Lesson Title: Fraction Rocket Race Game
Grade: 4

Math enduring understandings:

1. Fractional parts are equal shares with equal measurements of the whole or unit.
2. Fractions indicate a quantity and can be compared to another quantities.
3. The top number of a fraction is the counting number. It tells how many things we have. It tells how many have been counted. It tells how many parts are being considered. It counts the parts.
4. The bottom number tells what is being counted. It tells what fractional part is being counted.
5. Fraction symbols say how many and what.

Content Standard(s) – Grade 4
N.F.A.1 and N.F.A.2 Number & Operations-Fractions
Extend understanding of fraction equivalence and ordering.

1. Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
2. Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as ½. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

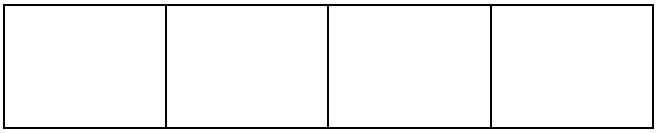
Materials: Rocket (a piece of paper and a straw for each student, crayons, masking tape.)
http://www.instructables.com/member/Childrens+Museum+of+Houston/ is a link to a video that teaches kids how to construct the rocket.
Electrical Tape for the floor to construct the Game Board, clip boards, paper to record and write.

1. **Shared experience:**

Object: To be the be the players who's rocket travels the farthest distance or the person who scores the most points.

Set-up: Students will construct 3 game boards that the 4 yards long. The hallway tiles are 3 square feet each. Using 4 tiles the students will construct a game board with a start and a finish.

Ex. Game board #4

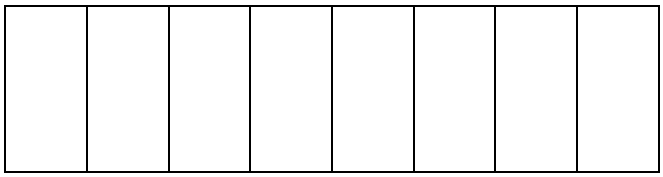


Note: The rocket will be estimated to the closest fractional line and rounded down. The students will compete against one another comparing the distance the rockets travel in each game. Students should make decisions about how to keep score. Making the first line 0pts, the second line 1pt, third line 2pts, and fourth line 3pts, and the fifth line 4pts creates a nice transition to 1/4th of the way on the game board or a 4th of a point, or ½ of the game board or a ½ of a point. It is not necessary for students to be told they are working on fractions. They often discover this as they play.

Play: Students take turns shooting the rockets from the starting line. A record of the location of where the rocket lands should be recorded by each observer.

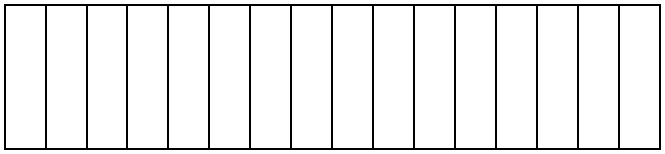
After playing game board #4, ask the students how they could create a game board that could be more accurate or fair. The students are likely to provide several answers. Cutting each of the four squares in half will create game board #8 After adding the divisions, the students can play again or recalculate the score.

Ex. Game board #8



Ask again, how can we make it even more accurate or fair?

Ex. Game board#16



Picture or model
Students will be asked to draw on whiteboards representation of the game board and the positions of their rocket.

People talk
Students will discuss the position of the rocket in each game. Students may answer the questions:
How can we describe the location of one rocket as compared to another rocket within the same game?
How can we describe the location of one rocket as compared to another rocket within different games?

Feature talk

The students will compare the location of the rockets and the distance the rocket traveled in relationship to each game board.

Math concepts that may emerge:
scale, count, tick marks, length, distance from zero, distance between, opposite direction, numbers plotted on the number line, each rocket has it's on location, each number has a definite location and each decimal or fraction has a definite location, greater than, less than, equal to, represent, variables, changes, comparisons.

Symbolic representation
Students will use symbols to represent both the numerator and the denominator of a fraction.
The numerator is the position of the rocket and the denominator is the type of game board they played on. Playing the game on multiple game boards creates a discovery opportunity to understand equivalent fractions and compare the location of one rocket as compared to another. Students may use traditional symbols for fractions or may create their own.

Extensions/Reteaching/What To Do Next:

After playing this game several times, students are able to transition to lessons such as

GoMath. (2015). *Teacher Edition Chapter 6 Grades 4.* Houghton Mifflin Publishing Company: Orlando Florida
Lesson 6.1 Equivalent Fractions: page 328 in the students book and Lesson 6.2 Generate Equivalent Fractions: page 333 in the students book. Lesson 6.4 Common Denominators: pages 347-350 in the students book Lesson 6.6 Comparing Fractions Using Benchmarks: pages 359-364 in the student book.

Teacher reflection: During discussion the game board will be referred to as game board #4, game board #8, game board # 16. This is important when helping students understand the concept of the denominator. The location of each rocket on the game board will represent the numerator. Ex. I scored a 3 in game board #4, Jon scored a 4 in game board # 8. Explain who won?

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Rocket Template