Building Computational Fluency
Grades 5 & 6

SAMPLE PAGES

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Building Computational Fluency, Grades 5 & 6

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Building Computational Fluency, Grades 5 & 6 Overview

Building Computational Fluency, Grades 5 & 6 is a supplement designed to provide you with powerful and flexible tools to assess and support students in developing key computational skills and concepts. Organized into three sections, this supplement enables you to assess some or all of your students on computational skills throughout the school year and provide support to students who need extra help in key areas, including:

- place value understandings
- rounding
- multiplication and division facts through 12's
- multi-digit addition and subtraction
- multi-digit multiplication and division
- fraction and decimal sense
- adding and subtracting fractions and decimals

In Section 1, you’ll find a set of assessments designed to be administered at key points throughout the school year. These assessments serve as a useful complement to any fifth grade math program, and may also be very helpful to sixth grade teachers seeking to diagnose specific skill deficits among students working below grade level. They also provide tools to check students’ proficiency with basic multiplication and division facts on a regular basis. In Section 2, you’ll find a collection of Support Activities designed to help students who indicate needs in the specific areas assessed. The games in this section are based around visual models and strategies, and help students develop deep conceptual understandings as well as proficiency. They can be used as instructional resources with your entire group, or as tools to remediate targeted students. Section 3 is a Fact Fluency Supplement that provides the kind of systematic, strategy-based practice students need to master basic multiplication and division facts. The worksheets and practice games in this section are designed to be tailored to the needs of individuals, and can be used with selected students or with your entire class. Each section is described in more detail below.

Section 1 Assessments

The six assessments in this collection are designed to help you gauge how your students are doing with key computational skills throughout the year. Assessment 1 is intended for use during the first few weeks of school. Depending on your district expectations, this assessment may be useful in determining whether your incoming fifth graders are working at, above, or below grade
level. Middle school teachers may also find the assessment helpful in identifying gaps in basic computational skills among their incoming sixth graders.

### Assessment 1 (page 1 of 5)

1. Solve these multiplication facts.

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2. Make a sketch to show what this expression means.

   \[ 6 \times 4 \]

3. Make a sketch to show what this expression means.

   \[ 28 \div 7 \]

### Assessment 2 (page 2 of 5)

4. Solve these division facts.

\[
\begin{array}{cccccc}
7 & 21 & 8 & 24 & 6 & 30 \\
5 & 25 & 8 & 48 & 4 & 16 \\
9 & 27 & 10 & 50 & 4 & 32 \\
7 & 14 & 2 & 18 & 5 & 45 \\
8 & 48 & 7 & 28 & 7 & 49 \\
5 & 35 & & & & \\
\end{array}
\]

Solve each equation below and show your work. If you use Base Ten Grid Paper, attach it to this sheet.

5. \[ 2,639 + 3,743 = \]

6. \[ 5,573 - 3,239 = \]

7. \[ 7 \times 32 = \]

8. \[ 108 + 4 = \]

9. \[ 25 \times 13 = \]

10. \[ \frac{5}{4} + \frac{3}{4} = \]

The first 2 pages of Assessment 1

Even if many of your students perform very well on Assessment 1, you may find that some of them need more practice with multiplication and division facts. Toward that end, a second assessment (Assessment 2: Quick Facts) which allows students to choose their own learning targets and track their own progress toward fact mastery has been included in the set. Teachers often introduce the “Quick Facts” assessment in September and continue to administer it weekly or even twice a week until the majority of their students are fluent with multiplication and division facts. An extensive set of worksheets and games is featured in the third section of Building Computational Fluency to provide the systematic practice students will need to progress through and eventually test out of Assessment 2.

Assessments 3, 4, 5, and 6 are quarterly checkups designed for use at the end of each grading period to support teachers in conferencing with parents and reporting on students’ progress. Each of these assessments offers another look at students’ proficiency with basic facts and host of other key math skills typically taught in the fall, winter, and early as well as late spring of the fifth
grade year. These assessments may also be useful to resource room teachers and others working with below-grade-level sixth graders.

All the assessments described above include instructions to the teacher, answer keys, assessment blacklines, and class checklists. Although use of the class checklists is optional, they allow teachers to easily spot strengths and weaknesses in individual students and in the class as a whole. The class checklists include suggested point values for each item so that teachers can score the assessments if they choose to do so.
Section 2 Support Activities

In the second section of this packet, you’ll find a set of 37 partner or small group games specifically designed to support the skills tested in the assessments described above. These games provide engaging practice with skills including basic multiplication and division concepts and strategies, multi-digit computation (addition, subtraction, multiplication, and division), rounding, money, time, decimals, and fractions. Most of these games are based around visual models such as base ten pieces and arrays, and are intended to help students develop conceptual understanding as well as proficiency.

Support Activity 29

Decimal Draw

You’ll need

- Instructions for Decimal Draw (Blackline S 29.2, 1 copy for each pair of players)
- Decimal Number Lines (Blackline S 29.3, 1 copy run double-sided for each pair of players)
- Decimal Draw Cards (Blacklines S 29.4 and 29.5, 1 copy on cardstock cut apart for each pair of players)
- scratch paper
- regular pencil and red colored pencil

Instructions for Decimal Draw

1. Lay the stack of Decimal Draw Cards face down between both players. Place a deck, mix them up, and return them to a pile face down. Start over step 1.

2. The first player draws a card and records the number shown on the card as both a fraction and a decimal on the number line. Then the second player does the same.

3. Players continue to take turns until both players have recorded four numbers on the number line.

4. Each player finds the sum of his or her four numbers. Players compare their work to make sure they have both reached the correct sum. The player with the higher sum wins.

5. To play again, return the cards to the deck, mix them up, and return them to a pile face down. Start over step 1.

Although the Support Activities have been designed to complement the assessments in this packet, you can use them as a set of additional instruction resources for your classroom even if you choose not to conduct the assessments. The activities can be used by educational assistants, parent volun-
teers, resource or title teachers, as well as classroom teachers, and many of
them also make effective homework assignments.

Each activity includes:
• instructional considerations
• playing instructions
• blacklines for game components if needed (spinners, gameboards,
and/or cards)
• record sheet blacklines if needed

Section 3  Fact Fluency Supplement

The Fact Fluency Supplement is designed to be used in conjunction with the
second assessment described above (Assessment 2: Quick Facts), but also
stands alone as systematic and dynamic set of practice sheets for fifth and
sixth graders who haven't yet mastered their multiplication and division
facts. This 82-page supplement includes worksheets, games, and flashcards
for each multiplier from 2 to 12, as well as three different ranges of facts: 2–6,
4–9, and 6–12. Based around such fact strategies as doubles (2's), double-dou-
bles (4's), and half decade facts (5's) these activities build on one another and
provide the kind of practice students need to learn and retain basic multipli-
cation and division facts.

### Fact Fluency with 8's

#### Multiplying & Dividing by 8

<table>
<thead>
<tr>
<th>Strategy</th>
<th>How It Works</th>
<th>Example</th>
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</table>
| Double-Double-Doubles | To multiply any number by 8, double the number 3 times. | What is 8 × 77?
|                 |              | It's 7 doubled 3 times, Double once: 7 + 7 = 14
|                 |              | Double twice: 14 + 14 = 28
|                 |              | Double three times: 28 + 28 = 56 |

1. Multiply each number in the grid by 8. Write each product in the box. The first
   one is done for you.

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2. Use the double-double-doubles strategy to help solve these combinations.

   8 × 15 = ______  8 × 25 = ______  8 × 35 = ______  8 × 50 = ______
   14 × 8 = ______  150 × 8 = ______  30 × 8 = ______

3. Use what you know about multiplying by 8 to solve these division problems.

   40 ÷ 8 = ______  88 ÷ 8 = ______  72 ÷ 8 = ______  64 ÷ 8 = ______
   8 ÷ 8 = ______  8 ÷ 8 = ______  8 ÷ 8 = ______  8 ÷ 8 = ______
**Fact Fluency with 6’s–12’s** Secret Path Problems, Set 1

- Find a path through all of the numbers in each set by multiplying or dividing to get from one number to the next.
- You have to use each number just one time.
- You can move only 1 space at a time. You can move over, up, down, or diagonally.
- Every path has a start point and an end point. Circle them both.
- You can also go backwards. Try to start at the end point and go back to the start point.

**Example**

```
6 x 5 takes you to 30.
9 x 4 takes you to 36.
36 ÷ 6 takes you to 6.
```

Find your own start and end points, as well as a path through the numbers.

1. 

```
   1 x +  4
   7   6   9
  42   6  36
```

2. 

```
   2 x +  6
   9  12  72
  54   9   8
```

3. 

```
   3 x + 12
   96  8   6
  92  6   8
```

4. 

```
   4 x +  4
  36   9  27
  6   6  27
```

5. 

```
   5 x + 120
  12  12   5
  10   6  60
```

6. 

```
   6 x +  8
  48   5  40
  12  4  10
```

**Scoring**

- 3 in a row—1 point
- 4 in a row—2 points

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**Fact Fluency with 6’s–12’s** Division Capture

- Try to capture 3 or 4 boxes in a row: across, up and down, or diagonally. Keep playing until the gameboard is filled or neither player can use the number he or she spins 3 times in a row.

**Instructions for Division Capture 6’s–12’s**

1. Take turns spinning the spinner. The player who gets the higher number goes first.
2. Take turns spinning the spinner. Use the number you spin to complete one of the division problems below. Be sure to use your own color pencil.
3. If the box you need is already filled, you lose your turn.
4. Try to capture 3 or 4 boxes in a row: across, up and down, or diagonally. Keep playing until the gameboard is filled or neither player can use the number he or she spins 3 times in a row.
5. Then circle the places on the grid where you got 3 or 4 in a row and add up your scores.

<table>
<thead>
<tr>
<th>42 ÷</th>
<th>81 ÷</th>
<th>96 ÷</th>
<th>121 ÷</th>
</tr>
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<tbody>
<tr>
<td>7</td>
<td>9</td>
<td>12</td>
<td>11</td>
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<table>
<thead>
<tr>
<th>63 ÷</th>
<th>54 ÷</th>
<th>49 ÷</th>
<th>12 ÷</th>
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</thead>
<tbody>
<tr>
<td>7</td>
<td>9</td>
<td>7</td>
<td>8</td>
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<table>
<thead>
<tr>
<th>54 ÷</th>
<th>84 ÷</th>
<th>88 ÷</th>
<th>56 ÷</th>
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</thead>
<tbody>
<tr>
<td>6</td>
<td>12</td>
<td>8</td>
<td>7</td>
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</table>

**Scoring**

- 3 in a row—1 point
- 4 in a row—2 points

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**You’ll need**

- a partner
- 2 pencils or markers in different colors
- paperclip and pencil to use as a spinner
Assessment 1

Overview
This assessment is designed to help gauge students' key math skills early in the school year. You'll find support suggestions on page 8.

Timing
Early in the school year or at any other time that's appropriate for your students

You'll need
★ Assessment 1, pages 1–5 (pages 11–15, class set)
★ Base Ten Grid Paper (page 16)
★ Assessment 1 Class Checklist (optional, pages 18 and 19, run as needed)
★ manipulatives such as base ten pieces and tile for students who want to use them (Use page 17 to make your own base ten pieces and cut out one-inch squares of construction paper if you don't have these materials.)

Skills & Concepts
★ demonstrating fluency with multiplication and division facts
★ adding and subtracting 4-digit numbers with regrouping
★ multiplying and dividing a 3-digit number by a 1-digit number
★ multiplying a 2-digit number by a 2-digit number
★ adding fractions with common denominators
★ finding factors and multiples
★ identifying odd and even numbers
★ reading and interpreting bar graphs, pictographs, and circle graphs
★ expressing the probability of an outcome as a fraction
★ recognizing equivalent forms of common fractions and decimals to hundredths
★ locating common fractions and decimals to hundredths on a number line

Conducting Assessment 1
You can administer this 5-page skills assessment during a single math period or break it out over 2 (or more) days, depending on your schedule and the needs of your students. Make base ten pieces, colored tile, and Base Ten Grid Paper available for students who wish to use them.

Conduct the first item, a set of 40 multiplication facts, as a timed test, allowing 2 minutes for students to complete as many of the 40 facts as they can. Before they begin, stress that this is a check-in designed to help you and them get a sense of which facts they still need to work on. It is only by timing students that we can get a sense of how fluent they are with their facts. After the two minutes are up, give them as much time as they need to complete the remaining problems on the first two pages. Emphasize that they'll need to show
their work for problems 2, 3, and 5–10. (You’ll find the answer key for this assessment on page 10.)

Pages 3–5 of Assessment 1 may be given to students the following day unless you choose to administer all 5 pages in one period. There is no need to time this portion of the assessment, though you’ll want to move things along at a relatively brisk pace so that students who have little or no access to some of the problems aren't stuck struggling over them for too long. (You may even want to invite them to write “I don't know yet” under the problems they truly feel they have no way of approaching at this time.)

**Using Information from Assessment 1**

You can use the Assessment 1 Class Checklist on pages 18 and 19 to compile the assessment results for your class to get an overview of students' strengths and areas of need. The checklist features suggested point values for each item so that you can score the assessments, although it is not necessary to score students' papers to get a clear sense of which topics are comfortable for them and which are more challenging.

Depending on your district expectations, you might need to offer additional support for students who complete fewer than 24, or 60%, of the basic multiplication facts within the 2-minute period allotted. (Students who are able to complete 40 facts correctly in 2 minutes are working at a rate of 3 seconds per fact, which is generally deemed to indicate fluency.) Students who are not able to complete at least half of the division problems on the second page correctly may also need additional support, as might students who have not yet developed efficient methods for adding and subtracting 4-digit numbers or multiplying 2-digit by 1-digit numbers. Information about how to offer such support is provided below.

**SUPPORT ACTIVITIES**

The first 8 games listed on the chart below deal with multi-digit addition and subtraction, both of which require remediation early in the school year if any of your students are having difficulty. The others listed below address basic multiplication and division. See Assessment 2 on pages 21–26 and the Fact Fluency Supplement Blacklines (F 1–F 81) for more basic facts support.
### SUPPORT ACTIVITIES

<table>
<thead>
<tr>
<th>Activity</th>
<th>Name</th>
<th>Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity 1</td>
<td>Make 100</td>
<td>Understanding 2- and 3-digit addition and subtraction</td>
</tr>
<tr>
<td>Activity 2</td>
<td>Race to 100 &amp; Back</td>
<td>Understanding 2- and 3-digit addition and subtraction</td>
</tr>
<tr>
<td>Activity 3</td>
<td>More or Less Addition</td>
<td>2- and 3-digit addition</td>
</tr>
<tr>
<td>Activity 4</td>
<td>More or Less Addition Big Time</td>
<td>Multi-digit addition</td>
</tr>
<tr>
<td>Activity 5</td>
<td>Count Down 400</td>
<td>2- and 3-digit subtraction</td>
</tr>
<tr>
<td>Activity 6</td>
<td>More or Less Subtraction</td>
<td>2- and 3-digit subtraction</td>
</tr>
<tr>
<td>Activity 7</td>
<td>More or Less Subtraction Big Time</td>
<td>Multi-digit subtraction</td>
</tr>
<tr>
<td>Activity 8</td>
<td>Larger Numbers on a Line</td>
<td>Multi-digit subtraction</td>
</tr>
<tr>
<td>Activity 9</td>
<td>Array Challenge</td>
<td>Understanding multiplication</td>
</tr>
<tr>
<td>Activity 10</td>
<td>Multiplication Challenge</td>
<td>Understanding multiplication</td>
</tr>
<tr>
<td>Activity 11</td>
<td>Spinning Around Multiplication</td>
<td>Multiplication strategies through 6 × 6</td>
</tr>
<tr>
<td>Activity 12</td>
<td>Spinning for Arrays</td>
<td>Multiplication facts to 8 × 10</td>
</tr>
<tr>
<td>Activity 13</td>
<td>Product Bingo</td>
<td>Multiplication facts to 9 × 9</td>
</tr>
<tr>
<td>Activity 14</td>
<td>What’s Missing? Bingo</td>
<td>Basic Multiplication &amp; Division Facts</td>
</tr>
</tbody>
</table>
Assessment 1 Answer Key

Pages 11–15

1 36, 15, 81, 35, 40, 42, 24
20, 21, 132, 36, 48, 24, 36
32, 72, 28, 64, 63, 54, 121
110, 25, 108, 144, 30, 100, 84
72, 48, 44, 45, 56
2 Students' sketches will vary. Examples:

example 1:

example 2:

3 Students' sketches will vary. Examples:

example 1:

example 2:

4 3, 3, 5, 8, 4, 9, 3
5, 8, 2, 9, 9, 5, 6
8, 6, 3, 10, 4, 7, 7
5 6, 382

6 2,334
7 224
8 27
9 325
10 \( \frac{4}{8} \) or \( \frac{1}{2} \)
11 346, 752, 3120
12 12, 36
13 a 1, 24, 2, 3, 8, 4, 6
b Students' responses will vary. Example:

I know I got them all because I started at 1 and went up to 6 and then they started repeating again.
14 a odd: 623, 6059, 50017
even: 508, 5516, 5692
b Students' explanations will vary. Example:

Numbers are even if the last number in them is even.
15 Mr. Gahringer, Ms. Macintosh, and Ms. Russell
(34 + 24 + 20 = 78) or Ms. Carruth, Ms. O'Donnell, and Ms. Macintosh (28 + 26 + 24 = 78)
16
17
18 a \( \frac{1}{2} \)
b 0.36
c \( \frac{3}{4} \)
d \( \frac{6}{10} \)
19 a 0.50
b 0.8
c \( \frac{36}{100} \)
d 0.75
20
### Assessment 1 page 1 of 5

1. Solve these multiplication facts.

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>5</td>
<td>9</td>
<td>5</td>
<td>8</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>×12</td>
<td>×3</td>
<td>×9</td>
<td>×7</td>
<td>×5</td>
<td>×7</td>
<td>×3</td>
</tr>
</tbody>
</table>

| 8 | 6 | 12 | 7 | 12 | 9 | 7 |
| ×9| ×3| ×8| ×7| ×5| ×3| ×8 |

| 5 | 7 | 11 | 6 | 8 | 4 | 9 |
| ×4| ×3| ×12| ×6| ×6| ×6| ×4 |

| 4 | 9 | 7 | 8 | 9 | 6 | 11 |
| ×8| ×8| ×4| ×8| ×7| ×9| ×11 |

| 11 | 5 | 12 | 12 | 5 | 10 | 12 |
| ×10| ×5| ×9| ×12| ×6| ×10| ×7 |

| 12 | 12 | 11 | 9 | 8 |
| ×6| ×4| ×4| ×5| ×7 |

2. Make a sketch to show what this expression means.

\[ 6 \times 4 \]

3. Make a sketch to show what this expression means.

\[ 28 \div 7 \]
Assessment 1 page 2 of 5

4 Solve these division facts.

\[
\begin{align*}
7 \div 21 & \quad 8 \div 24 & \quad 6 \div 30 & \quad 5 \div 40 & \quad 4 \div 16 & \quad 4 \div 36 & \quad 9 \div 27 \\
10 \div 50 & \quad 4 \div 32 & \quad 7 \div 14 & \quad 2 \div 18 & \quad 5 \div 45 & \quad 5 \div 25 & \quad 8 \div 48 \\
8 \div 64 & \quad 6 \div 36 & \quad 6 \div 18 & \quad 4 \div 40 & \quad 7 \div 28 & \quad 7 \div 49 & \quad 5 \div 35
\end{align*}
\]

Solve each equation below and show your work. If you use Base Ten Grid Paper, attach it to this sheet.

5 \(2,639 + 3,743 = \)

6 \(5,573 - 3,239 = \)

7 \(7 \times 32 = \)

8 \(108 \div 4 = \)

9 \(25 \times 13 = \)

10 \(\frac{3}{8} + \frac{1}{8} = \)
**Assessment 1** page 3 of 5

11 Circle the numbers that are multiples of 2.

346        247        752        4,441        3,120

12 Circle the numbers that are multiples of 2 and 3.

12           16           21           32           36

13a List all the factors of 24.

b How do you know you listed all of them?

14a Draw a line under each odd number. Circle each even number.

623        6,059        508        5,516        5,692        50,017

b Explain how you know when a number is odd and when it is even.

15 Here is a graph of the number of students in 5 different 5th grade classrooms. Which 3 classes have a total of 78 students in all?

[Bar graph showing student counts for Ms. Russell, Ms. Carruth, Mr. Gahringer, Ms. O’Donnell, and Ms. MacIntosh]
16 Mr. Olivera’s class has been keeping track of the weather for many months with this tally chart. Choose the circle graph that best shows this information.

<table>
<thead>
<tr>
<th>Weather Condition</th>
<th>Number of Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunny</td>
<td>☀️ ☀️ ☀️ ☀️ ☀️ ☀️ ☀️ ☀️ ☀️ ☀️ ☀️ ☀️ ☀️ ☀️</td>
</tr>
<tr>
<td>Cloudy</td>
<td>☁️ ☁️ ☁️ ☁️ ☁️ ☁️ ☁️ ☁️ ☁️ ☁️ ☁️ ☁️ ☁️</td>
</tr>
<tr>
<td>Rainy</td>
<td>☂️ ☂️ ☂️ ☂️ ☂️ ☂️ ☂️ ☂️ ☂️ ☂️ ☂️ ☂️ ☂️</td>
</tr>
<tr>
<td>Snowy</td>
<td>🌨️ 🌨️ 🌨️ 🌨️ 🌨️ 🌨️ 🌨️ 🌨️ 🌨️ 🌨️ 🌨️ 🌨️ 🌨️</td>
</tr>
</tbody>
</table>

17 There are 9 red tile in a bag and 3 blue tile. The students take 120 samples from the bag. Each time, they pull a tile out of the bag without looking. Then they put it back in the bag and shake it up before they take the next sample. Which circle graph below comes closest to showing the results of this experiment?
Assessment 1 page 5 of 5

18  Match each grid to the fraction or decimal that tells how much is shaded in if the biggest square is 1. Write the correct letter in each box.

- a  
- b  
- c  
- d  

19  Match each number on the left to a number on the right that describes the same quantity. Write the correct letter in each box.

- a  
- b  
- c  
- d  

20  Mark and write these 6 numbers where they belong on the number line.

0.62  0.25  3/10  0.5  75/100  1/5
Base Ten Grid Paper
Base Ten Pieces

[Diagram of Base Ten Pieces]
# Assessment 1 Class Checklist

**Student name**

<p>| | | | | | | | | | | | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>2</td>
<td>creates sketch that demonstrates understanding of process of multiplication</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3</td>
<td>creates sketch that demonstrates understanding of process of division</td>
<td>1</td>
<td></td>
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</tr>
<tr>
<td>4</td>
<td>completes X out of 21 division facts correctly</td>
<td>19–21: 4 pts.&lt;br&gt;17 or 18: 3 pts.&lt;br&gt;15 or 16: 2 pts.&lt;br&gt;13 or 14: 1 pt.&lt;br&gt;12 or fewer: 0 pts.</td>
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<tr>
<td>5a</td>
<td>adds 4-digit numbers with regrouping (2,639 + 3,743)</td>
<td>1</td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>shows work</td>
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<td></td>
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<tr>
<td>6a</td>
<td>subtracts 4-digit numbers with regrouping (5,573 – 3,239)</td>
<td>1</td>
<td></td>
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<td></td>
<td>shows work</td>
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<tr>
<td>7a</td>
<td>multiplies 2-digit number by 1-digit number (7 × 32)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>shows work</td>
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<tr>
<td>8a</td>
<td>divides 3-digit number by 1-digit number (108 ÷ 4)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>shows work</td>
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</tr>
<tr>
<td>9a</td>
<td>multiplies 2-digit number by 2-digit number (25 × 13)</td>
<td>1</td>
<td></td>
<td></td>
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</table>

* The total possible number of points for each problem is shown.
| Student Name     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | Total Score |   |
| 10a adds fractions with like denominators $\left(\frac{3}{8} + \frac{1}{8}\right)$ | 1 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 1            |   |
| 10b shows work   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 1            |   |
| 11 identifies multiples of 2 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 1            |   |
| 12 identifies multiples of 2 and 3 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 1            |   |
| 13a lists all factors of 24 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 1            |   |
| 13b explains thinking |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 1            |   |
| 14a identifies odd and even numbers correctly |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 1            |   |
| 14b explains thinking |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 1            |   |
| 15 reads and interprets a bar graph |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 1            |   |
| 16 transfers information from a tally chart to a circle graph |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 1            |   |
| 17 identifies likely outcomes of a probability experiment |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 1            |   |
| 18 matches fractions and decimals with base ten models |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 4            |   |
| 19 matches decimals and common fractions |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 4            |   |
| 20 locates fractions and decimals along a number line |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 6            |   |
| Total score      | 45|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |               |   |
support activities
Support Activities

There are 37 activities in this collection. Most are games designed to be played by partners or small groups, although some can be adapted for use with an entire class at once. The Support Activities are listed by skill in the table below, and are intended to supplement any intermediate math program. Most involve the use of visual models and strategies, and are meant to help students develop conceptual understandings as they gain increased fluency. As you look through the collection, you may find some games you want to use to help teach key computational skills to your whole class. Some teachers also run the game components on cardstock and laminate them to make a durable set of “learning stations” available for use by students during free time or to check out for home use.

### ADDING & SUBTRACTING MULTI-DIGIT NUMBERS

<table>
<thead>
<tr>
<th>Activity</th>
<th>Name</th>
<th>Support Blackline Numbers</th>
</tr>
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<tbody>
<tr>
<td>Support Activity 1</td>
<td>Make 100</td>
<td>1.1–1.7</td>
</tr>
<tr>
<td>Support Activity 2</td>
<td>Race to 100 &amp; Back</td>
<td>2.1–2.7</td>
</tr>
<tr>
<td>Support Activity 3</td>
<td>More or Less Addition</td>
<td>3.1–3.7</td>
</tr>
<tr>
<td>Support Activity 4</td>
<td>More or Less Addition Big Time</td>
<td>4.1–4.6</td>
</tr>
<tr>
<td>Support Activity 5</td>
<td>Count Down 400</td>
<td>5.1–5.4</td>
</tr>
<tr>
<td>Support Activity 6</td>
<td>More or Less Subtraction</td>
<td>6.1–6.5</td>
</tr>
<tr>
<td>Support Activity 7</td>
<td>More or Less Subtraction Big Time</td>
<td>7.1–7.4</td>
</tr>
<tr>
<td>Support Activity 8</td>
<td>Larger Numbers on a Line</td>
<td>8.1–8.4</td>
</tr>
<tr>
<td>Support Activity 15</td>
<td>Round &amp; Add Tens</td>
<td>15.1–15.5</td>
</tr>
<tr>
<td>Support Activity 16</td>
<td>Round &amp; Add Hundreds</td>
<td>16.1–16.5</td>
</tr>
<tr>
<td>Support Activity 17</td>
<td>Round &amp; Add Thousands</td>
<td>17.1–17.6</td>
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</tbody>
</table>

### BASIC MULTIPLICATION FACTS

<table>
<thead>
<tr>
<th>Activity</th>
<th>Name</th>
<th>Support Blackline Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support Activity 9</td>
<td>Array Challenge</td>
<td>9.1–9.5</td>
</tr>
<tr>
<td>Support Activity 10</td>
<td>Multiplication Challenge</td>
<td>10.1–10.5</td>
</tr>
<tr>
<td>Support Activity 11</td>
<td>Spinning Around Multiplication</td>
<td>11.1–11.5</td>
</tr>
<tr>
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<td>Spinning for Arrays</td>
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### BASIC MULTIPLICATION & DIVISION FACTS

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### MULTIPLYING 1-DIGIT BY 2-DIGIT NUMBERS

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#### FRACTIONS

<table>
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<td>28.1–28.6</td>
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</table>

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<td>34.1–34.5</td>
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#### DECIMALS

<table>
<thead>
<tr>
<th>Activity</th>
<th>Name</th>
<th>Support Blackline Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support Activity 22</td>
<td>Round &amp; Add Tenths</td>
<td>22.1–22.6</td>
</tr>
<tr>
<td>Support Activity 23</td>
<td>Decimal More or Less</td>
<td>23.1–23.5</td>
</tr>
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</tr>
</tbody>
</table>

#### ELAPSED TIME

<table>
<thead>
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<th>Name</th>
<th>Support Blackline Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support Activity 25</td>
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</tr>
</tbody>
</table>

#### AVERAGING

<table>
<thead>
<tr>
<th>Activity</th>
<th>Name</th>
<th>Support Blackline Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support Activity 21</td>
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<td>21.1–21.4</td>
</tr>
</tbody>
</table>

#### PERIMETER & AREA OF RECTANGLES

<table>
<thead>
<tr>
<th>Activity</th>
<th>Name</th>
<th>Support Blackline Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support Activity 24</td>
<td>Perimeter Showdown</td>
<td>24.1–24.5</td>
</tr>
</tbody>
</table>
Support Activities (cont.)

If you plan to use the activities for remediation rather than instructional purposes, you'll find that they're most effective when used with targeted students by an educational assistant, parent volunteer, or title/resource teacher. Based on students' performance on the Building Computational Fluency assessments, you'll be able to determine which individuals would benefit from a particular Support Activity and can assign them to work with an adult on that activity. You can also send specific activities home with students for extra practice with their families. In order to prepare the Support Activities for use by other adults, we recommend creating a packet that contains the instructional considerations, game instructions, and materials. That way, you can provide an instructional assistant or volunteer with the packet and ask him or her to conduct specific activities with individuals or small groups in need of help in one or more areas.

While you can run game cards on cardstock, you'll find that paper copies of the game components work nearly as well with intermediate students, who can cut out their own playing cards and use a paper-clip and pencil arrangement for a spinner arrow. Because these games have been designed for use at home as well as school, very few of them involve concrete manipulatives. Those that do include blacklines for making the manipulatives (i.e., base 10 pieces or money value pieces), and you may want to run these sheets on cardstock.
Support Activity 7 ★ Instructional Considerations

More or Less Subtraction Big Time

Overview
Players begin by spinning a more or less spinner to determine whether they will play for the largest or smallest difference. Then they take turns spinning single-digit numbers, which they arrange to create two triple-digit numbers. When both players have a pair of triple-digit numbers, they each find their own differences. If they were playing for more, the player with the largest difference wins. If they were playing for less, the player with the smaller difference wins.

Skills & Concepts
★ reading, writing, ordering, modeling, comparing, and identifying place value of digits in whole numbers to 1000
★ subtracting 3-digit numbers with and without regrouping using models and a variety of efficient paper/pencil and mental strategies

You’ll need
★ Instructions for More or Less Subtraction Big Time (Blackline S 7.3)
★ More or Less Subtraction Big Time Record Sheet (Blackline S 7.4, 1 copy per player)
★ More or Less Addition/Subtraction Big Time Spinner 1 or 2 (Blacklines S 4.5 or 4.6, 1 copy for every 2 pairs of players, cut in half. Spinner 1 contains numbers 1–6 and Spinner 2 contains numbers 4–9. Select the spinner based on students’ readiness level.)
★ a pencil and paperclip to use as a spinner
★ scratch paper

The strategies involved in More or Less Subtraction are quite a bit more complex than in More or Less Addition. In More or Less Addition, students simply tried to get the largest numbers in the hundreds place if playing for more, and the smallest numbers in the hundreds place if playing for less. In More or Less Subtraction, however, it is the difference between the numbers, and not the numbers themselves, that students must consider. For example, it is quite possible to have relatively large numbers and still get the smallest difference, as shown below, and students may also become strategic about arranging numbers that require them to borrow in order to subtract.

(Continued on back.)
Keith Wow! I had bigger numbers than you did, but I still won. My difference was 72 and yours was 131!

Mrs. Gray Keith, how can that be? You had bigger numbers, but you still got a smaller difference than I did.

Keith Well, it’s the difference that matters, not the numbers.

Mrs. Gray Hmm, can you think of some other big numbers that have a small difference?

Keith Well, 1000 and 1001. They’re big, but the difference between them is small: 1!

If students are having difficulty finding the difference between their numbers, you can invite them to use the open number line for support. Do not press students to use the traditional algorithm. In fact, students who are struggling with place value concepts and computation may need to take a fresh look at multi-digit subtraction, using a model different from those they have experienced in the past. The open number line has proven to be particularly effective for students experiencing difficulties with multi-digit addition and subtraction.

Using the open number line, students begin with the smaller number and add up to the larger number using landmark numbers in chunks as shown above. The difference is the total amount the student added to get from the smaller number to the larger number. Students who are unfamiliar with this method will need you to model it for them a few times, and you may want to have them practice using it before they begin playing the game.

Note If the spins result in a negative difference—if, for instance, a student has set up a problem such as the one shown below and spins a 9 on his final spin—allow him to take another spin or rearrange his digits so that the difference that results isn’t negative. We don’t want to communicate to students that it’s impossible to get a negative outcome, but dealing with negative numbers is outside the scope of this game as a support activity for fourth graders.
Support Activity 7

More or Less Subtraction Big Time

You’ll need
- Instructions for More or Less Subtraction Big Time (Blackline S 7.3)
- More or Less Subtraction Big Time Record Sheet (Blackline S 7.4, 1 copy per player)
- More or Less Addition/Subtraction Big Time Spinner 1 or 2 (Blacklines S 4.5 and 4.6, 1 copy for every 2 pairs of players, cut in half. Spinner 1 contains numbers 1–6 and Spinner 2 contains numbers 4–9. Select the spinner based on students’ readiness level.)
- a pencil and paperclip to use as a spinner
- scratch paper

Instructions for More or Less Subtraction Big Time

1 Write your name and the date at the top of the record sheet. Spin the more or less spinner to see whether you are playing for the largest or smallest difference. Circle more or less on your record sheet for this round to show what you are playing for.

2 Take turns with your partner spinning the numbered spinner. Each time, decide whether you will put the number in the ones place, tens place, or hundreds place of the top or bottom number.

3 After you have both taken 6 turns each, find the difference between your 2 numbers and see whose difference is higher and whose is lower. The player with the lower difference wins if you were playing for less. If you were playing for more, the player with the higher difference wins. Circle the winner on your record sheet.

4 Play 4 more rounds. Circle whether you were playing for more or less in each round, and circle the winning difference each time.
More or Less Subtraction Big Time Record Sheet

Write the numbers you spin in the boxes and then add to find your score. Be sure to circle whether you played for more or less each time and circle the winner at the end.

<table>
<thead>
<tr>
<th>Example</th>
<th>Round 1</th>
<th>Round 2</th>
<th>Round 3</th>
<th>Round 4</th>
<th>Round 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>We played for (circle one) more / less.</strong></td>
<td><strong>We played for (circle one) more / less.</strong></td>
<td><strong>We played for (circle one) more / less.</strong></td>
<td><strong>We played for (circle one) more / less.</strong></td>
<td><strong>We played for (circle one) more / less.</strong></td>
<td><strong>We played for (circle one) more / less.</strong></td>
</tr>
<tr>
<td>My score</td>
<td>My partner’s score</td>
<td>My score</td>
<td>My partner’s score</td>
<td>My score</td>
<td>My partner’s score</td>
</tr>
<tr>
<td>8 9 4</td>
<td>7 9 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 5 6</td>
<td>5 7 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 3 8</td>
<td>2 2 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Example

Round 1

Round 2

Round 3

Round 4

Round 5
Support Activity 20 ★ Instructional Considerations

More or Less Multiplication

Overview
Players take turns spinning 3 numbers. Each player must decide in which order it will make the most sense to multiply his or her 3 numbers. After both players have found their products, they compare products and the spin of a more or less spinner determines the winner.

Skills & Concepts
★ developing efficient strategies for multiplying 2-digit by 1-digit numbers

You'll need
★ More or Less Multiplication Instructions (Blackline S 20.2 and 20.3, 1 copy run back-to-back.)
★ More or Less Multiplication Spinner (Blackline S 20.4, 1 copy for every 2 pairs of players, cut in half)
★ More or Less Multiplication Record Sheet (Blackline S 20.5, 1 copy for each player)
★ Large and Small Base Ten Grid Paper (Blacklines S 20.6 and 20.7, optional)
★ colored pencils
★ calculators (optional)

Students may need help recording their numbers. The game has a fair number of steps, and some students will need more review than others to record and then multiply the three numbers they spin.

You might need to encourage some students to use a variety of strategies and help them discover that thinking in terms of what they know about coin values, or working with a strategy like the double-doubles to compute something like $4 \times 27$, is more efficient than drawing a sketch.

Beth I know $4 \times 27$ is like $4 \times 25$. $4 \times 25$ is 100, and then I need to add $4 \times 2$, or 8, more. So it’s 108.

Javier I thought about double-doubles. I know $27 + 27$ is 54, and $54 \times 2$ is 108.
Support Activity 20

More or Less Multiplication

You’ll need

★ More or Less Multiplication Instructions (Blackline S 20.2 and 20.3, 1 copy run back-to-back)

★ More or Less Multiplication Spinner (Blackline S 20.4, 1 copy for every 2 pairs of players, cut in half)

★ More or Less Multiplication Record Sheet (Blackline S 20.5, 1 copy for each player)

★ Large and Small Base Ten Grid Paper (Blacklines S 20.6 and 20.7, optional)

★ colored pencils

★ pencil and paperclip to use as a spinner

★ calculators (optional)

Instructions for More or Less Multiplication

1. Take turns spinning one number spinner. The player with the higher number goes first.

2. Spin the more or less spinner to see if you will play for more or for less. Circle the word more or less on your record sheet.

3. Spin the 3 number spinners and record the numbers on your record sheet. You are going to multiply these 3 numbers. Think about the best order to put them in.

4. Write a number sentence to show the order you will multiply the numbers. Write the 2 numbers you will multiply first inside the parentheses, and the third one outside the parentheses.

(Continued on back.)
Support Activity 20 (cont.)

Player 1 I got a 6, a 4, and a 3. What would be the easiest way to multiply those three numbers? Oh, I know! I’ll go 3 × 4, that's 12, and then multiply 12 × 6.

5 Now multiply the first two numbers inside the parentheses and write the product, along with the third number, on the next line.

6 Find the product and show your work. Find a way to solve the problem that uses multiplication instead of repeated addition. You can use Base Ten Grid Paper or the multiplication facts you know to help. You can’t use the calculator for this part of the game, though.

7 The Last Toss Option: If you’re not happy with your total, you can choose to spin one 1–6 spinner, write the number in the box beside the little calculator, and then multiply or divide your total by that number. You can use a calculator to help you do this part, but be sure to write a number sentence to show what you did.

8 Now it’s your partner’s turn. Be sure to record your partner’s turn too. After your partner has found his or her total, compare them and circle the winner. (The lower total wins if you spun “less” at the start of the round. The higher total wins if you spun “more” at the start of the round.)
Run 1 copy for every 2 pairs of players and cut in half.
# More or Less Multiplication Record Sheet

## Round 1

We played for (circle one) more / less.

<table>
<thead>
<tr>
<th>Player 1 spin: ___ ___ ___</th>
<th>Player 2 spin: ___ ___ ___</th>
</tr>
</thead>
<tbody>
<tr>
<td>(___ × ___) × ___</td>
<td>(___ × ___) × ___</td>
</tr>
<tr>
<td>___ × ___ = ___</td>
<td>___ × ___ = ___</td>
</tr>
</tbody>
</table>

Show your work:

___ × / ÷ ___ = ___

___ × / ÷ ___ = ___

## Round 2

We played for (circle one) more / less.

<table>
<thead>
<tr>
<th>Player 1 spin: ___ ___ ___</th>
<th>Player 2 spin: ___ ___ ___</th>
</tr>
</thead>
<tbody>
<tr>
<td>(___ × ___) × ___</td>
<td>(___ × ___) × ___</td>
</tr>
<tr>
<td>___ × ___ = ___</td>
<td>___ × ___ = ___</td>
</tr>
</tbody>
</table>

Show your work:

___ × / ÷ ___ = ___

___ × / ÷ ___ = ___

## Round 3

We played for (circle one) more / less.

<table>
<thead>
<tr>
<th>Player 1 spin: ___ ___ ___</th>
<th>Player 2 spin: ___ ___ ___</th>
</tr>
</thead>
<tbody>
<tr>
<td>(___ × ___) × ___</td>
<td>(___ × ___) × ___</td>
</tr>
<tr>
<td>___ × ___ = ___</td>
<td>___ × ___ = ___</td>
</tr>
</tbody>
</table>

Show your work:

___ × / ÷ ___ = ___

___ × / ÷ ___ = ___
Run a few copies for each player if needed.
Support Activity 27 ★ Instructional Considerations

Fraction Race

Overview
Players take turns adding different fractions to their collections until one player gets a total of exactly 1. At that point, players begin subtracting fractions from their collections until one player reaches exactly 0 to win. This game can be played using halves, fourths, and eighths or thirds, sixths, and twelfths.

Skills & Concepts
★ using physical models to model, compare, add, and subtract fractions
★ exploring equivalent fractions and using equivalence to compare fractions

You’ll need
★ Instructions for Fraction Race (Blacklines S 27.2 and 27.3, 1 copy of each run back-to-back)
★ Eighths Strips (Blackline S 27.4, 1 copy per player)
★ Eighths Spinner (Blackline S 27.5, 1 copy for every 2 pairs of players, cut in half)
★ Twelfths Strips (Blackline S 27.6, 1 copy per player, optional)
★ Twelfths Spinner (Blackline S 27.7, 1 copy for every 2 pairs of players, cut in half, optional)
★ a pencil and paperclip to use as a spinner

As they play, encourage players to look for trades they can make, for example, exchanging two eighths for a fourth. When they begin subtracting fractions from their collections, students will probably need to make trades in order to remove a particular fraction. For example, if a player has \( \frac{1}{4} \) left and he spins \( \frac{1}{8} \), he will need to trade in his fourth for two-eighths in order to subtract an eighth.

Encourage students to verbalize the equivalencies on which these trades are based, for example, “I can trade in this fourth for two eighths because one-fourth is equal to two-eighths.”

Once students seem comfortable playing with eighths, fourths, and halves, you can give them the Twelfths Strips and Spinner so they can play using thirds, sixths, and twelfths.
Support Activity 27

Fraction Race

You’ll need

- Instructions for Fraction Race (Blacklines S 27.2 and 27.3, 1 copy of each run back-to-back)
- Eighths Strips (Blackline S 27.4, 1 copy per player)
- Eighths Spinner (Blackline S 27.5, 1 copy for every 2 pairs of players, cut in half)
- Twelfths Strips (Blackline S 27.6, 1 copy per player, optional)
- Twelfths Spinner (Blackline S 27.7, 1 copy for every 2 pairs of players, cut in half, optional)
- a pencil and paperclip to use as a spinner (optional)

Instructions for Fractions Race

1. Cut the strips on your sheet of paper apart so that you have 1 one strip, 2 half strips, 4 fourth strips, and 8 eighth strips.

2. Take turns spinning the Eighths Spinner. The player who spins the larger fraction goes first.

3. The first player spins the spinner and puts that fraction on his or her 1 strip.

4. Players take turns spinning the spinner and adding the fractions shown to their strips, racing to be the first to fill the strip exactly. To fill your strip, you must spin exactly the fraction you need to make a whole or a smaller fraction. If you spin a fraction that is bigger than what you need, you lose that turn.

5. When 1 player gets to 1 exactly, both players begin subtracting fractions from their strips with each spin, starting right from where they are.

(Continued on back.)
strip exactly, but the other player has only filled $\frac{3}{4}$ of her strip, they both get to go backwards. This means that the player who was behind is now ahead.)

6 The first player to remove all of his or her fractions exactly wins. For example, if you have $\frac{1}{4}$ left, and you spin $\frac{1}{2}$, you cannot remove the $\frac{1}{4}$ piece. Instead, you lose the turn and must wait for your next turn to try again.
Eighths Strips

Cut out these fraction strips and then cut each strip into the appropriate number of parts. For example, cut the strip with the parts marked $\frac{1}{2}$ into two pieces along the line.
Eighths Spinner

Eighths Spinner
Twelfths Strips

Cut out these fraction strips and then cut each strip into the appropriate number of parts. For example, cut the strip with the parts marked $\frac{1}{3}$ into three pieces along the lines.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>$\frac{1}{3}$</th>
<th>$\frac{1}{6}$</th>
<th>$\frac{1}{12}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$\frac{1}{3}$</td>
<td>$\frac{1}{6}$</td>
<td>$\frac{1}{12}$</td>
</tr>
</tbody>
</table>
Twelfths Spinner

Run 1 copy for every 2 pairs of players. Cut in half and give each pair a spinner.

Twelfths Spinner
Support Activity 30 ★ Instructional Considerations

Money, Fraction & Decimal Showdown

Overview
Players take turns drawing cards, each of which shows a fraction, decimal number, or money amount. Players compare their amounts, and the player with the greater amount takes both cards. The player with the most cards at the end wins.

Skills & Concepts
★ recognizing, ordering, and comparing common fractions and decimals
★ recognizing equivalent forms of common fractions and decimals
★ using equivalence to compare fractions

You’ll need
★ Instructions for Money, Fraction & Decimal Showdown (Blackline S 30.2)
★ Money, Fraction & Decimal Showdown Cards, pages 1–5 (Blacklines S 30.3–30.7, 1 copy for each pair of players cut apart and stored in an envelope or plastic bag)

The models used in this game help students strengthen their understanding of the connections between money, fractions, and decimals. If students are having trouble comparing the amounts, encourage them to focus on the visual models. You may need to help students see that the whole for all three models is the same size, which is what allows us to compare the amounts using all three models.

I can put them next to each other and see $\frac{4}{8}$ is bigger than $0.40$. 
Support Activity 30

Money, Fraction & Decimal Showdown

You'll need

- Instructions for Money, Fraction & Decimal Showdown (Blackline S 30.2)
- Money, Fraction & Decimal Showdown Cards, pages 1–5 (Blacklines S 30.3–30.7, 1 copy for each pair of players cut apart and stored in an envelope or plastic bag)

Instructions for Money, Fraction & Decimal Showdown

1. Place the cards in a stack face down.
2. Take turns drawing a card and reporting the money amount, fraction, or decimal you see. Work with your partner to compare the amounts on the two cards: which is worth more and how do you know? The person whose card is worth more gets to take both cards. If the two cards are worth the same amount, both players should each draw another card. The player whose card is worth more this time gets to take all 4 cards.
3. Continue until there are no cards left. The player with the most cards wins.
4. Shuffle the cards and play again.

5. After you have played the game at least twice, shuffle the cards well and then pick 14 of them. Put them in order from smallest to greatest. If some are equal in value, like $0.50 and $0.50, put them next to each other.
Money, Fraction & Decimal Showdown Cards page 1 of 5

1. $0.25

\[ \frac{2}{5} \]

2. $1.37

3. 1.05

4. $0.50

\[ 0.28 \]

5. $0.25

\[ 0.05 \]

6. $0.50

\[ 0.3 \]
### Money, Fraction & Decimal Showdown Cards

#### Run 1 copy for each pair of players. Cut apart and store in an envelope or resealable plastic bag.

<table>
<thead>
<tr>
<th>$0.10</th>
<th>$0.40</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Fraction 3/4" /></td>
<td><img src="image2.png" alt="Fraction 4/4" /></td>
</tr>
<tr>
<td><img src="image3.png" alt="Money $0.55" /></td>
<td><img src="image4.png" alt="Money $1.25" /></td>
</tr>
<tr>
<td><img src="image5.png" alt="Money $0.06" /></td>
<td><img src="image6.png" alt="Money 1.25" /></td>
</tr>
</tbody>
</table>

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Money, Fraction & Decimal Showdown Cards

Run 1 copy for each pair of players. Cut apart and store in an envelope or resealable plastic bag.

<table>
<thead>
<tr>
<th>Fraction/Decimal</th>
<th>Card 1</th>
<th>Card 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.63</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>0.55</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>0.08</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>$0.70</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>$0.14</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>$0.75</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td>4/8</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
</tr>
</tbody>
</table>
Money, Fraction & Decimal Showdown Cards

1. $1.37
2. 0.16
3. 0.02
4. 1.05
5. 0.75
Money, Fraction & Decimal Showdown Cards

1. \[ \frac{6}{10} \]
2. $0.76
3. $0.40
4. $0.75

Run 1 copy for each pair of players. Cut apart and store in an envelope or resealable plastic bag.
Support Activity 31 ★ Instructional Considerations

Spin & Multiply Big Time

Overview
Players take turns spinning 2-by-2-digit multiplication combinations. After they have each taken 3 turns, they find the sum of their 3 products. The player with the larger sum wins.

Skills & Concepts
★ multiplying 2-digit numbers by 2-digit numbers
★ adding 3- and 4-digit numbers

You’ll need
★ Instructions for Spin & Multiply Big Time (Blackline S 31.2)
★ Spin & Multiply Big Time Spinner (Blackline S 31.3, 1 copy for every 2 pairs of players, cut in half)
★ Spin & Multiply Big Time Record Sheet (Blackline S 31.4, 1 copy per player)
★ paperclip and pencil for use as a spinner

It may be helpful if, before students play a full game of Spin & Multiply, you model how to sketch the frame and then the array for a 2-by-2-digit combination. As they compute their products, encourage players to think in chunks and use friendly numbers.

Encourage students to estimate a reasonable answer before they compute the exact product. If they are having trouble, encourage them to round each number to the nearest ten. You might also have them first sketch the combination and then estimate if working with numbers alone is too abstract for them.
Support Activity 31

Spin & Multiply Big Time

You'll need

- Instructions for Spin & Multiply Big Time (Blackline S 31.2)
- Spin & Multiply Big Time Spinner (Blackline S 31.3, 1 copy for every 2 pairs of players, cut in half)
- Spin & Multiply Big Time Record Sheet (Blackline S 31.4, 1 copy per player)
- paperclip and pencil for use as a spinner

Instructions for Spin & Multiply Big Time

1. Record both players' names on a record sheet.
2. Spin each spinner to get two numbers to multiply. Estimate about what the product will be.
3. Sketch an array to show the combination on the record sheet. Then compute the product in the way that makes the best sense to you. Explain how you computed the product of those two factors to your partner.
4. Record the combination and the product in the space provided on the record sheet.
5. You and your partner will each take 3 turns spinning, sketching, and finding the product.
6. When you have both taken 3 turns, find the sums of your products. Double-check each other's work.
7. The player with the larger sum wins the game.

Player I broke my array into four parts. I got the area of each part and then added them all together.
Spin & Multiply Big Time Spinner

22 25 21
12 15 16

×

24 13 14
17 26 23

Spin & Multiply Big Time Spinner

22 25 21
12 15 16

×

24 13 14
17 26 23
## Spin & Multiply Big Time Record Sheet

<table>
<thead>
<tr>
<th>Player 1</th>
<th>Player 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Product</td>
<td>1st Product</td>
</tr>
<tr>
<td>_____ × _____ = _____</td>
<td>_____ × _____ = _____</td>
</tr>
<tr>
<td>2nd Product</td>
<td>2nd Product</td>
</tr>
<tr>
<td>_____ × _____ = _____</td>
<td>_____ × _____ = _____</td>
</tr>
<tr>
<td>3rd Product</td>
<td>3rd Product</td>
</tr>
<tr>
<td>_____ × _____ = _____</td>
<td>_____ × _____ = _____</td>
</tr>
<tr>
<td>Sum</td>
<td>Sum</td>
</tr>
</tbody>
</table>
Support Activity 32 ★ Instructional Considerations

Divide 'Em Up

Overview
Together, players spin a number from 4 to 9 and then they each select one 2- or 3-digit number from a set of six numbers to divide by the number spun. The goal is to have the lowest total remainders after 3 turns, so players try to select a number that will divide by the number on the spinner with as little left over as possible. After 3 turns, players find the sum of their remainders and the player with the lowest sum wins.

Skills & Concepts
★ developing fluency with division facts
★ dividing 2-digit and 3-digit numbers by 1-digit numbers

At the end of the game, the goal is to have the lowest total of remainders. Therefore, players will want to pick numbers from a given set of choices that divide as evenly as possible by the number on the spinner. At first, students may pick the numbers more or less randomly, but as their number sense gets better, they may be able to make more strategic choices.

Give students the freedom to use whatever methods make the most sense to them to complete the calculations. Some will want to move base ten pieces around to form equal groups, while others may feel more comfortable working with numbers.

You'll need
★ Instructions for Divide 'Em Up (Blackline S 32.2)
★ Divide ‘Em Up Spinner (Blackline S 32.3, 1 copy for every 2 pairs of players, cut in half)
★ Divide ‘Em Up Record Sheet (Blackline S 32.4, 1 copy for each player)
★ base ten pieces (Use Blackline S 2.6 to make your own if needed.)
★ pencil and paperclip to use as a spinner

112 ÷ 9 = 12 r4
112 ÷ 9 = 12 r4

Student 1

Student 2
Support Activity 32

Divide ’Em Up

You’ll need

★ Instructions for Divide ’Em Up (Blackline S 32.2)
★ Divide ’Em Up Spinner (Blackline S 32.3, 1 copy for every 2 pairs of players, cut in half)
★ Divide ’Em Up Record Sheet (Blackline S 32.4, 1 copy for each player)
★ base ten pieces (Use Blackline S 2.6 to make your own if needed.)
★ pencil and paperclip to use as a spinner

Instructions for Divide ’Em Up

1. Get your own record sheet and write your name on it.
2. Spin the spinner.
3. You and your partner each pick one of the six numbers for this game. You’ll divide this number by the number on the spinner. The goal is to get no remainder or the smallest remainder possible, so pick a number that you think will divide evenly or almost evenly by the number on the spinner. Once you pick a number, you cannot use it again during the game. You and your partner may pick the same number or different numbers each time.
4. Now divide the number you chose by the number on the spinner. You can do it in your head, use numbers or base ten pieces, or make sketches. Write an equation on the record sheet to show the division and record the remainder if there is one.
5. Do this three times. After three turns, add up your remainders. The player with the smallest sum wins.
Divide 'Em Up Spinner

Run 1 copy for every 2 pairs of players. Cut in half and give each pair a spinner.
Divide ‘Em Up Record Sheet

Game 1

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>Equation</th>
<th>Remainder (if any)</th>
<th>Sum of Remainders</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>75</td>
<td>84</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>91</td>
<td>112</td>
<td>117</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Game 2

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>Equation</th>
<th>Remainder (if any)</th>
<th>Sum of Remainders</th>
</tr>
</thead>
<tbody>
<tr>
<td>72</td>
<td>83</td>
<td>96</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>127</td>
<td>135</td>
<td>143</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Game 3

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>Equation</th>
<th>Remainder (if any)</th>
<th>Sum of Remainders</th>
</tr>
</thead>
<tbody>
<tr>
<td>52</td>
<td>68</td>
<td>78</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>92</td>
<td>112</td>
<td>119</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
fact fluency
The Fact Fluency Supplement provides the kind of practice students need to become fluent with multiplication and related division facts, and is designed to complement any intermediate grade math program. You can assess students' fluency on a regular basis using Assessment 2: Quick Facts (pages 21–26), or you can use the Fact Fluency Supplement as a stand-alone resource if you prefer. The supplement contains a 6-page section for each multiplier from 2 through 12. The material in this supplement is based on accessible and effective strategies for learning and remembering multiplication and related division facts. The table below summarizes each for your reference.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Category</th>
<th>Example</th>
<th>How the strategy works</th>
</tr>
</thead>
<tbody>
<tr>
<td>×2</td>
<td>doubles</td>
<td>2 × 6 = 12</td>
<td>To multiply any number by 2, double that number.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9 × 2 = 18</td>
<td></td>
</tr>
<tr>
<td>×3</td>
<td>doubles plus 1 set facts</td>
<td>3 × 6 = 18</td>
<td>To multiply any number by 3, double the number and then add that number. For example, 3 × 6 = (2 × 6) + 6, which equals 18.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9 × 3 = 27</td>
<td></td>
</tr>
<tr>
<td>×4</td>
<td>double-doubles</td>
<td>4 × 6 = 24</td>
<td>To multiply any number by 4, double that number and then double the result. For example, 4 × 6 = 2(2 × 6). This is equivalent to 2 × 12 = 24.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9 × 4 = 36</td>
<td></td>
</tr>
<tr>
<td>×5</td>
<td>half-decade facts</td>
<td>5 × 7 = 35</td>
<td>To multiply any number by 5, multiply by 10 first and divide the result by 2. For example, 5 × 7 = (10 × 7) ÷ 2. 10 × 7 = 70, and 70 ÷ 2= 35.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 × 5 = 40</td>
<td></td>
</tr>
<tr>
<td>×6</td>
<td>triple then double facts</td>
<td>6 × 7 = 42</td>
<td>To multiply any number by 6, triple the number first and then double the result. For example, 6 × 7 = 2(3 × 7). 3 × 7 = 21, and 21 × 2 = 42.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 × 6 = 48</td>
<td></td>
</tr>
<tr>
<td>×8</td>
<td>double-double-doubles</td>
<td>4 × 8 = 32</td>
<td>To multiply any number by 8, double the number 3 times. For example, 8 × 12 = (2(2(2 × 8))). 2 × 8 = 16, 2 × 16 = 32, and 2 × 32 = 64.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 × 12 = 96</td>
<td></td>
</tr>
<tr>
<td>×9</td>
<td>decade minus 1 set facts</td>
<td>9 × 7 = 63</td>
<td>To multiply any number by 9, think of the related decade fact and then subtract 1 set of the number itself. For example, 9 × 7 = (10 × 7) – 7. (10 × 7) – 7 = 70 – 7, which is 63.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9 × 9 = 81</td>
<td></td>
</tr>
<tr>
<td>×10</td>
<td>decade facts</td>
<td>10 × 7 = 70</td>
<td>Multiplying by 10 comes naturally for students who have a solid grasp of skip counting and place value concepts.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9 × 10 = 90</td>
<td></td>
</tr>
<tr>
<td>×11</td>
<td>decade plus 1 set facts</td>
<td>11 × 3 = 33</td>
<td>To multiply any number by 11, think of the related 10's fact and then add 1 set of the number itself. For example, 11 × 9 = (10 × 9) + 9. (10 × 9) + 9 = 90 + 9, which is 99.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 × 11 = 88</td>
<td></td>
</tr>
<tr>
<td>×12</td>
<td>decade plus 2 sets facts</td>
<td>12 × 5 = 60</td>
<td>To multiply any number by 12, think of the related 10's fact and then add 2 sets of the number itself. For example, 12 × 7 = (10 × 7) + (2 × 7). (10 × 7) + (2 × 7) = 70 + 14, which is 84.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7 × 12 = 84</td>
<td></td>
</tr>
</tbody>
</table>

You’ll notice that there is no explicit strategy for multiplying by 7. That’s because all of the 7’s facts, with the exception of 7 × 7, can be solved using the other strategies. Students will generate their own strategies for 7 × 7, for example, recalling that 7 × 5 is 35 and then adding 7 × 2 for a total of 49. Others may remember that 7 × 6 is 42 and add another 7 to get 49.

You’ll notice too, that there are no explicit division strategies listed above. This is because students generally learn their division facts by remembering the related multiplication facts. The expression 56 ÷ 7, for instance, can be interpreted to mean, “How many 7’s are there in 56?” This question is easily answered if one knows that 8 × 7 = 56. For this reason, every worksheet in this supplement pairs multiplication and division. In order to provide that extra boost many students need with division, however, this operation is featured on the game sheets throughout the supplement.
The Fact Fluency Supplement contains a 6-page section for each multiplier from 2 through 12. For each multiplier, you’ll find 2 worksheets, 2 games, and a set of flashcards suitable for use at home or school. These materials are formatted in the same way for every multiplier, and each set refers to a strategy for multiplying by that number.

Depending on the needs of your class, you might run a copy of the entire supplement for each student to use throughout the year. Alternatively, you might run multiple copies of the sheets for each multiplier and each range of facts and keep them in labeled folders that are easily accessible to students. You can have students work on the packets at school during a designated time and/or take them home for practicing with a family member.
Fact Fluency with 8’s  Multiplying & Dividing by 8

### MULTIPLICATION FACT FLUENCY

<table>
<thead>
<tr>
<th>Strategy</th>
<th>How It Works</th>
<th>Example</th>
</tr>
</thead>
</table>
| Double-Double-Doubles | To multiply any number by 8, double the number 3 times. | What is $8 \times 7$?  
It’s 7 doubled 3 times.  
Double once: $7 + 7 = 14$  
Double twice: $14 + 14 = 28$  
Double three times: $28 + 28 = 56$ |

1. Multiply each number in the grid by 8. Write each product in the box. The first one is done for you.

<table>
<thead>
<tr>
<th></th>
<th>5</th>
<th>7</th>
<th>3</th>
<th>9</th>
<th>11</th>
<th>8</th>
<th>12</th>
<th>6</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>8</td>
<td>11</td>
<td>1</td>
<td>9</td>
<td>5</td>
<td>0</td>
<td>12</td>
<td>4</td>
</tr>
</tbody>
</table>

2. Use the double-double-doubles strategy to help solve these combinations.

$$8 \times 15 = \_\_\_\_\_$$  $$8 \times 25 = \_\_\_\_\_$$  $$8 \times 35 = \_\_\_\_\_$$  $$8 \times 50 = \_\_\_\_\_$$

$$14 \times 8$$  $$150 \times 8$$  $$30 \times 8$$

3. Use what you know about multiplying by 8 to solve these division problems.

$$40 \div 8 = \_\_\_\_\_$$  $$88 \div 8 = \_\_\_\_\_$$  $$72 \div 8 = \_\_\_\_\_$$  $$64 \div 8 = \_\_\_\_\_$$

$$8 \overline{80}$$  $$8 \overline{48}$$  $$8 \overline{56}$$  $$8 \overline{96}$$
Fact Fluency with 8’s  Practice Multiplying by 8 & 4

1 Circle all the double-double-doubles (×8) in blue. Then go back and fill in the answers with regular pencil.

2 Circle all the double-doubles (×4) in red. Then go back and fill in the answers with regular pencil.

3 Write two multiplication and two division facts for each set of numbers.
Fact Fluency with 8’s  Missing Number Capture 8’s & 4’s

### Instructions for Missing Number Capture 8’s & 4’s

1. Take turns spinning the spinner. The player who gets the higher number goes first.

2. Take turns spinning the spinner. Use the number you spin to complete one of the problems below. Be sure to use your own color pencil.

3. If the box you need is already filled, you lose your turn.

4. Try to capture 3 or 4 boxes in a row: across, up and down, or diagonally. Keep playing until the gameboard is filled or neither player can use the number he or she spins 3 times in a row.

5. Then circle the places on the grid where you got 3 or 4 in a row and add up your scores.

### Scoring

3 in a Row—1 point  
4 in a Row—2 points

<table>
<thead>
<tr>
<th>4 × 12</th>
<th>8 × 40</th>
<th>4 × 48</th>
<th>8 × 64</th>
<th>4 × 28</th>
<th>Player 1 Points</th>
<th>Player 2 Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 × 16</td>
<td>8 × 24</td>
<td>4 × 44</td>
<td>8 × 72</td>
<td>8 × 32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 × 96</td>
<td>4 × 32</td>
<td>8 × 80</td>
<td>4 × 24</td>
<td>8 × 88</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 × 56</td>
<td>4 × 20</td>
<td>4 × 36</td>
<td>8 × 40</td>
<td>8 × 88</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Fact Fluency with 8’s  Flashcard Bingo 8’s

You’ll need

★ a partner
★ one set of 8’s flashcards and your flashcard pocket
★ marker or crayon for each player

Instructions for Flashcard Bingo 8’s

1 Mix up one set of flashcards and arrange them so that the multiplication side is facing up on all of them. Put them in the flashcard pocket.

2 Take turns pulling 1 card. Each time, both players color the product on their board or mark it with an x.

3 The first player to get two rows of 4 going horizontally, vertically, or diagonally, wins.

4 Play the game a second time using the division side of your cards.

<table>
<thead>
<tr>
<th>Player 1</th>
<th>Player 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>96 40 72 48</td>
<td>24 16 8 40</td>
</tr>
<tr>
<td>64 88 16 72</td>
<td>40 88 72 16</td>
</tr>
<tr>
<td>48 8 56 80</td>
<td>32 96 80 8</td>
</tr>
<tr>
<td>56 32 24 64</td>
<td>56 64 48 32</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Game 1 x</th>
<th>Game 2 +</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 4 8 12</td>
<td>7 4 3 6</td>
</tr>
<tr>
<td>9 11 3 7</td>
<td>12 6 8 11</td>
</tr>
<tr>
<td>1 6 11 10</td>
<td>10 7 5 9</td>
</tr>
<tr>
<td>5 10 9 2</td>
<td>5 2 1 8</td>
</tr>
</tbody>
</table>
Fact Fluency with 8’s Flashcards, page 1 of 2

- Cut out this set of 12 flashcards.
- Fold a 3-by-5 index card in half.
- Tape or staple both sides but leave the top open.
- Label this storage pocket with your name and the set number.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>×8</td>
<td>×8</td>
<td>×8</td>
<td>×8</td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>×8</td>
<td>×8</td>
<td>×8</td>
<td>×8</td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>×8</td>
<td>×8</td>
<td>×8</td>
<td>×8</td>
</tr>
</tbody>
</table>
Fact Fluency with 8’s  Flashcards, page 2 of 2

32 ÷ 8  24 ÷ 8  16 ÷ 8  8 ÷ 8

64 ÷ 8  56 ÷ 8  48 ÷ 8  40 ÷ 8

96 ÷ 8  88 ÷ 8  80 ÷ 8  72 ÷ 8