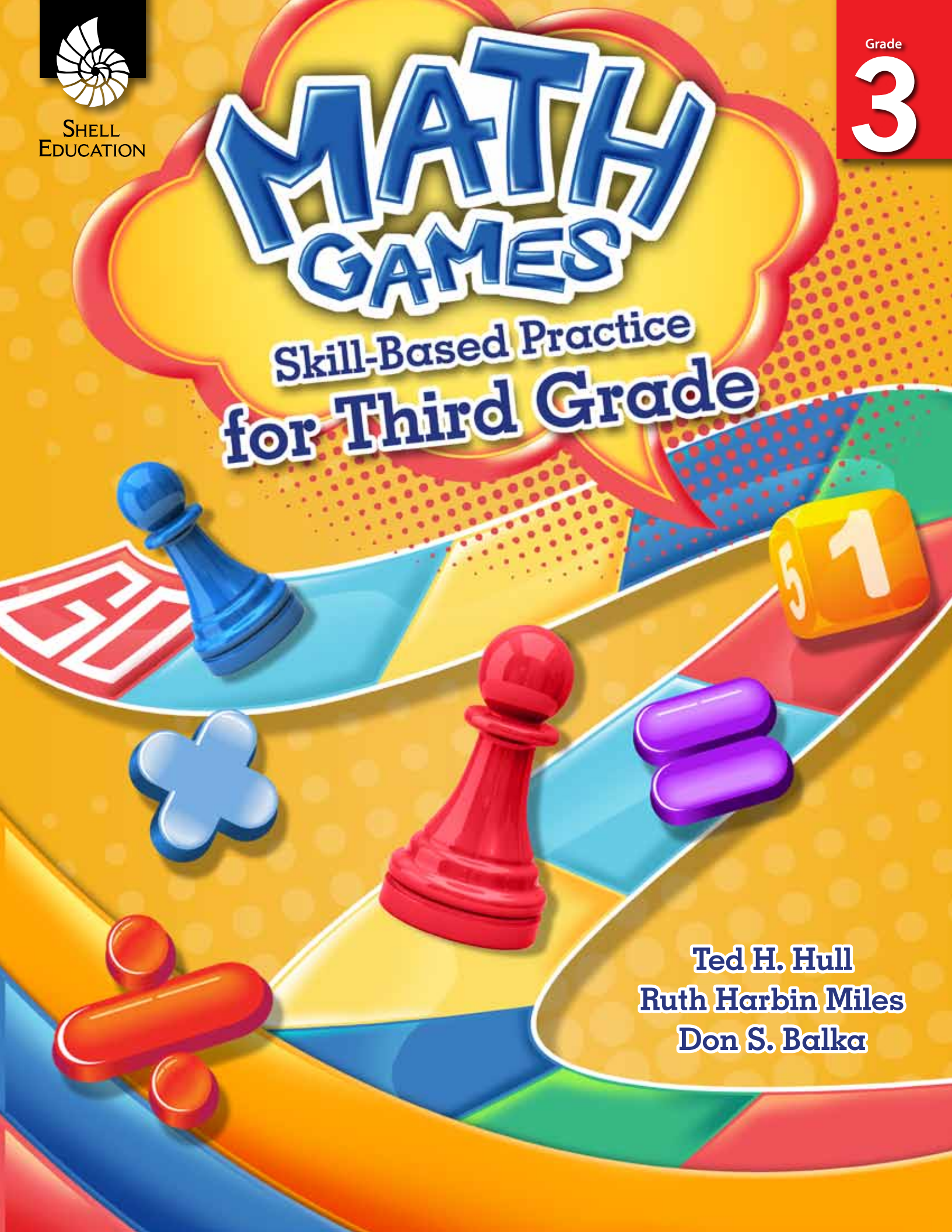
Shell Education
Grade 3
MATH GAMES
Skill-Based Practice for Third Grade
Ted H. Hull
Ruth Harbin Miles
Don S. Balka

Table of Contents

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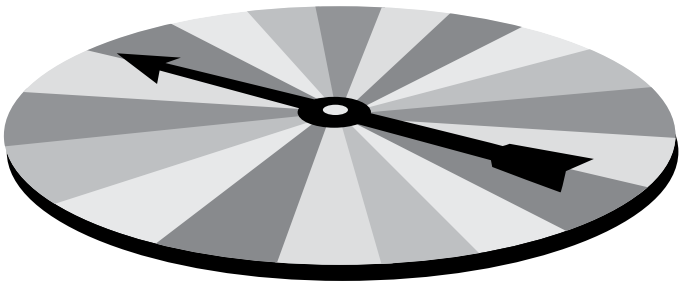


Importance of Games

Students learn from play. Play begins when we are infants and continues through adulthood. Games are motivational and educational (Hull, Harbin Miles, and Balka 2013; Burns 2009). They can assist and encourage students to operate as learning communities by requiring students to work together by following rules and being respectful. Games also foster students' thinking and reasoning since students formulate winning strategies. They provide much more sustained practices than do worksheets, and students are more motivated to be accurate. Worksheets may provide 20 to 30 opportunities for students to practice a skill, while games far exceed such prescribed practice opportunities. Lastly, games provide immediate feedback to students concerning their abilities.

Games must be part of the overall instructional approach that teachers use because successful learning requires active student engagement (Hull, Harbin Miles, and Balka 2013; National Research Council 2004), and games provide students with the motivation and interest to become highly engaged. Instructional routines need balance between concept development and skill development. They must also balance teacher-led and teacher-facilitated lessons. Students need time to work independently and collaboratively in order to assimilate information, and games can help support this.

When games are used appropriately, students also learn mathematical concepts.

Mathematical Learning

Students must learn mathematics with understanding (NCTM 2000). Understanding means that students know the relationship between mathematical concepts and mathematical skills—mathematical procedures and algorithms work because of the underlying mathematical concepts. In addition, skill proficiency allows students to explore more rigorous mathematical concepts. From this relationship, it is clear that a balance between skill development and conceptual development must exist. There cannot be an emphasis of one over the other.

The National Council of Teachers of Mathematics (2000) and the National Research Council (2001) reinforce this idea. Both organizations state that learning mathematics requires both conceptual understanding and procedural fluency. This means that students need to practice procedures as well as develop their understanding of mathematical concepts in order to achieve success. The games presented in this book reinforce skill-based practice and support students' development of proficiency. These games can also be used as a springboard for discourse about mathematical concepts. The counterpart to this resource is *Math Games: Getting to the Core of Conceptual Understanding*, which builds students' conceptual understanding of mathematics through games.

Importance of Games *(cont.)*

The *Common Core State Standards for Mathematics* (2010) advocate a balanced mathematics curriculum by focusing standards both on mathematical concepts and skills. This is also stressed in the Standards for Mathematical Practice, which discuss the process of "doing" mathematics and the habits of mind students need to possess in order to be successful.

The Standards for Mathematical Practice also focus on the activities that foster thinking and reasoning in which students need to be involved while learning mathematics. Games are an easy way to initiate students in the development of many of the practices. Each game clearly identifies a Common Core domain, a standard, and a skill, and allows students to practice them in a fun and meaningful way.

Games vs. Worksheets

In all likelihood, many mathematics lessons are skill related and are taught and practiced through worksheets. Worksheets heavily dominate elementary mathematics instruction. They are not without value, but they often command too much time in instruction. While students need to practice skills and procedures, the way to practice these skills should be broadened.

Worksheets generally don't promote thinking and reasoning. They become so mechanical that students cease thinking. They are lulled into a feeling that completing is the goal. This sense of "just completing" is not what the Common Core Standards for Mathematical Practice mean when they encourage students to "persevere in solving problems."

Students need to be actively engaged in learning.

Students need to be actively engaged in learning. While worksheets do serve a limited purpose in skill practice, they also contain many potential difficulties. Problems that can occur include the following:

- **Worksheets are often completed in isolation,** meaning that students who are performing a skill incorrectly most likely practice the skill incorrectly for the entire worksheet. The misunderstanding may not be immediately discovered, and in fact, will most likely not be discovered for several days!
- **Worksheets are often boring to students.** Learning a skill correctly is not the students' goal. Their goal becomes to finish the worksheet. As a result, careless errors are often made, and again, these errors may not be immediately discovered or corrected.

Importance of Games *(cont.)*

- **Worksheets are often viewed as a form of subtle punishment.** While perhaps not obvious, the perceived punishment is there. Students who have mastered the skill and can complete the worksheet correctly are frequently "rewarded" for their efforts with another worksheet while they wait for their classmates to finish. At the same time, students who have not mastered the skill and do not finish the worksheet on time are "rewarded" with the requirement to take the worksheet home to complete, or they finish during another portion of the day, often recess or lunch.
- **Worksheets provide little motivation to learn a skill correctly.** There is no immediate correction for mistakes, and often, students do not really care if a mistake is made. When a game is involved, students want and need to get correct answers.

The *Common Core State Standards for Mathematics*, including the Standards for Mathematical Practice, demand this approach change. These are the reasons teachers and teacher leaders must consciously support the idea of using games to support skill development in mathematics.

How to Use This Book *(cont.)*

Students are able to work collaboratively during game play, thus promoting student discourse and deeper learning. The games can also be used to reduce the amount of time students spend completing worksheets.

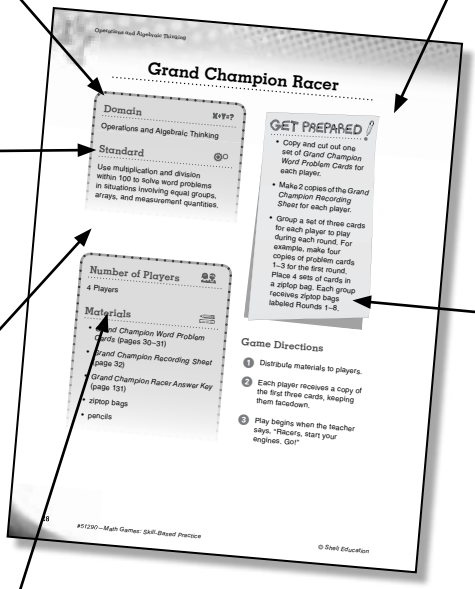
Each game in this book is based upon a common format. This format is designed to assist teachers in understanding how the game activities are played and which standards and mathematical skills students will be practicing.

Domain
The domain that students will practice is noted at the beginning of each lesson. Each of the five domains addressed in this series has its own icon.

Standards
One or more *Common Core State Standards* will state the specific skills that students will practice during game play.

Number of Players
The number of players varies for each game. Some may include whole-group game play, while others may call for different-size groups.

Materials
A materials list is provided for each game to notify the teacher what to have available in order to play the games.


Operations and Algebraic Thinking

Grand Champion Racer

Domain
Operations and Algebraic Thinking

Standard
Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities.

Number of Players
4 Players

Materials
- Grand Champion Word Problem Cards (pages 30–31)
- Grand Champion Recording Sheet (page 32)
- Grand Champion Racer Answer Key (page 131)
- ziptop bags
- pencils

GET PREPARED!
- Copy and cut out one set of *Grand Champion Word Problem Cards* for each player.
- Make 2 copies of the *Grand Champion Recording Sheet* for each player.
- Group a set of three cards for each player to play during each round. For example, make four copies of problem cards 1–3 for the first round. Place 4 sets of cards in a ziptop bag. Each group receives ziptop bags labeled Rounds 1–8.

Game Directions
1. Distribute materials to players.
2. Each player receives a copy of the first three cards, keeping them facedown.
3. Play begins when the teacher says, "Racers, start your engines. Go!"

#51290—Math Games: Skill-Based Practice

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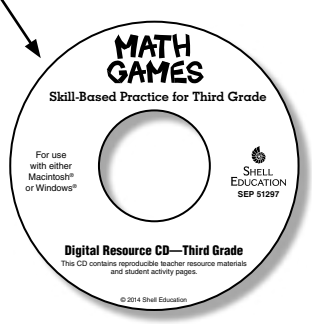
Get Prepared!
Everything a teacher needs to be prepared for game play is noted in the Get Prepared! section. This includes how many copies are needed as well as other tasks that need to be completed with the materials.

Game Directions
The directions allow for step-by-step guidance on how to easily implement each game.

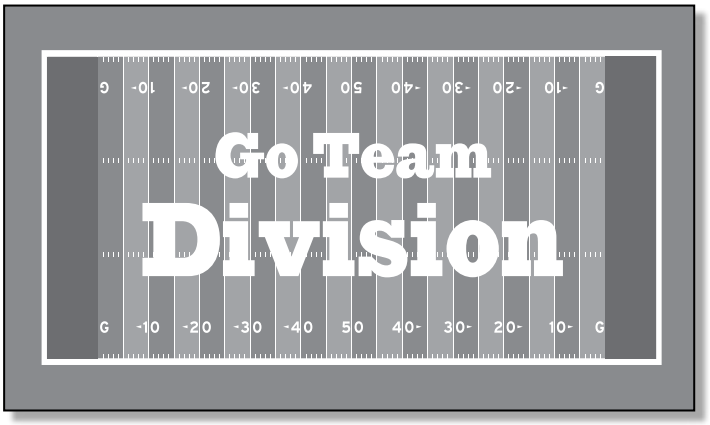
All game resources can be found on the **Digital Resource CD**. For a complete list of files, see page 129–130.



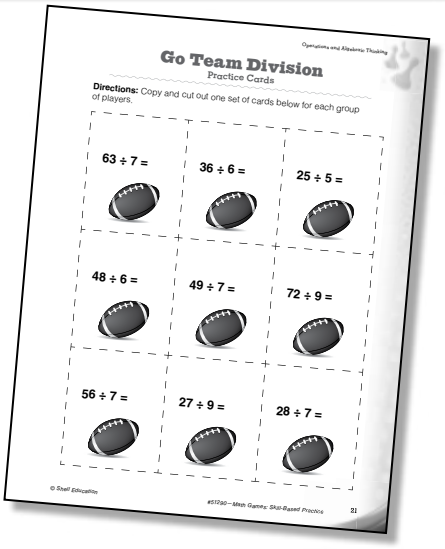
How to Use This Book *(cont.)*

Many games include materials such as game boards, activity cards, score cards, and spinners. You may wish to laminate materials for durability.

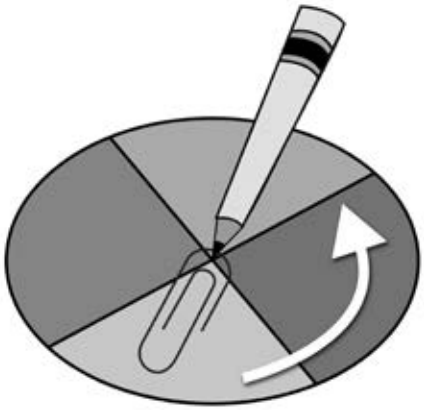
Game Boards
Some game boards spread across multiple book pages in order to make them larger for game play. When this is the case, cut out each part of the game board and tape them together. Once you cut them apart and tape them together, you may wish to glue them to a large sheet of construction paper and laminate them for durability.



Activity Cards
Some games include activity cards. Once you cut them apart, you may wish to laminate them for durability.



Spinners
Some games include spinners. To use a spinner, cut it out from the page. Place the tip of a pencil in the center with a paperclip around it. Use your other hand to flick the other side of the paperclip.



Fraction Throwdown

Domain

Numbers and Operations—Fractions

Standards

Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.

Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions.

Number of Players

2 Players

Materials

- *Fraction Throwdown Cards* (pages 89–91)
- *Equivalent Fractions Visual Model* (page 92) (optional)
- *Fraction Throwdown Recording Sheet* (page 93)
- number cubes

GET PREPARED!

- Copy and cut out the *Fraction Throwdown Cards*, *Equivalent Fractions Visual Model* (optional), and *Fraction Throwdown Recording Sheet* for each pair of players.
- Collect a number cube for each pair of players.

Game Directions

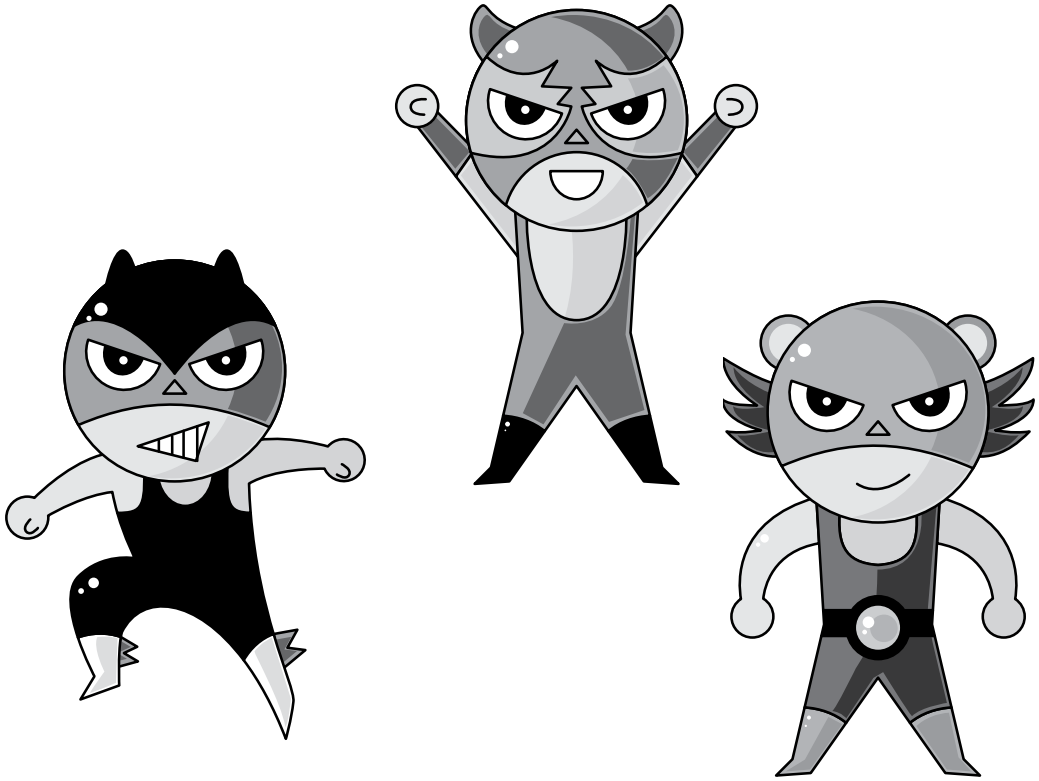
1. Distribute materials to players.
2. Players take turns rolling a number cube. The player who rolls the higher number is Player 1.
3. Player 1 shuffles the *Fraction Throwdown Cards* and deals out the whole deck into two piles, one for Player 1 and one for Player 2.
4. Play begins when both players turn over and "throwdown" the top cards on their piles. Each player records the fractions in the correct columns of the *Fraction Throwdown Recording Sheet*.

Fraction Throwdown *(cont.)*

5. Players compare the two fractions by writing the less than, greater than, or equal symbols (<, >, or =) in the middle column of the chart. They may use the *Equivalent Fractions Visual Model,* if needed.

6. The player whose fraction is greater collects both cards and places them in a winning pile. If the fractions are equivalent, neither player collects cards and the cards go into the discard pile.

7. Play continues until players run out of cards or only equivalents remain. The player with the most cards in his or her winning pile wins the game.



Fraction Throwdown
Cards

Directions: Copy and cut out a set of cards for each pair of players.

$\frac{1}{3}$ 	$\frac{1}{3}$ 	$\frac{1}{3}$ 
$\frac{1}{3}$ 	$\frac{1}{3}$ 	$\frac{1}{3}$ 
$\frac{1}{4}$ 	$\frac{1}{4}$ 	$\frac{1}{4}$ 
$\frac{1}{4}$ 	$\frac{1}{4}$ 	$\frac{1}{4}$ 
$\frac{1}{2}$ 	$\frac{1}{2}$ 	$\frac{1}{2}$ 
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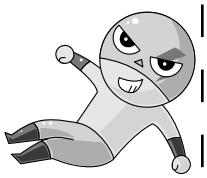
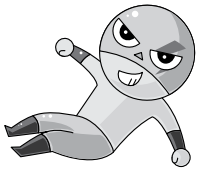
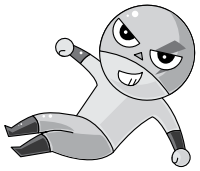
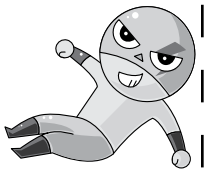
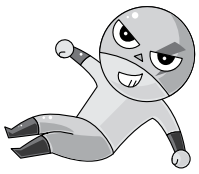
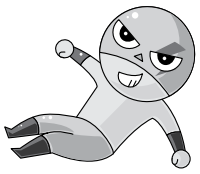
Fraction Throwdown

Cards *(cont.)*

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

Fraction Throwdown

Cards *(cont.)*

$\frac{2}{4}$ 	$\frac{2}{4}$ 	$\frac{2}{4}$ 
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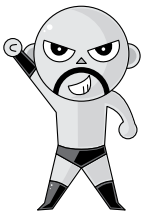
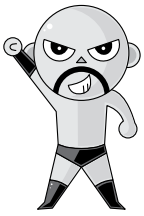
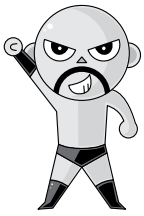
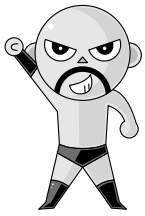
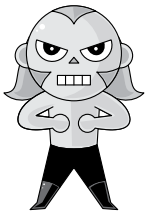
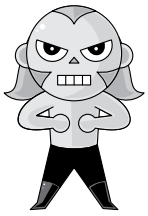
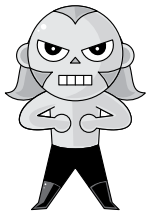
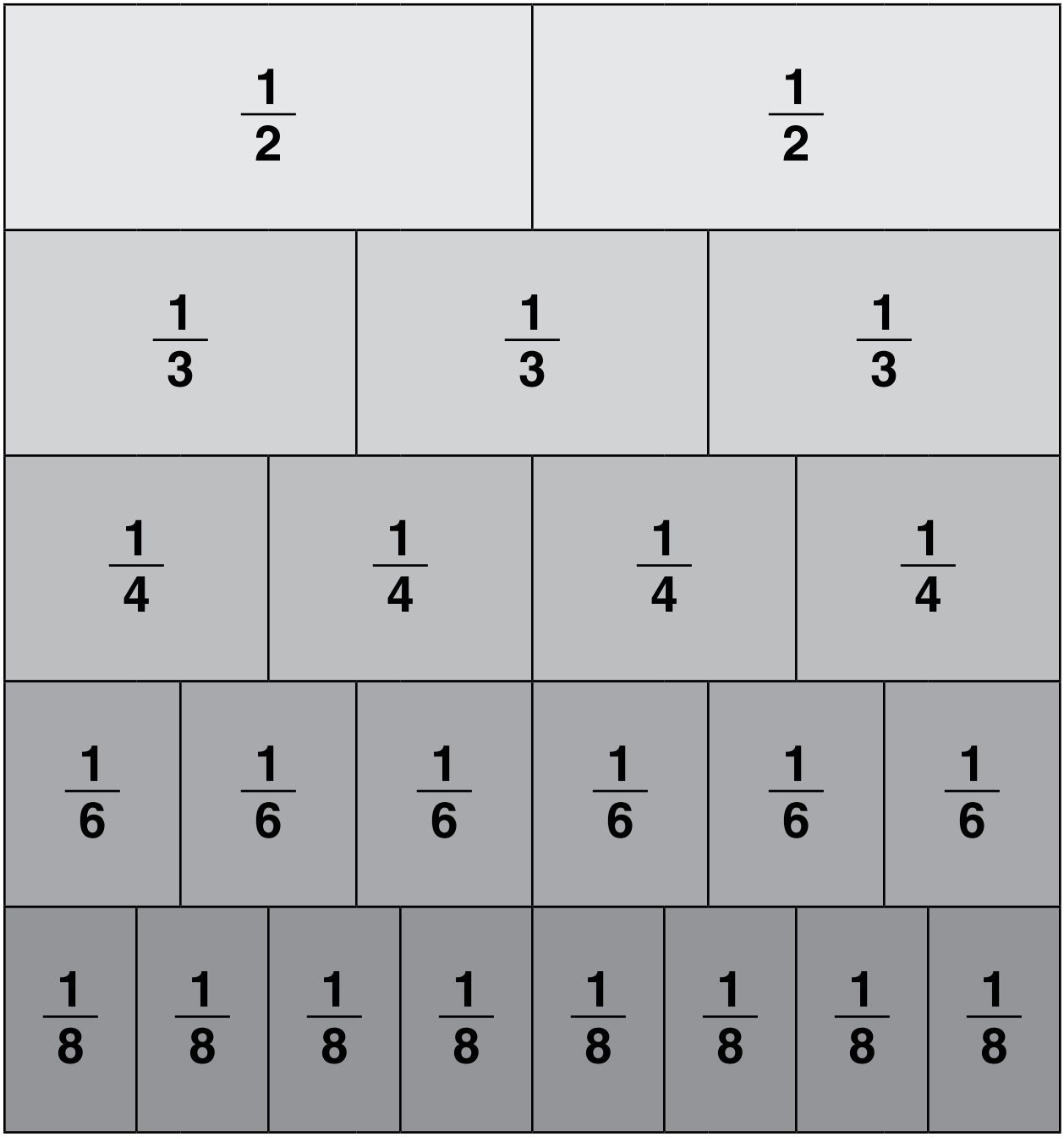
$\frac{3}{4}$ 	$\frac{3}{4}$ 	$\frac{3}{4}$ 
$\frac{3}{4}$ 	$\frac{3}{4}$ 	$\frac{3}{4}$ 
$\frac{3}{6}$ 	$\frac{3}{6}$ 	$\frac{3}{6}$ 

Equivalent Fractions

Visual Model

Directions: Use this visual model to help check your answers.



Name:_____ Date:_____

Fraction Throwdown

Recording Sheet

Directions: Record the fractions in the correct column and compare them as you play the game.

Player 1 Fraction	<, >, or =	Player 2 Fraction