

Wipeout (Fractional Relationships)

Overview

This game gives students practice in understanding fractional relationships such as whole to part and part to whole. The goal of the game is to be the first to discard all your pattern blocks. Both players begin with the same number (one, two, or three) of hexagons (considered the whole) as well as other pattern blocks (the parts): red trapezoids, blue rhombuses, and green triangles. Players roll a special die marked with fractions ($\frac{1}{2}, \frac{1}{3}, \frac{1}{3}, \frac{1}{3}, \frac{1}{6}, \frac{1}{6}$) and have three options of moves: (1) remove the pattern block represented by the fraction on the die, (2) exchange any of your blocks for equivalent blocks, or (3) do nothing.

Materials

- pattern blocks (6 yellow hexagons, 12 red trapezoids, 18 blue rhombuses, and 36 green triangles), 1 set per pair of students
- die (faces marked $\frac{1}{2}, \frac{1}{3}, \frac{1}{3}, \frac{1}{3}, \frac{1}{6}, \frac{1}{6}$), 1 per pair of students
- *Wipeout (Fractional Relationships)* Game Directions (REPRODUCIBLE G-33), 1 per pair of students

Related Games

- Game 7: Close to 100 (the variation Close to 0)
- Game 27: Roll for \$1.00 (the variation Roll for 1)

Recommended Grades 4–5

Time Instruction: 45–60 minutes
Independent Play: 20–30 minutes



TEACHING TIPS

Don't Have Enough Pattern Blocks?

Although eighteen blue rhombuses and thirty-six green triangles allow for the most options when playing this game, if you have a limited supply of pattern blocks, twelve of each (rhombuses and triangles) should suffice.

Don't Have Dice?

If you do not have the dice required for this game, consider these options:

- Convert wooden cubes to dice by placing small, round, numbered stickers on each face of wooden cube.
- Use cards marked with the necessary fractions instead of dice. Instead of dice, players draw a card when it is their turn.



TIME SAVER

Managing the Materials

For ease in managing the distribution of materials, place the required die and pattern blocks in quart-size sandwich bags (one bag for each pair of students playing the game).



See the Connections to the Common Core State Standards for Mathematics, page xv.

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LEARNING TARGETS

Grade 4:

- I have an understanding of fractions as numbers.
- I can build fractions from unit fractions.
- I understand addition and subtraction of fractions as joining and separating parts referring to the same whole.

Grade 5:

- I can add and subtract fractions with unlike denominators.
- I can find fractional equivalences.



TEACHING TIP

Arranging Students

For the modeling part of this game, have students make two concentric circles. In the first circle, students kneel or sit; in the second, students stand. This ensures that everyone can view the demonstration area.



TECHNOLOGY TIP

Using an Interactive Whiteboard

Consider using an interactive whiteboard to model this game. To do so, create a page with a hexagon, trapezoid, rhombus, and triangle. All these shapes are in the whiteboard tool kit. Clone the trapezoid, rhombus, and triangle as many times as needed for ease of exchanging pattern blocks. To rotate the blocks, simply touch the block and grab the rotation toggle. This action allows you to rotate the shapes in the way you wish.

Key Questions

- How many trapezoids make a hexagon? In this game, what fractional part is a trapezoid?
- How many rhombuses make a hexagon? In this game, what fractional part is a rhombus?
- How many triangles make a hexagon? In this game, what fractional part is a triangle?

Teaching Directions

Part I: The Connection

Relate the game to students' ongoing work.

Connect the game to previous work with fractional parts. Discuss real-world fractions as they relate to students' lives. Many students participate in sports or enjoy watching them. Discuss how a basketball court has a centerline that creates two halves, as does an ice hockey rink or soccer field. Most playgrounds still have the game of Four-square painted on the blacktop. Connect the concept of the four smaller, equal-size squares that make one large square.

Part II: The Teaching

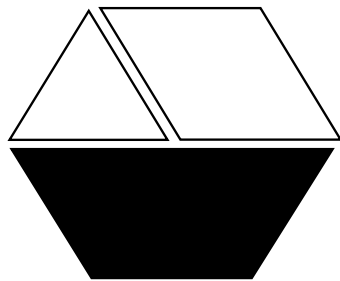
Introduce and model the game to students.

1. Explain to students that they will be playing the game *Wipeout* in pairs using pattern blocks. The winner is the first person to remove all of his or her pattern blocks. Gather students around a table or floor space.
2. Show students the specially marked die. Ask, "How are the faces labeled?" Have a few students examine the die and report to the group.
3. Place one yellow hexagon on the table. Tell students that the hexagon represents one whole.
4. Take the die and place face up the side of the die labeled $\frac{1}{2}$. With the red trapezoid, blue rhombus, and green triangle in the demonstration area, ask, "What pattern block would

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be one half of the whole hexagon?” Discuss. Students should be able to discern that the trapezoid is half a hexagon. Place a trapezoid pattern block on the table.

5. Repeat Step 4 two more times, first with the $\frac{1}{3}$ side face up for everyone to see, then with the $\frac{1}{6}$ side face up for everyone to see. Encourage students to share their thinking as they determine that a third of a hexagon is a rhombus block and a sixth of a hexagon is a triangle block. Place these blocks on the table.
6. Review which pattern blocks beside the hexagon can be used in the game—red trapezoids, blue rhombuses, and green triangles. Say, “These are the pattern blocks used in *Wipeout*. We will not be using the narrow tan rhombus or the orange square.” Point out that the red, blue, and green blocks represent the parts of the whole (the hexagon).
7. Ask a student sitting opposite you to be the opposing player. Begin by placing a yellow hexagon in front of the student and another yellow hexagon in front of you.
8. The game begins with each player exchanging the hexagon for equivalent fractional pattern block pieces. For modeling purposes, trade in your hexagon for one trapezoid, one rhombus, and one triangle:



9. Next, explain the three moves listed on this page. Post these moves or have copies of the *Wipeout* Game Directions (REPRODUCIBLE G-33) available for all students.



TEACHING TIP Modeling the Game

Note the trade described in Step 9 ensures that, during the next roll, a pattern block can be removed. Do not divulge this to students; let them observe and make the discovery on their own.



TEACHING TIP Three Moves in the Game *Wipeout*

Roll the die and:

1. Remove the pattern block the fraction on the die represents,
2. Trade in any of your remaining pattern blocks for an equivalent portion, or
3. Do nothing.

Note that you can only choose one of these moves during each turn. You may not remove a pattern block (move 1) and trade in pattern blocks (move 2) in one turn.

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TEACHING TIP Equivalent Parts May Not Be Substituted

In the game *Wipeout*, equivalent parts may not be substituted. For example, two triangles (each having the value of one-sixth) may not be removed if a $\frac{1}{3}$ (represented by the rhombus) is rolled. Only a rhombus may be removed.



TEACHING TIP The Importance of Practice

Refrain from discussing skill or strategies during the active engagement part of the lesson. The purpose at this time is to give students as much practice as possible first; they will then have the opportunity later to discuss their experiences (see “Math Workshop and Summarizing the Experience”).

10. Now have the selected student roll the die and remove the fractional part shown. If the fractional part is not something he exchanged for, remind students of the other two moves (see “Three Moves in the Game *Wipeout*”). The winner of the game is the first player to discard all of his pattern blocks.
11. Continue modeling the game, alternating turns, until a player removes all the parts of the whole.

Part III: Active Engagement

Engage students to ensure they understand how to play the game.

12. Now give students an opportunity to explore the game in pairs. Make sure each pair has a set of pattern blocks per the materials list, as well as the special die. Set up students so that a yellow hexagon is in front of each player.
13. Circulate to observe whether the game is being played properly. Revisit the three game moves, making certain students understand how the game is played.
14. After students have played at least one round using a single hexagon to begin the game, bring them together to clarify the game moves. Be certain students understand that they may not exchange two one-sixths if a $\frac{1}{3}$ is rolled.
15. Last, introduce the fact that the game of *Wipeout* can actually begin with either one, two, or three hexagons, and that this is a decision players make at the beginning of the game. Emphasize that *both* players need to begin with the same number of hexagons (wholes). Play begins as before, players first exchanging *just one* of the hexagons for equivalent fractional pattern block pieces.

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Part IV: The Link

Students play the game independently.

16. Set up students for independent practice of the game in pairs. In addition to the pattern blocks and die, distribute the game directions (REPRODUCIBLE G-33) as needed.
17. Students play for a certain amount of time, predetermined by you. Students beginning the game with just one hexagon (or whole) will most certainly finish their game more quickly than those students electing to begin with three hexagons (or wholes). Letting students know the amount of time remaining in this part of the lesson will help them determine whether they should start a new round with just one, two, or three hexagons.



TEACHING TIP Pairing Students

The game of *Wipeout* involves skill, strategy, and luck; therefore, a random pairing of students will work. You might have students choose their partners or use a classroom management routine, such as pulling sticks labeled with students' names, to establish partners at random.



DIFFERENTIATING YOUR INSTRUCTION

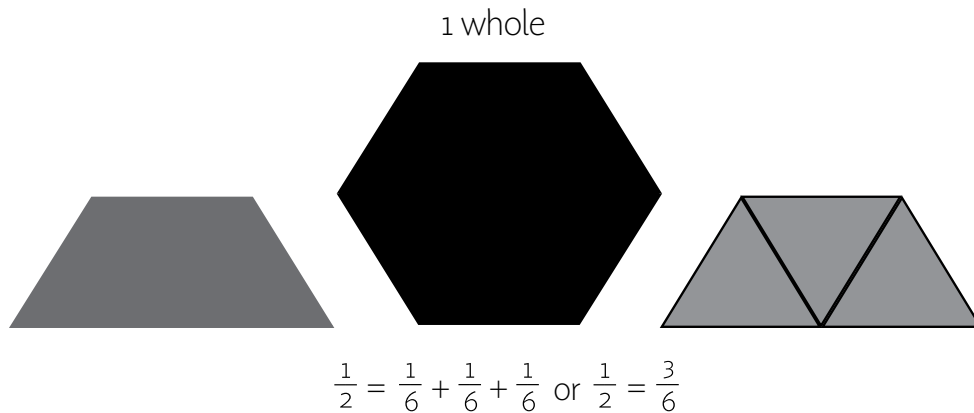
For students who are ready for practice with equivalent fractions, eliminate the rule "equivalent portions may not be substituted."

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MATH WORKSHOP AND SUMMARIZING THE EXPERIENCE

Teach this game at the beginning of the week to the whole class, and then make it a fundamental part of your math workshop (for more on math workshops, see Chapter 5 in *From Reading to Math* by Maggie Siena). Build in time to observe students playing the game, noting students' individual skill level and fluency with fractional relationships. Come together as a class later in the week and have students explain some of the fractional relationships they discovered when playing *Wipeout*. Students will likely be able to express that one-half is equivalent to three-sixths or one-third and one-sixth. Or that two-sixths is the same as one-third. Consider recording these understandings on chart paper, using both pictures of the pattern block relationships as well as the numerical representation of the concepts.



one trapezoid is the same as three triangles

ASSESSMENT

Writing Prompt

Ask students to journal about the strategies they use when playing *Wipeout*.

GAME DIRECTIONS

Reproducible G-33

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Objective

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Materials

- pattern blocks (6 yellow hexagons, 12 red trapezoids, 18 blue rhombuses, and 36 green triangles), 1 set per pair of players
- die (faces labeled $\frac{1}{2}, \frac{1}{3}, \frac{1}{3}, \frac{1}{3}, \frac{1}{6}, \frac{1}{6}$), 1 per pair of players

Players

2

Pattern Blocks

Although 18 blue rhombuses and 36 green triangles allow for the most options when playing this game, if you have a limited supply of pattern blocks, 12 of each (rhombuses and triangles) should suffice.

Directions

1. Decide together how many yellow hexagons you want to play with—1, 2, or 3. Place the corresponding number of hexagons in front of each player.
2. Take turns rolling the die. On his or her turn the player has three options of moves to make (see “Three Moves in the Game”).
3. The winner is the first player to discard all of his or her pattern blocks.

Reminder: Equivalent parts may not be substituted. In the game of Wipeout, equivalent parts may not be substituted. For example, two triangles (each having the value of $\frac{1}{6}$) may not be removed if a $\frac{1}{3}$ (represented by the rhombus) is rolled. Only a rhombus may be removed.

Three Moves in the Game

Roll the die and:

1. Remove the pattern block that the fraction on the die represents,
2. Trade in any of your remaining pattern blocks for an equivalent portion, or
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Note that you can only choose one of these moves on each turn. You may not remove a pattern block (move 1) and trade in pattern blocks (move 2) in one turn.