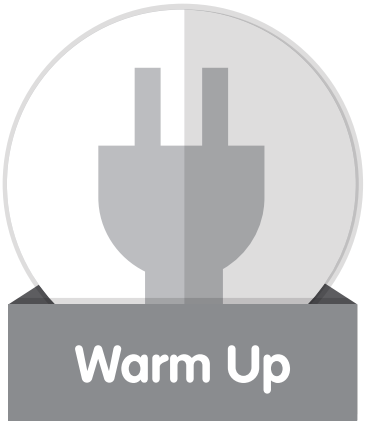
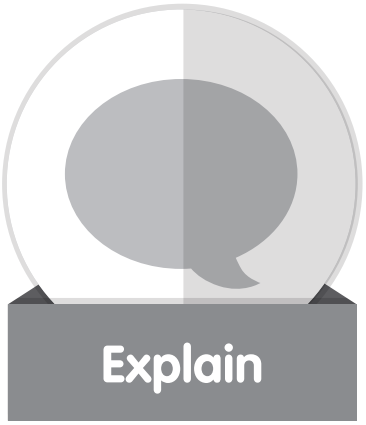
MATH GAMES FOR THE COMMON CORE

Grade 3

Operations • Algebraic Thinking • Base Ten • Fractions





Gail Gerdemann with Kathleen Barta

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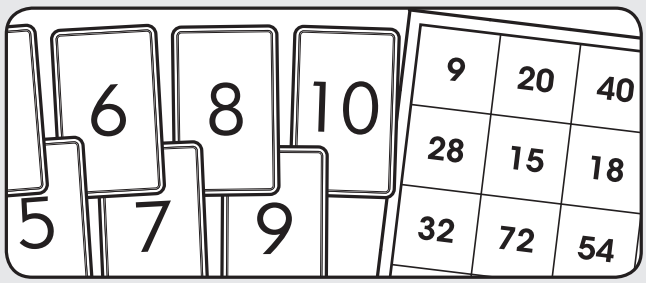


Double Trouble

GAME 3–1

Learning Objectives

Develop fluency with the multiplication facts for 2s and 4s.

Content Standards

Apply properties of operations as strategies to multiply . . . (CCSSM: 3.OA.5)

Fluently multiply . . . within 100, using strategies such as the relationship between multiplication and division . . . or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers. (CCSSM: 3.OA.7)

Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. (CCSSM: 3.OA.9)

Prerequisite Skills

Students should be fluent, or nearly fluent, with adding one- and two-digit numbers within 100.

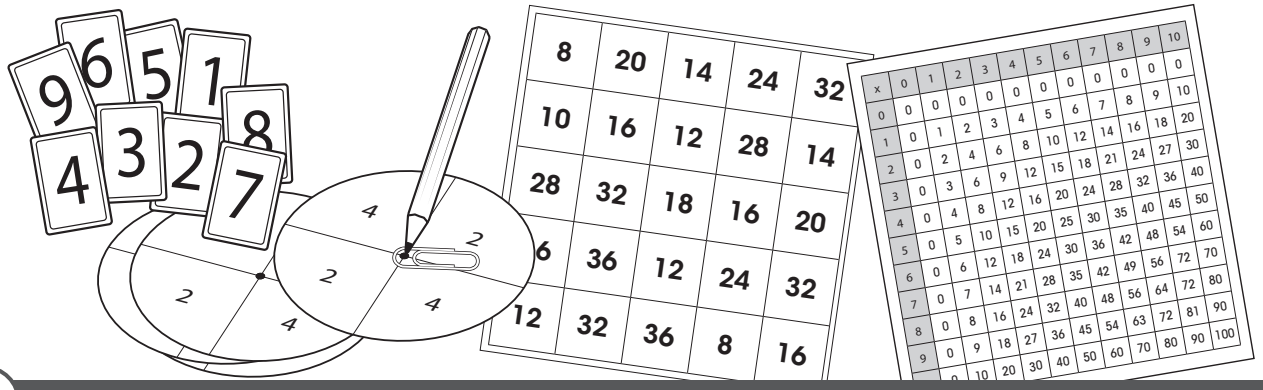
Math Vocabulary

double

Materials

For each pair of students:

	Warm-Ups	"Double Trouble" Game	"Double Trouble – Four in a Row" Game
• Deck of Number Cards 0–10 (page 107)	✓	✓	✓
• Multiplication Chart (page 108)	✓	✓	
• Spinners (page 74)		✓	✓
• Game Board (page 75)			✓
• Tiles or other markers	✓		



GAME
3–1

Warm-Up A-1: Using Area Models for Multiples of 2

Materials for each pair of students:

- Tiles (at least 30)
- 1-cm graph paper (optional)

Directions:

1. Build area models with tiles for the first five multiples of 2 on a projector or whiteboard. Identify rows, columns, and dimensions.
2. Have each pair of students make models of the first five multiples of 2 with tiles. List the total number of tiles or units in each area model (save this list to use again):

Rows (How many rows)	Columns (How many tiles in each row)	2 × __ (2 groups of __)
2	1	2 × 1 = 2
2	2	2 × 2 = 4
2	3	2 × 3 = 6
2	4	2 × 4 = 8
2	5	2 × 5 = 10

3. Ask students what they notice about the pattern. (They may note the pattern of even numbers; each multiple is 2 more than the previous one.)
4. Physically turn the area models 90 degrees and record the rows, columns, and equations to illustrate the commutative property of multiplication.
5. Students who are being introduced to multiplication, or students who need more support, need to spend time working with visual representations before completing the list of multiples of 2 through 2 × 10. Have them:
   - Fold two pieces of graph paper in half the long way (hotdog fold).
   - Sketch area models of 2 × 1 through 2 × 10 on graph paper on the left side of their papers, leaving some space between each sketch.
   - Label the dimensions. Write an equation to represent each area model (for example, 2 × 3 = 6).
   - On the right side of their papers, show each model turned 90 degrees. Label the dimensions and the total number of units for each model.
   - Circle each pair of equations with the same product. (For example, circle 2 × 5 = 10 and 5 × 2 = 10.)
   - Complete the list of the multiples of 2 through 2 × 10.

GAME
3–1

Warm-Up A-2: Skip–Count by 2s

Directions:

1. Whole class stands in a circle.
2. Players take turns skip counting by 2s, one number at a time. Whoever says "20" sits down.
3. Anyone who sits down is now a judge and needs to verify that the correct number has been called out.
4. The next player begins again with "2." Game continues until only one student is left.

(*Note:* In the Differentiation section, see the reference to songs for multiples.)

Warm-Up A-3: Product Crossing with Twos

Number of Players: 2

Materials:

- Deck of Number Cards 0–10 (page 107)

Object: Cross off each of the numbers on the list of products by multiplying correctly and quickly.

Directions:

1. Each player makes a list of the products of 2 (0, 2, 4, … , 20) and then turns the list facedown.
2. Place the first factor card, 2, on the table.
3. Players take turns:
   - Drawing a card from the deck (This is the other factor.)
   - Multiplying the number on the card by 2.
4. If players say the product correctly and quickly, they cross it off their list of products and then turn the list facedown again.
5. Players reshuffle the cards as needed. The first player to cross off all the numbers on his/her list of products wins.

GAME
3–1

Warm-Up B-1: Using Area Models for Multiples of 4

Materials:

For a projection device:

- Multiplication Chart (page 108)

For each pair of students:

- Tiles (at least 30)
- 1-cm graph paper (optional)

Directions:

1. Build area models with tiles for the first three multiples of 4 on a projector or whiteboard.
2. Have each pair of students use tiles to make an area model for each of the first five multiples of 4.
3. As a class, record the rows, columns, and total number of units for each multiple of 4 next to the information for the corresponding multiple of 2:

Rows	Columns	2 × __ (2 groups of __)	4 × __ (4 groups of __)	Columns	Rows
2	1	2 × 1 = 2	4 × 1 = 4	1	4
2	2	2 × 2 = 4	4 × 2 = 8	2	4
2	3	2 × 3 = 6	4 × 3 = 12	3	4
2	4	2 × 4 = 8	4 × 4 = 16	4	4
2	5	2 × 5 = 10	4 × 5 = 20	5	4

4. Ask students what they notice about the pattern. (If necessary, ask questions to help students discover that each area model for a multiple of 4 is twice as large as the matching model.)
5. Look at a multiplication chart. Highlight all the multiples of 2 and 4. Ask students if the pattern(s) they noticed work for all the multiples of 4.
6. Students who are being introduced to multiplication, or students who need more support, should spend time working with visual representations before completing the list of multiples of 4 through 4 × 10. Have them:
   - Fold two pieces of graph paper in half the long way (hotdog fold).
   - Sketch area models of 4 × 1 through 4 × 10 on graph paper on the left side of their papers, leaving some space between each area model.
   - Label the dimensions. Write an equation to represent each area model (for example, 4 × 6 = 24).
   - On the right side of their papers, show each model turned 90˚. Label the dimensions and total number of units for each model.
   - Circle each pair of equations with the same product. For example, circle 4 × 5 = 20 and 5 × 4 = 20.

GAME
3–1

Warm-Up B-2: Skip-Count by 4s

Directions:

1. Whole class stands in a circle.
2. Players take turns skip counting by 4s, one number at a time. Whoever says "40" sits down.
3. Anyone who sits down is now a judge and needs to verify that the correct number has been called out.
4. The next player begins again with "4." Game continues until only one student is left.

Warm-Up B-3: Double 2s

Number of Players: Pairs of students

Materials:

- Deck of Number Cards 0–10 (page 107)

Object: Practice multiplying by 2s and 4s.

Directions:

1. Player 1 draws a card and multiplies that number by 2.
2. Player 2 multiplies the same number by 4, doubling the "2 ×" product. Example: Player 1 draws "5" and says, "2 × 5 = 10." Player 2 says, "4 × 5 = 20."
3. Partners check each other's answers for accuracy.
4. Students alternate being Player 1.

GAME
3–1

Warm-Up B-4: Product Crossing with 4s

Number of Players: 2

Materials:

- Deck of Number Cards 0–10 (page 107)

Object: Cross off each of the numbers on the list of products by multiplying correctly and quickly.

Directions:

1. Each player makes a list of the products of 4 (0, 4, 8, . . . , 40) and then turns the list facedown.
2. Place the first factor card, 4, on the table.
3. Students take turns:
   - Drawing a card from the deck. This is the other factor.
   - Multiplying the number on the card by 4.
4. If players say the product correctly and quickly, they cross it off their list of products and then turn the list facedown again.
5. Players reshuffle the cards as needed. The first player to cross off all the numbers on his/her list of products wins.

GAME
3–1

Explaining the Game: Double Trouble

Number of Players: 2

Materials:

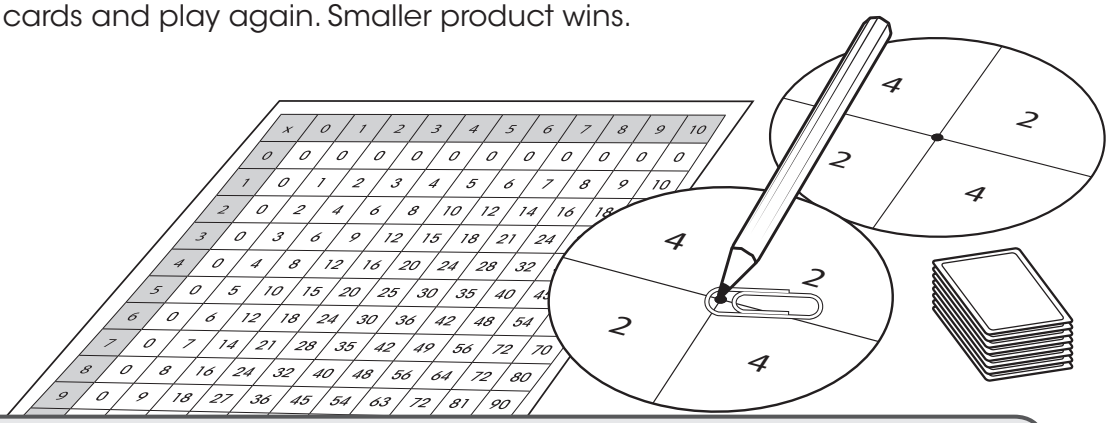
For each pair of students:

- Two Spinners (page 74)
- Deck of Number Cards 0–10 (page 107)
- Multiplication Chart (facedown, except when used to check products) (page 108)
- Game Rules, if needed, after presentation (page 1119)

Object: Players multiply their "spinner number" by the number on their card. Larger (or smaller) product wins.

How to Play:

1. Each player:
   - Spins for his/her "spinner number."
   - Draws a number card from the deck.
   - Multiplies the "spinner number" by the number on his/her card.
   - Says the equation (for example, "2 times 7 equals 14").
2. The player with the larger product wins both cards.
3. Repeat until the deck is used up. The player with the most cards wins.
4. Shuffle the cards and play again. Smaller product wins.



Variations

- Flip a coin to determine the winner (heads: larger product; tails: smaller product).
- Use only one spinner. The first player to say the product correctly wins.

GAME
3–1

Explaining the Game: Double Trouble – Four in a Row

Number of Players: Pairs of students

Materials:

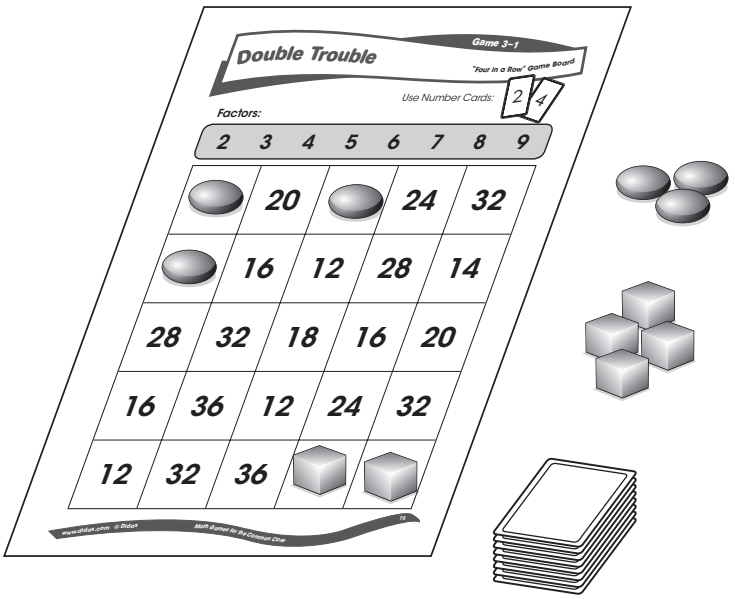
For each pair of students:

- "Double Trouble – Four in a Row" Game Board (page 75)
- 4 sets of the Number Cards 2 and 4
- Tiles or other markers
- Game Rules, if needed, after presentation (page 120)

Object: Multiply to capture four adjacent numbers in a row (horizontal, vertical, or diagonal).

Directions:

1. Players take turns drawing a card.
2. The player whose turn it is:
   - Multiplies the number on the card by one of the factors at the top of the page.
   - Says the multiplication fact and places a tile on the product.
3. If that product has already been captured, it is the other player's turn.
4. The first player to capture four adjacent numbers in a row wins.



Differentiation

Warm-Up Exercises A-1 and B-1

More Support

- Build all the models with tiles. Some students may need to begin by counting to figure out how many tiles are in each array. They may need to do this many times before they understand and learn the multiples.
- Songs help some students learn the multiples. Songs for the multiples of 2 through 6 are available at **www.teachertoteacher.com/songs.html**. Video clips are included.

"Double Trouble" Game

More Support

- At first, limit the number cards to 0–5 when playing "Double Trouble." Then gradually add the other number cards to the deck.
- Allow students to use their grid paper arrays as references, if needed.

More Challenge
(Above grade level)

- Draw a card to determine the starting number. Take turns doubling, mentally if possible, until one player, the winner, crosses the 100 mark.

"Double Trouble – Four in a Row" Game

More Support

- Play cooperatively. Goal can be to get five in a row or to capture every square (blackout).

More Challenge

- Play competitively. The winner gets 20 points for being the first to get four in a row, but subtracts 1 point for each tile he/she played that is not in the winning row. The other player gets one point for each tile played.
- Create a game board for the factors 2–10 and the cards 2 and 4. Play the game.