FRACTION POWER

People have been using math principles for thousands-even millions-of years. Their use is spread across countries and continents; whether sailing a boat off the coast of Japan or building a house in Peru, math principles are used to get things done.

How can math be so universal? First, human beings didn't invent math concepts; we discovered them. Also, the language of math is numbers, not English or German or Russian. If we are well versed in this language of numbers, it can help us make important decisions and perform everyday tasks.

One essential math concept is fractions. Because we know about fractions, we are able to fix a tasty meal, travel around our neighborhood, arrive at school on time, buy our favorite toy or share a treat with our friends.

This lesson will use the hands-on activity of constructing a dry cookie mix to explore the math principles of fractions and highlight the importance of fractions in daily life. Each recipe makes a dozen cookies. After this activity you can challenge your students by asking them to convert the recipe to make two or more dozen cookies or just six cookies.

Introduce the importance of fractions in daily life. With the students' help, make a list of ways that fractions are used every day, and tell why fractions are essential for each task. Some suggestions are:

Clock—knowing about three quarter, half and quarter hours make it possible to tell time

Gas gauge in automobiles—tells how much fuel is left so vehicle does not run out of gas

Money—allows people to compute cost and pay for goods and services

Cooking—need to know fractions so recipes will taste good.

Here are some activities with fractions you may want to utilize.

Critter Crawl

1. Tell students that you have invented a totally new unit of measurement called the "critterfoot". It is the distance that a creepy crawly critter can squirm, slither or slide in one minute. Tell them that they are going to spend some time investigating it now.

2. Distribute one 2" x 11" (approximately) strip of paper to each student.

3. Ask students to fold the paper in half, then unfold and look at the crease that was formed. Talk about the fact that the critterfoot is now in 2 parts. If a critter walked to the fold and stopped, he would only have walked over 1 of the 2 parts (1/2) of the distance.

4. Ask them to write the fraction 1/2 on the fold, near the edge of the paper.

5. Fold the strip of paper back into halves, then fold it again. Ask students to open the paper and observe that it is now divided into 4 sections.

6. Write the fractions 1/4, 2/4, 3/4 on the appropriate folds. Write 2/4 below the 1/2 that is already written there.

7. Repeat the process twice more, dividing the piece of paper into eighths (1/8s) and sixteenths (1/16s).

8. When writing a new fraction on a fold that already has one or more fractions written on it, ask the students to write the new fraction below the previous one(s).

9. After all the fractions are written, tell students that those written on the same fold are *equivalent fractions*. Discuss what the term *equivalent* means using the questions below as a guide:

> What happened when you folded the paper?
> Were some of the folds the same for halves, fourths, eights and sixteenths?
> Each fraction has a different name, but some of the names are in the same place. What does that mean?
> If the fractions are the same, does it matter what you call them? Why do you think so?

10. To ensure students' understanding of fractions and equivalencies, pose some problems that they can answer with the help of their critterfoot ruler. Some examples are:

> If Anthony Ant crawled to the 3/4 mark, and William Worm squirmed to 7/8, who walked the farthest?
>
> Christopher Cockroach, Inez Inchworm, and Fezziwig Fly decided to race. They made it to 3/8, 3/16, and 3/4 of a critterfoot, respectively, by the end of the race. Who won the race?
>
> Bobbi Beetle ran to the 3/4 critterfoot line and Earnestine Earwig scurried to the line that marked 12/ 16 in the same length of time. Who traveled farthest? Why do you think that?
>
> Sylvester Silverfish scurried across 4/8 of a critterfoot to get toSally Spider's house. How many different names can you think of that mean the same as 4/8?

Conduct a **Mars Fraction Hunt** using the directions below. This lesson is designed to provide practice in the use of fractions, changing fractions, using equivalent fractions, and paying attention to detailed instructions.

Materials Needed:

A note that says: "Bring this note to my desk to receive your prize of a MARS candy bar for each person in your group."
Three or four MARS candy bars (depending on the size of the groups)
Classroom globe (on a small stand or cradle)
One copy of Fraction Hunt (pages12-13) for each student.

1. Before the activity, hide the note above under the classroom globe.

2. Divide the class into groups of three or four students.

3. Tell students that they will be using their fraction skills to decode the hidden message on the activity sheet. Each clue forms a new word that is part of the clue. When all the words are decoded, the first group to complete the puzzle can follow the clues to a prize.

4. The ANSWER KEY for the activity is:

FOR THE FIRST ONE TO FINISH THIS THERE WAITS A PRIZE IF YOU USE YOUR HEAD PERIOD CLUE MARS IS DIRECTLY BENEATH THE SOUTH POLE PERIOD GO LOOK

FRACTION HUNT

Complete the clues below to the Fraction Hunt. When you have finished decoding the clues, use them to find your way to the prize.

1. The first half of food + the last quarter of door. _____

2. The last third of hat + the first 2/5 of heavy. _____

3. The second 1/3 of office + the last 1/4 of door + the first 1/3 of street. _____

4. The last half of go + the last 1/2 of done. _____

5. The last 1/8 of elephant + the first 1/5 of order. _____

6. The first 3/4 of fine + the last 3/4 of dish. _____

7. The last 1/6 of cement + the first 3/7 of history. _____

8. The last half of bath + the first 1/3 of end + the last 2/7 of require. _____

9. The first 2/5 of water + the last 3/4 of fits. _____

10. The last 1/6 of Glenda. _____

11. The first 1/3 of principal + the first half of zero. _____

12. The first 1/7 of instant + the first third of fat. _____

13. The first 2/5 of young + the first 1/10 of understand. _____

14. The first 1/4 ugly + the first 1/5 of settlement. _____

15. The first 1/4 of youthful + the last half of pour._____

16. The first 1/4 of hesitate + the last 2/3 of sad. _____

17. The first 1/3 of permanent + the first half of iodine. _____

18. The first 2/6 of clover + the last 2/4 of blue. _____

19. The first 1/4 of Mark + the last 3/5 of stars._____

20. The last 1/4 of Meri + the first 1/5 of Susan._____

21. The first 3/5 of dirty + the last 3/7 of perfect + the first 2/5 of Lynda._____

22. The first 3/4 of bent + the last 2/3 of breath._____

23. The first 1/3 of Thomas + the first 1/8 of Endicott. _____

24. The first 3/5 of sound + the last 2/9 of Aylsworth._____

25. The first quarter of positive + the first two thirds of Lee._____

26. The first 4/9 of periscope + the last 2/5 of blood. _____

27. The first third of get + the second fourth of Jody._____

28. The first half of loud + the last half of book. _____

Hold a school spirit flag design contest in your classroom. Students will use the design grid on page 14 to plan the flag, then complete the entry form on page 15 when it is completed. You may wish to invite a "celebrity" judge to choose one or two finished design winners based on adherence to the design criteria and the creativity shown by the students.

This activity may be completed as an individual or group project.

Before beginning the activity, read through the flag design instructions on page 14 with the students. Discuss how to determine how many squares of each color will be needed. Discuss ways that students can combine portions of squares to create whole squares. (Coloring 2 different squares 1/2 blue counts as 1 whole blue square.)

Then read through the entry form (p15) with students. Recommend that students use complete sentences to answer the questions on the form. Share the information on the scoring guide with the students, so they will know what is expected. Encourage the students to be creative.

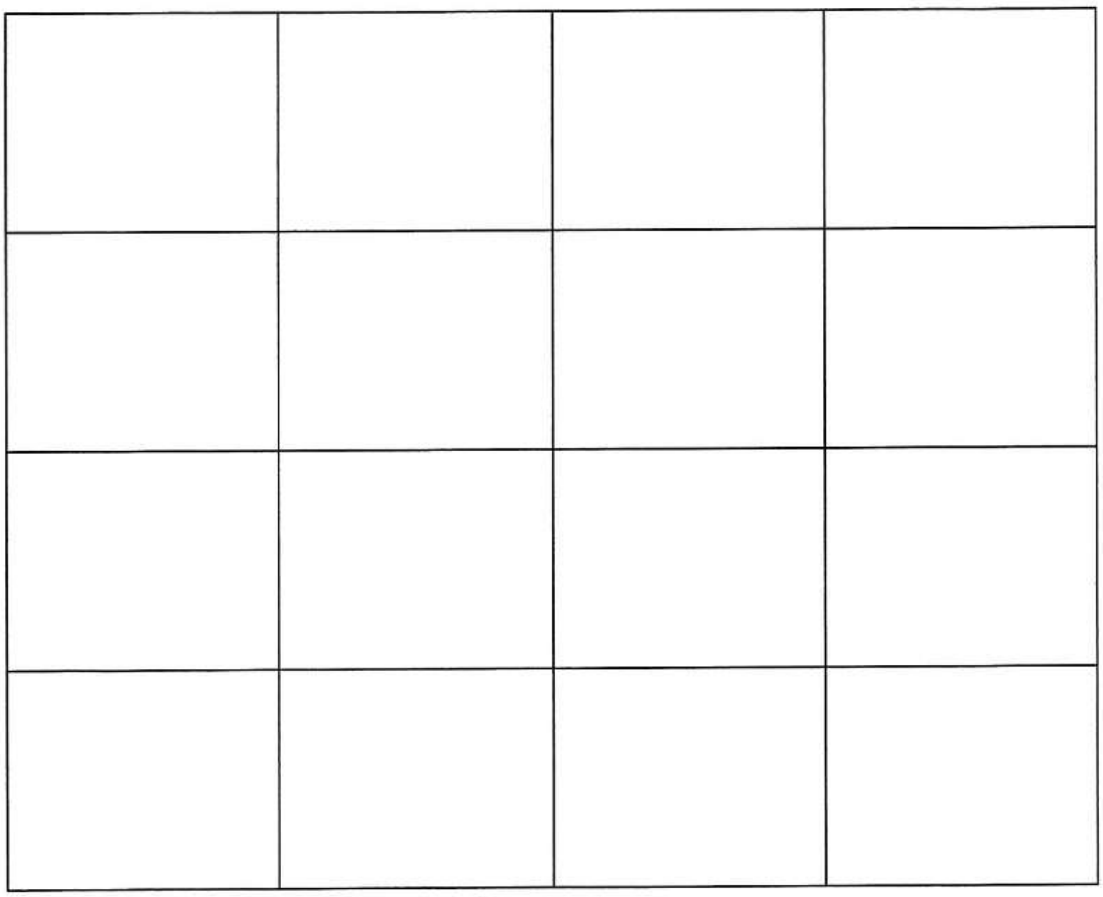
SCHOOL SPIRIT FLAG DESIGN CONTEST

The flags must be designed according to the following rules:

1. You must use 4 colors - no more, no less.
   Color 1 must cover 1/2 of the flag. Color 2 must cover 1/4 of the flag. Color 3 must cover 1/8 of the flag. Color 4 must cover 1/8 of the flag.

2. Your design must be planned on the 16 square grid below.

3. You must complete the entry form on page15



SCHOOL SPIRIT FLAG DESIGN ENTRY FORM

Name _____

What color did you choose for color 1? _____

How do you know that it covers 1/2 of your flag?

_____

What color did you choose for color 2? _____

How do you know that it covers 1/4 of your flag?

_____

How would your flag look different if these fractions were used as color guidelines?

Color 1: 1/4 of the flag
Color 2: 1/4 of the flag
Color 3: 1/4 of the flag
Color 4: 1/4 of the flag

_____
_____
_____

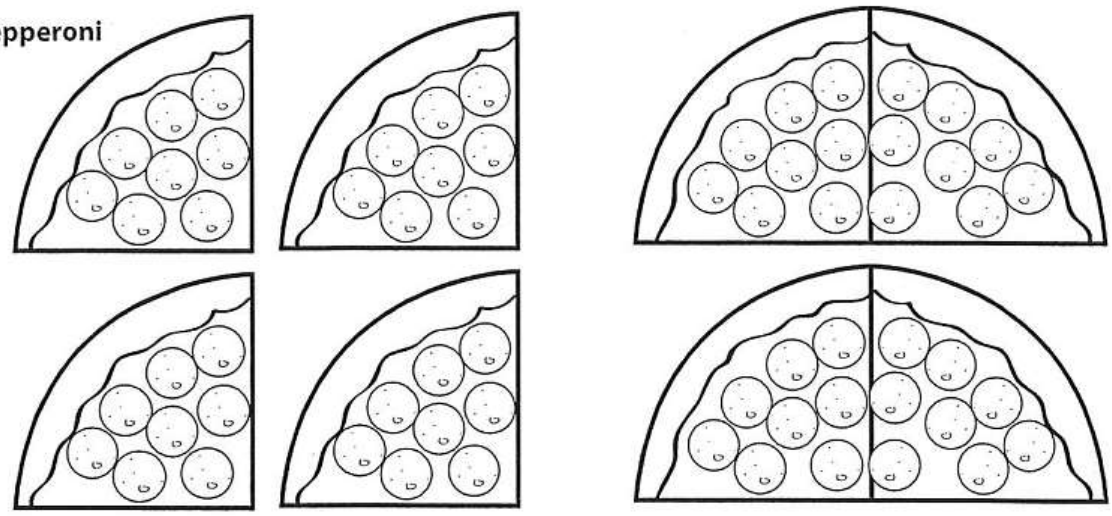
School Spirit Flag Design Scoring Matrix

	3 Points	2 Points	1 Point
Planning Grid	Used grid, design covers all 16 squares	Used grid, design does not cover all 16 squares	Did not use grid for design
Color	Used 4 colors		Did not use 4 colors
Use of Fractions in Creating Design	All colors cover the space specified in guidelines	No more than 1 color fails to cover space specified.	More than 1 color fails to cover space specified.
Entry Form	Form is complete, complete explanations given.	Form is complete, explanations need improvement.	Form is incomplete, explanations need improvement.

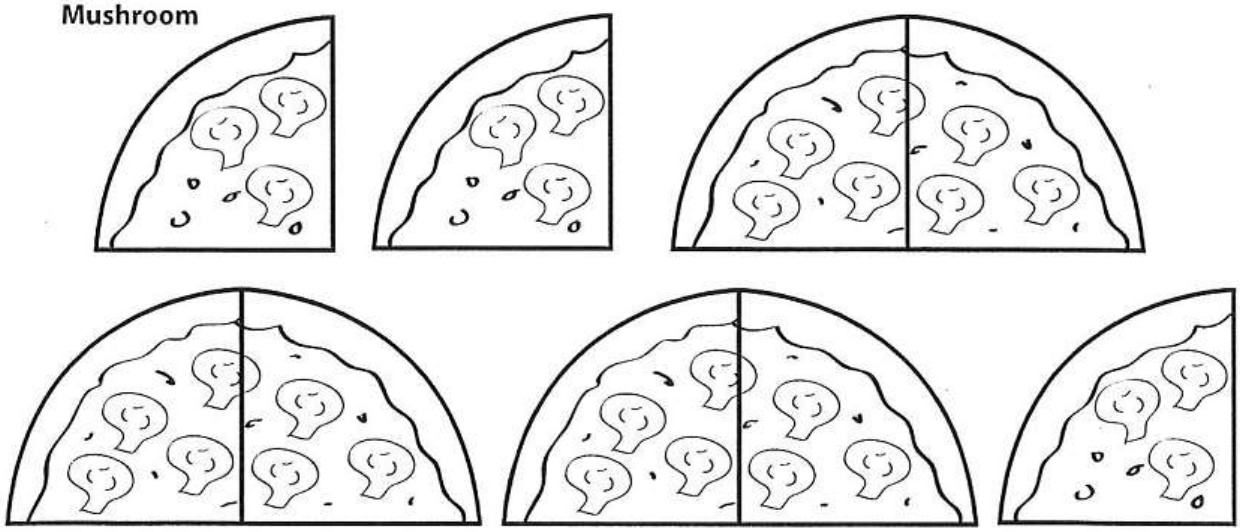
Pizza Mania: Practice Fractions

Cut out the pieces of pizza and glue them to the pizza plate to match the order on the next page.

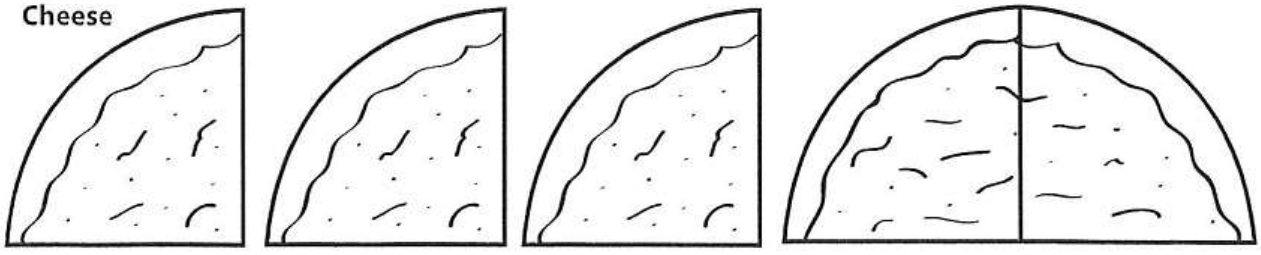
Pepperoni



Mushroom



Cheese



Pizza Mania: Practice Fractions

$\frac{1}{2}$ of pepperoni

$\frac{1}{2}$ of mushroom

$\frac{1}{4}$ of pepperoni

$\frac{1}{2}$ of mushroom

$\frac{1}{4}$ of cheese

$\frac{2}{4}$ of pepperoni

$\frac{2}{4}$ of mushroom

$\frac{1}{2}$ of cheese

$\frac{1}{2}$ of mushroom

Make your own pizza!
Figure out the toppings,
then write down the fractions.

Recipe:

_____

_____

_____

FRACTION POWER

Name : _____ Score : _____

Teacher : _____ Date : _____

What is the Fraction of the Shaded Area ?

1)  _____

2)  _____

3)  _____

4)  _____

5)  _____

6)  _____

7)  _____

8)  _____

9)  _____

10)  _____

Shade the Figure with the Indicated Fraction.

11)  $\frac{3}{8}$

12)  $\frac{2}{8}$

13)  $\frac{1}{5}$

14)  $\frac{2}{4}$

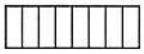
15)  $\frac{4}{8}$

16)  $\frac{6}{8}$

17)  $\frac{2}{5}$

18)  $\frac{2}{5}$

19)  $\frac{4}{5}$

20)  $\frac{1}{8}$

FRACTION POWER

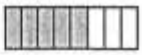
Name : _____ Score : _____

Teacher : _____ Date : _____

What is the Fraction of the Shaded Area ?

1)  $\frac{3}{5}$

2)  $\frac{1}{4}$

3)  $\frac{5}{8}$

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

5)  $\frac{1}{2}$

6)  $\frac{4}{5}$

7)  $\frac{7}{8}$

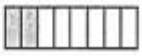
8)  $\frac{3}{5}$

9)  $\frac{3}{4}$

10)  $\frac{1}{3}$

Shade the Figure with the Indicated Fraction.

11)  $\frac{3}{8}$

12)  $\frac{2}{8}$

13)  $\frac{1}{5}$

14)  $\frac{2}{4}$

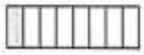
15)  $\frac{4}{8}$

16)  $\frac{6}{8}$

17)  $\frac{2}{5}$

18)  $\frac{2}{5}$

19)  $\frac{4}{5}$

20)  $\frac{1}{8}$

CURRICULAR CORRELATIONS

Mathematics Curricular Standards

Grades 2 - 4

- Standard 1: Numbers and Computations

Benchmark 1: The student demonstrates number sense for whole numbers, simple fractions, money and decimals in a number of situations.

Indicator 1:Uses appropriate representations of whole numbers to formulate and solve real-world problems.

Benchmark 2: The student demonstrates an understanding of whole numbers with a special emphasis on place value; recognizes uses and explains their properties; and extends these properties to simple fractions, mixed numbers decimals and money

* Indicator 1: Uses place value and properties of the whole number system and money to explain his/her reasoning and to formulate and solve real-world problems.

Indicator 2: Uses place value and whole number properties to perform various computational procedures, extends these properties to simple fractions, mixed numbers and decimals and explains how the properties are used.

- Standard 3: Geometry

Benchmark 2: The student estimates and measures using standard and non-standard units in a variety of situations.

* Indicator 1: Formulates and solves real-world problems by applying measurements and measurement formulas.