 4) × 3
13	4 × 4	16 sq. units	4	64 cubic units	(4 × 4) × 4
14	4 × 4	16 sq. units	5	80 cubic units	(4 × 4) × 5
15	8 × 2	16 sq. units	1	16 cubic units	(8 × 2) × 1
16	8 × 2	16 sq. units	2	32 cubic units	(8 × 2) × 2
17	8 × 2	16 sq. units	3	48 cubic units	(8 × 2) × 3
18	8 × 2	16 sq. units	4	64 cubic units	(8 × 2) × 4

2 Ask students to turn and talk with a neighbor about any patterns they notice on the record sheet, and then invite volunteers to share their observations with the class.

The following questions might spur conversation:

» *How can the volume of each prism be quickly determined?*

» *How is the volume of the prism related to the volume of one layer?*

» *Do you notice any patterns or connections between the information recorded for Days 10–14 and the information recorded for Days 15–18?*

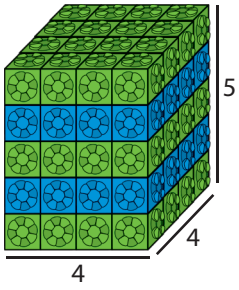
» *How can you use the given information to make a prediction about the prism to be recorded on Day 19?*

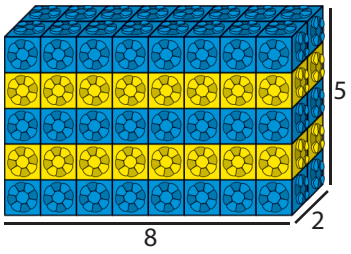
3 Invite a student to add an additional layer to the $(8 \times 2) \times 4$ prism from Day 18 and have that student record the information for Day 19, with input from the class.

Invite conversation about which columns of information will not change as an additional layer is added. Be sure the student volunteer includes parentheses in the final column of the chart.

4 Ask students to share the strategies they used for finding the volume of the prism just built and recorded.

If it doesn't come from the students, draw out the connection between the third and fourth prisms, noting that their height is the same, while one dimension of the 4×4 base has been doubled, and the other halved.





5 Close the activity by asking students to summarize some of the things they have learned during this month's Calendar Collector workout.

Math Practices in Action

Look for and make use of structure

Students might recognize the relationship between the final dimensions of the third and fourth prisms and their total volumes. Making sense of doubling one dimension and halving another dimension to match one prism to the other can be supported by the physical manipulation of the arrangement of the cubes.

Day 20

Updates

Complete the update routine for Calendar Grid.

Solving Problems: Discussing Field Trip Snacks

Classroom Materials	• Field Trip Snacks (NCSB 7–8) with student work from Day 16 • chart paper

Look over students' work from Day 16. Look for a pair of students who used a guess-and-check method for determining the number of bags that could be made. Look for another pair of students who used an organized system or list to keep track of the possibilities.

1 Open today's activity by letting students know they will share and discuss their work on the Field Trip Snacks problems.

2 Display the first page of Field Trip Snacks, and ask students to find their work in their Number Corner Student Books.

Take a few moments to review the problems students solved during the previous Solving Problems activity.

3 Let students know that you looked at their work and are excited to have them share their thinking with the class. Review the guidelines and expectations you have set for sharing.

4 Invite the pairs of students whose work you selected ahead of time to display and share their work with the class.

Encourage the other students to do the following:

- Ask clarifying questions.
- Summarize each strategy after it's presented.
- Compare the strategies, noting differences and similarities, as well as their potential for being efficient and effective.

Math Practices in Action

Construct viable arguments and critique the reasoning of others

Students might continue to need support with asking questions of their peers and commenting on their work. Invite students to use the ABCs of Math Talk prompts inside the cover of their student books to clarify each other's thinking and make connections between the solution strategies.

Student Work/Strategy	Comments
Guess & Check **a** What is the greatest number of snack bags that the teacher can make, if each bag is identical? How do you know? 2 bags 36 ÷ 2 = 18 fruit cups, and 24 ÷ 2 = 12 bananas 12 bags 36 ÷ 12 = 3 fruit cups, and 24 ÷ 12 = 2 bananas 8 bags doesn't work because you can't divide 36 by 8 evenly 9 bags doesn't work because you can't divide 24 by 9 evenly We think 12 bags is the most, because no number more than 12 can go into 24 and 36 at the same time. **b** What other numbers of snack bags could be made? How do you know? 3 bags... 36 ÷ 3 = 12 and 24 ÷ 3 = 8, so 12 FC and 8 bananas 5 bags... NO 7 bags... NO	***Ivan*** *So, we know she can make 2 bags or 12 bags or 3 bags, but 12 is the most.* ***Xavier*** *We picked a number of bags and then tried to see if we could split the fruit cups and bananas equally. And then we tried another number of bags. It didn't work with 8 bags and 9 bags.* ***Teacher*** *Ivan and Xavier, my question to you is this: How do you know that you found all the bags she could make?* ***Xavier*** *Um, I'm not sure. I think we tried everything.* ***Ivan*** *Yeah, those were the only bags that worked out.* **Big Idea** Using a guess-and-check strategy is one way to approach a problem, but it can be challenging to know if and when all the possible solutions have been found.
Organized List **a** What is the greatest number of snack bags that the teacher can make, if each bag is identical? How do you know? Bags Fruit Cups Bananas 1 36 ÷ 1 = 36 24 ÷ 1 = 24 2 36 ÷ 2 = 18 24 ÷ 2 = 12 3 36 ÷ 3 = 12 24 ÷ 3 = 8 4 36 ÷ 4 = 9 24 ÷ 4 = 6 5 No 6 36 ÷ 6 = 6 24 ÷ 6 = 4 7 No 8 No 9 No **b** What other numbers of snack bags could be made? How do you know? Bags Fruit Cups Bananas 10 No 11 No 12 36 ÷ 12 = 3 24 ÷ 12 = 2 13 No 14 No The most bags she can make is 12. She can also make 1, 2, 3, 4, and 6 bags.	***Akiko*** *We tried all the bags until we were done. At first we thought we had to go all the way to 24 because that's how many bananas there were and 24 bags would mean one banana in each. But after we thought about 13 and 14 bags, we realized we could stop.* ***Raven*** *When there are 12 bags, each bag has 2 bananas, and if there are 24 bags, each bag would have 1 banana, but any number of the bags from 13 to 23 would have a partial banana so those wouldn't work. However, 24 wouldn't work because you can't divide 36 by 24 evenly.* ***Teacher*** *Can someone summarize the strategy these students used to find the number of bags possible?* ***Sam*** *They made a list and went in order, trying each bag until they got to a place they could stop.* ***Teacher*** *Ah, so making a list and going in order. And how was that helpful?* ***Xavier*** *They were able to make sure they got them all. We missed some because we skipped around.* **Big Idea** Using an organized list makes it easier to determine when and if you've found all the possible solutions to a problem.

5 After a second pair of students has shared, ask students to turn their focus to the third problem in the set.

- Invite a student to read the question aloud. Then facilitate a conversation about the fact that the numbers of snack bags that work are the common factors of 24 and 36.
- Here are some questions and prompts you might use to drive the discussion:
  - » *Let's focus on the bananas for a moment. What are the factors of 24? Let's write those on the board.* (1, 2, 3, 4, 6, 8, 12, 24)
  - » *Now let's think about the 36 fruit cups, and list the factors of 36 on the board.* (1, 2, 3, 4, 6, 9, 12, 18, 36)
  - » *How does the number of snack bags that can be made, which we said were 1, 2, 3, 4, 6, and 12, relate to the number of fruit cups and bananas?* (Each of those numbers is a factor of both 24 and 36.)

6 If you have time, invite students to use the strategies discussed to solve or reexamine problem 2, then share their thinking.

7 Close the activity by listing on chart paper the types of problem-solving strategies students have shared this month.

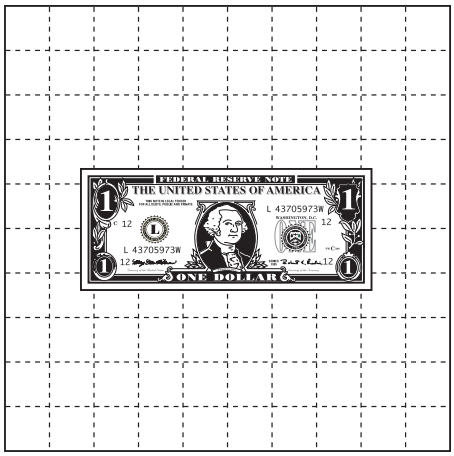
Remind students that developing a repertoire of problem-solving skills will allow them to have choice and become more flexible thinkers.

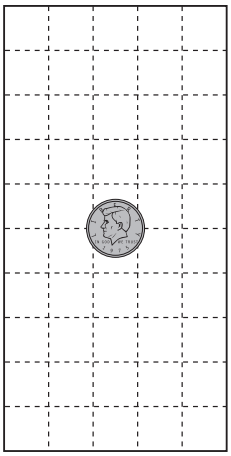
You might leave this list posted somewhere in the classroom, where you can add to it throughout the school year.

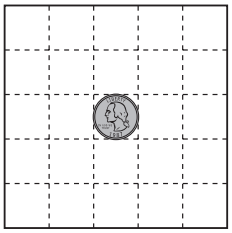
Print Originals

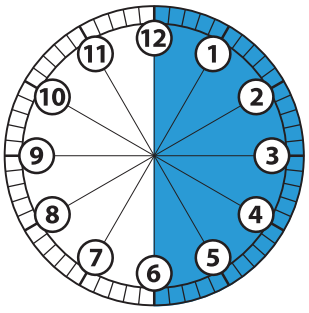
GRADE 5 – SEPTEMBER

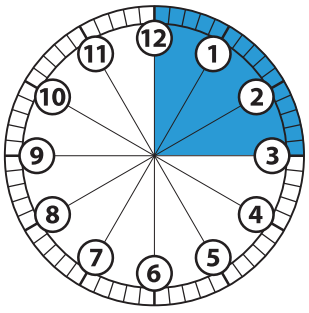
Money & Clock Models

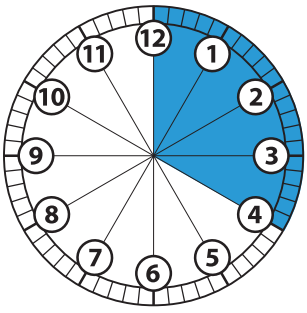


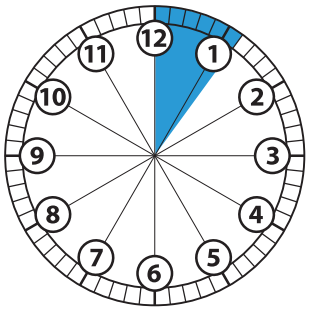












Student Book

GRADE 5 – SEPTEMBER

number corner®

SAMPLE 0922

NAME | **DATE**

Claim the Factors Game Board

Player 1 _____ Player 2 _____

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

Player 1 Total _____ Player 2 Total _____

Player 1 _____ Player 2 _____

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

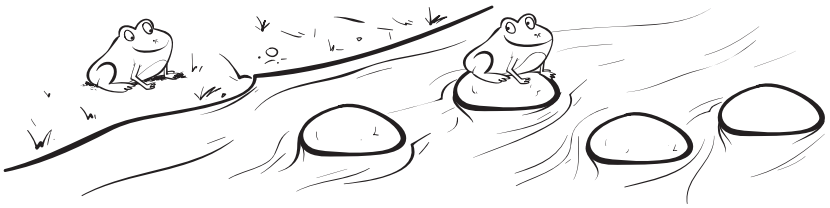
Player 1 Total _____ Player 2 Total _____

NAME | DATE

Rock Hopping page 1 of 2

Use the blank space to solve each problem. Show your thinking. Write a complete sentence below your work to show the answer.

1 Two frogs, DJ and Freddy, were hopping from rock to rock in their favorite stream. In all, there were 36 rocks in the stream. DJ landed on every second rock, and Freddy landed on every third rock. Which rocks did they *both* land on?



2 A new friend, Sue, joined in and landed on every sixth rock. Which rocks did all three frogs land on?

(continued on next page)

NAME | DATE

Rock Hopping page 2 of 2

3 If there were more rocks and the three friends kept jumping, which of the frogs would land on the 51st rock? How do you know?

4 What is the first rock that all three frogs will land on after the 51st rock? How do you know?

NAME | DATE

What's Missing?

1 Raj's class is collecting information about prisms they are building, but he is missing some of the data. Fill in the missing information in the table below.

Building Prisms				
Dimensions of the Base	**Area of the Base**	**Number of Layers**	**Volume**	**Dimensions of the Prism**
4×2		2		
		2		$(3 \times 3) \times 2$
2×10			40 cubic units	
$4 \times$ ___	36 sq. units	3		
5×2			100 cubic units	

2 Raj and his partner disagree about the following equations. Decide whether each is true or false.

a $(5 \times 2) \times 4 = 2 \times (4 \times 5)$ True/False

b $8 \times (10 \times 2) = 16 \times (5 \times 1)$ True/False

c $2 \times (9 \times 3) = 3 \times 18$ True/False

3 Help Raj and his partner fill in the blanks in the equations below.

a $(4 \times 3) \times 6 = (2 \times 3) \times$ _____

b $9 \times ($ _____ $\times 3) = 9 \times (6 \times 6)$

c $(3 \times 4) \times 6 = 24 \times$ _____

NAME | DATE

Factors & Multiples page 1 of 2

1 Maddy is playing Claim the Factors. She goes first. She chooses the number 36.

a How many points does Maddy get? _____

b How many points does Maddy's partner get? _____

c Was 36 a good choice for Maddy's first turn? Explain.

Claim the Factors Game Board									
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

2 List the factors for each number below. Write P next to numbers that are prime and C next to numbers that are composite.

	36	
	39	

	41	
	50	

(continued on next page)

NAME | DATE

Factors & Multiples page 2 of 2

3 Which of the four numbers in problem 2 would you choose if you were going first in Claim the Factors? Why?

4 List the factors each pair of numbers below has in common.

ex What factors do 24 and 36 have in common? 1, 2, 3, 4, 6, 12

a What factors do 20 and 28 have in common? _____

b What factors do 18 and 32 have in common? _____

5 List two multiples that each pair of numbers below has in common.

ex What are two multiples that 6 and 12 have in common? 12, 24

a What are two multiples that 3 and 5 have in common? _____

b What are two multiples that 4 and 7 have in common? _____

NAME | DATE

Field Trip Snacks page 1 of 2

Use the blank space to solve each problem. Show your thinking. Write a complete sentence below your work to show the answer.

1 A parent donated 36 fruit cups and 24 bananas to the fifth grade. The teacher wants to make field trip snack bags with the donated food and is wondering about ways to pack the snacks. To be fair, the teacher wants to make sure that all the snack bags are exactly the same.

a What is the greatest number of snack bags that the teacher can make, if each bag is identical? How do you know?

b What other numbers of identical snack bags could be made? How do you know?

(continued on next page)

NAME | DATE

Field Trip Snacks page 2 of 2

2 Another parent donates 24 more bananas, so now there are 48 bananas total. Six of the fruit cups were accidentally opened, so now there are only 30 fruit cups. Now what is the greatest number of identical snack bags that can be made?

3 What do the different numbers of snack bags that can be made have to do with the number of fruit cups and number of bananas?