GRADE
3

Building Conceptual Understanding and Fluency Through Games

FOR THE NORTH CAROLINA STANDARD COURSE OF STUDY IN MATHEMATICS

PUBLIC SCHOOLS OF NORTH CAROLINA
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K-12 MATHEMATICS
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Building Conceptual Understanding and Fluency Through Games

Developing fluency requires a balance and connection between conceptual understanding and computational proficiency. Computational methods that are over-practiced without understanding are forgotten or remembered incorrectly. Conceptual understanding without fluency can inhibit the problem solving process. – NCTM, *Principles and Standards for School Mathematics*, pg. 35

WHY PLAY GAMES?

People of all ages love to play games. They are fun and motivating. Games provide students with opportunities to explore fundamental number concepts, such as the counting sequence, one-to-one correspondence, and computation strategies. Engaging mathematical games can also encourage students to explore number combinations, place value, patterns, and other important mathematical concepts. Further, they provide opportunities for students to deepen their mathematical understanding and reasoning. Teachers should provide repeated opportunities for students to play games, and let the mathematical ideas emerge as they notice new patterns, relationships, and strategies. Games are an important tool for learning. Here are some advantages for integrating games into elementary mathematics classrooms:

- Playing games encourages strategic mathematical thinking as students find different strategies for solving problems and it deepens their understanding of numbers.
- Games, when played repeatedly, support students' development of computational fluency.
- Games provide opportunities for practice, often without the need for teachers to provide the problems. Teachers can then observe or assess students, or work with individual or small groups of students.
- Games have the potential to develop familiarity with the number system and with "benchmark numbers" – such as 10s, 100s, and 1000s and provide engaging opportunities to practice computation, building a deeper understanding of operations.
- Games provide a school to home connection. Parents can learn about their children's mathematical thinking by playing games with them at home.

BUILDING FLUENCY

Developing computational fluency is an expectation of the North Carolina Standard Course of Study. Games provide opportunity for meaningful practice. The research about how students develop fact mastery indicates that drill techniques and timed tests do not have the power that mathematical games and other experiences have. Appropriate mathematical activities are essential building blocks to develop mathematically proficient students who demonstrate computational fluency (Van de Walle & Lovin, *Teaching Student-Centered Mathematics Grades K-3,* pg. 94). Remember, computational fluency includes efficiency, accuracy, and flexibility with strategies (Russell, 2000).

The kinds of experiences teachers provide to their students clearly play a major role in determining the extent and quality of students' learning. Students' understanding can be built by actively engaging in tasks and experiences designed to deepen and connect their knowledge. Procedural fluency and conceptual understanding can be developed through problem solving, reasoning, and argumentation (NCTM, P*rinciples and Standards for School Mathematics,* pg. 21). Meaningful practice is necessary to develop fluency with basic number combinations and strategies with multi-digit numbers. Practice should be purposeful and should focus on developing thinking strategies and a knowledge of number relationships rather than drill isolated facts (NCTM, *Principles and Standards for School Mathematics,* pg. 87). Do *not* subject any student to computation drills unless the student has developed an efficient strategy for the facts included in the drill (Van de Walle & Lovin, *Teaching Student-Centered Mathematics Grades K-3,* pg. 117). Drill can strengthen strategies with which students feel comfortable – ones they "own" – and will help to make these strategies increasingly automatic. Therefore, drill of strategies will allow students to use them with increased efficiency, even to the point of recalling the fact without being conscious of using a strategy. Drill without an efficient strategy present offers no assistance (Van de Walle & Lovin, *Teaching Student-Centered Mathematics Grades K-3,* pg. 117).

CAUTIONS

Sometimes teachers use games solely to practice number facts. These games usually do not engage children for long because they are based on students' recall or memorization of facts. Some students are quick to memorize, while others need a few moments to use a related fact to compute. When students are placed in situations in which recall speed determines success, they may infer that being "smart" in mathematics means getting the correct answer quickly instead of valuing the process of thinking. Consequently, students may feel incompetent when they use number patterns or related facts to arrive at a solution and may begin to dislike mathematics because they are not fast enough.

For students to become fluent in arithmetic computation, they must have efficient and accurate methods that are supported by an understanding of numbers and operations. "Standard" algorithms for arithmetic computation are one means of achieving this fluency.

– NCTM, *Principles and Standards for School Mathematics,* pg. 35

Overemphasizing fast fact recall at the expense of problem solving and conceptual experiences gives students a distorted idea of the nature of mathematics and of their ability to do mathematics.

– Seeley, *Faster Isn't Smarter: Messages about Math, Teaching, and Learning in the 21st Century,* pg. 95

Computational fluency refers to having efficient and accurate methods for computing. Students exhibit computational fluency when they demonstrate flexibility in the computational methods they choose, understand and can explain these methods, and produce accurate answers efficiently.

– NCTM, *Principles and Standards for School Mathematics,* pg. 152

Fluency refers to having efficient, accurate, and generalizable methods (algorithms) for computing that are based on well-understood properties and number relationships.

– NCTM, *Principles and Standards for School Mathematics,* pg. 144

INTRODUCE A GAME

A good way to introduce a game to the class is for the teacher to play the game against the class. After briefly explaining the rules, ask students to make the class's next move. Teachers may also want to model their strategy by talking aloud for students to hear his/her thinking. "I placed my game marker on 6 because that would give me the largest number."

Games are fun and can create a context for developing students' mathematical reasoning. Through playing and analyzing games, students also develop their computational fluency by examining more efficient strategies and discussing relationships among numbers. Teachers can create opportunities for students to explore mathematical ideas by planning questions that prompt students to reflect about their reasoning and make predictions. Remember to always vary or modify the game to meet the needs of your leaners. Encourage the use of the Standards for Mathematical Practice.

HOLDING STUDENTS ACCOUNTABLE

While playing games, have students record mathematical equations or representations of the mathematical tasks. This provides data for students and teachers to revisit to examine their mathematical understanding.

After playing a game, have students reflect on the game by asking them to discuss questions orally or write about them in a mathematics notebook or journal:

1. What skill did you review and practice?
2. What strategies did you use while playing the game?
3. If you were to play the game a second time, what different strategies would you use to be more successful?
4. How could you tweak or modify the game to make it more challenging?

A Special Thank-You

The development of the NC Department of Public Instruction Document, *Building Conceptual Understanding and Fluency Through Games* was a collaborative effort with a diverse group of dynamic teachers, coaches, administrators, and NCDPI staff. We are very appreciative of all of the time, support, ideas, and suggestions made in an effort to provide North Carolina with quality support materials for elementary level students and teachers. The North Carolina Department of Public Instruction appreciates any suggestions and feedback, which will help improve upon this resource. Please send all correspondence to **Denise Schulz** (denise.schulz@dpi.nc.gov)

GAME DESIGN TEAM

The Game Design Team led the work of creating this support document. With support of their school and district, they volunteered their time and effort to develop *Building Conceptual Understanding and Fluency Through Games*.

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STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

OPERATIONS AND ALGEBRAIC THINKING

Represent and solve problems involving multiplication and division.

NC.3.OA.1 *For products of whole numbers with two factors up to and including 10:*
- *Interpret the factors as representing the number of equal groups and the number of objects in each group.*
- *Illustrate and explain strategies including arrays, repeated addition, decomposing a factor, and applying the commutative and associative properties.*

NC.3.OA.2 For whole-number quotients of whole numbers with a one digit divisor and a one-digit quotient:
- Interpret the divisor and quotient in a division equation as representing the number of equal groups and the number of objects in each group.
- Illustrate and explain strategies including arrays, repeated addition or subtraction, and decomposing a factor.

NC.3.OA.3 Represent, interpret, and solve one-step problems involving multiplication and division.
- Solve multiplication word problems with factors up to and including 10. Represent the problem using arrays, pictures, and/or equations with a symbol for the unknown number to represent the problem.
- Solve division word problems with a divisor and quotient up to and including 10. Represent the problem using arrays, pictures, repeated subtraction and/or equations with a symbol for the unknown number to represent the problem.

Understand properties of multiplication and the relationship between multiplication and division.

NC.3.OA.6 Understand division as an unknown-factor problem. *For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.*

Multiply and divide within 100.

NC.3.OA.7 Demonstrate fluency with multiplication and division with factors, quotients and divisors up to and including 10.
- Know from memory all products with factors up to and including 10.
- Illustrate and explain using the relationship between multiplication and division.
- Determine the unknown whole number in a multiplication or division equation relating three whole numbers.

Solve two-step problems.

NC.3.OA.8 Solve two-step word problems using addition, subtraction, and multiplication, representing problems using equations with a symbol for the unknown number.

Explore patterns of numbers.

NC.3.OA.9 Interpret patterns of multiplication on a hundreds board and/or multiplication table.

NUMBER AND OPERATIONS IN BASE TEN

Use value to add and subtract.

NC.3.NBT.2 Add and subtract whole numbers up to and including 1,000.
- • Use estimation strategies to assess reasonableness of answers.
- Model and explain how the relationship between addition and subtraction can be applied to solve addition and subtraction problems.
- Use expanded form to decompose numbers and then find sums and differences.

Generalize place value understanding for multi-digit numbers.

NC.3.NBT.3 Use concrete and pictorial models, based on place value and the properties of operations, to find the product of a one-digit whole number by a multiple of 10 in the range 10-90.

NUMBER AND OPERATIONS - FRACTIONS

Understand fractions as numbers.

NC.3.NF.1 Interpret unit fractions with denominators of 2, 3, 4, 6, and 8 as quantities formed when a whole is partitioned into equal parts;
- Explain that a unit fraction is one of those parts.
- Represent and identify unit fractions using area and length models.

NC.3.NF.2 Interpret fractions with denominators of 2, 3, 4, 6, and 8 using area and length models.
- Using an area model, explain that the numerator of a fraction represents the number of equal parts of the unit fraction.
- Using a number line, explain that the numerator of a fraction represents the number of lengths of the unit fraction from 0.

NC.3.NF.3 Represent equivalent fractions with area and length models by:
- Composing and decomposing fractions into equivalent fractions using related fractions: halves, fourths and eighths; thirds and sixths.
- Explaining that a fraction with the same numerator and denominator equals one whole.
- Expressing whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.

NC.3.NF.4 Compare two fractions with the same numerator or the same denominator by reasoning about their size, using area and length models, and using the >, <, and = symbols. Recognize that comparisons are valid only when the two fractions refer to the same whole with denominators: halves, fourths and eighths; thirds and sixths.

MEASUREMENT AND DATA

Solve problems involving measurement.

NC.3.MD.1 Tell and write time to the nearest minute. Solve word problems involving addition and subtraction of time intervals within the same hour.

NC.3.MD.2 Solve problems involving customary measurement.

- Estimate and measure lengths in customary units to the quarter-inch and half-inch, and feet and yards to the whole unit.
- Estimate and measure capacity and weight in customary units to a whole number: cups, pints, quarts, gallons, ounces, and pounds.
- Add, subtract, multiply, or divide to solve one-step word problems involving whole number measurements of length, weight, and capacity in the same customary units.

Represent and interpret data.

NC.3.MD.3 Represent and interpret scaled picture and bar graphs:

- Collect data by asking a question that yields data in up to four categories.
- Make a representation of data and interpret data in a frequency table, scaled picture graph, and/or scaled bar graph with axes provided.
- Solve one and two-step "how many more" and "how many less" problems using information from these graphs.

Understand the concept of area.

NC.3.MD.5 Find the area of a rectangle with whole-number side lengths by tiling without gaps or overlaps and counting unit squares.

NC.3.MD.7 Relate area to the operations of multiplication and addition.

- Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.
- Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving problems, and represent whole-number products as rectangular areas in mathematical reasoning.
- Use tiles and/or arrays to illustrate and explain that the area of a rectangle can be found by partitioning it into two smaller rectangles, and that the area of the large rectangle is the sum of the two smaller rectangles.

Understand the concept of perimeter.

NC.3.MD.8 Solve problems involving perimeters of polygons, including finding the perimeter given the side lengths, and finding an unknown side length.

GEOMETRY

Reason with shapes and their attributes.

NC.3.G.1 Reason with two-dimensional shapes and their attributes.

- Investigate, describe, and reason about composing triangles and quadrilaterals and decomposing quadrilaterals.
- Recognize and draw examples and non-examples of types of quadrilaterals including rhombuses, rectangles, squares, parallelograms, and trapezoids.

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Operations and Algebraic Thinking

Number and Operations in Base Ten

Number and Operations – Fractions

Measurement and Data

Geometry

REVIEW

Online Games for Each Category

Double Up!

Building Fluency: multiply within 100

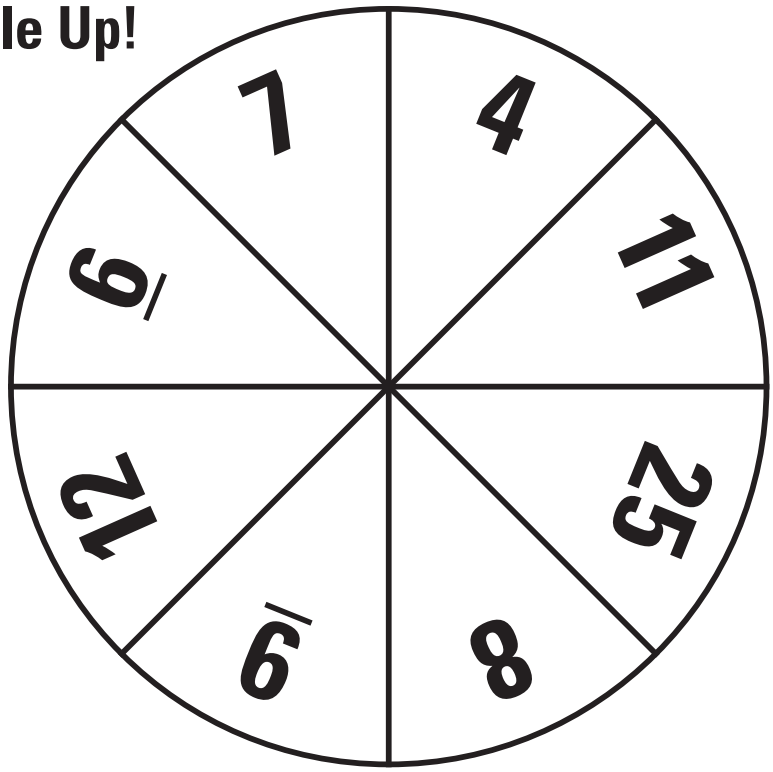
Materials: gameboard, spinner (paper clip and pencil), 8 game markers - different color for each player

Number of Players: 2

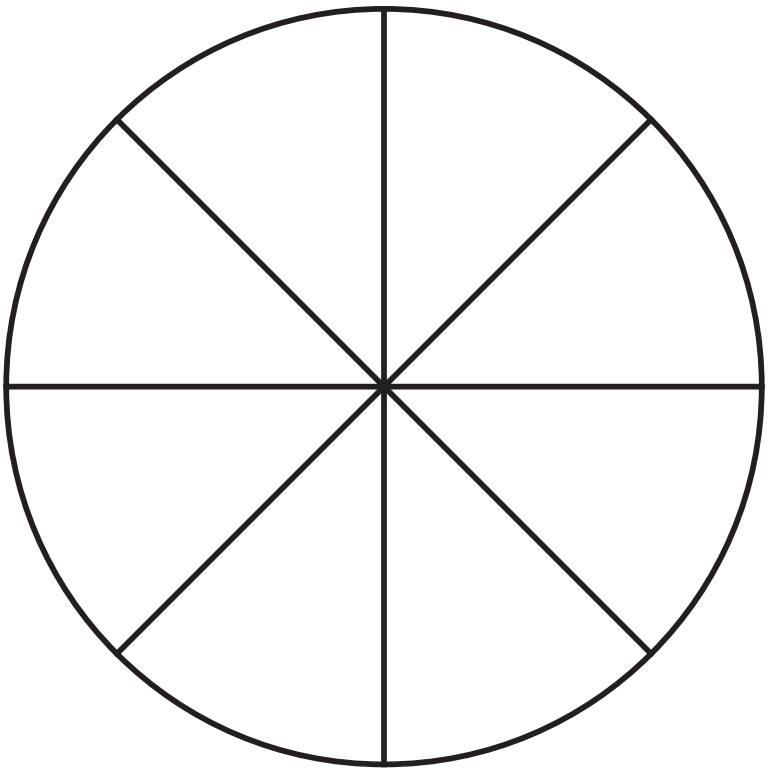
Directions:

1. Spin and double the number (multiply by 2)
2. Cover the product on the gameboard.
3. If the spinner lands on a line, spin again.
4. The first player to cover three products in a row wins.

Variation/Extension: Students create their own spinner game with products, an example might be having players spin two factors and multiply and cover the products on the board.



8	18	12	14	16
16	50	8	50	18
22	14	22	12	24
8	24	12	18	16
50	18	14	24	22



Tic-Tac-Toe Array

Building Fluency: products of whole numbers and their relationship to rectangular arrays

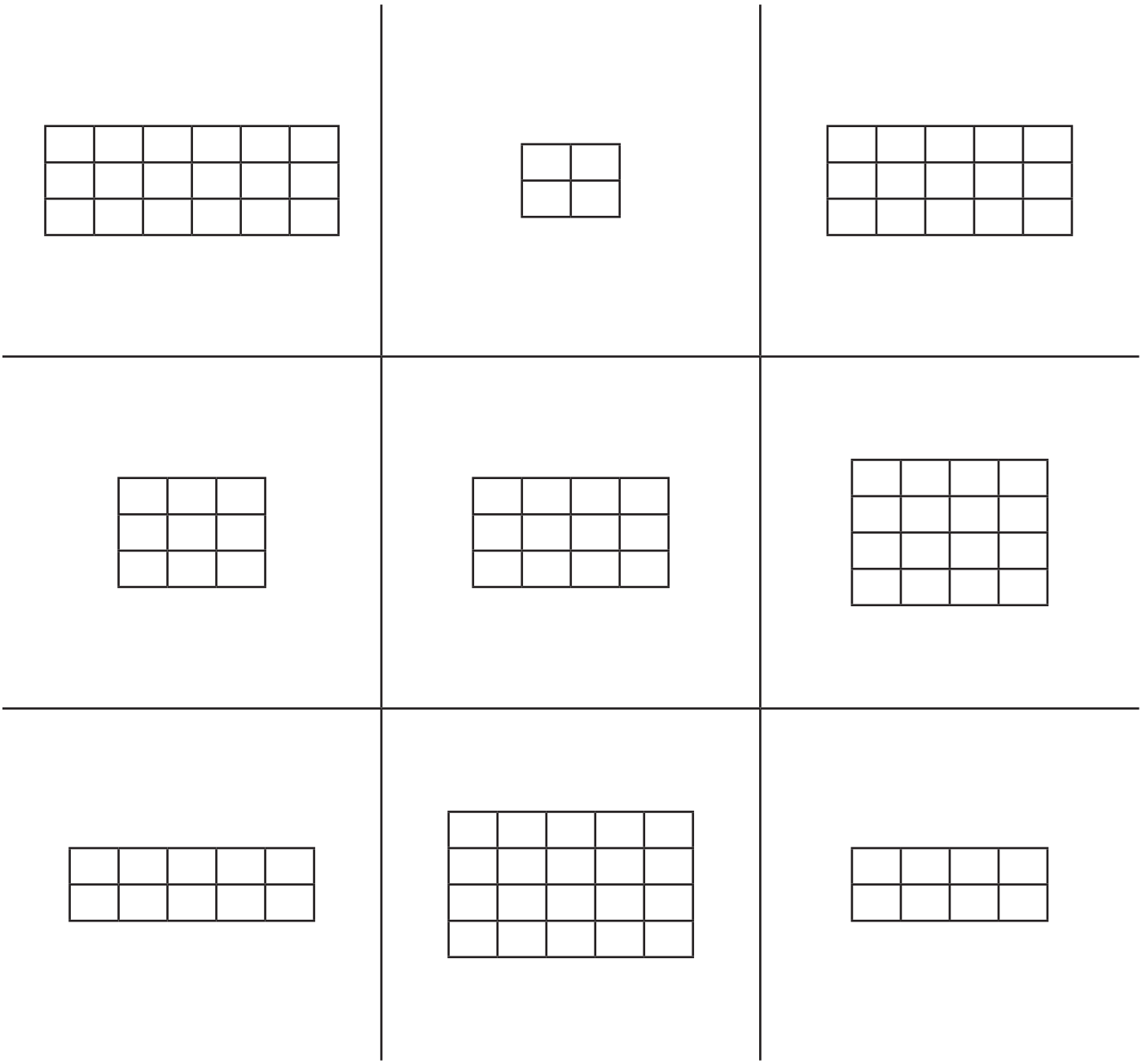
Materials: gameboard, pile of centimeter cubes (at least 20), 5 game markers - different color for each player, a spinner (your choice)

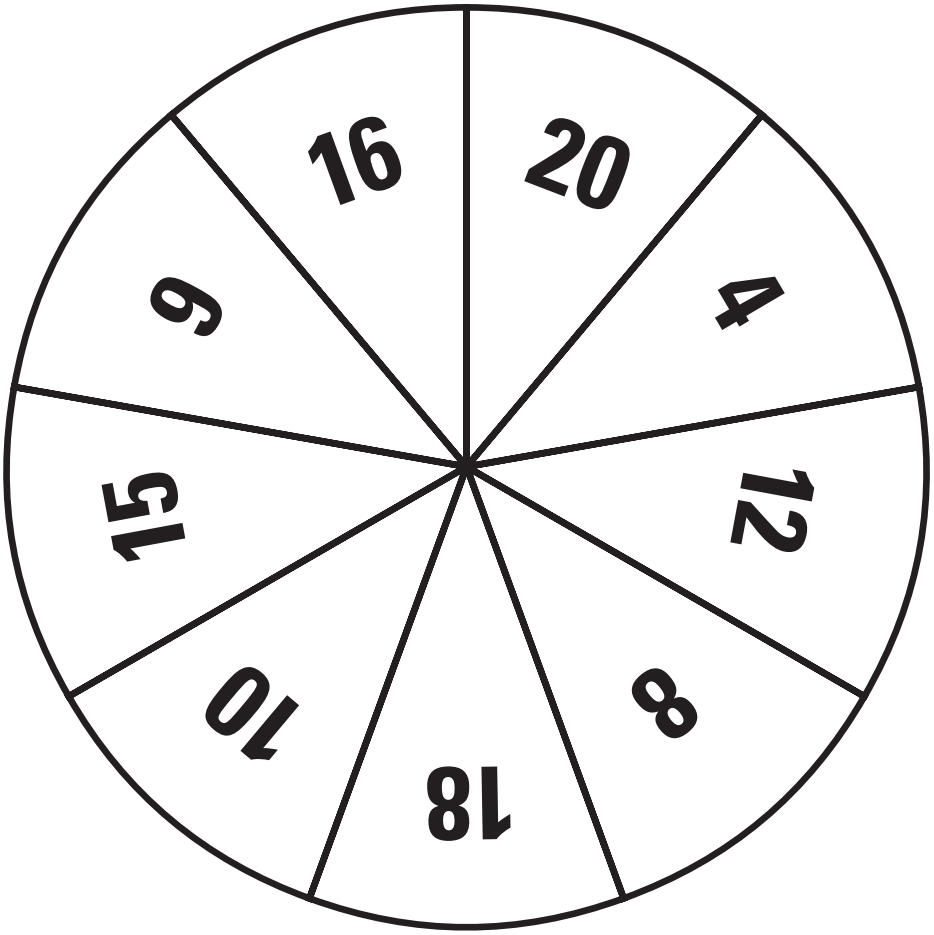
Number of Players: 2

Directions:

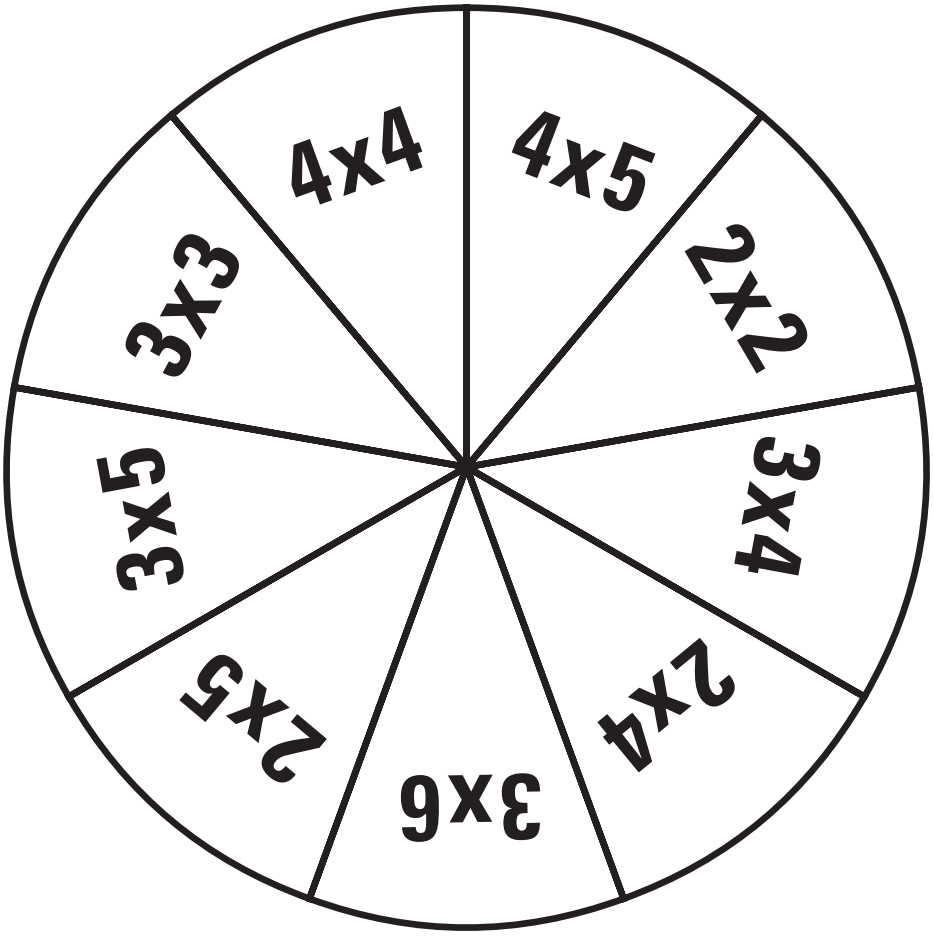
1. Players take turns spinning the spinner. The player takes the number of cubes shown on the spinner.
2. The player uses the cubes to build one of the rectangles shown on the gameboard & says the equation used to build the rectangle.
3. The player puts the cubes back in the pile and places a marker on the rectangle.
4. The winner is the first player to have three markers in a row.

Variation/Extension: Player may win by being the first to cover four adjacent rectangles to form a box. Use the second spinner. Player will multiply and use those dimensions to make the rectangle.





Variation #2
Spinner



Sakes Alive, Go For Fives!!

Building Fluency: multiply within 100

Materials: gameboard, pair of dice, 20 game markers - different color for each player

Number of Players: 2 or 3

Directions:

1. Players take turns rolling dice. Player covers the product or the two factors with game markers.
2. If the player is not able to cover a number, the turn is lost.
3. The first player to cover five squares in a row, vertically, horizontally, or diagonally wins the game.

Variation/Extension: Play a "doubles" variation. When a player cannot play the factors or the product, they may play a double of the product. Example: Player rolls 2 and 5. 10 is not available. Player calls "double" and covers the 20.

24	5	16	3	18	2	20	12	4
4	8	6	12	4	3	25	5	8
18	1	36	4	30	5	24	3	2
12	18	2	5	16	6	1	9	4
25	3	2	20	4	5	3	8	25
5	9	1	15	5	18	6	12	1
8	3	5	4	24	3	2	24	6
2	30	25	6	2	8	4	9	3
15	1	20	9	18	3	6	24	36

Raging Rectangles

Building Fluency: products of whole numbers and their relationship to rectangular arrays; relate area to operations of multiplication

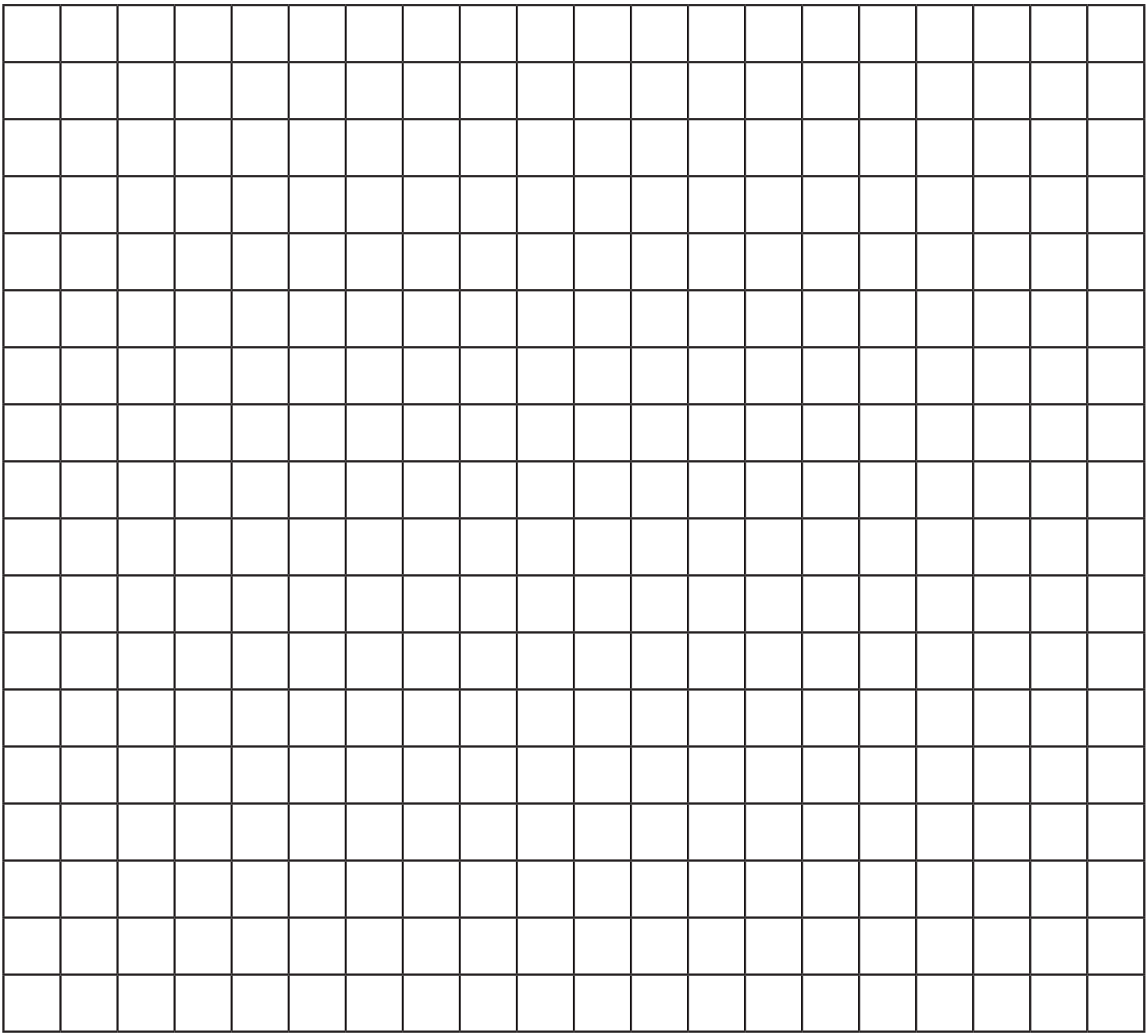
Materials: gameboard, pair of dice, 1 crayon - different color per player

Number of Players: 2

Directions:

1. Each player takes a turn rolling the dice to get two factors.
2. The player outlines and colors a rectangle on the gameboard to match the pair of factors. Example: a roll of 6 and 3 is colored as a 6 x 3 rectangle or a 3 x 6 rectangle.
3. The player writes the equation (area) inside the rectangle.
4. A player loses a turn when the rectangle cannot be drawn on the gameboard.
5. The winner is the player with the most area colored.

Variation/Extension: Students can add the two numbers on the dice for the first factor and then use 2, 5 or 10 as the second factor.



Multiple Madness

Building Fluency: multiply within 100

Materials: gameboard, 8 game markers – different color for each player, 2 paperclips

Number of Players: 2

Directions:

1. The first player places the two paperclips on any factors at the bottom of the page. Both paperclips may be on the same factor.
2. The player covers the product of the two factors with a game marker.
3. The second player moves one of the paperclips then places a game marker on the new product.
4. Players alternate moving a paperclip and marking a product.
5. The winner is the first to cover four products in a row.

Variation/Extension: Multiple Madness II is a variation

1	2	3	4	5	6
8	9	10	12	15	16
20	25	1	2	3	4
5	6	8	9	10	12
15	16	20	25	1	2
3	4	5	6	8	10

FACTORS: 1 2 3 4 5

Multiple Madness II

Building Fluency: products of whole numbers

Materials: gameboard, 8 game markers – different color for each player, 2 paperclips

Number of Players: 2

Directions:

1. The first player places the two paperclips on any factors at the bottom of the page. Both paperclips may be on the same factor.
2. The player covers the product of the two factors with a game marker.
3. The second player moves one of the paperclips and places a game marker on the new product.
4. Players alternate moving a paperclip and marking a product.
5. The winner is the first to cover four products in a row.

Variation/Extension: Multiple Madness is a variation

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

FACTORS: 1 2 3 4 5 6 7 8 9

No Leftovers Wanted!

Building Fluency: products of whole numbers and their relationship to rectangular arrays

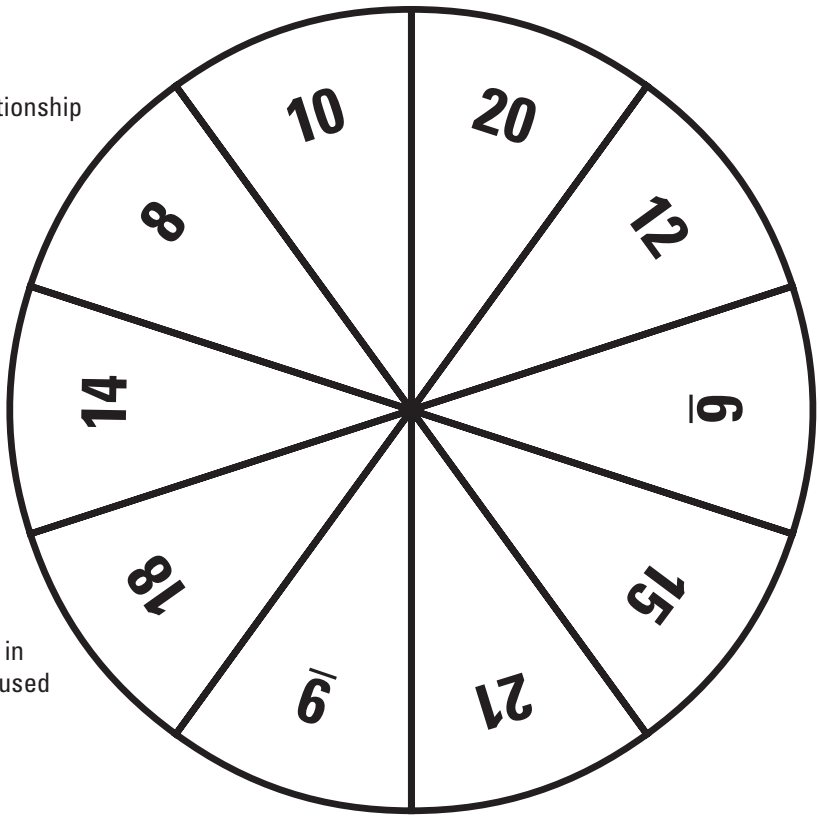
Materials: gameboard, a die, spinner (pencil and paperclip), 21 color tiles, cubes, or counters

Number of Players: 2

Directions:

1. Player spins the spinner and takes that number of counters.
2. Player rolls the die to see how many equal rows will be in the array. Then the player builds the array.
3. The number of counters in one row is the player's score. The player's score is doubled if there are no leftovers.
4. Players record their score after each turn.
5. The winner has the highest score after six rounds.

Variation/Extension: Use the area or number of blocks used in the array to be the score. Use the area or number of blocks used in the array minus the leftovers to be the score.



PLAYER 1

Turn	# of Counters	# of Equal Rows	# in Each Row	# of Leftovers	Score
1					
2					
3					
4					
5					
6					

PLAYER 2

Turn	# of Counters	# of Equal Rows	# in Each Row	# of Leftovers	Score
1					
2					
3					
4					
5					
6					

Whose Winning Products?

Building Fluency: multiply within 100

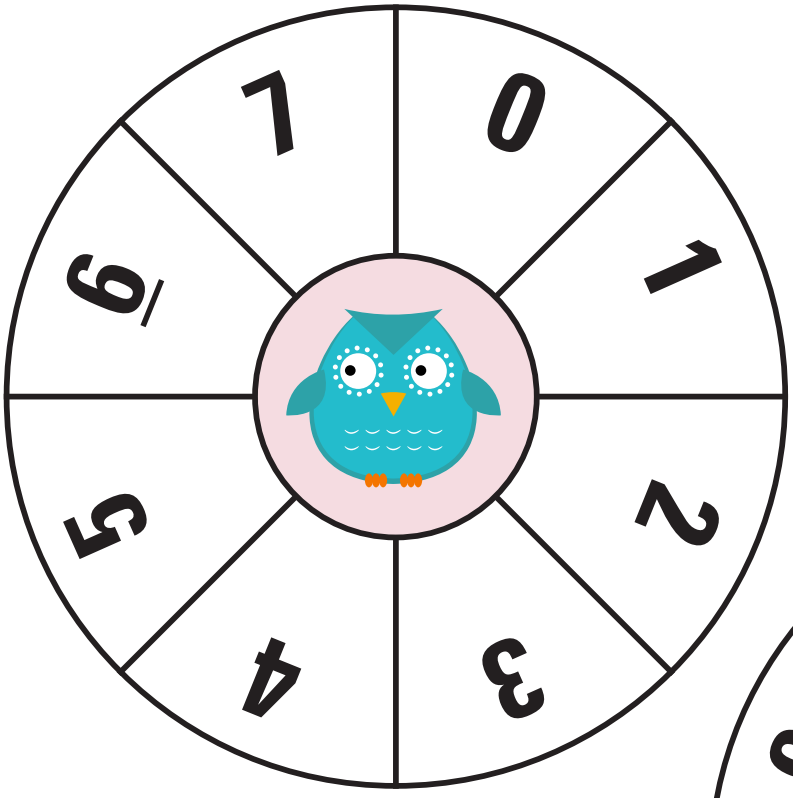
Materials: gameboard for each player, spinners (pencil and paper clip), 25 game markers for each player

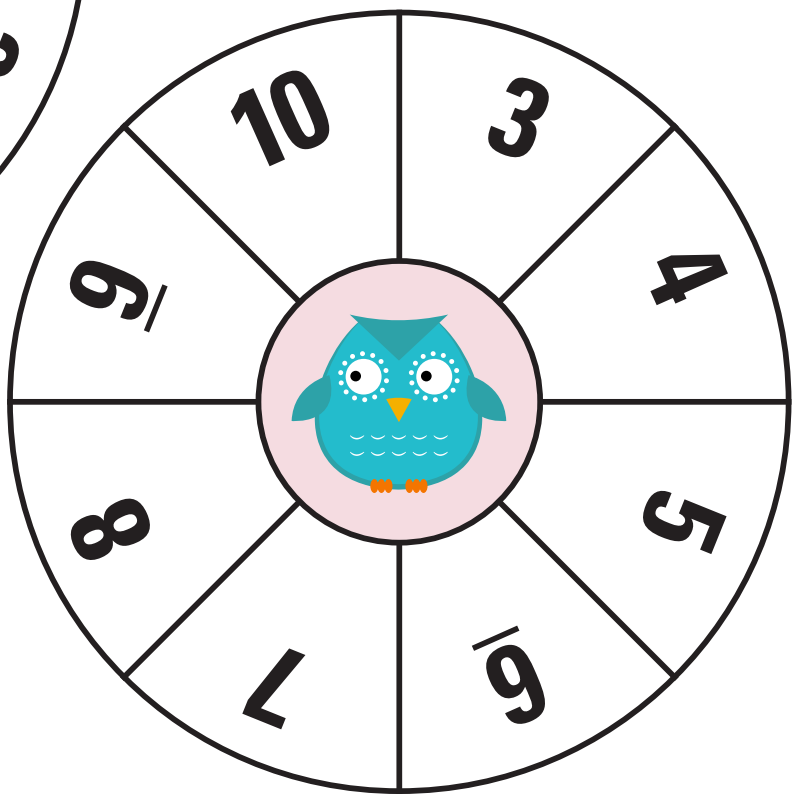
Number of Players: any number

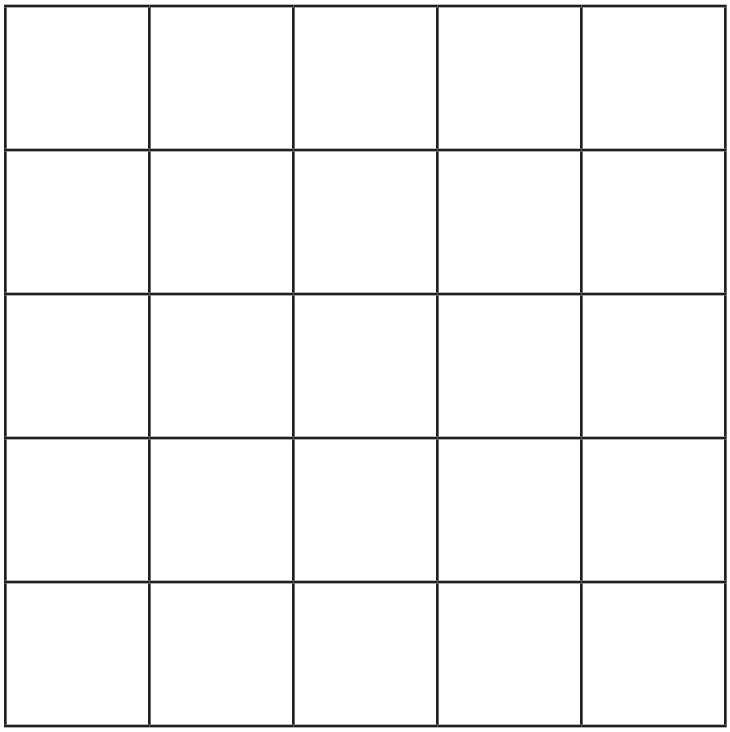
Directions:

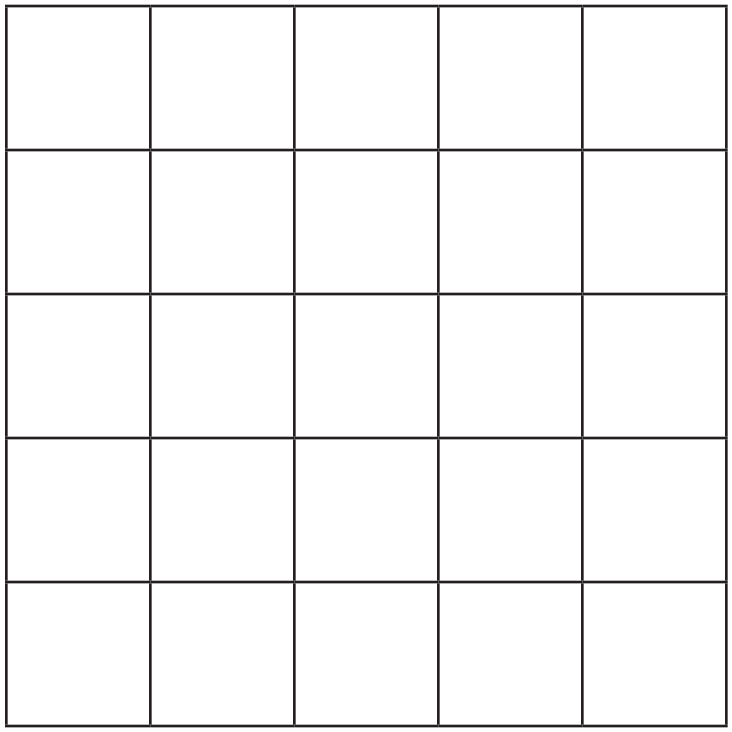
1. Each player completes their gameboard with possible products.
2. Player 1 spins the spinners to find two factors.
3. Find the product and place game marker on the square on the gameboard.
4. In turn, each player spins and multiplies.
5. All players cover the product if it appears on their gameboards.
6. First player to cover 5 in any direction wins.

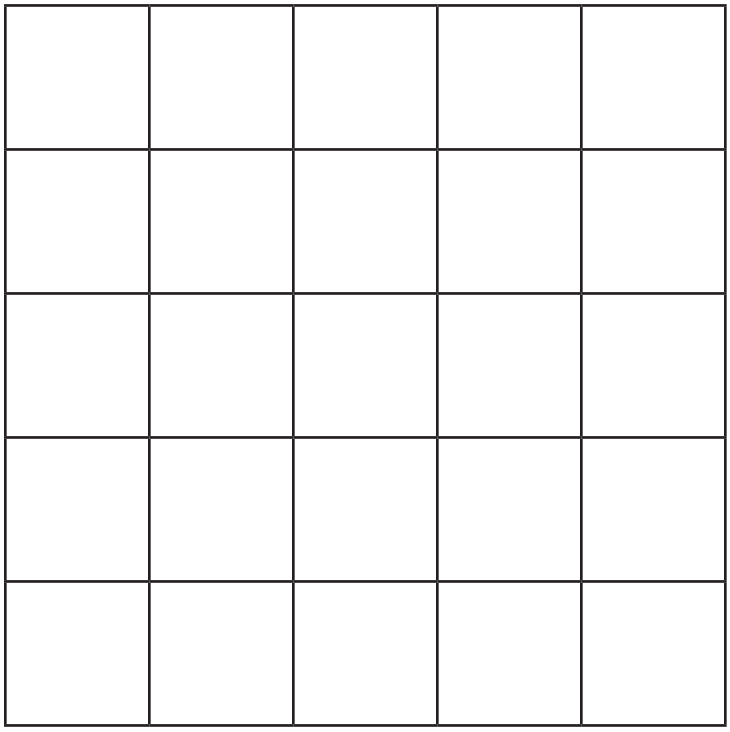
Variation/Extension: This could be played with a larger group using a document camera. Place the spinner under the document camera and let players take turns spinning and multiplying.

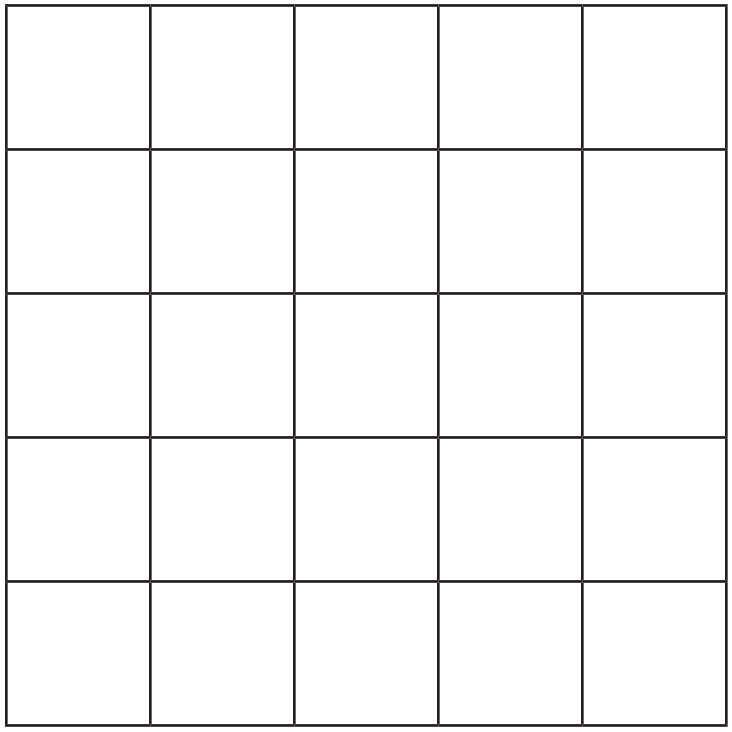












Murphy to Manteo

Building Fluency: fluently divide within 100

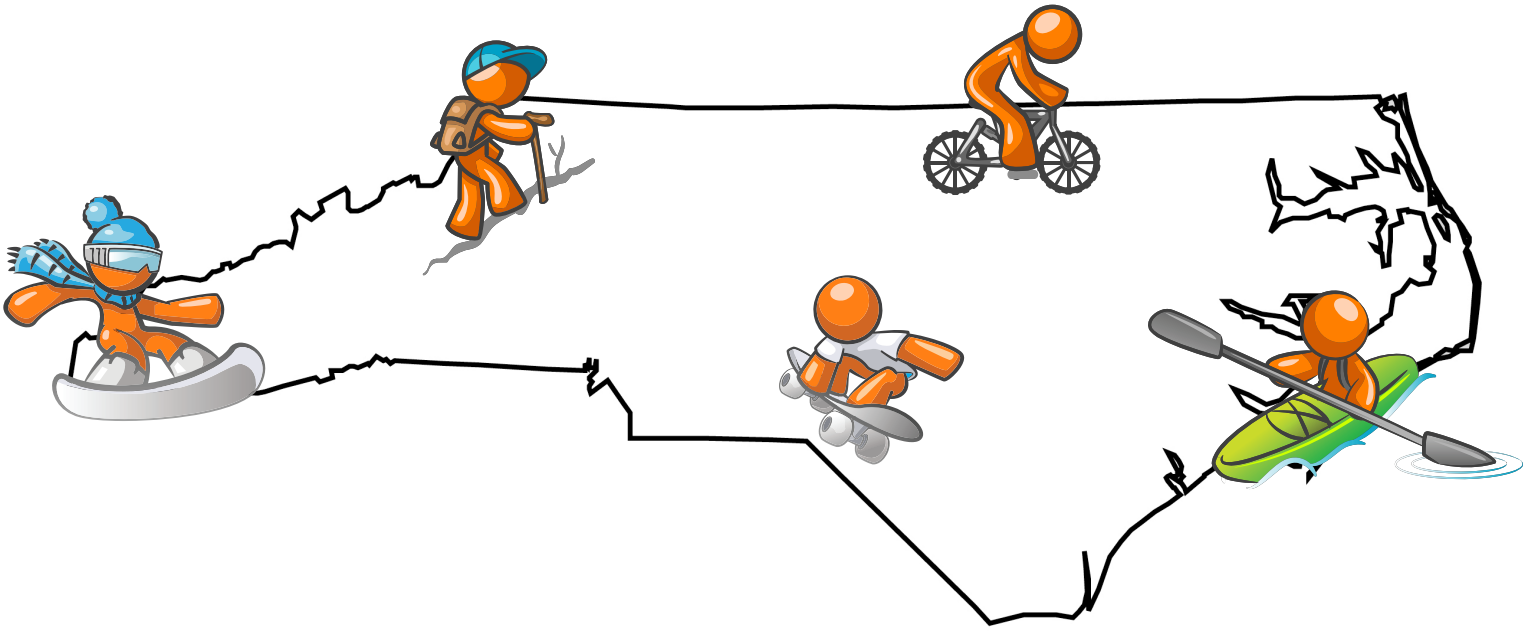
Materials: gameboard, a die, game marker

Number of Players: 2

Directions:

1. Players take turns rolling the die to determine how many spaces to move.
2. Player must give the correct answer in each block before moving forward. If an error is made, the player returns to the starting place for that turn.
3. The first player who crosses the state and gets to Manteo wins.

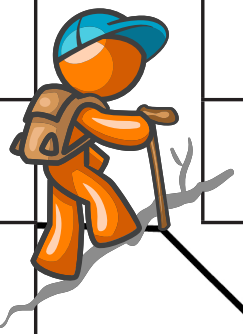
Variation/Extension: If a player misses a question, the other player may answer it correctly and receive a pass for the next penalty space (go back or lose a turn). For some students, teachers may want to provide a division chart or a calculator to resolve arguments about answers.

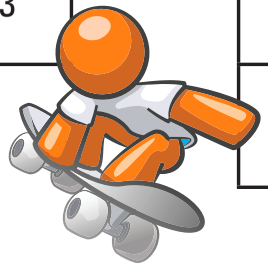


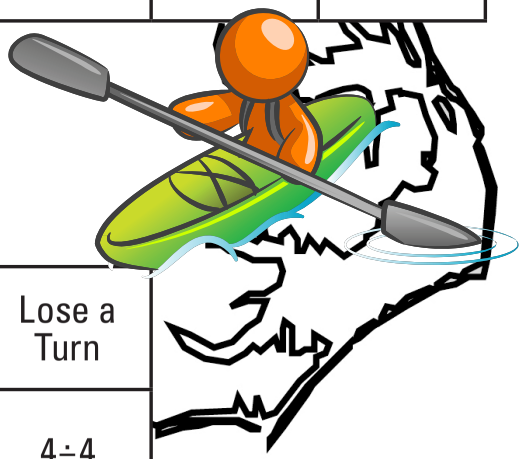
Murphy to Manteo

MANTEO
YOU WIN!!

		Go Back 3 Spaces	49÷7	64÷8	42÷7	5÷5	Go Back 6 Spaces	27÷3
		56÷8		72÷8	48÷6		21÷7	36÷6
		81÷9		40÷5	36÷4		48÷8	32÷4	40÷8
		45÷9		8÷2	24÷3			
		12÷3		42÷6	16÷4			
		6÷1		90÷9	27÷9	28÷4	Lose a Turn	
30÷6	54÷9	9÷3		54÷6			4÷4	
START AT MURPHY				Lose a Turn	18÷6	15÷3	63÷7	
						56÷7	8÷1	
						Go Back 5 Spaces	42÷7	16÷8







Out of this World Operations!

Building Fluency: addition, subtraction, multiplication and division

Materials: an operation card per player, and a set of game cards

Number of Players: 4

Directions:

1. Each of the 4 players chooses an operation card.
2. Each player takes turn selecting and reading the game cards.
3. The player with the correct operation to solve the equation takes the card and records it on their recording sheet.
4. The first player to record and collect 10 cards wins.

Variation/Extension: Once students understand the game then they can record they work in their math notebook. This could be played with 1 or 2 players as a sorting game.

OPERATION CARD ADDITION (+)

	Equation
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

OPERATION CARD SUBTRACTION (-)

	Equation
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

OPERATION CARD MULTIPLICATION (x)

	Equation
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

OPERATION CARD DIVISION (÷)

	Equation
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

x	+	−
48 ? 6 = 8	8 ? 4 = 32	÷
6 ? 8 = 48	8 ? 6 = 2	3 ? 8 = 24
8 ? 4 = 12	7 ? 7 = 0	8 ? 4 = 4
7 ? 7 = 14	7 ? 7 = 49	8 ? 1 = 8
16 ? 2 = 8	8 ? 2 = 16	8 ? 1 = 9

5 ? 4 = 20	6 ? 2 = 12	6 ? 8 = 14
6 ? 2 = 8	6 ? 2 = 4	32 ? 4 = 8
36 ? 6 = 6	6 ? 6 = 12	8 ? 8 = 0
6 ? 6 = 0	24 ? 6 = 4	8 ? 8 = 1
21 ? 3 = 7	5 ? 4 = 9	5 ? 4 = 1
8 ? 7 = 1	6 ? 2 = 12	20 ? 5 = 4

7 ? 3 = 21	8 ? 7 = 15	56 ? 8 = 7
7 ? 4 = 3	7 ? 3 = 10	8 ? 7 = 15
9 ? 8 = 1	8 ? 9 = 17	9 ? 2 = 7
2 ? 9 = 18	9 ? 4 = 5	8 ? 9 = 72
8 ? 7 = 56	6 ? 6 = 1	4 ? 6 = 2
18 ? 2 = 9	6 ? 4 = 10	6 ? 4 = 2

12 ? 2 = 6	6 ? 6 = 36	9 ? 5 = 14
9 ? 7 = 2	45 ? 9 = 5	7 ? 2 = 9
7 ? 2 = 5	6 ? 5 = 30	6 ? 5 = 1
6 ? 5 = 11	30 ? 6 = 5	6 ? 3 = 3
5 ? 5 = 0	5 ? 5 = 25	5 ? 3 = 15
25 ? 5 = 5	5 ? 5 = 10	18 ? 3 = 6

2 ? 9 = 11	9 ? 4 = 13	72 ? 9 = 8
9 ? 7 = 16	5 ? 9 = 45	9 ? 5 = 4
63 ? 7 = 9	5 ? 3 = 8	9 ? 7 = 63
7 ? 2 = 14	6 ? 3 = 9	49 ? 7 = 7
14 ? 2 = 7	6 ? 7 = 42	6 ? 7 = 13
15 ? 3 = 5	42 ? 6 = 7	7 ? 6 = 1

8 ? 5 = 3	7 ? 5 = 12	42 ? 6 = 7
40 ? 8 = 5	8 ? 3 = 5	3 ? 8 = 11
8 ? 2 = 6	8 ? 2 = 10	5 ? 8 = 13
5 ? 8 = 40	24 ? 3 = 8	9 ? 6 = 3
8 ? 8 = 16	6 ? 9 = 15	36 ? 9 = 4
54 ? 9 = 6	8 ? 8 = 0	4 ? 9 = 36

6 ? 9 = 54	7 ? 7 = 1	7 ? 5 = 35
8 ? 8 = 1		

Find the Unknown Number

Building Fluency: understand division as an unknown factor problem

Materials: a recording sheet for each player, unknown number game cards

Number of Players: 2

Directions:

1. Spread out the missing number game cards.
2. Players take turns picking a card and telling the unknown number.
3. The player keeps all cards correctly answered & writes the equation as both a multiplication & division equation on their recording sheet.

   Example: 4 x $\boxed{7}$ = 28; 28 ÷ 4 = $\boxed{7}$
4. If the player answers incorrectly, the card is placed back in the pile.
5. Play until all cards are picked and the player with the most cards wins.

Variation/Extension: When a player misses a question, the other player may answer correctly and keep the card. This game could be played by an individual just picking and recording equations. A multiplication chart may be needed to solve any disagreements.

PLAYER 1

Multiplication	Division
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.
9.	9.
10.	10.

PLAYER 2

Multiplication	Division
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.
9.	9.
10.	10.

1 x ___ = 5	1 x ___ = 4	1 x __ = 3	1 x ___ = 2
2 x ____ = 10	2 x ____ = 8	2 x ____ = 6	2 x ____ = 4
3 x ___ = 15	3 x ___ = 12	3 x ___ = 9	3 x ___ = 6
4 x ___ = 20	4 x ___ = 16	4 x ___ = 12	4 x ___ = 8

5 x ___ = 25	5 x ___ = 20	5 x ___ = 15	5 x ___ = 10
1 x ____ = 9	1 x ____ = 8	1 x ____ = 7	1 x ____ = 6
2 x ___ = 18	2 x ___ = 16	2 x ___ = 14	2 x___ = 12
3 x ___= 27	3 x ___= 24	3 x ___ = 21	3 x ___ = 18

1 x ____ = 10	3 x ___= 30	6 x ___ = 18	6 x ___ = 12
2 x ____ = 20	4 x ___= 40	5 x ___= 50	7x ___ = 14
4 x ___= 36	4 x ___= 32	4 x ___ = 28	4 x ___ = 24
5 x ___= 45	5 x ___= 40	5 x ___ = 35	5 x ___ = 30

7 x ___ = 70	7 x ___ = 63	7 x ___ = 56	7 x ___ = 49
8 x ___ = 80	8 x ___ = 72	8 x ___ = 64	8 x ___ = 56
9 x ___ = 90	9 x ___ = 81	9 x ___ = 72	9 x ___ = 63
10 x ___ = 100	10 x ___ = 90	10x ___ = 80	10x ___ = 70

7 x ___ = 42	7 x ___ = 35	7 x ___ = 28	7 x ___ = 21
8 x ___ = 48	8 x ___ = 40	8 x ___ = 32	8 x ___ = 24
9 x ___ = 54	9 x ___ = 45	9 x ___ = 36	9 x ___ = 27
10 x ___ = 60	10x ___ = 50	10 x ___ = 40	10x ___ = 30

6 x ___ = 42	6 x ___ = 24	8x ___ = 16	9x ___ = 18
6 x ___ = 48	6 x ___ = 30	10x ___ = 20	6 x ___ = 60
6 x ___ = 54	6 x ___ = 36		

Charlotte Speedway Race

Building Fluency: fluently multiply within 100

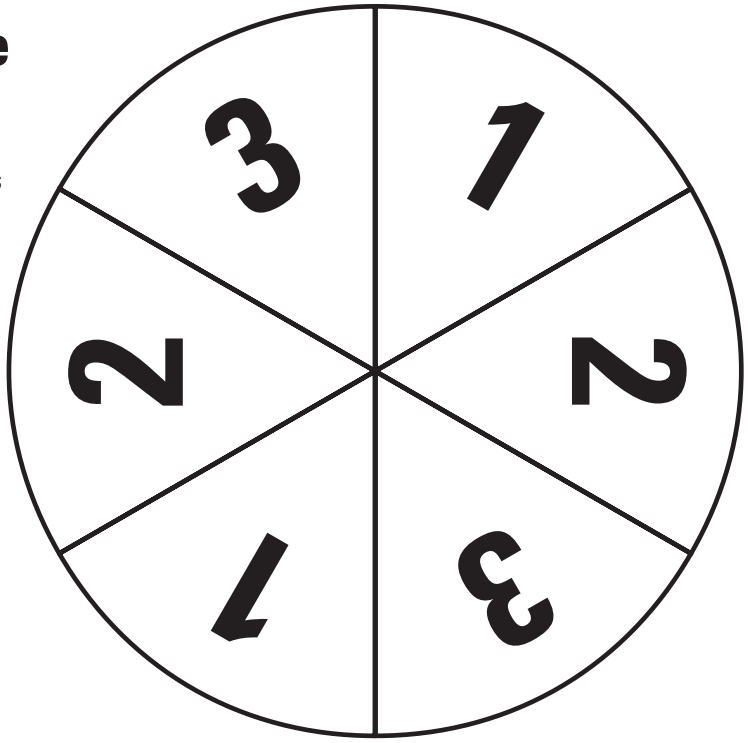
Materials: gameboard, spinner (paperclip and pencil), game markers

Number of Players: 2

Directions:

1. Each player takes a turn and spins the spinner.
2. Move the number of spaces shown on the spinner.
3. Player must give a multiplication fact for the product in the space using 2 or 5 as one of the factors.
4. If an incorrect answer is given, the player loses the turn and returns to the previous position.
5. The winner is the first to cross the finish line.

Variation/Extension: A player may tell a second factor pair to make that product and move an extra space.



0	PIT STOP	24	25	15	30	18	20	START
55								
14								
2								
Trouble on the Curve – Go Back 2 Spaces								
35								
10	15	20	16	Your Tire Blows Out – Lose a Turn	35	40	8	18

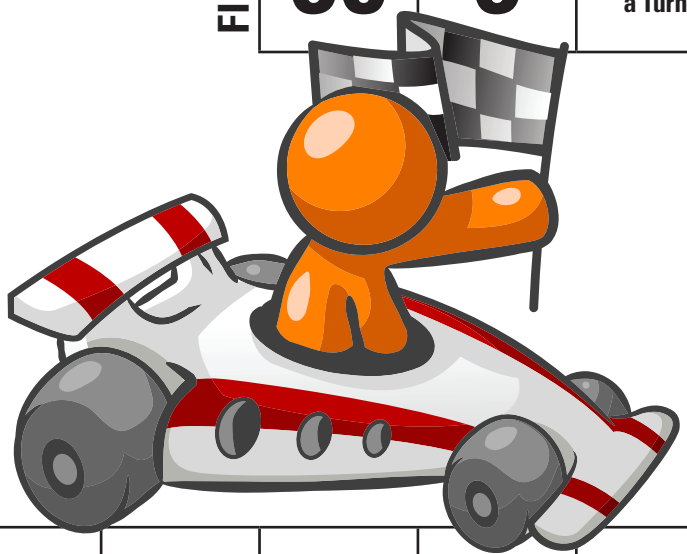
FINISH

60 6 Stop for Gas – Lose a Turn 45 12 4

30

Car Stalls – Lose a Turn

50



Division Duel

Building Fluency: division within 100

Materials: gameboard, division cards, game markers (small cube)

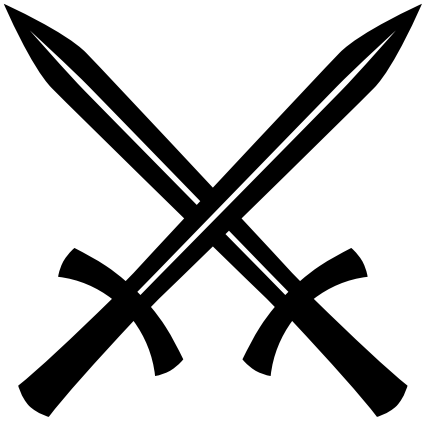
Number of Players: 2

Directions:

1. Place the cards face down in the center of the gameboard.
2. Each player takes a card from the stack and answers the problem.
3. The winner of the round is the player whose answer is the larger number.
4. The winner places the marker on the number grid at the bottom of the gameboard and moves the marker each time a point is scored.
5. The champion is the first player to win 14 rounds.

Variation/Extension: Students could make card sets with the division facts they most need to work on.

Place Division Cards Face Down Here



PLAYER 1

1	2	3	4	5	6	7
8	9	10	11	12	13	14

PLAYER 2

1	2	3	4	5	6	7
8	9	10	11	12	13	14

$8\overline{)48}$	$8\overline{)24}$	$6\overline{)36}$
$4\overline{)32}$	$6\overline{)42}$	$9\overline{)63}$
$3\overline{)24}$	$7\overline{)35}$	$9\overline{)81}$
$9\overline{)36}$	$8\overline{)72}$	$5\overline{)30}$
$9\overline{)54}$	$8\overline{)56}$	$5\overline{)40}$
$9\overline{)27}$	$8\overline{)40}$	$6\overline{)48}$

$6\overline{)54}$	$6\overline{)24}$	$9\overline{)45}$
$6\overline{)30}$	$7\overline{)56}$	$7\overline{)28}$
$4\overline{)24}$	$8\overline{)64}$	$8\overline{)32}$
$7\overline{)49}$	$5\overline{)35}$	$7\overline{)42}$
$4\overline{)28}$	$9\overline{)72}$	$4\overline{)36}$
$7\overline{)63}$	$3\overline{)27}$	$5\overline{)45}$

Four Quotients

Building Fluency: division within 100

Materials: gameboard, pair of dice, division grid, 15 game markers - different color for each player,

Number of Players: 2

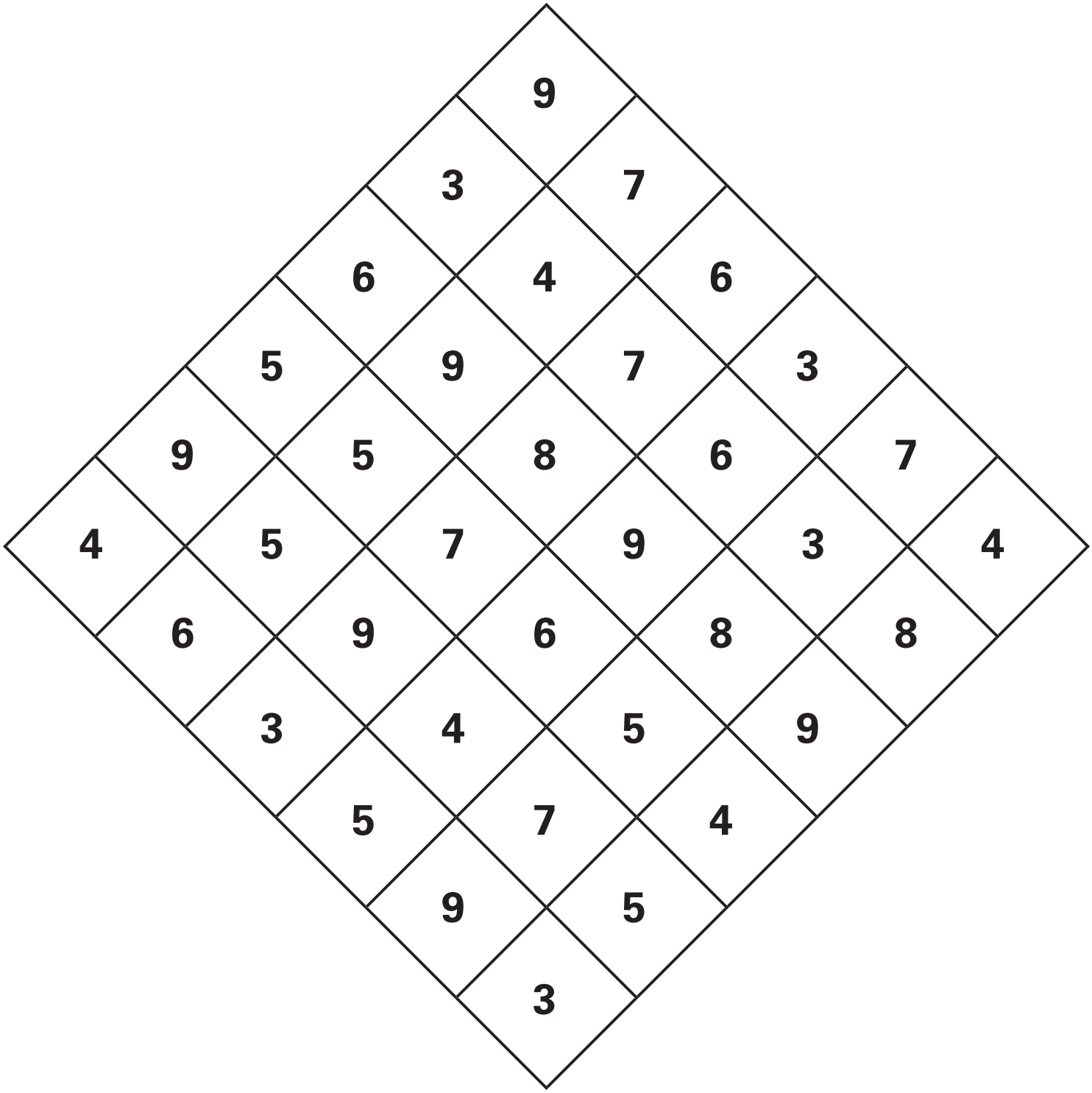
Directions:

1. Player rolls the pair of dice and locates the spaces on the grid named by them.
   Example: A roll of a 3 and a 5 could be space (3,5) or space (5,3).
2. The player answers the division problem and places a game marker on that number on the gameboard.
3. The first player to get 4 spaces in a row is the winner.

Variation/Extension: Players could pick a space on the gameboard and give a division fact to match it in order to place a marker on the board. Example: I pick 7. 42÷6 = 7. The winner could fill an entire row.

	1	2	3	4	5	6
1	$8\overline{)48}$	$8\overline{)24}$	$6\overline{)36}$	$6\overline{)54}$	$6\overline{)24}$	$9\overline{)45}$
2	$4\overline{)32}$	$6\overline{)42}$	$9\overline{)63}$	$6\overline{)30}$	$7\overline{)56}$	$7\overline{)28}$
3	$3\overline{)24}$	$7\overline{)35}$	$9\overline{)81}$	$4\overline{)24}$	$8\overline{)64}$	$8\overline{)32}$
4	$9\overline{)36}$	$8\overline{)72}$	$5\overline{)30}$	$7\overline{)49}$	$5\overline{)35}$	$7\overline{)42}$
5	$9\overline{)54}$	$8\overline{)56}$	$5\overline{)40}$	$4\overline{)28}$	$9\overline{)72}$	$4\overline{)36}$
6	$9\overline{)27}$	$8\overline{)40}$	$6\overline{)48}$	$7\overline{)63}$	$3\overline{)27}$	$5\overline{)45}$

Four Quotients



Race to the Resort

Building Fluency: division within 100

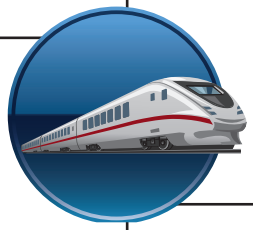
Materials: a die, gameboard, a game marker – different color for each player

Number of Players: 2

Directions:

1. Players take turns rolling a die and move that many spaces answering all of the facts along the way. If the player misses a fact, the player returns to the previous position.
2. If a player lands on the same space as the other player, the other player goes back to the beginning. The winner is the first to finish the game.

Variation/Extension: If a player misses an equation, the other player may answer it correctly and receive a pass for the next time they land on a penalty space.

					START	
					$6 \overline{)42}$	
					$9 \overline{)72}$	
					64 ÷ 4	**Out of Gas: Lose a Turn**
	$3 \overline{)36}$	64 ÷ 8	**No Wind: Move Back 3 Spaces**			$4 \overline{)28}$
$7 \overline{)49}$	48 ÷ 6		54 ÷ 9		$5 \overline{)35}$	24 ÷ 8
49 ÷ 7			$6 \overline{)30}$		36 ÷ 9	
YOU WIN!!		**Low on Fuel: Lose a Turn**	20 ÷ 5		**Bonus: Move Ahead 1 Space**	$9 \overline{)81}$
		$10 \overline{)100}$				$6 \overline{)18}$
$4 \overline{)32}$	56 ÷ 8	$4 \overline{)36}$		$5 \overline{)25}$	**Flat Tire: Lose a Turn**	16 ÷ 4
Stormy Seas: Move Back 2 Spaces				24 ÷ 4		
$6 \overline{)42}$	48 ÷ 8	$3 \overline{)15}$	$8 \overline{)72}$	**Ship Ran Aground: Move Back 3 Spaces**		

Order up

Building Fluency: review place value - compare multi-digit numbers

Materials: recording sheet, digit cards (or 0-9 die)

Number of Players: 2-4

Directions:

1. The first player selects 4 digit cards and makes the largest possible four-digit number with those digits. Example: cards show these digits: 6, 4, 3, 3, this order makes the largest possible number for those digits.
2. The player writes that number on line 1.
3. The second player selects 4 digit cards and makes the smallest possible number for those digits.
4. The player writes that number on line 10.
5. The next player selects 4 digit cards and must make a number that falls between the other two. They can choose any line to place that number on.
6. The next player selects 4 digit cards and makes a number using those digits that could be placed on an empty line between any two existing numbers.
7. Game continues until a number is correctly placed on each line. (All 10 lines contain a number and they are in the correct order), OR players cannot place a number correctly on any of the empty lines.

Variation/Extension: Once students understand the game they can create their own recording sheet in their math notebook. Teacher can modify this game by changing the number of digits or number of lines.

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

7 _____

8 _____

9 _____

10 _____

0	1	2	3
4	5	6	7
8	9	0	1
2	3	4	5
6	7	8	9

1,000 Close Enough 1,000

Building Fluency: Add and subtract within 1000.

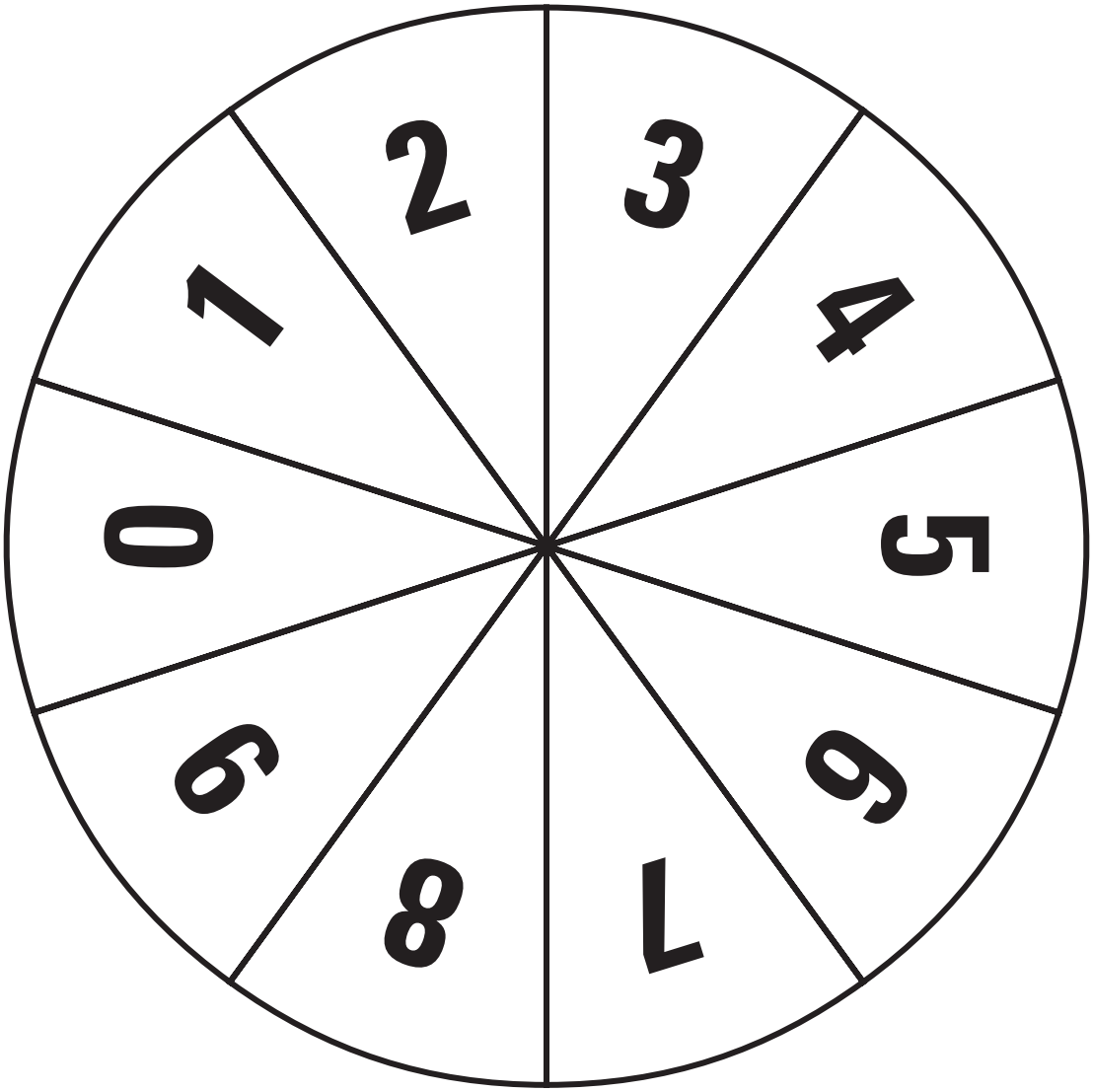
Materials: Spinner (pencil and paper clip), base ten blocks (ones, tens, and hundreds), recording sheet

Number of Players: 2-4

Directions:

1. A player spins and takes either that number of ones, tens, or hundreds blocks
2. The player records the number on their recording sheet. Example: a spin of 4 may be recorded as 4, 40, or 400.
3. Players take turns spinning, collecting blocks, and recording their numbers.
4. After six spins, the player with the total closest to 1000, but not more than 1000, wins the game.

Variation/Extension: Once students understand how to play the game, they can record their work in their math notebook students could vary the game by changing the desired final number.



PLAYER 1

SPIN	NUMBER
1	
2	
3	
4	
5	
6	
TOTAL	

PLAYER 2

SPIN	NUMBER
1	
2	
3	
4	
5	
6	
TOTAL	

PLAYER 3

SPIN	NUMBER
1	
2	
3	
4	
5	
6	
TOTAL	

PLAYER 4

SPIN	NUMBER
1	
2	
3	
4	
5	
6	
TOTAL	

Money Wheel

Building Fluency: multiply one-digit whole numbers by multiples of 10

Materials: spinners (pencil and paperclip), paper, money (optional)

Number of Players: 2-4

Directions:

1. Players take turns spinning the "How Many?" spinner and the "How Much?" spinner.
2. Record the product and describe the strategy to the other players.
   Example: I spun 8 and 50 cents. I know that 8 times 5 is 40 so 8 times 50 is 400 cents.
   (Student could use play money to represent the amount spun.)
3. After each player has had 5 turns, total the value. The player with the most money wins.

Variation/Extension: Change the amounts on the spinners; spinner could be changed to have 80 cents and 90 cents instead of 10 cents and 20 cents.

PLAYER 1

	How Many?	How Much?	Amount of Money
1			
2			
3			
4			
5			
		TOTAL	

PLAYER 2

	How Many?	How Much?	Amount of Money
1			
2			
3			
4			
5			
		TOTAL	

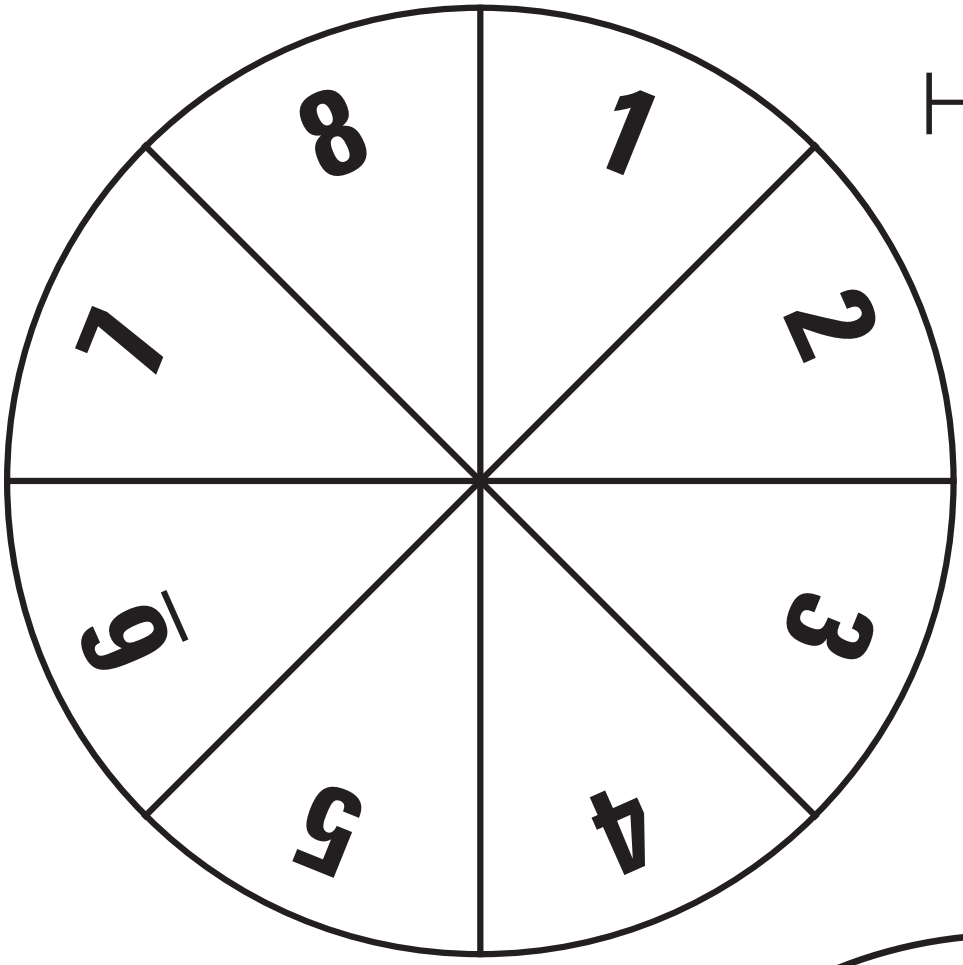
PLAYER 3

	How Many?	How Much?	Amount of Money
1			
2			
3			
4			
5			
		TOTAL	

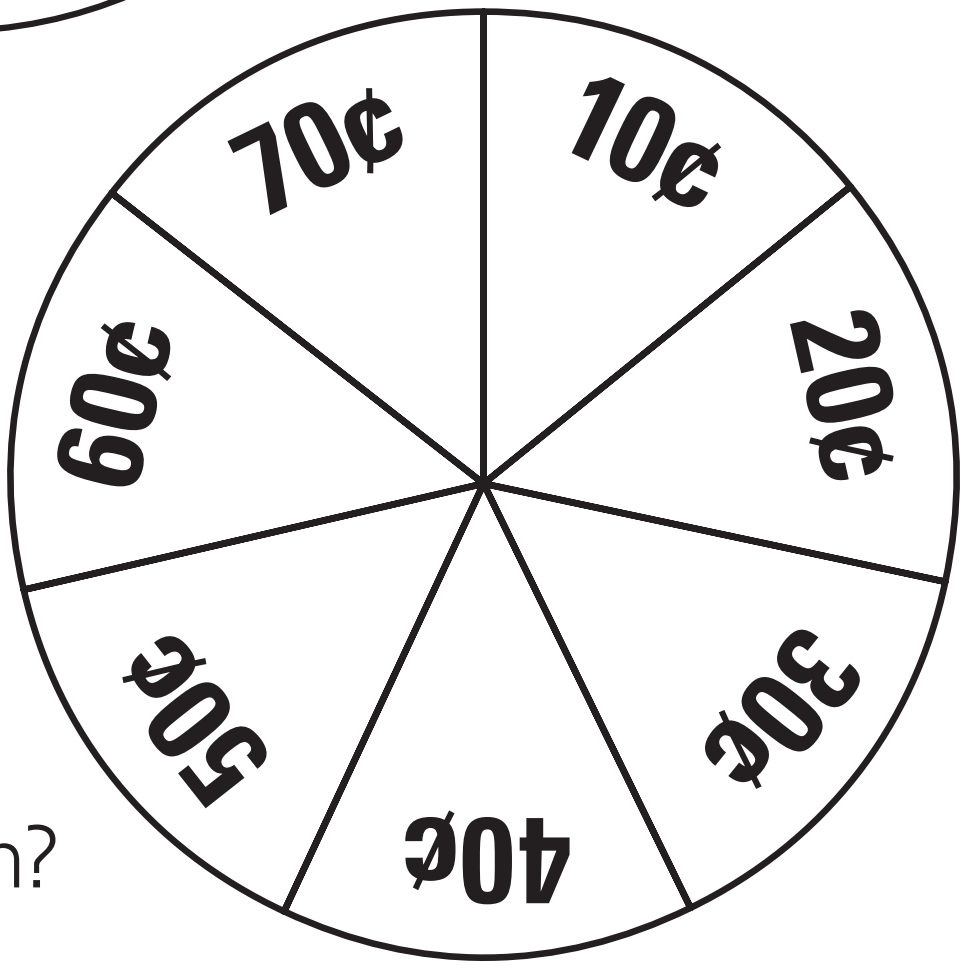
PLAYER 4

	How Many?	How Much?	Amount of Money
1			
2			
3			
4			
5			
		TOTAL	

How Many?



How Much?



Race to 300

Building Fluency: multiply one-digit whole numbers by multiples of ten

Materials: a die, recording sheet

Number of Players: 1-4

Directions:

1. Each player rolls a die in turn. The player multiplies that number by 10 and records the answer.
2. Add the numbers after each turn.
3. The first player to reach or pass 300 wins.

Variation/Extension: Once students understand how to play the game they can record their work in their math notebook. Students could play 10 rounds and see who has the lowest score. Students change the goal number and make it a higher or lower.

Example:

NUMBER ROLLED	NUMBER X 10	TOTAL SUM
3	3 x 10= 30	30
6	6 x 10= 60	30 + 60=90
4	4 x 10= 40	90 + 40= 130
5	5 x 10= 50	130 + 50= 180
2	2 x 10 = 20	180 + 20=200
6	6 x 10= 60	200 + 60= 260
5	5 x 10= 50	260 + 50= 310 – GOAL REACHED

NUMBER ROLLED	NUMBER X 10	TOTAL SUM

NUMBER ROLLED	NUMBER X 10	TOTAL SUM

NUMBER ROLLED	NUMBER X 10	TOTAL SUM

NUMBER ROLLED	NUMBER X 10	TOTAL SUM

NUMBER ROLLED	NUMBER X 10	TOTAL SUM

NUMBER ROLLED	NUMBER X 10	TOTAL SUM

NUMBER ROLLED	NUMBER X 10	TOTAL SUM

NUMBER ROLLED	NUMBER X 10	TOTAL SUM

Fraction Match-Up

Building Fluency: understand fractions and how they are represented on the number line

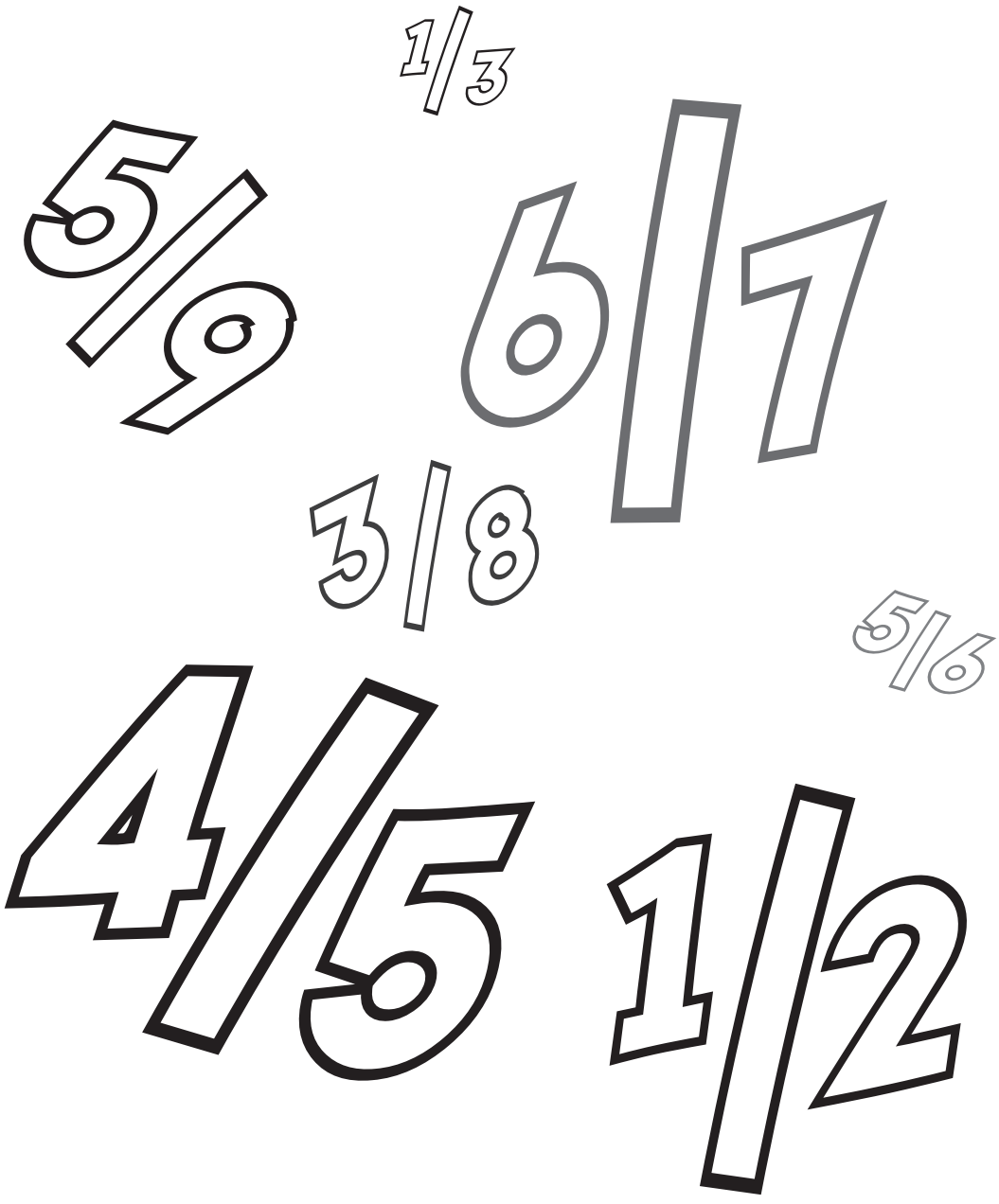
Materials: fraction bar cards and number lines cards

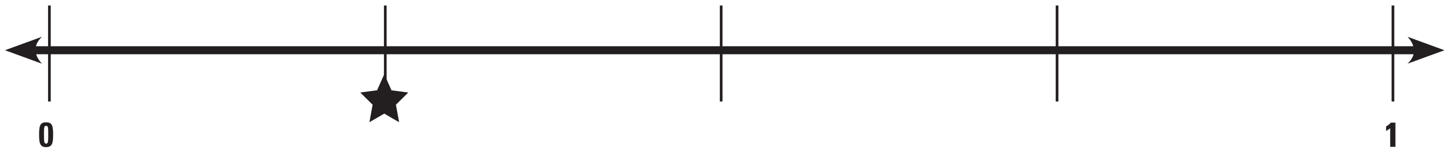
Number of Players: 2

Directions:

1. Mix up the fraction bar cards and place them face down on one side of the game area. Mix up the number line cards and put them face down on the other side.
2. Players take turns turning up one card from each area. If the cards represent the same fraction, the player takes the cards. If they do not match, the player turns the cards back over.
3. The player with the most matches wins.

Variation/Extension: Have students make different representations of fractions (shaded circles or rectangles) and play the game matching those to number lines.

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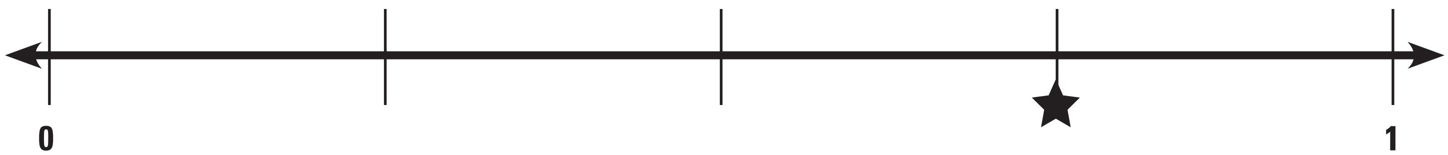
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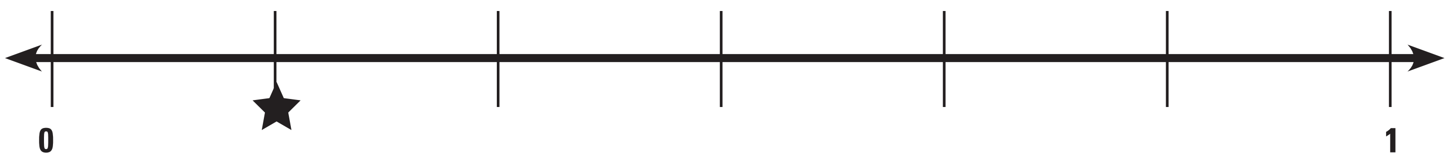
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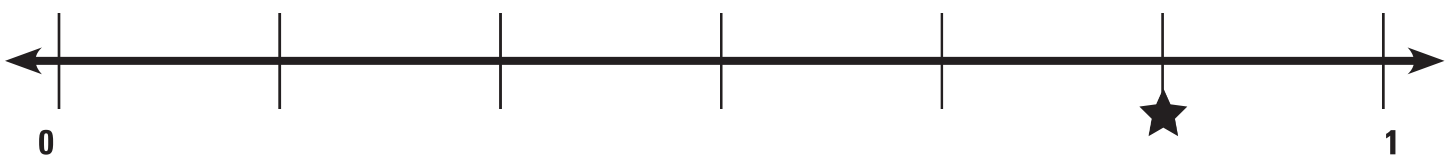
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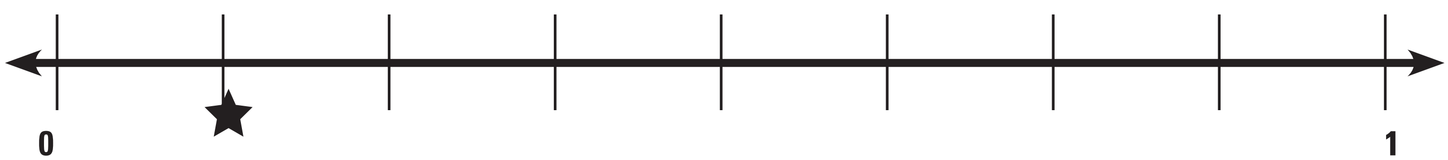
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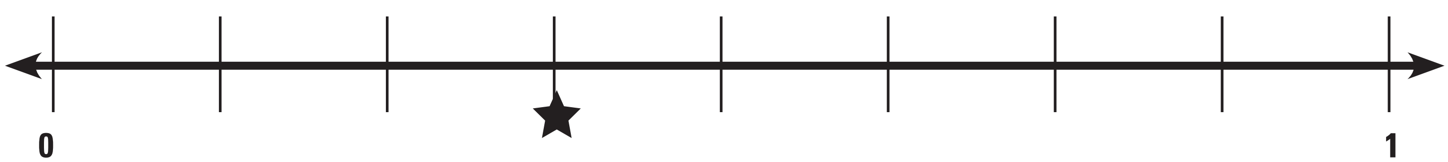
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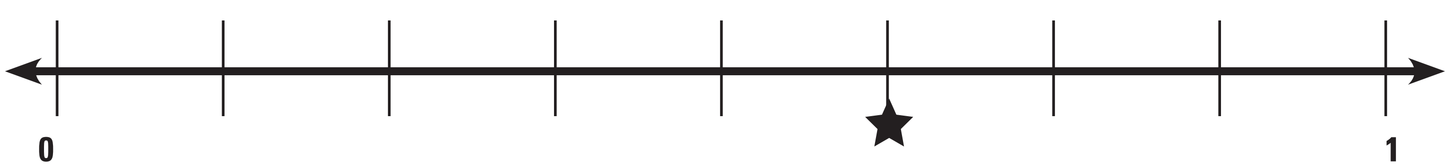
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Three in a Row Gameboard

Building Fluency: understand fractions

Materials: gameboard, game cards, nine game markers per player.

Number of Players: 2-6

Directions:

1. Choose an answer board for each round.
2. Shuffle the Three-In-A-Row game cards and place them face down.
3. Turn over the top card.
4. All players cover the fraction with a game marker if it appears on their board.
5. Three in a row is a winner, horizontally, vertically or diagonally.

Variation/Extension: Players play using the same gameboard but take turns turning cards with only one player marking the play for each turn. Players could cover the entire board.

$\frac{1}{6}$	$\frac{3}{4}$	$\frac{5}{6}$
$\frac{1}{2}$	$\frac{3}{3}$	$\frac{3}{8}$
$\frac{3}{5}$	$\frac{7}{8}$	$\frac{1}{4}$

$\frac{1}{6}$	$\frac{3}{4}$	$\frac{5}{6}$
$\frac{1}{2}$	$\frac{3}{3}$	$\frac{3}{8}$
$\frac{3}{5}$	$\frac{7}{8}$	$\frac{1}{4}$

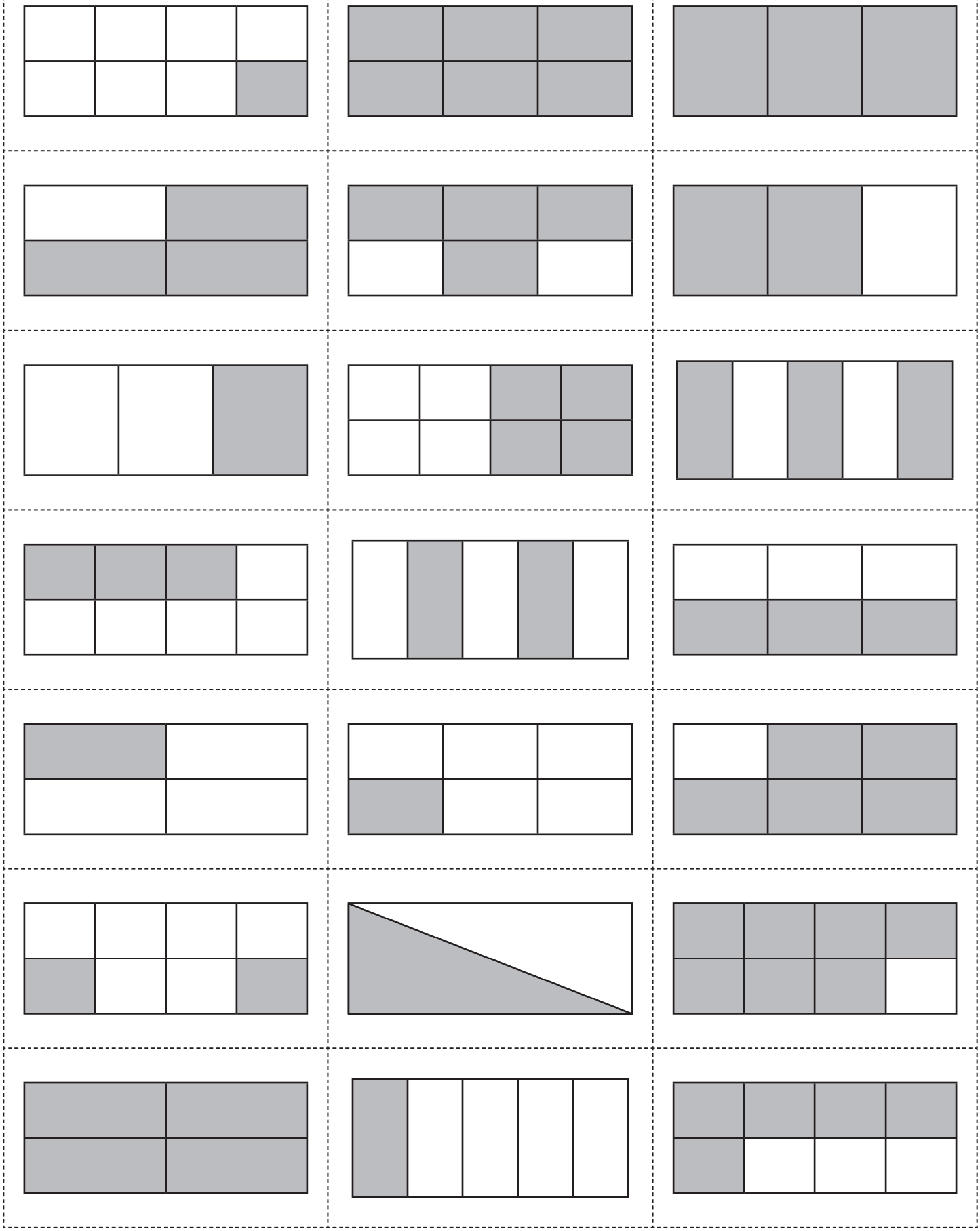
$\frac{5}{8}$	$\frac{2}{3}$	$\frac{1}{4}$
$\frac{3}{4}$	$\frac{2}{5}$	$\frac{2}{8}$
$\frac{3}{3}$	$\frac{1}{2}$	$\frac{5}{6}$

$\frac{5}{8}$	$\frac{1}{2}$	$\frac{3}{6}$
$\frac{2}{3}$	$\frac{3}{8}$	$\frac{4}{4}$
$\frac{7}{8}$	$\frac{2}{5}$	$\frac{1}{3}$

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

$\frac{2}{8}$	$\frac{1}{3}$	$\frac{5}{6}$
$\frac{2}{5}$	$\frac{4}{4}$	$\frac{2}{3}$
$\frac{1}{2}$	$\frac{7}{8}$	$\frac{1}{4}$

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



"I Have" Fraction Cards

Building Fluency: Understand a fraction as a number on the number line.

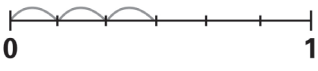
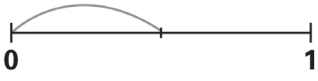
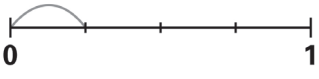
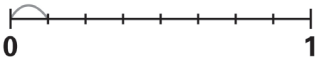
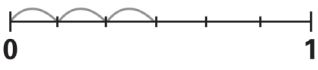
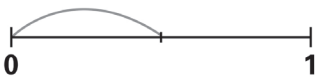
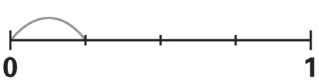
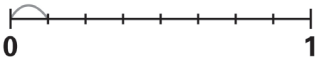
Materials: 2 sets of "I Have" cards

Number of Players: 2

Directions:

1. Shuffle cards. Each player has one set of the cards below.
2. First player draws a card saying, "Who has ___?" or the fraction on the card that is drawn by the first player. The second player finds the card that shows ___ and explains how the number line shows ___. If correct, the second player says, "Who has ___?"
3. Player #1 finds the card with a number line that shows ___. Player one explains how the number line represents the fraction. Once card is used they place the card face up on the table. Continue until all cards have been played by both players.

Variation/Extension: Students might work with partners to create more cards. Teacher and class may create more cards together. Additional cards have been added for your convenience.

I have  Who has $\frac{3}{4}$?	I have  Who has $\frac{1}{4}$?	I have  Who has $\frac{6}{8}$?	I have  Who has $\frac{1}{8}$?
I have  Who has $\frac{2}{3}$?	I have  Who has $\frac{2}{2}$?	I have  Who has $\frac{3}{6}$?	I have  Who has $\frac{1}{2}$?
I have  Who has $\frac{3}{4}$?	I have  Who has $\frac{1}{4}$?	I have  Who has $\frac{6}{8}$?	I have  Who has $\frac{1}{8}$?
I have  Who has $\frac{2}{3}$?	I have  Who has $\frac{2}{2}$?	I have  Who has $\frac{3}{6}$?	I have  Who has $\frac{1}{2}$?

I have 0 1 **Who has ___ ?**	**I have** 0 1 **Who has ___ ?**	**I have** 0 1 **Who has ___ ?**	**I have** 0 1 **Who has ___ ?**
I have 0 1 **Who has ___ ?**	**I have** 0 1 **Who has ___ ?**	**I have** 0 1 **Who has ___ ?**	**I have** 0 1 **Who has ___ ?**
I have 0 1 **Who has ___ ?**	**I have** 0 1 **Who has ___ ?**	**I have** 0 1 **Who has ___ ?**	**I have** 0 1 **Who has ___ ?**
I have 0 1 **Who has ___ ?**	**I have** 0 1 **Who has ___ ?**	**I have** 0 1 **Who has ___ ?**	**I have** 0 1 **Who has ___ ?**
I have 0 1 **Who has ___ ?**	**I have** 0 1 **Who has ___ ?**	**I have** 0 1 **Who has ___ ?**	**I have** 0 1 **Who has ___ ?**

Number Line Madness!

Number of Players: 1-2

Building Fluency: understand fractions on the number line

Materials: gameboard, game cards, and game marker

Number of Players: 2

Directions:

1. Each player in turn draws a card to see where to jump on the number line.
2. The player places the marker in the correct location.
3. Some cards move forward and others move backward. If the card requires a player to move lower than 0, the player loses the turn.
4. The player who lands exactly on 1 is the winner.

Variation/Extension: Play with the plus fraction cards only. Have each player draw a card. Compare fractions. Player with the larger fraction plays. Continue to draw with only one player moving each turn.

PLAYER 1

PLAYER 2

$+\frac{1}{8}$	$-\frac{1}{8}$	$+\frac{2}{8}$	$-\frac{2}{8}$
$-\frac{3}{8}$	$+\frac{4}{8}$	$-\frac{4}{8}$	$+\frac{5}{8}$
$+\frac{6}{8}$	$-\frac{6}{8}$	$+\frac{7}{8}$	$-\frac{7}{8}$
$-\frac{1}{2}$	$+\frac{1}{4}$	$-\frac{1}{4}$	$+\frac{3}{4}$
$+\frac{3}{8}$	$-\frac{5}{8}$	$+\frac{1}{2}$	$-\frac{3}{4}$

Capturing Hexagons

Building Fluency: understanding fractions

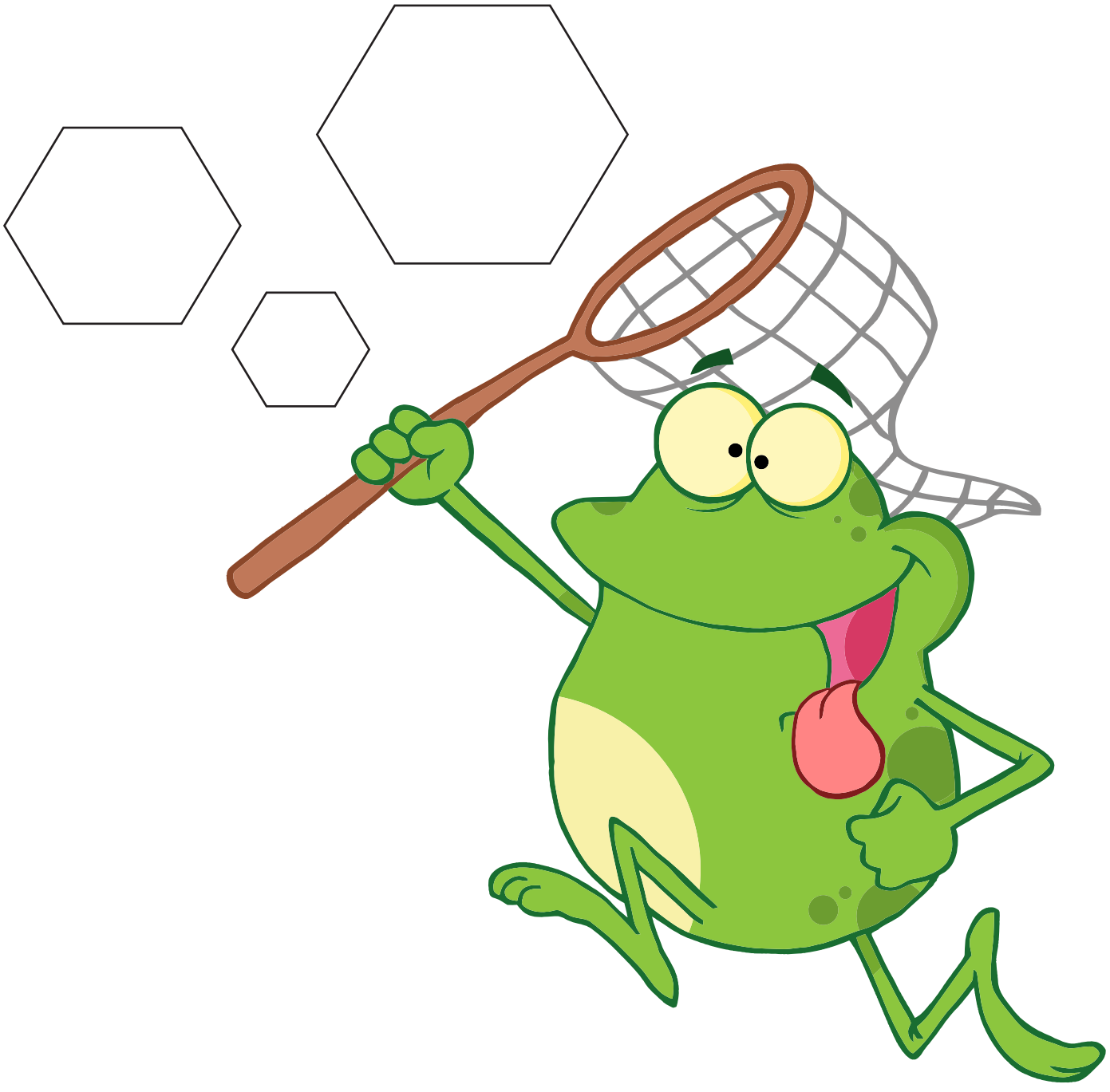
Materials: gameboard per player, spinner (pencil and paperclip), and pattern blocks (hexagons, triangles, trapezoids, and rhombuses)

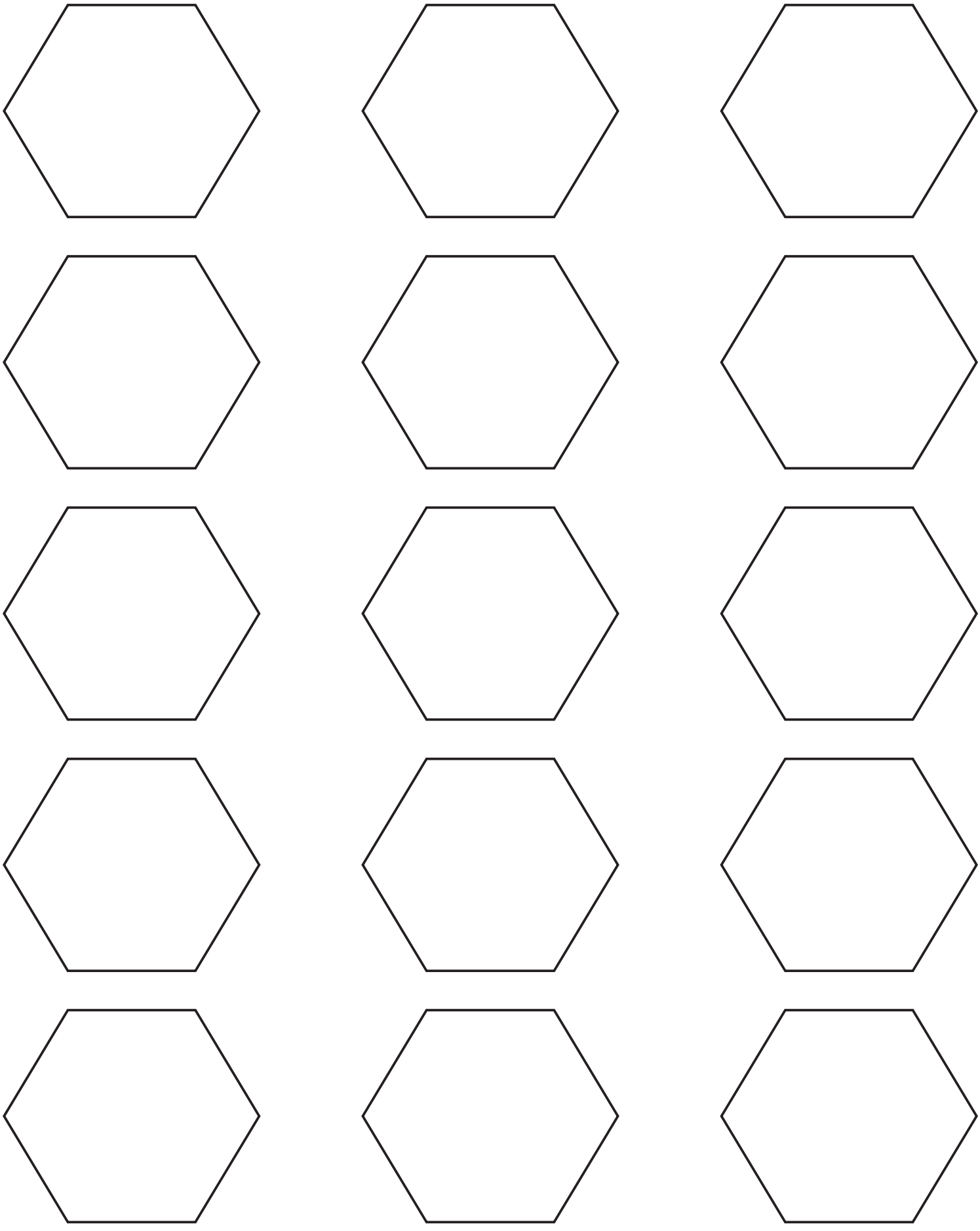
Number of Players: 2-4

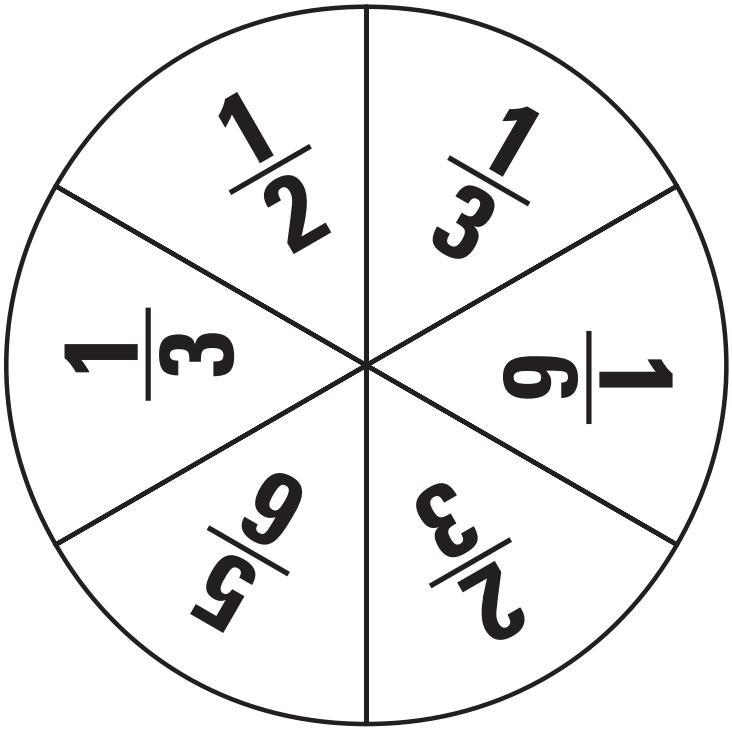
Directions:

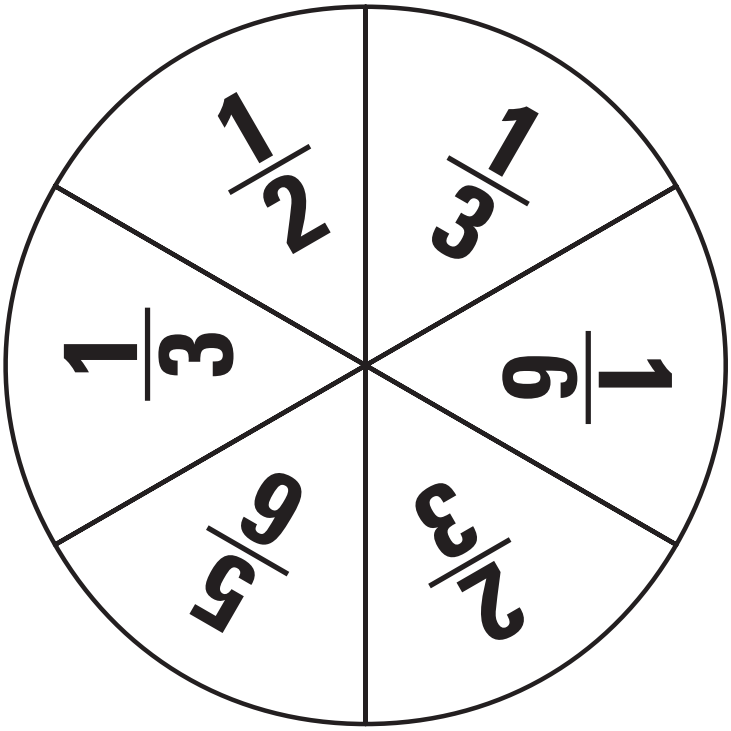
1. Players take turns spinning the spinner and placing the pattern blocks on the gameboard. Players should be encouraged to trade up whenever possible.
2. When a player captures an entire hexagon, the shape is covered with a hexagon.
3. The winner is the first player to capture all of the hexagons on the gameboard.

Variation/Extension: The spinner contains two 1/3 opportunities. Label one of these as “take away”.






1/2
1/3
1/6
1/3
5/6
2/3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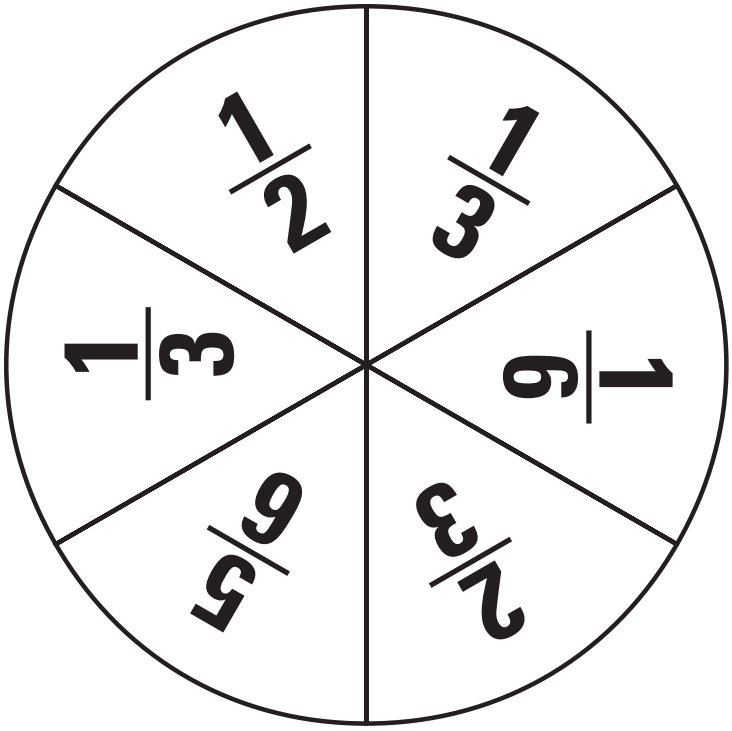
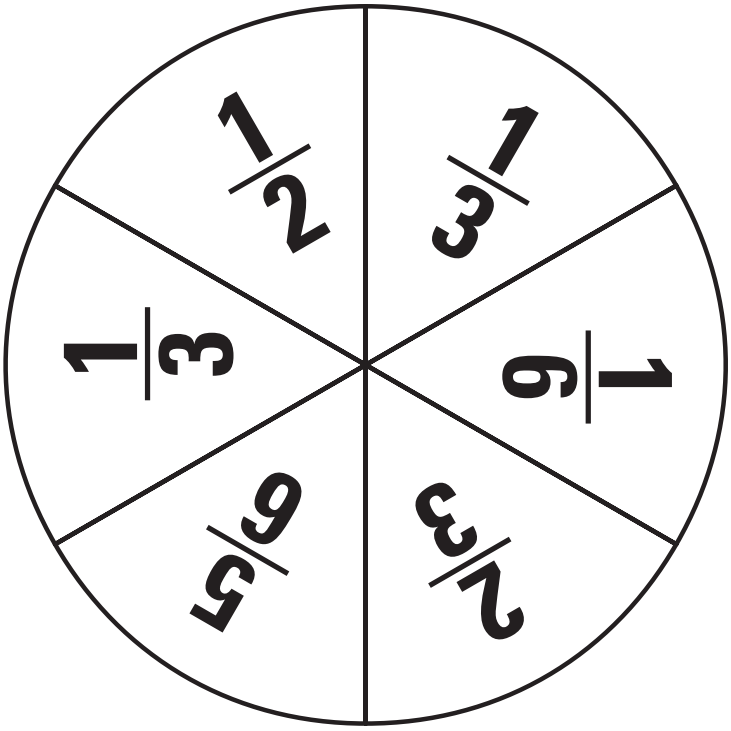
5/6
2/3


1/2
1/3
1/6
1/3
5/6
2/3


1/2
1/3
1/6
1/3
5/6
2/3

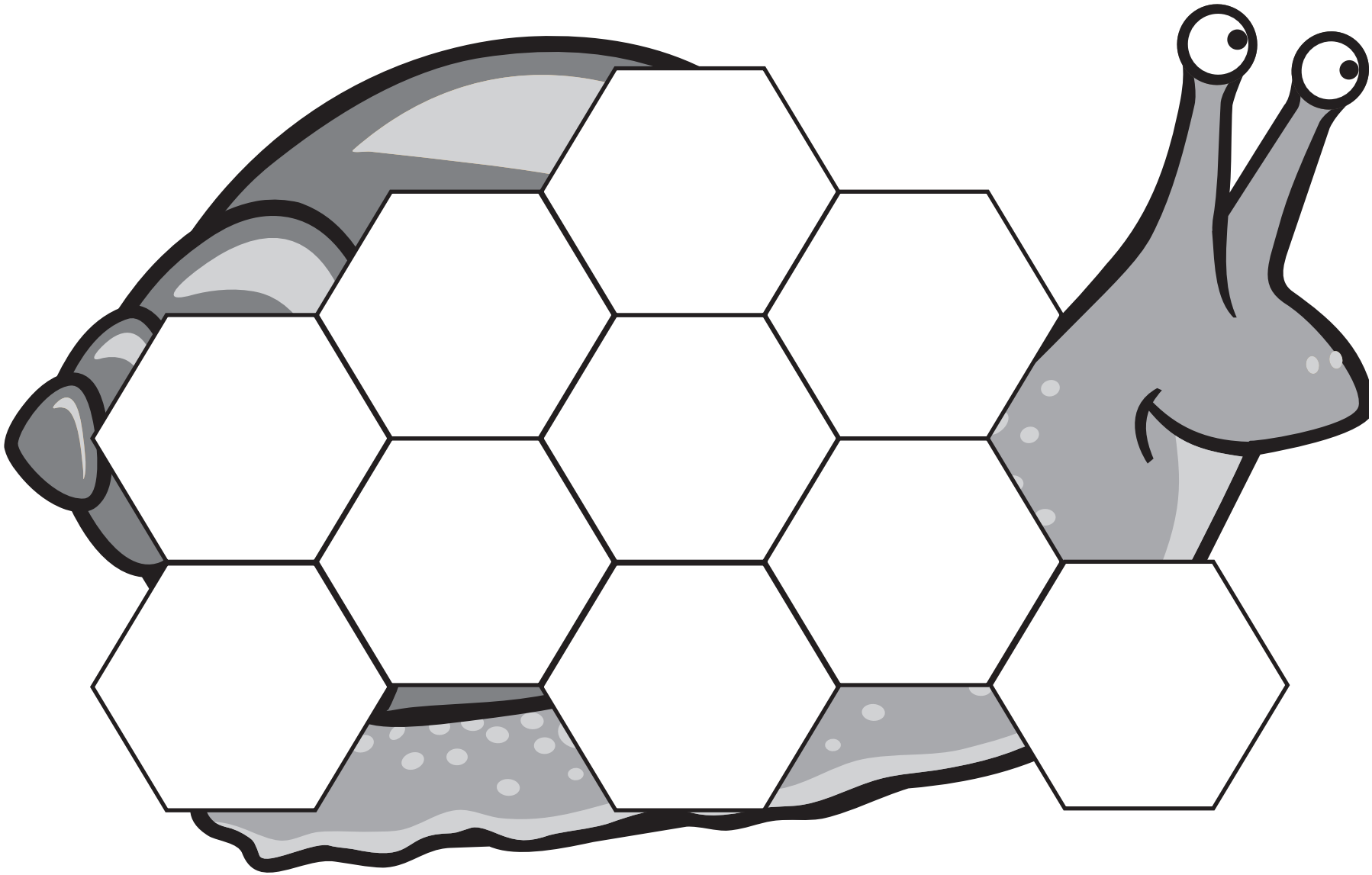
Snail Nim

Building Fluency: equivalent fractions **Materials:** gameboard and pattern blocks (triangles, parallelograms, trapezoids, hexagons) **Number of Players:** 2

Directions:

1. Players take turns placing pattern blocks on the snail. The player announces the fraction being placed. Example: Player places a triangle on the board and says "This is 1/6 of the hexagon." Player places a trapezoid on the board and says "This is ½ of the hexagon."
2. The person who places the last block on the gameboard loses the game.

Variation/Extension: The winner places the last piece or players may not cover adjoining hexagons in the same way. Example: If a player covers one hexagon with 2 trapezoids, the adjoining hexagons must have at least two different shapes.



Race to Midnight

Building Fluency: telling time

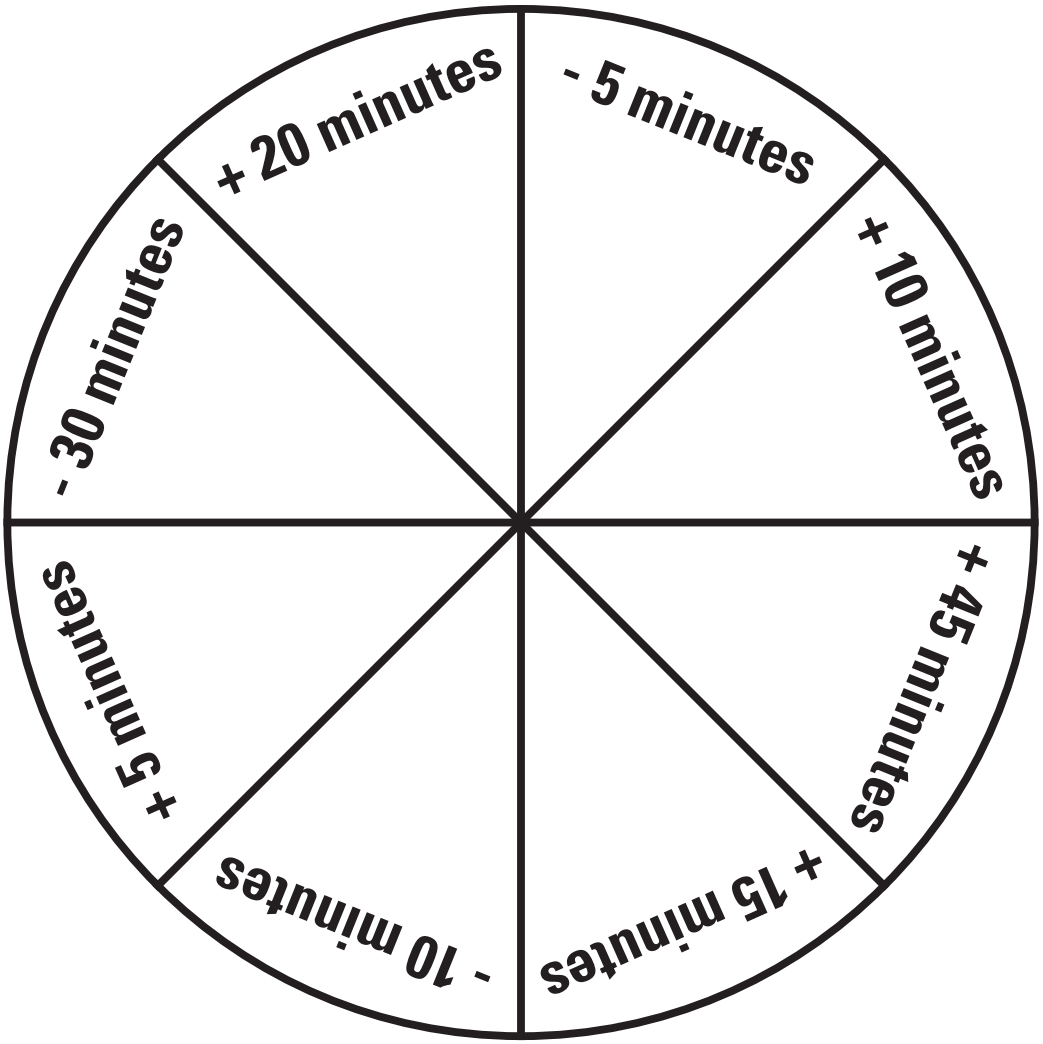
Materials: gameboard, spinner (pencil and paperclip), number line for each player

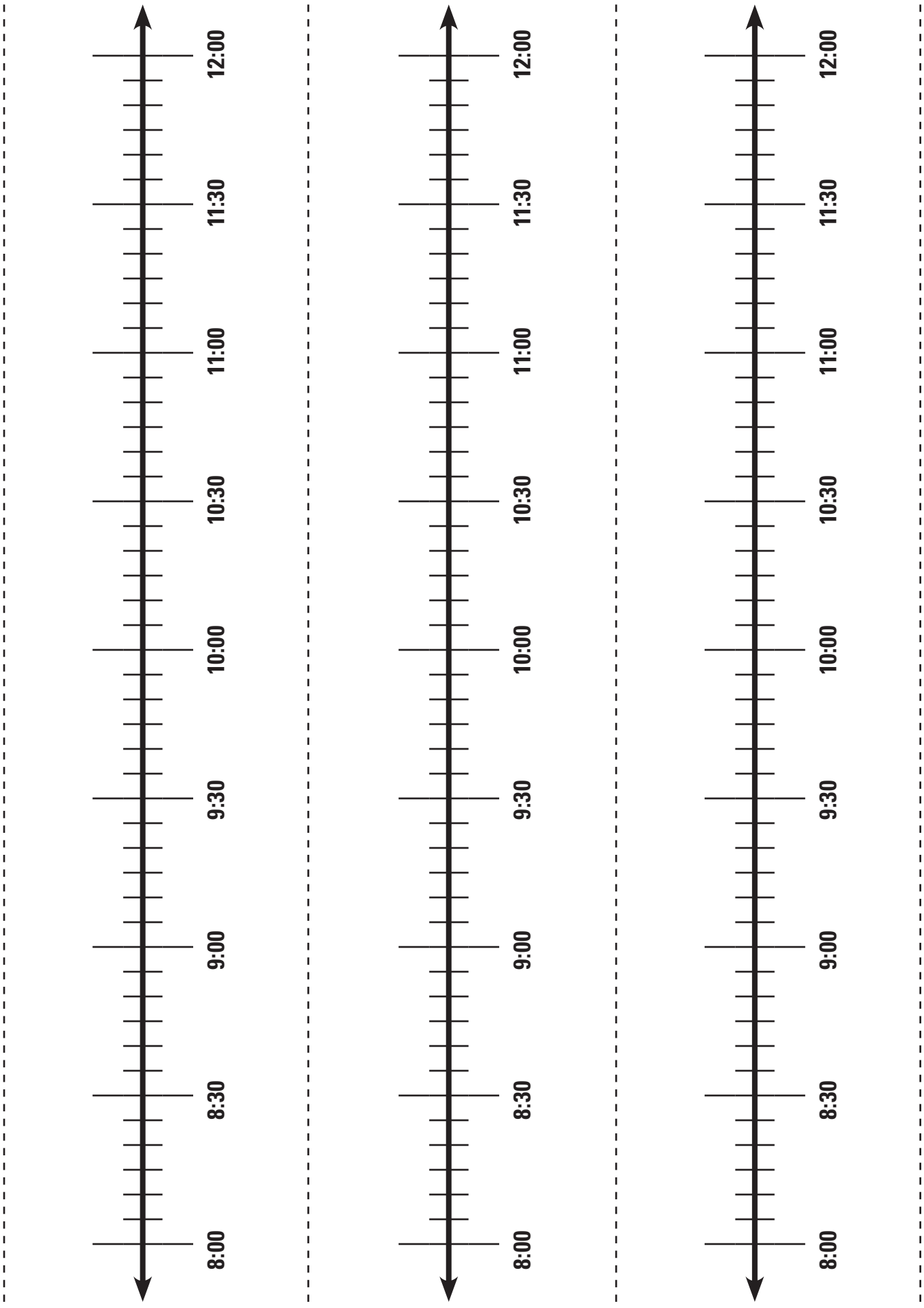
Number of Players: 2 or 3

Directions:

1. Each player will have a number line and begin at 8:00.
2. In turn, players spin and add or subtract the time indicated on the spinner and record on the number line.
3. The winner is the first player to reach 12:00 midnight.

Variation/Extension: Students can create their own number lines using different begin and end times.




8:00
8:30
9:00
9:30
10:00
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11:00
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12:00
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9:30
10:00
10:30
11:00
11:30
12:00

Standard Measure Up

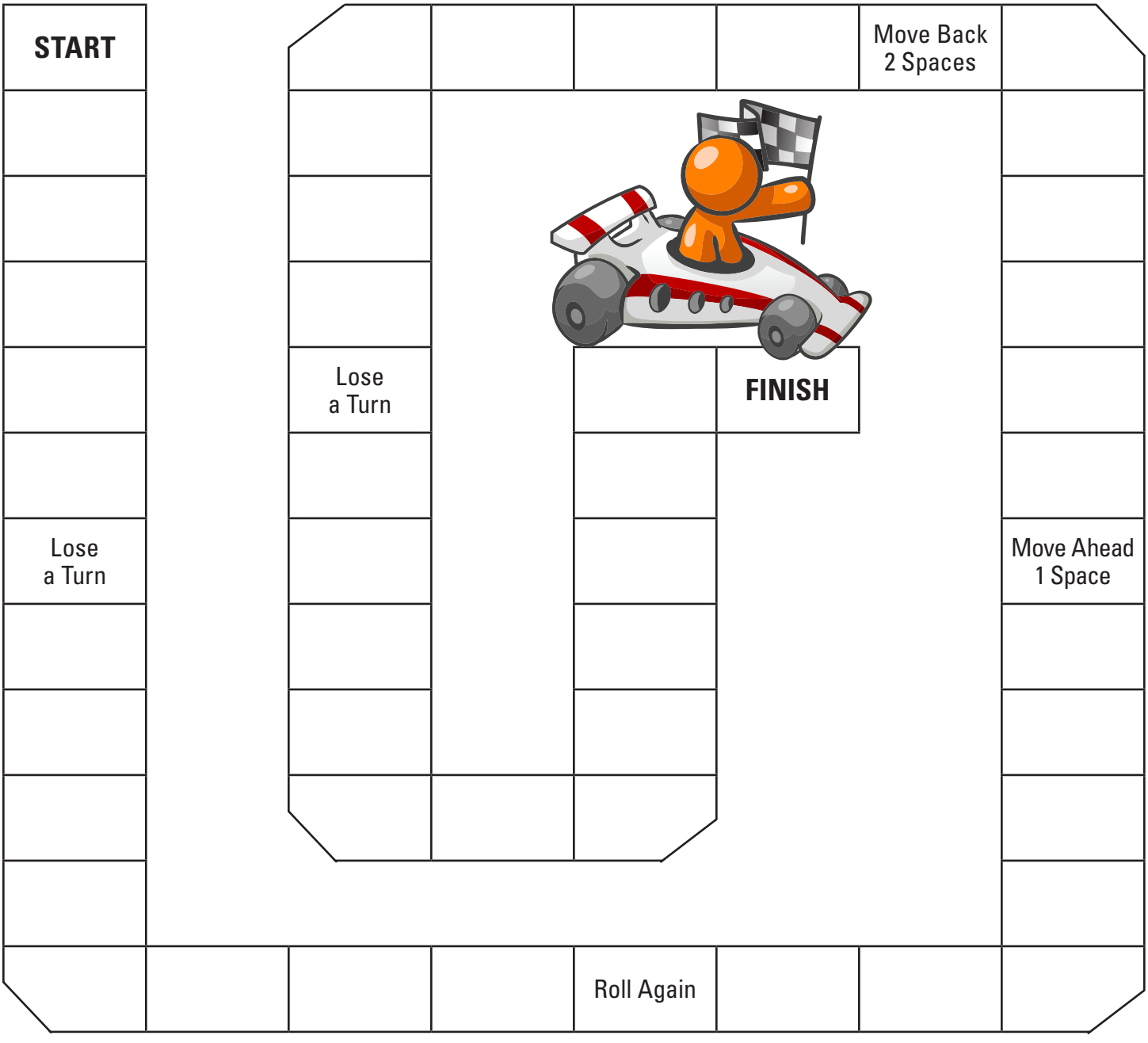
Building Fluency: standard unit of measurement

Materials: gameboard, game marker, die, and standard unit game cards

Number of Players: 2-4

Directions:
1. Each player places markers on "start".
2. Shuffle the game cards. Then, first Player draws the top card from the deck and reads.
3. The second player must fill in the blank with the correct unit of measure. If the player answers correctly, then they roll the cube and move that many spaces. If the player answers incorrectly, no spaces are moved.
4. Play continues with the next player drawing and reading a card from the top of the deck.

Variation/Extension: Students create additional standard unit cards for the game. An additional page of cards are included for your convenience.



A hotdog is about six _____ long. inches	**A Blue Whale weighs about 220 _____.** tons	**A dictionary weighs about three _____ .** pounds
A ladder is about six _____ tall. feet	**An airplane weighs about 400_____.** tons	**A small telescope weighs about 40 ____ .** pounds
A medium sized dog weighs about 40 ___ . pounds	**A broom weighs about 36_____.** ounces	**A broom is about 54 _____ long.** inches
A motorcycle is about six _____ long. feet	**A Blue Whale is about 100 _____ long.** feet	**A hot dog weighs about two _____ .** ounces

A can of soda holds about 12 _____ . ounces	**A jet is about 75 _____ long.** yards	**A large container of milk holds about one _____ .** gallon
A necktie is about two _____ long. feet	**The earth is about 93 million _____ away from the sun.** miles	**A new pencil is about seven _____ long.** inches
A roll of 50 pennies weighs about four _____. ounces	**A dictionary is about ten _____ long.** inches	**A football field is 100_____ long.** yards
A piano weighs about 650_____. pounds	**A dining room table is about 30 _____ tall.** inches	**A regular door is about seven_____ tall.** feet

Cut a Rug

Building Fluency: understand area and perimeter

Materials: pair of dice, recording sheet, centimeter grid paper

Number of Players: 2

Directions:

1. Player tosses the dice, finds the sum and puts the total in the length box. The player tosses the dice again to find the width.
2. Using the length and width, the player creates a rectangle on the grid paper and records the perimeter and area on the recording sheet. Then Player 2 does the same.
3. After each round the players look at their numbers together. Which player has the greater area? Which player has the greater perimeter? Is the perimeter always bigger? Always smaller? Can they be the same?
4. After 4 rounds, players total their perimeters and their areas. The winner has the highest total area.

Variation/Extension: Once students understand how to play this game they can create their own table in their math notebook. "I Get Around" is a variation of this game.

PLAYER 1

Round	Length	Width	Perimeter	Area
1				
2				
3				
4				
			Total Score	

PLAYER 2

Round	Length	Width	Perimeter	Area
1				
2				
3				
4				
			Total Score	

Geo-Matchup

Building Fluency: reason with shapes and their attributes

Materials: a set of Geo-Matchup cards per player

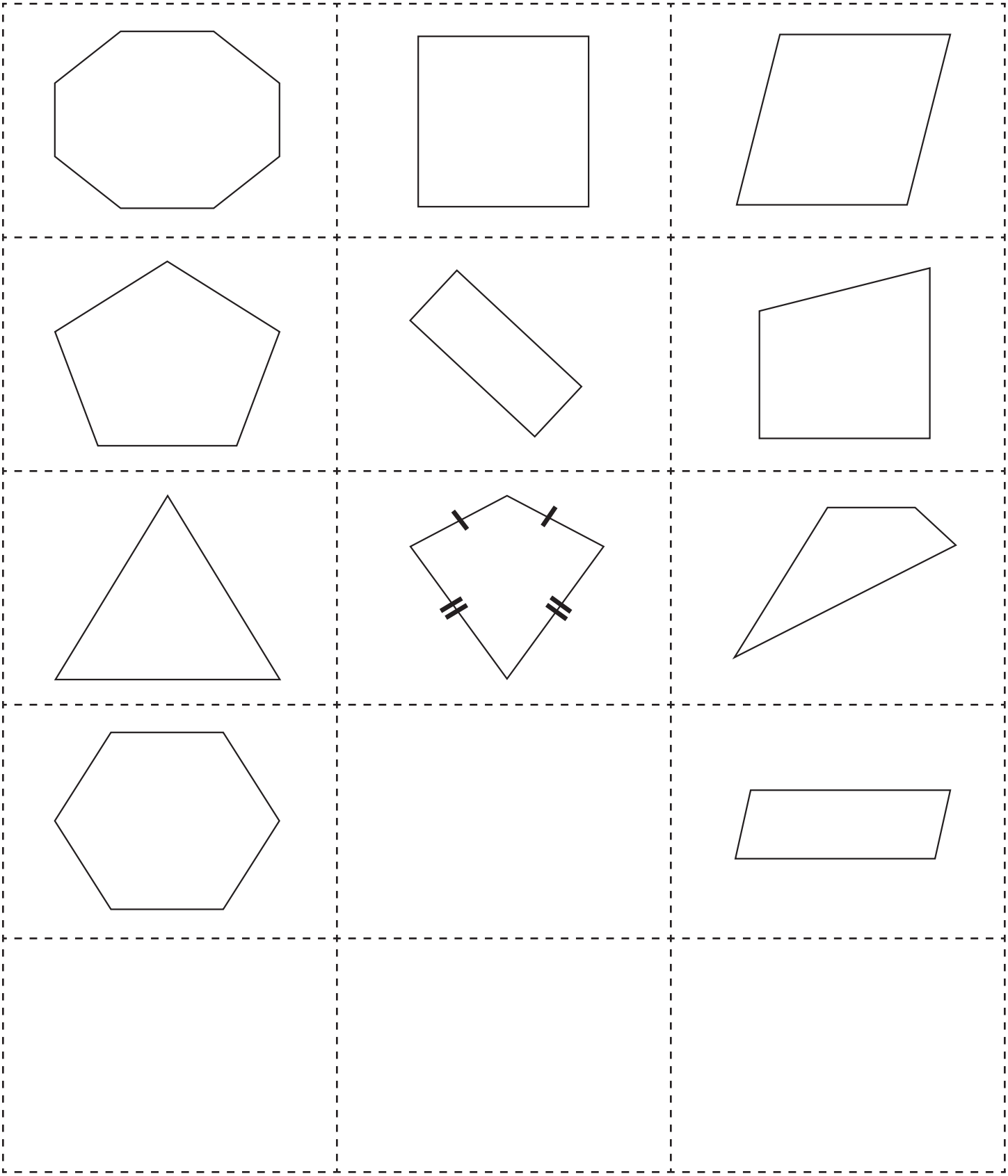
Number of Players: 2-4

Directions:

1. Each player has a set of cards.
2. Players match up their cards.
3. Players compare their answers and agree or disagree.
4. Players defend and prove their answers until all players agree.

Variation/Extension: Play as a memory game. First player turns over two cards. If they match, the player takes the cards and plays again. If not, the player turns the cards back over and play passes to the next player. Players can create additional cards.

A polygon with 8 sides and 8 angles	**A quadrilateral with 2 pairs of parallel sides, all right angles, and all sides equal**	**A quadrilateral with 4 sides equal and 2 pairs of parallel sides, no right angles**
A polygon with 5 sides and 5 angles	**A quadrilateral with 2 pairs of parallel sides and all right angles. All sides are not congruent**	**A quadrilateral with one pair of parallel sides**
A polygon with 3 sides and 3 angles	**A quadrilateral with two pairs of adjacent equal sides. The four sides do not all have the same length.**	**A polygon with 4 sides and 4 angles**
A polygon with 6 sides and 6 angles		**A quadrilateral with two pairs of parallel sides**



Spin and Review

Building Fluency: review of multiple concepts

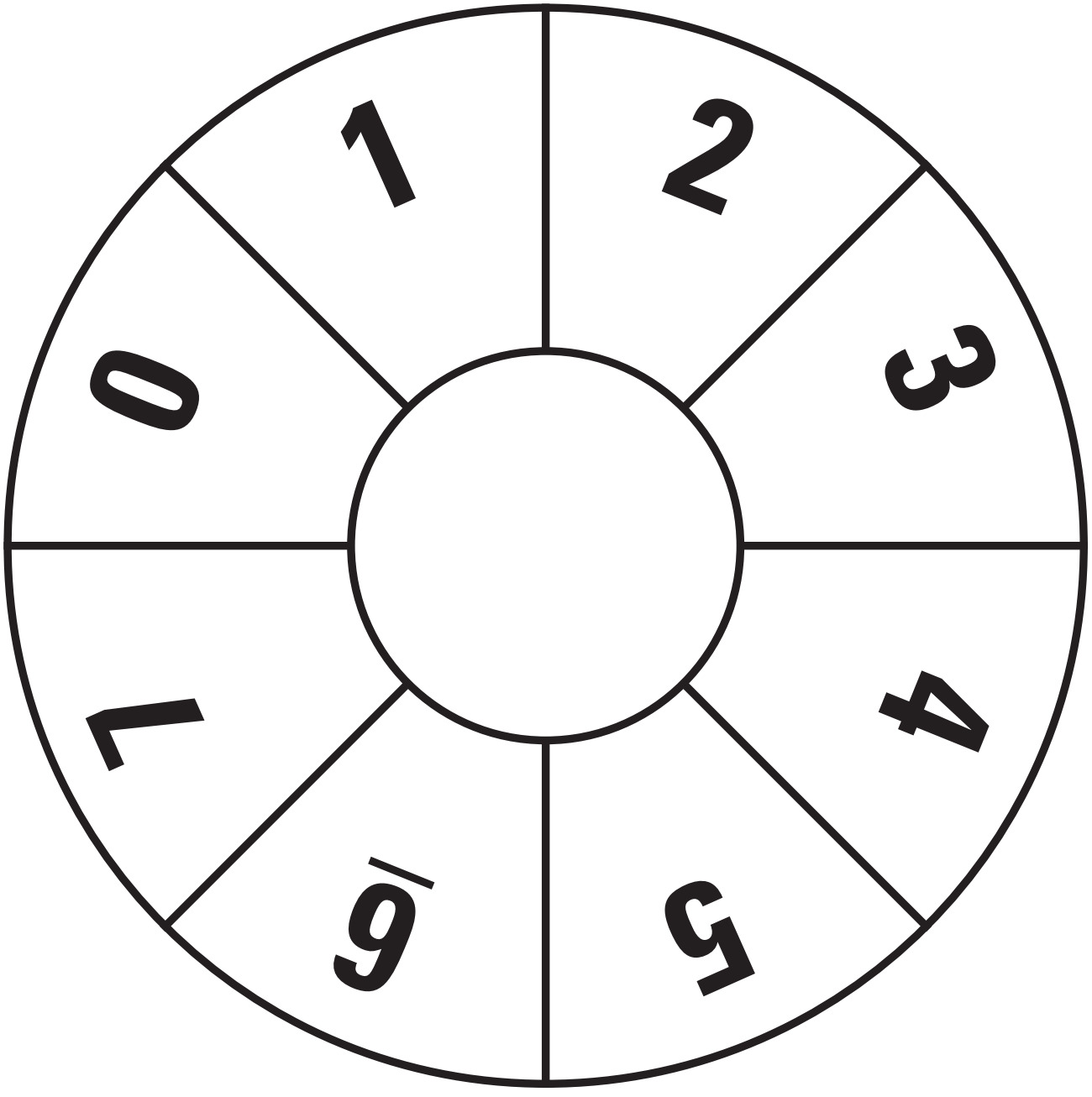
Materials: spinner (pencil and paper clip), game cards, approximately 50 counters

Number of Players: 3-4

Directions:

1. Cards are shuffled and placed face down. Then the first player draws a card and reads it to player 2.
2. If the player answers correctly, the player spins the spinner and takes that number of counters. The game card is placed in a discard pile.
3. If the player answers incorrectly the card is placed at the bottom of the pile and no spin is taken.
4. Player 2 reads a card for Player 3 and play continues around.
5. When all of the cards have been answered, the player with the most counters wins.

Variation/Extension: Students can write more questions for this game.

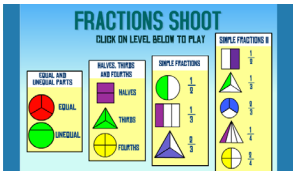


Ellen has 5 groups of bracelets. There are 6 bracelets in each group. What equation expresses this? (A. 5 x 6)	8 x ___ = 48 What is the missing factor? (A. 6)	John cut a brownie into two parts. He ate one part. What fraction of the brownie did he eat? (A. ½)
Alan began jogging at 9:15. He jogged until 10:00. How long did he jog? (A. 45 minutes)	Mary has 7 packs of gum, each pack has 10 pieces. How many total pieces of gum does Mary have? (A. 70 pieces)	John has 3 bags of candy. Each bag contains 4 pieces. Caroline has 4 bags of candy. Each bag contains 2 pieces. Who has more candy? (A. John)
Which digit is in the tens place in 843? (A. 4)	Would two quarters, one dime and five pennies be the same amount of money as six dimes and one nickel? (A. yes, 65¢)	If you were skip counting by 3's, would you say the number 15? (A. yes)
Name a polygon with four congruent sides and four congruent angles. (A. Square)	Jake drew the numbers 3, 5 and 2 out of a bag of number tiles. What is the largest number he can make using all three numbers only once? (A. 532)	Marcus traced his hand on a piece of paper. What do we call the measurment of space on the inside of his drawing? (A. Area)
Suckers are 15¢ each. Mary bought six. How much did she spend? What operation would you use to solve this problem? (A. Multiplication or Addition)	John measured the distance around the entire outside of his desk. What do we call this measurement around an entire object? (A. Perimeter)	Lamont was building a cube. He used six of the same polygon. What polygon did he use? (A. Square)
Tina collects dimes. She had 198 dimes and gave her brother 36. How many did she then have? What operation would you use to solve this problem? (A. Subtraction)	Susie works in a flower shop. She received a shipment of tulips and roses. She received 38 tulips. She received 50 more roses than tulips. How many roses did she receive? What operation should you use? (A. Addition)	There were eight clowns at the circus. Each clown was juggling four bowling pins. How many bowling pins were there? What operation would you use to solve this problem? (A. Multiplication or Addition)

Tyler drew a closed figure with six sides. What was the name of this figure? (A. Hexagon)	200 + 40 + 3 is an example of...? (A. Expanded Notation)	A closed figure with three or more straight sides is called a ____? (A. Polygon)
Round 432 to the tens place. (A. 430)	Does a 3 cm x 6 cm rectangle and a 2 cm x 9 cm rectangle cover the same amount of space? (A. Yes)	What unit of measure would yo use to give the weight of a paper clip? Grams or Liters? (A. Grams)
What is x? 3 x 2 = 2x (A. 3)	Katie buys a shirt for $7.99 and a belt for $5.49. She paid with a $20.00 bill. How much change will she receive? How many operational steps will it take to solve this problem? (A. 2)	Would three dimes, two nickels and ten pennies be the same amount of money as two quarters? (A. yes)
Blake ordered a medium pizza and ate one half and Ernest ordered a medium pizza and ate one half. How much pizza did they have left all together? (A. One Whole Pizza)	Judy arrived at school at 8:15. LuAnn arrived 20 minutes later. What time did LuAnn arrive at school? (A. 8:35)	

Online Games Available

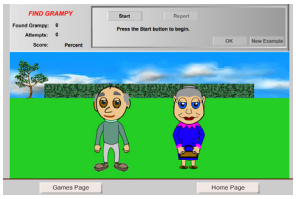
Number and Operations – Fractions



Fractions Shoot

http://www.sheppardsoftware.com/mathgames/earlymath/fractions_shoot.htm

NC.3.NF. 1 – A great introduction game to fractions. Students need to touch the fraction identified by the game. Students can pick relaxed mode, timed mode, and which fractions they can play with.



Find Grampy

http://www.visualfractions.com/FindGrampy/findgrampy.html

3. NF. 2 – Students need to identify the location of "Grampy" when he goes behind some bushes. Set up in a fraction bar/number line. It gives students clues where to go if they do not respond correctly the first time:

Fraction Track

http://illuminations.nctm.org/ActivityDetail.aspx?ID=18

NC.3.NF.2 and NC.3.NF.3 – Students need to get their pieces to the end of the track with the least amount of moves. The game corrects the students if they are incorrect. Equivalent fractions are also allowed to be used on the track. Denominators go up to 12ths.

Measurement and Data

Hickory Clock

http://www.ictgames.com/hickory4.html

NC.3.MD.1 – Students need to identify the correct time so the mouse can get the cheese. If they are incorrect, a cat comes in.