

**Fraction and Decimal Games**  
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**Presenters**

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**Resources and Materials**

**(many) Fraction and Decimal Games (text comes with Fraction Bars and Decimal Squares)**  
"Mathematics for Elementary Teachers, An Activity Approach," 9e, McGraw Hill, 2011,  
Bennett, Burton and Nelson

**(Free) Online Fraction Games**

<http://fractionbars.com/>

Also: Links to vendors that sell Fraction Bars ©

**(Free) Online Decimal Games**

<http://www.decimalsquares.com>

Also: Links to vendors that sell Decimal Squares ©

**Fraction Bar Templates**

Linked to ORMATYC website

FractionBarMasterColor.pdf

Color print on white cardstock

**Decimal Square Templates**

*Note: Only tenths and hundredths; if you want to make thousandths, consider making simple cards with decimal number printed on them.*

Linked to ORMATYC website

DecimalSquareMasterColor.pdf

Color print on white cardstock

### Buy Cheap Game (2 players)\*

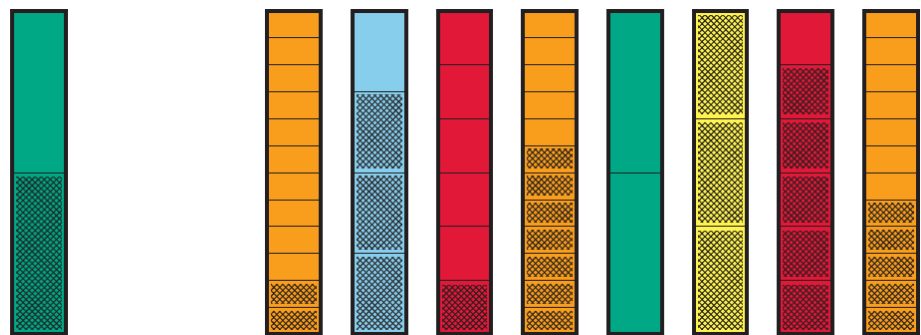
Shuffle one deck of Fraction Bars, deal each player eight bars, and set the unused bars aside. Player A lays down one bar face up and names the fraction on his or her bar. Player B lays down a bar and names the fraction on his or her bar. If the shaded amount of Player B's bar is greater than or equal to that on Player A's bar, Player B wins both bars (and sets them aside). Otherwise, Player A wins the bars. This is the end of the first play. The player who won the two bars begins the next play.

When the players have both used their eight bars, deal eight more bars from the unused bars to continue the game. After all of the bars have been played, the player with the most bars wins.

*Variation:* For 3 players, deal five bars to each player and adjust the rules accordingly.

**Example:** For the bars shown here, the second player can win two bars by playing any of the bars for the fractions

$$\frac{3}{4}, \frac{7}{12}, \frac{3}{3} \text{ or } \frac{5}{6}$$



**First bar played    Second player's eight bars**

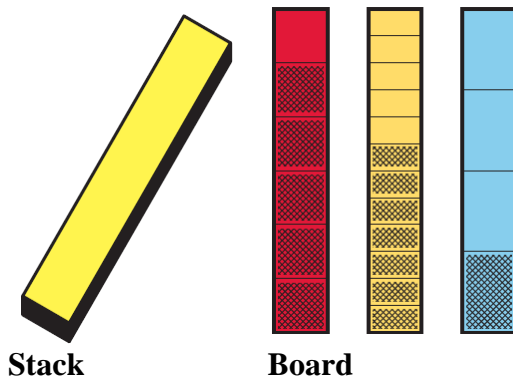
- Play at least one full Buy Cheap game.
- What is the best bar for the second player to play in the example on the previous page? (Hint: Why is this game called Buy Cheap?)
- Suppose Player 2 in the example started the game. Explain why it might not be a good strategy to start the game by laying down the zero bar.

\* From: "Mathematics for Elementary Teachers, An Activity Approach, 9e," McGraw Hill, Bennett, Burton and Nelson

### Match Game (2 to 4 players)<sup>†</sup>

Shuffle one deck of Fraction Bars, and turn three bars face up to form the beginning of the Board. Place the remaining bars face down to form the Stack. Each player, in turn, takes the top bar from the Stack and compares it to the bars on the Board. On a player's turn, he or she has three options and can pick up all of the bars that match one or more of these options:

- If his or her Stack bar has the same shaded amount as one of the bars on the Board, the player wins the two bars;
- If the shaded amount of his or her Stack bar equals the sum of the shaded amounts of two bars on the Board, the player wins the three bars; or
- If the shaded amount of his or her Stack bar equals the difference between the shaded amounts of two bars on the Board, the player wins the three bars.



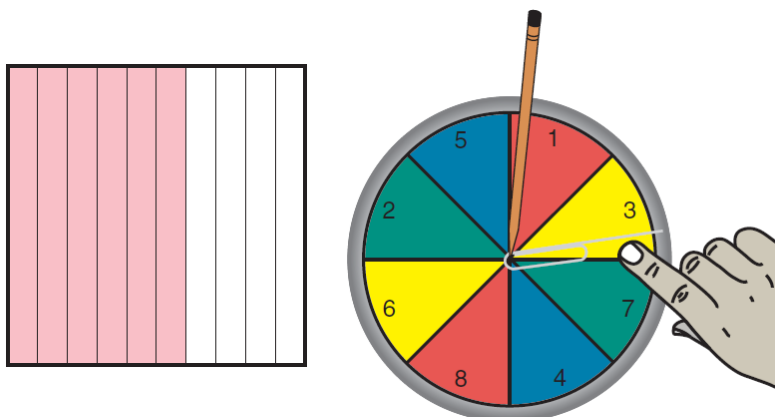
If a player wins two or three bars, he or she continues by taking another bar from the Stack and plays again; if not, the player places his or her Stack bar on the Board and the player's turn ends. As play progresses; turn up new bars from the Stack so there are always at least three bars on the Board. After each bar in the Stack has been used, the player with the most bars wins. Stack Board

- a. Play at least one full game of Match.
- b. Using fractions from the Match game, write four equality sentences that demonstrate the following option: The shaded amount of one bar equals the same shaded amount as another bar.
- c. Using fractions from the Match game, write four addition sentences that demonstrate the following option: The shaded amount of one bar equals the total shaded amounts of two bars.
- d. Using fractions from the Match game, write four subtraction sentences that demonstrate the following option: The shaded amount of one bar equals the difference between the total shaded amounts of two bars.

<sup>†</sup> From: "Mathematics for Elementary Teachers, An Activity Approach, 9e," McGraw Hill, Bennett, Burton and Nelson

## Lucky Twenty-One Game (2 to 4 players)<sup>‡</sup>

Shuffle one deck of Decimal Squares and place them face down. Each player in turn selects a square, writes the decimal of its shaded amount, spins the spinner, and writes the product of the number on the spinner times the decimal. The player's score for the turn is the product rounded to the nearest whole number. The first player with a total score of 21 or more wins.



$$.6 \times 3 = 1.8 \approx 2$$

### Double or Nothing Option:

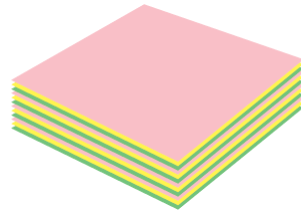
A player may say "double or nothing" before selecting a square. If .6 or more of the square is shaded, the score the player receives for the round is doubled. However, if the square has less than .6 shaded, the player loses his or her turn.

- Play at least one Lucky Twenty-One game. This game should be played without a calculator.
- What is the smallest product you can obtain using your deck of Decimal Squares and 1-to-8 Spinner? What is the corresponding score? List three cards and spinner numbers for which you will get this score.
- What is the largest product you can obtain using your deck of Decimal Squares and 1-to-8 Spinner? What is the corresponding score? List the cards and spinner numbers for which you will get this score.
- Is Double or Nothing a good strategy? Explain.

<sup>‡</sup> From: "Mathematics for Elementary Teachers, An Activity Approach, 9e," McGraw Hill, Bennett, Burton and Nelson

## Greater Quotient Game (2 to 4 players)<sup>§</sup>

Shuffle one deck of Decimal Squares and place all of them face down to form the Draw pile. During each round, each player takes two squares from the Draw pile. The player obtaining the greatest possible quotient by dividing one of the decimals by the other wins the round. The first player to win three rounds wins the game.



**Draw**

**Chance Option:**

Each player has the option of replacing one of their Decimal Squares by discarding a square and drawing a new square from the Draw pile.

- a. Play at least one Greater Quotient game.
- b. What is the greatest quotient you can obtain using the deck of Decimal Squares?
- c. What is the least quotient you can obtain using the deck of Decimal Squares (if you are trying to actually win the round)?
- d. Give an example of two Decimal Squares where the best strategy is to replace a square with the Chance option. Explain.

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<sup>§</sup> From: "Mathematics for Elementary Teachers, An Activity Approach, 9e," McGraw Hill, Bennett, Burton and Nelson