

# Fractions in Action

**Grade Level:** Fourth Grade

**Presented by:** Rhonda Alfano, Challenge Charter School, Glendale, Arizona

**Length of Unit:** 8 Lessons

## I. ABSTRACT

The purpose of “Fractions in Action” is to combine the Core Knowledge content on fractions with hands on learning activities. This is an introductory unit on fractions and how they can be modified. The fraction activities in this unit are designed to work together with textbook work. Since students learn in different ways it is necessary to use different strategies when teaching math. A variety of hands on activities have been included, such as Cuisenaire rods, fraction bars, recipes and games. Assessment will be based on work the students complete for each activity, and work they complete in their textbook.

## II. OVERVIEW

### A. Concept Objectives

1. Students will create fractions using Cuisenaire rods and fraction bars.
2. Students will be able to identify fractions by playing a game.
3. Students will identify equivalent fractions using fraction bars.
4. Students will determine equivalent fractions using the Farm Fresh Fractions worksheet.
5. Students will review equivalent fractions by playing a game where they have to solve equivalent fraction equations.
6. Students will play a game to help them understand how to create mixed numbers from improper fractions.
7. Students will create fractions in the lowest terms using fraction bars.

### B. Core Knowledge Content

1. Fractions as rational numbers
2. Identifying fractions
3. Equivalent fractions
4. Mixed Numbers
5. Fractions in the lowest terms

### C. Skills to be Taught

1. The students will begin to recognize fractions.
2. Students will be able to identify equivalent fractions.
3. Students will create mixed numbers from improper fractions.
4. Students will put fractions into the lowest terms.

## III. BACKGROUND KNOWLEDGE

### A. For Teachers:

1. Hirsch Jr., E.D. What Your Fourth Grader Needs to Know. New York: Doubleday, 1992. ISBN 0-385-4118-9
2. Any textbook or materials that contains the concepts addressed in this unit.

### B. Students' Prior Knowledge

1. Addition
2. Subtraction
3. Multiplication
4. Division with remainders
5. Patterning

#### IV. RESOURCES

- A. Alfving, Albert M., et al (1987). Fun with Foods: A Recipe for Math and Science. AIMS Activities Grades 5-9. AIMS Education Foundation: Fresno, California. ISBN 1-881431-07-X
- B. Fennell, Francis et al (1988). Mathematics: Unlimited Student Resource Book. Holt, Reinhart & Winston, Inc: Austin, Texas. ISBN 0-03-021719-9.
- C. Hugel, Bob (1998). Secret Code Math. Scholastic: New York. ISBN 0-590-64459-9.
- D. Lichtenberg, Troutman (1995). Mathematics a Good Beginning, 5<sup>th</sup> Ed. International Thompson: Pacific Grove, California. ISBN 0-534-21948-9.
- E. Michel, Margaret (ed.), (1995). The Best of Teacher's Helper: Math 4-5. The Education Center, Inc: Greensboro, North Carolina. ISBN 0-03-021719-9.
- F. Silbert, Jack (1997). Brain-Boosting Math Activities Grade 4. Scholastic: New York. ISBN 0-590-06544-0.
- G. Utah Council Teachers of Mathematics (1990). "Fourth-Sixth Grade Math Activities."

#### V. LESSONS

##### **Lesson One: Introduction to Fractions**

- A. *Daily Objectives*
  1. *Lesson Content:*
    - a. Fractions as rational numbers.
  2. *Concept Objective:*
    - a. Students will create fractions using Cuisenaire rods and fraction bars.
  3. *Skill Objective:*
    - a. The students will begin to recognize fractions.
- B. *Materials:*
  1. Cuisenaire Rods
- C. *Key Vocabulary:*
  1. Fraction
  2. Numerator
  3. Denominator
  4. Whole number
- D. *Procedures and Activities:*

For this lesson the students will be determining fractions using Cuisenaire rods in groups and fractions bars independently.

  1. Divide students into groups of four.
  2. Distribute several different Cuisenaire rods to each group of students.
  3. Ask the students to find a half of the orange rod. Gives students a moment to find the correct rod. Wait to make sure each group finds the correct rod and have one explain how they found the correct rod. Ask the students how many of the yellow rods it takes to make one orange rod.
  4. Continue asking these questions to the students. Change the fraction you are using. Have the students find a third of the blue rod. When each group has found the correct rod ask them how many of the light green rods did it take to equal one blue rod. Continue this type of questioning up to the tenths.
  5. When the students have mastered finding a fraction, introduce what the fraction looks like. Go back to the orange rod. Ask, "How many yellow rods did it take to make an orange rod?" Explain that since it takes two yellow rods to equal an orange rod than each yellow is worth one half or one yellow rod out of two.

Write  $\frac{1}{2}$  on the chalkboard. Continue doing this until they understand the concept.

6. Ask the students, “how much is the light green rod worth?” Make sure their answers are in the form of one third or one fourth.

E. *Assessment:*

Walk around the groups and make sure all students are on task. This is only an introduction to the unit so more assessment will take place throughout the unit.

## **Lesson Two: Identifying Fractions**

A. *Daily Objectives*

1. *Lesson Content:*
  - a. Identifying fractions
2. *Concept Objective:*
  - a. Students will be able to identify fractions by playing a game.
3. *Skill Objective:*
  - a. Students will be able to identify fractions.

B. *Materials:*

1. “Conquer the Colonies” game board (Appendix A) copied onto overhead film for each pair of students
2. Directions for “Conquer the Colonies” (Appendix B)
2. 2 overhead markers for each pair of students
3. Soft Cloth (1 per player)

C. *Procedures and Activities:*

For this lesson students will play a game in pairs that will allow them to identify fractions.

1. Review with the students the Cuiesenaire rods from the last lesson.
2. After review and questions have been answered, explain to the students that they will be playing a game to help them to better understand fractions.
3. Pass out the materials to each pair of students.
4. Explain the directions to the students.
5. *Directions:*
  - a. The player spins the spinner.
  - b. If the spinner lands on a fraction with a plus (+) sign they may begin filling in the first circle located in Georgia.
  - c. If the spinner lands on a fraction with the minus sign (-), the player must erase that fractional part. If the player has not filled in a circle yet, they may not go until they spin a plus (+) sign.
  - d. The students continue to move up through the thirteen colonies.
  - e. Whoever fills in all of the fractional circles first is the winner.

D. *Assessment:*

After the game has been played review with the students what they learned from the game. Students will be assessed at the end of the unit using a formal test.

## **Lesson Three: Equivalent Fractions**

A. *Daily objectives*

1. *Lesson Content:*
  - a. Equivalent fraction
2. *Concept Objective:*
  - a. Students will identify equivalent fractions using fraction bars.
3. *Skill Objective:*
  - a. Students will be able to identify equivalent fractions.

B. **Materials:**

1. Cuisenaire Rods
2. Sheet of fraction bars
3. Mathematics: A Good Beginning
4. Ruler or 1 inch piece of a manila folder
5. Scissors
6. Baggies

C. *Vocabulary:*

1. Equivalent

D. *Procedures and Activities:*

In this lesson the students will be using the fraction bar sheets to review simple fractions and to identify equivalent fractions. The students will cut out their own fraction bars to use throughout the unit.

1. Distribute the Cuisenaire Rods according to lesson 1. Review with the students the concepts learned in lesson 1.
2. Next, give each student a fraction bar sheet and a ruler or strip of manila folder.
3. Individually, have the students line up the their strips on the  $\frac{1}{2}$  line on their fraction bars. Ask the students, "How many of the fourths does it take to make a half?" Continue with this type of questioning with sixths, eighths, twelfths, and twenty fourths. When students find the equivalent fractions, write the number sentence on the chalkboard, such as  $\frac{1}{2} = \frac{2}{4}$ .
4. When students have grasped this concept have the students find all of the equivalent fractions they can find for  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{6}$ ,  $\frac{1}{8}$ , and  $\frac{1}{12}$  on a sheet of paper.
5. The students will need to cut out their fraction bars next. Emphasize that is very important that they cut each bar on the line, or else they will not fit together.
6. When they have completed the activity put the pieces in the Baggies.

E. *Assessment:*

Assessment will be based on the equivalent fractions they find using the fraction bars.

**Lesson Four: Equivalent Fractions**

A. *Daily Objectives*

1. *Lesson Content:*
  - a. Equivalent fractions
2. *Concept Objective:*
  - a. Students will determine equivalent fractions using the Farm Fresh Fractions worksheet.
3. *Skill Objective:*
  - a. Students will be able to identify equivalent fractions.

B. *Materials:*

1. Brain Booting Math Activities: Grade 4 by Jack Silbert
2. Handout page 44
3. Crayons or colored pencils
4. Fraction Bars

C. *Vocabulary:*

1. Equivalent

D. *Procedures and Activities:*

The students will first determine the fractions in the handout. The students will then determine equivalent fractions using those same fractions.

1. Review fractions and equivalent fractions using the fraction bars that were cut out in the last lesson.
  2. Have the students complete the handout on Farm-Fresh Fractions.
  3. After all students have this completed ask them to find equal parts of the calves and horses. Explain that since each of these is worth  $\frac{1}{2}$  then  $\frac{1}{2}$  and  $\frac{2}{4}$  are equivalent or the same.
  4. Have the students find a third of the chicks and a third of the birds. Again explain that  $\frac{1}{3}$  is equivalent to  $\frac{2}{6}$ .
  5. Next, have the students find their own equivalent fractions using the pictures on the handout.
- E. *Assessment:*  
Students will be evaluated on their participation in the activity and on the completion of the activity. Students will also choose their own rhyme such as the rhymes found in this activity.

### **Lesson Five: Equivalent Fractions**

- A. *Daily Objectives:*
1. *Lesson Content:*
    - a. Equivalent fractions
  2. *Concept Objective:*
    - a. Students will review equivalent fractions by playing a game where they have to solve equivalent fraction equations.
  3. *Skill Objective:*
    - a. Students will be able to identify equivalent fractions.
- B. *Materials:*
1. "The Fractions are Coming, The Fractions are Coming" game board for every 2-4 players (Appendix C)
  2. Directions for "The Fractions are coming, The Fractions are Coming" (Appendix D)
  2. 1 die for every 2-4 players
- C. *Activities and Procedures:*  
Students will become more familiar with equivalent fractions by playing the game "The Fractions are Coming, The Fractions Are Coming."
1. Review equivalent fractions with the students using fraction bars.
  2. After review and questions have been answered, explain to the students that they will be playing a game to help them understand equivalent fractions.
  3. Pass out the materials to each group of students.
  4. Give the students the directions to the game.
    - a. The person who rolls the highest number will go first.
    - b. Players roll the die, moves the appropriate number in the equivalent number of spaces on the board.
    - c. If a player cannot supply the correct number, he/she must return to his previous space.
    - d. If the player is correct, he/she may remain on the space.
  5. Give the students approximately 20 to 30 minutes to play the game.
- E. *Assessment:*  
After the game has been played discuss the outcome with the students. Students will be assessed on their participation in the game and the discussion.

## **Lesson Six: Mixed Numbers**

### A. *Daily Objectives:*

1. *Lesson Content:*
  - a. Mixed Numbers
2. *Concept Objective:*
  - a. Students will play a game to help them understand how to create mixed numbers from improper fractions.
3. *Skill Objective:*
  - a. Students will create mixed numbers from improper fractions.

### B. *Materials:*

1. “Tea Totalers” game board for each group of 2-4 students (Appendix E)
2. Directions for “Tea Totalers” (Appendix F)
3. Barrels (Appendix G)
4. Fraction Bars

### C. *Vocabulary:*

1. Improper fraction
2. Mixed number

### D. *Activities and Procedures:*

After a lesson on how to make a mixed number from an improper fraction, students will create mixed numbers from improper fractions by playing a game.

1. Write an improper fraction on the board and have them try to figure out what is wrong with the fraction.
2. When somebody figures out that the bigger number is the numerator, explain that this fraction is called an improper fraction.
3. Write a mixed number on the board. Explain that this is a mixed number. Have them find a mixed number using their fraction bars.
4. Explain to the students how it is possible to change an improper fraction to a mixed number by dividing the denominator by the numerator.
5. Give many examples on the board then have the students practice on their own.
6. When all questions have been answered, explain to the students that they will be playing a game to help them understand mixed numbers.
7. Pass out the materials to each group of students.
8. Explain to the students the directions to the game.
  - a. The player that rolls the largest number goes first.
  - b. Each player rolls the die and moves that number of spaces.
  - c. Next, tell the equivalent mixed number to the improper fraction on the space.
  - d. If correct, the player earns barrels of tea equal to the whole number portion of the mixed number.
  - f. When the players reach the finish line, the player with the most barrels of tea is declared the winner.
9. Give the students about 30 minutes to play the game.
10. After the students have finished, discuss the game and what they learned.

### E. *Assessment:*

Students will be assessed on their participation in the game and discussion.

## **Lesson Seven: Fractions in the Lowest Terms**

### A. *Daily Objectives:*

1. *Lesson Concept:*

- a. Fraction in the lowest terms
2. *Content Objective:*
  - a. Students will create fractions in the lowest terms using fraction bars.
3. *Skill Objective:*
  - a. Students will put fractions into the lowest terms.
- B. *Materials:*
  1. Fraction pieces
  2. Recipes with amounts given as fractions, which are not in their lowest terms or improper fractions
- C. *Vocabulary:*
  1. Lowest terms
  2. Reducing
- D. *Activities and Procedures:*

Students will be finding the lowest term of a fraction using fraction pieces.

  1. Hand out the fraction pieces to the students.
  2. Review equivalent fractions with the students.
  3. Ask the students to find the fraction  $\frac{6}{12}$ .
  4. After they have found the fraction ask them to find the equivalent fraction to  $\frac{6}{12}$  that takes up the least pieces.
  5. Explain to the students that this is called a fraction in the lowest terms.
  6. Continue doing this until the students get the right idea.
  7. Explain to the students the mathematical way to put a fraction in the lowest terms.
  8. Give each student a copy of the recipes.
  9. Explain that they need to put each fraction in the recipe in the lowest terms.
- E. *Assessment:*

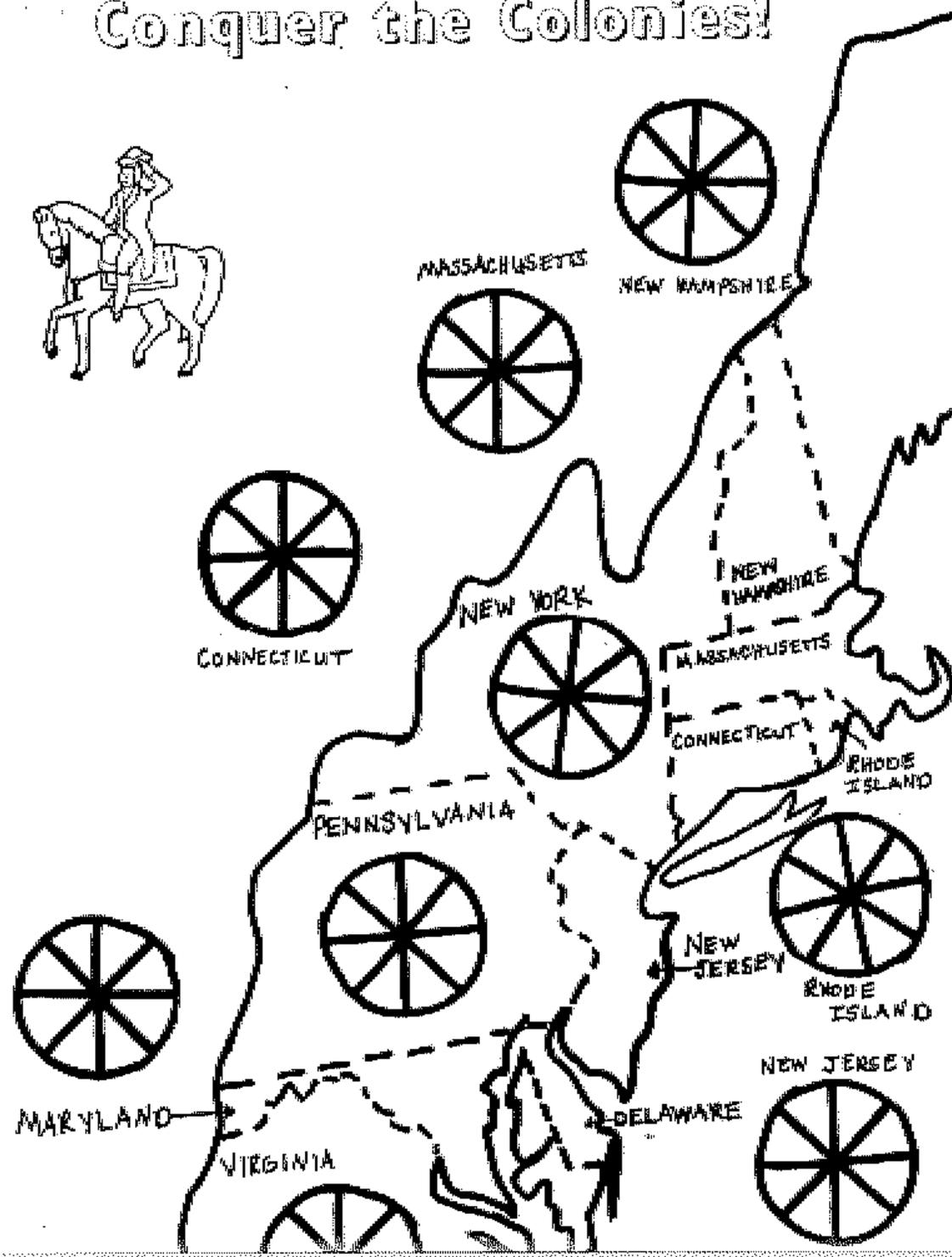
Students will be assessed on their participation in the activity and the completion of the recipe sheet.

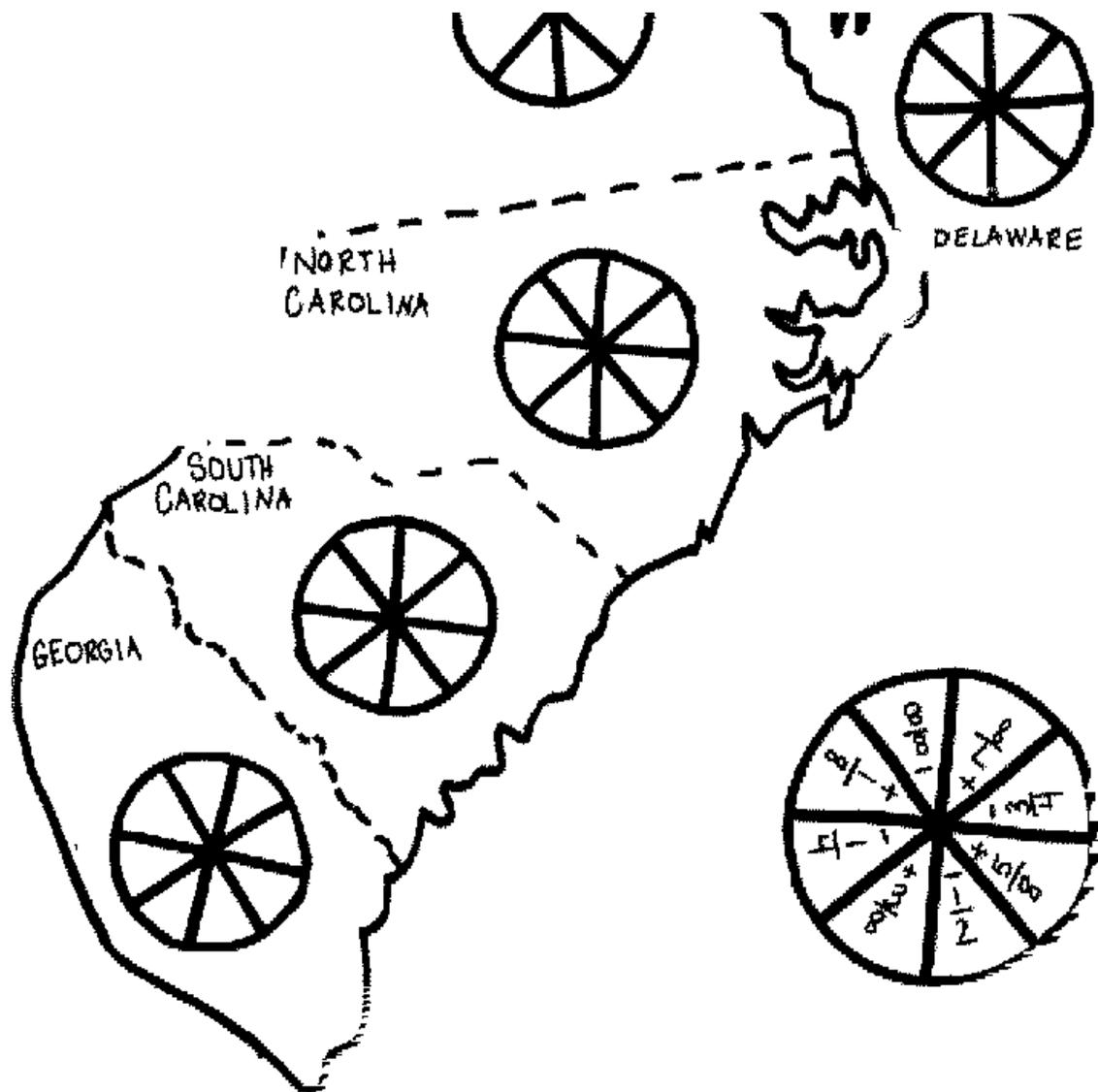
## **VI. CULMINATING ACTIVITY**

- A. Students will make one of the recipes found in this unit for each student in the class.

## **VII. HANDOUTS/WORKSHEETS**

# Conquer the Colonies!



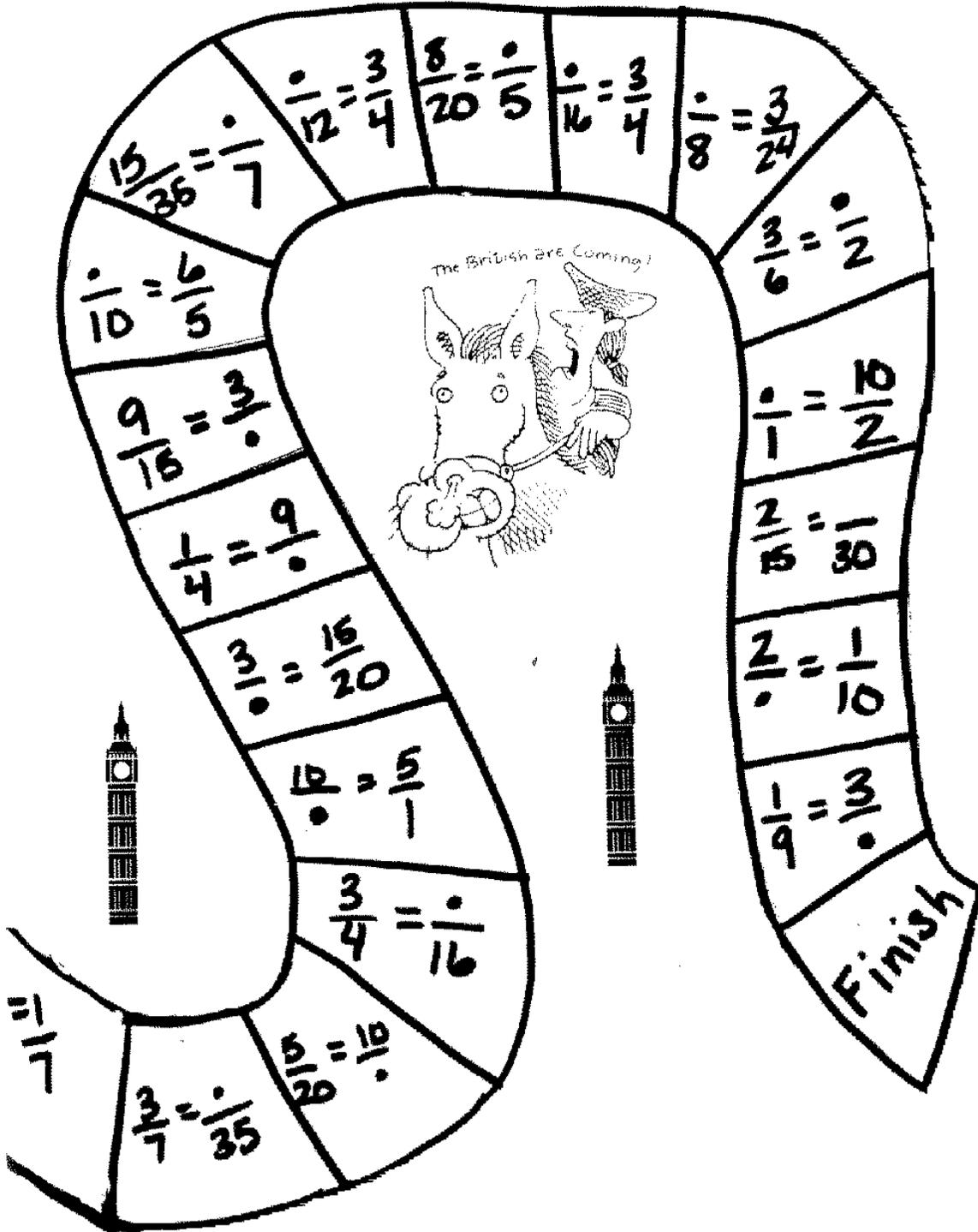


# Conquer the Colonies!

1. The first player spins the spinner.
2. If the spinner lands on a fraction with a plus (+) sign they may begin filling in the first circle located in Georgia.
3. If the spinner lands on a fraction with the minus sign (-), the player must erase that fractional part. If the player has not filled in a circle yet, they may not go until they spin a plus (+) sign.
4. The players continue to move up through the thirteen colonies.
5. Whoever fills in all of the fractional circles first is the winner.



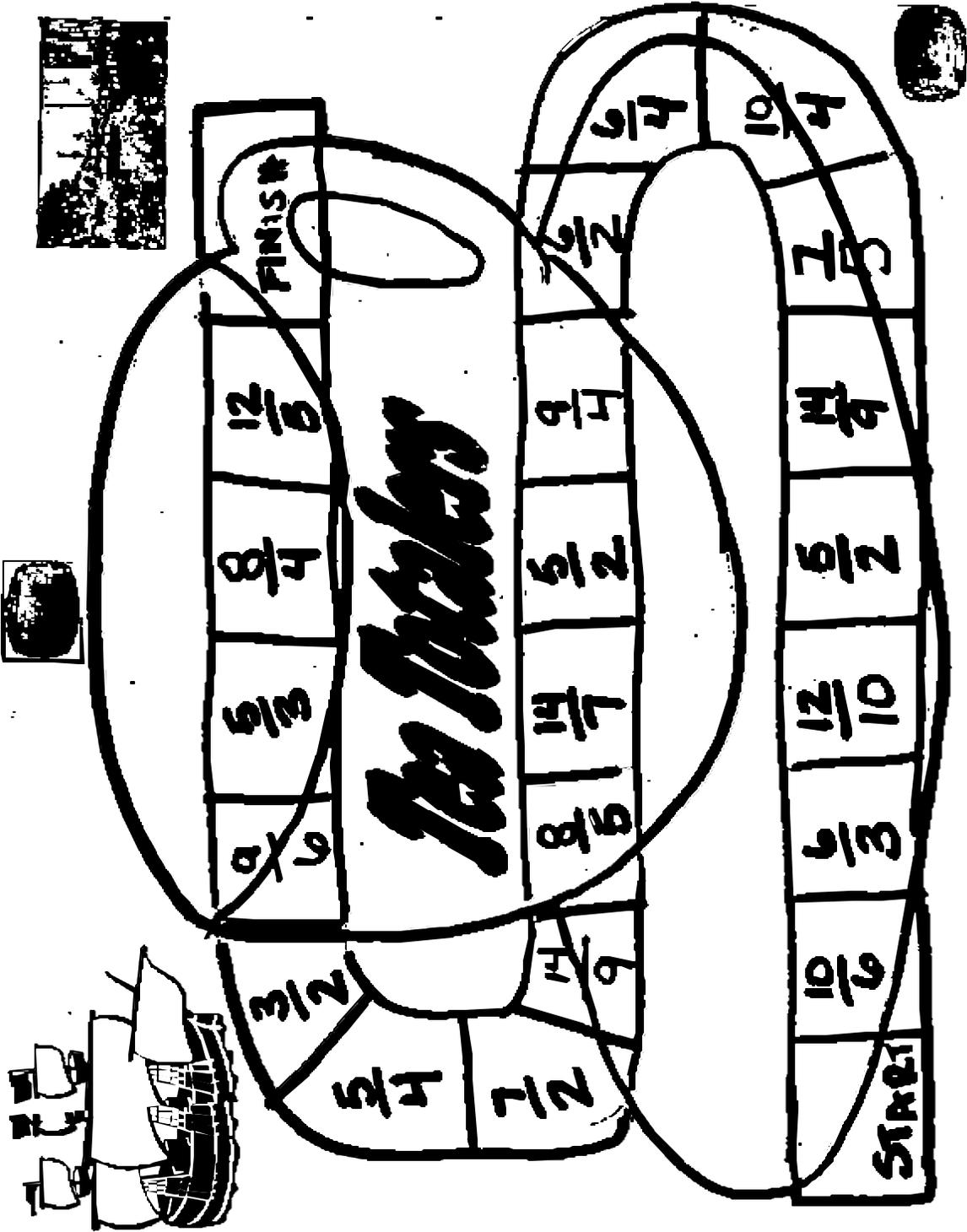
Appendix C: Fractions in Action



# **The Fractions Are Coming, The Fractions Are Coming!**

1. The person who rolls the highest number will go first.
2. Players roll the cube, moves the appropriate number in the equivalent number of spaces on the board.
3. If a player cannot supply the correct number, he/she must return to his previous space.
4. If the player is correct, he/she may remain on the space.
5. Whoever reaches the end first wins!

Appendix E: Fractions in Action



# Tea Totalers

1. The player that rolls the largest number goes first.
2. Each player rolls the die and moves that number of spaces.
3. Next, tell the equivalent mixed number to the improper fraction on the space.
4. If correct, the player earns barrels of tea equal to the whole number portion of the mixed number.
5. When the players reach the finish line, the player with the most barrels of tea is declared the winner.

Appendix G: Fractions in Action

