

A “Whole” Lot of Fraction Fun!

Grade Level: First Grade
Presented by: April Dowdy, Cardinal Community Academy, Keenesburg, Colorado
Jennifer DeBoer, Platte River Academy, Littleton, Colorado
Length of Unit: 6 Lessons

I. ABSTRACT

This unit introduces fractions as found in the *Core Knowledge Sequence* for first grade. It utilizes literature to create a connection between language arts and math and includes activities that are auditory, visual and kinesthetic. In this unit the students explore fractions, color fractions and make fractions using a variety of manipulatives. The students become familiar with where fractions are found in our environment and learn important vocabulary such as whole, fraction, denominator and numerator.

II. OVERVIEW

- A. Concept Objectives
1. Students will develop number sense. (Colorado State Math Standard #1)
 2. Students will understand how to use numbers. (Colorado State Math Standard #1)
 3. Students will understand number relationships in problem solving situations. (Colorado State Math Standard #1)
- B. Content from the *Core Knowledge Sequence*
1. Learn these fractions as part of a whole: $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{6}$, $\frac{1}{8}$, $\frac{3}{4}$, $\frac{2}{8}$, $\frac{3}{8}$
- C. Skill Objectives
1. The students will demonstrate an understanding of $\frac{1}{2}$ by cutting pictures into two equal parts.
 2. The students will demonstrate how to write a fraction by labeling each part of the picture with $\frac{1}{2}$.
 3. The students will understand that fractions are all around us.
 4. The students will recognize that $\frac{1}{2}$ is a fraction.
 5. The students will understand that fractions are a part of a whole.
 6. The students will identify $\frac{1}{2}$ as a fraction.
 7. The students will demonstrate understanding one-half by dividing whole objects and sets of objects.
 8. The students will identify situations in our environment where we use fractions.
 9. The students will understand that one-half, half, and $\frac{1}{2}$ are interchangeable.
 10. The students will make connections between language arts and math through the integration of literature.
 11. The students will write the names of the vegetables that are used in Lesson Three.
 12. The students will write fractions $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{6}$, $\frac{1}{8}$, $\frac{1}{10}$.
 13. The students will identify numerators and denominators.
 14. The students will demonstrate an understanding of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{6}$, $\frac{1}{8}$, $\frac{2}{4}$, $\frac{2}{6}$, $\frac{3}{4}$, $\frac{3}{8}$, $\frac{3}{6}$, and $\frac{4}{8}$ by coloring the appropriate parts of shapes.
 15. The students will manipulate a fraction circle (See Appendix E) to demonstrate their understanding of fractions.
 16. The students will compare fractions that are greater than and less than each other.

III. BACKGROUND KNOWLEDGE

- A. For Teachers
None

- B. For Students
None

IV. RESOURCES

- A. Abrohms, Alison. *1001 Instant Math Manipulatives for Math*
- B. Adler, David A. *Fraction Fun*
- C. Appendices A - H
- D. Larson, Nancy. *Saxon Math 1, An Incremental Development*
- E. Mathews, Louise. *Gator Pie*
- F. Murphy, Stuart J. *Give Me Half!*
- G. The Mailbox: April/May 2000, pages 41-46
- H. Wood, Don and Audrey. *The Little Mouse, The Red Ripe Strawberry, and The Big Hungry Bear*

V. LESSONS

Lesson One: Fractions All Around Us

- A. *Daily Objectives*
 - 1. Concept Objective
 - a. Students will understand number relationships in problem solving situations.
 - 2. Lesson Content
 - a. Learn the fraction $\frac{1}{2}$.
 - 3. Skill Objective(s)
 - a. The students will demonstrate an understanding of $\frac{1}{2}$ by cutting pictures into two equal parts.
 - b. The students will demonstrate how to write a fraction by labeling each part of the picture with $\frac{1}{2}$.
 - c. The students will understand that fractions are all around us.
 - d. The students will recognize that $\frac{1}{2}$ is a fraction.
 - e. The students will understand that fractions are a part of a whole.
 - f. The students will make connections between language arts and math through the integration of literature.
- B. *Materials*
 - 1. *The Little Mouse, the Red Ripe Strawberry, and the Big Hungry Bear* by Audrey Wood
 - 2. Paper strawberries-one per student (see Appendix A)
 - 3. Large piece of chart paper
- C. *Key Vocabulary*
 - 1. Fraction – part of a whole
 - 2. Whole – an entire object
- D. *Procedures/Activities*
 - 1. Teacher reads *The Little Mouse, The Red Ripe Strawberry, and The Big Hungry Bear*.
 - 2. Ask students what happened at the end of the book and how they solved the problem. (The mouse cuts the strawberry in half and shares it with the “narrator” to prevent the big hungry bear from eating it.) Ask, “What does this book have to do with math?”
 - 3. Explain how this book uses the fraction $\frac{1}{2}$ and write it on the board. Also, write the word fraction on the board and explain that a fraction is part of a whole or part of a group of objects.
 - 4. Ask the students where they see fractions in their environment. Generate a list on piece of chart paper. Hang the list up in the classroom for students to read and add to the list throughout the unit.

E. *Assessment/Evaluation*

1. Distribute the large strawberry to each student in the classroom (see Appendix A). Have students cut their strawberries in half so that they get two equal pieces. Each student should color and label the halves of their strawberry with $\frac{1}{2}$.

Lesson Two: Give Me Half

A. *Daily Objectives*

1. Concept Objective
 - a. Students will develop number sense.
2. Lesson Content
 - a. One-half, half, and $\frac{1}{2}$ are interchangeable.
 - b. $\frac{1}{2}$ is a fraction.
 - c. The top number of a fraction is called a numerator and the bottom number is called a denominator.
3. Skill Objective(s)
 - a. The students will identify $\frac{1}{2}$ as a fraction.
 - b. The students will demonstrate understanding one-half by dividing whole objects and sets of objects.
 - c. The students will identify situations in our environment where we use fractions.
 - d. The students will understand that one-half, half, and $\frac{1}{2}$ are interchangeable.
 - e. The students will identify numerators and denominators.
 - f. The students will make connections between language arts and math through the integration of literature.

B. *Materials*

1. *Give Me Half* by Stuart J. Murphy
2. Chart paper, "Where we see fractions" from Lesson One
3. Unifix cubes (10 for every pair of students)
4. Worksheet: Appendix B

C. *Key Vocabulary*

1. Fraction – part of a whole
2. Numerator – the top number in the fraction
3. Denominator – the bottom number in the fraction

D. *Procedures/Activities*

1. Write the number $\frac{1}{2}$ on the board and ask the students if they remember what that number is called (a fraction).
2. Review the list that was generated from the previous lesson about where we see fractions around us. If the students are able to come up with other instances where we use or see fractions, add these to the list.
3. Read *Give Me Half*. Discuss with the class other things that we can cut in half or fold in half. Write on the board the following: $\frac{1}{2}$, one-half, and half. Explain to the students that *one-half* and *half* are the same thing. They will hear it said to them both ways.
4. Explain that in $\frac{1}{2}$, the number 2 is the number of parts we have after we cut something in half. That number is on the bottom and is called the denominator. Explain that the top number is always called the numerator.
5. Divide the class into groups of two and distribute unifix cubes (or any other manipulative) to each pair of students. Instruct the students to split the unifix cubes so that each person in the group has one-half.

E. *Assessment/Evaluation*

1. Distribute worksheet (see Appendix B). Give verbal instructions to shade or color half of the whole objects on the 1st page of Appendix B. Instruct students to draw a line between objects in the set to split them in half for the 2nd page of Appendix B.

Lesson Three: Eating Fractions

A. Daily Objectives

1. Concept Objective
 - a. Students will understand how to use numbers.
2. Lesson Content
 - a. Learn fractions $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{6}$, $\frac{1}{8}$, $\frac{1}{10}$
3. Skill Objective(s)
 - a. The students will write the names of the vegetables that are used in Lesson Three.
 - b. The students will understand that fractions are a part of a whole.
 - c. The students will write fractions $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{6}$, $\frac{1}{8}$, $\frac{1}{10}$.
 - d. The students will identify numerators and denominators.

B. Materials

1. Cherry tomatoes (1 for every 2 students)
2. Mushrooms (1 for every 3 students)
3. Green Beans (1 for every 4 students)
4. Celery (1 for every 6 students)
5. Carrots (1 for every 8 students)
6. Cucumbers (1 for every 10 students)
7. Square pieces of the following colored construction paper to be used for graphing purposes. Each student needs one of every color.
 - a. Tomato = red
 - b. Mushroom = gray
 - c. Green Beans = dark green
 - d. Celery = lime green
 - e. Carrots = orange
 - f. Cucumbers = white(Place one of every color in an envelope for each student)
 - g. Plastic knife for the students
 - h. Writing/Math booklet (see Appendix C)

C. Key Vocabulary

1. Fraction – a part of a whole
2. Denominator – the bottom number in a fraction
3. Numerator – the top number in a fraction

D. Procedures/Activities

1. Show the students the foods that they will be eating that day. Ask the students what each food item is and if they know the type of food that they will be eating (vegetables).
2. Explain to the students that even though you bought a lot of vegetables, there isn't enough of each for every student to try the vegetables.
3. Ask the students what we can do with the vegetables to assure that each person gets a taste of the vegetables. (Cut the vegetables into smaller pieces.) Each person will get a "fraction" of the vegetable.
4. Start with cutting the tomatoes into halves. Ask the students what part of the tomato each person will be eating. Have a student write $\frac{1}{2}$ on the board. The teacher can have a student(s) cut the vegetables or do it herself/himself.
5. Pass out the pieces of tomatoes for the students to eat along with envelopes containing the pieces of construction paper at this time. Instruct the students to take all the colors out of their envelope and place at the corner of their desk. If they like the tomato, they are to put the red piece of construction paper back inside the envelope.

6. After trying the tomato, have each student fill in the appropriate page in their booklet. See Appendix C. Please note that the square on each page is for the students to draw a picture while they are waiting or at another time.
 7. Proceed in the same way with the mushroom, but cut the mushrooms into thirds, and so on with the other vegetables. After trying each vegetable, have the students write in their booklets.
 8. Also have a student write the fraction on the board for each vegetable. Review with them that it is called a fraction. Also, have students identify the denominator and the numerator for each fraction.
 9. Instruct the students to place the color for each vegetable in their envelope ONLY if they liked the vegetable. These pieces of construction paper can be used later to display a graph of the vegetables that they like.
- E. *Assessment/Evaluation*
1. Teacher observation
 2. Appendix C-If the teacher is not able to tell whether or not the students understand numerator and denominator through observation, he/she can instruct the students to write a small “n” or “d” beside the numbers in their booklet.

Lesson Four: Sculpting Fractions

A. *Daily Objectives*

1. Concept Objective
 - a. Students will understand number relationships in problem solving situations.
2. Lesson Content
 - a. Learn fractions $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{6}$, $\frac{1}{8}$, $\frac{2}{4}$, $\frac{2}{6}$, $\frac{3}{4}$, $\frac{3}{8}$, $\frac{3}{6}$, $\frac{4}{8}$.
3. Skill Objective(s)
 - a. The students will write the fractions $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{6}$, and $\frac{1}{8}$.
 - b. The students will demonstrate an understanding of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{6}$, $\frac{1}{8}$, $\frac{2}{4}$, $\frac{2}{6}$, $\frac{3}{4}$, $\frac{3}{8}$, $\frac{3}{6}$, and $\frac{4}{8}$ by coloring the appropriate parts of shapes.
 - c. The students will understand that fractions are a part of a whole.

B. *Materials*

1. Play dough or soft clay
2. Toothpicks (one for each student)
3. Square pieces of paper (6 X 6 pieces would be a good size, but sizes can vary)-cut approximately 10 pieces for each student
4. Colored pencils or crayons
5. Assessment: Appendix D

C. *Key Vocabulary*

1. Fraction – a part of a whole
2. Numerator – the top number of a fraction
3. Denominator – the bottom number of a fraction; the denominator is the number of parts in a whole

D. *Procedures/Activities*

1. Give a handful of clay to each student. Instruct students to shape their clay into a square and make it flat.
2. Pass out the toothpicks and have them cut their piece of clay in half. Write $\frac{1}{2}$ on the board. The students can then write $\frac{1}{2}$ on each piece of clay with their toothpick.
3. Ask students to state the numbers that are numerators and denominators. Also, ask them how many pieces they cut their piece of clay into. Explain that the denominator is always the amount of smaller parts in the whole.
4. Have the students form another square and make it flat. Write $\frac{1}{4}$ on the board. Ask the students how many pieces the clay should be split into now.

5. After the students split their clay into four pieces, have the students label with the toothpick $\frac{1}{4}$ on each piece.
 6. Have the students form the clay into a circle and proceed the same way with $\frac{1}{3}$.
 7. Collect the clay and toothpicks and pass out the square pieces of paper and crayons. Have the students fold the paper in half and have them color in $\frac{1}{2}$ of the square.
 8. Instruct the students to fold the second piece of paper in half two times so that there are four equal squares. Model how to fold the paper for the students. Have the students color in $\frac{1}{4}$ on the paper.
 9. Have the students fold the other pieces of paper into fourths, sixths and eighths and have them shade in other fractions. An example using the ten pieces of paper may be the following:

Paper #1: $\frac{1}{2}$	Paper #2: $\frac{1}{4}$	Paper #3: $\frac{1}{6}$
Paper #4: $\frac{1}{8}$	Paper #5: $\frac{2}{4}$	Paper #6: $\frac{2}{6}$
Paper #7: $\frac{3}{4}$	Paper #8: $\frac{3}{8}$	Paper #9: $\frac{3}{6}$
Paper #10: $\frac{4}{8}$		
 10. As the students shade in the appropriate areas for each fraction, review with them which number is the numerator and the denominator. For example, when writing the fraction $\frac{2}{6}$, ask the students, “Which number is the denominator?” “If 6 is the denominator, how many parts will we have in our square?” “What is this top number called?” “How many parts out of the six should we color in?”
 11. Have the students write their name on the back of each piece of paper.
- E. *Assessment/Evaluation*
1. Observation of the students during whole class activity. The teacher will also collect the fraction papers to look at closer.
 2. Appendix D

Lesson Five: Fraction Comparisons

A. *Daily Objectives*

1. Concept Objective(s)
 - a. Students will understand how to use numbers.
 - b. Students will understand number relationships in problem solving situations.
2. Lesson Content
 - a. The students will learn less than and more than in relation to fractions.
3. Skill Objective(s)
 - a. The students will manipulate a fraction circle (See Appendix E) to demonstrate their understanding of fractions.
 - b. The students will make connections between language arts and math through the integration on literature.
 - c. The students will compare fractions that are greater than and less than each other.
 - d. The students will recognize numerators and denominators.

B. *Materials*

1. *Gator Pie* by Louise Matthews
2. Fraction Circles (see Appendix E)
3. The following construction paper pieces for every student:
 - a. One whole circle
 - b. Two $\frac{1}{2}$ pieces of a circle
 - c. Three $\frac{1}{3}$ pieces of a circle
 - d. Four $\frac{1}{4}$ pieces of a circle
 - e. Six $\frac{1}{6}$ pieces of a circle

C. *Key Vocabulary*

1. Fraction – a part of a whole

2. Numerator – the top number in a fraction
 3. Denominator – the bottom number in a fraction
 4. $<$ = Less than
 5. $>$ = More than
- D. *Procedures/Activities*
1. Pass the fraction circles out to each student in the class prior to reading the book (see Appendix E).
 2. As you're reading the book, ask the students to pretend that they are one of the alligators in the story. Each time the pie is cut, have the students demonstrate how much pie they would get to eat by moving the fraction circle. The colored part of the circle should represent the amount of pie that he or she gets to eat.
 3. Write the corresponding fraction on the board each time the pie is cut. The fractions demonstrated with the fraction circles will not be exact, but observe that they are estimating closely to the fraction shown in the book. The teacher can also model with his/her own fraction circle.
 4. As you are reading the story, ask the students if their share of the pie is getting smaller or bigger. Also ask, "What is happening to the denominator?" "Would you rather have $1/12$ of a piece of pie or $1/4$?"
 5. Use the fractions in the story to practice using $<$ and $>$. Write two fractions on the board. Ex: $1/2$ $1/20$. Have the students use $<$ and $>$ to show which piece of pie would be bigger. $1/2 > 1/20$
 6. Give the students the fraction circle pieces cut out of construction paper (see materials list).
 7. Using the fraction circles, instruct the students to put all the pieces together so that they create four complete circles. Then allow the students to mix and glue the fractions on a piece of construction paper to create their own work of art.
- E. *Assessment/Evaluation*
1. Observation of class activity and art project.

Lesson Six: Pizza Math

- A. *Daily Objectives*
1. Concept Objective(s)
 - a. Students will develop number sense.
 - b. Students will understand how to use numbers.
 2. Lesson Content
 - a. The students will learn $1/2$, $1/4$, $1/8$, $2/8$, $3/8$, $3/4$.
 3. Skill Objective(s)
 - a. The students will write the fractions $1/2$, $1/4$, $1/8$.
 - b. The students will make connections between language arts and math through the integration of literature.
 - c. The students will understand that fractions are a part of a whole.
 - d. The students will recognize numerators and denominators.
- B. *Materials*
1. *Fraction Fun* by David A. Adler (*Note – This book is optional. It is a review of what the students have been learning and contains the pizza math activity that is also explained in the procedures.)
 2. Three paper plates for each student
 3. A ruler for each student (or two students could share)
 4. A red, blue and green crayon for each student
 5. Chart paper "Where we see fractions" from Lesson One
 6. Assessment (see Appendix F)

- C. *Key Vocabulary*
1. Fraction – a part of a whole
 2. Numerator – the top number in a fraction
 3. Denominator – the bottom number in a fraction; the bottom number tells how many parts in the whole
- D. *Procedures/Activities*
1. Read the first eight pages of *Fraction Fun*.
 2. Ask the students if they have any more ideas about where we see fractions and add to the class list.
 3. Show the students page 9 of *Fraction Fun* and explain that they will need three paper plates, a pencil, a ruler, and a red, green and blue crayon to do Pizza Math.
 4. After the materials are in place, have each student mark the center of their plate with a pencil and use the ruler to draw a line down the center to divide the plate into two equal parts.
 5. Have the students label each part as $\frac{1}{2}$. With the red crayon, have them color 1 part or $\frac{1}{2}$ of the paper plate.
 6. Have the students divide the second plate into four equal parts. Students should write $\frac{1}{4}$ in each section. With the red crayon, have them color $\frac{1}{4}$ of the plate.
 7. With the third plate, demonstrate how to use the ruler and pencil to draw lines that would divide the plate into eight different parts. Students can then color $\frac{1}{8}$ of the plate with a red crayon.
 8. Have the students look at each of their three pieces of “pizza.” Ask, “Which slice is the smallest?” or “Which is the largest?” “As the bottom number, or denominator, gets bigger what happens to the piece of pizza?”
 9. With the plate that is divided into fourths, have the students shade in $\frac{2}{4}$ or $\frac{3}{4}$ with the green crayon.
 10. With the plate that is divided into eighths, have the students color $\frac{2}{8}$ with the green crayon and $\frac{3}{8}$ with the blue crayon. Proceed with additional fractions if the students need continued practice or do not understand.
- E. *Assessment/Evaluation*
1. Teacher observation
 2. Appendix F

VI. CULMINATING ACTIVITY

- A. Split the students into groups of three or four to play the Shape Fraction Game.
- B. Pass out a fraction die to each group that has the following fractions: $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$. Each group should also have a set of shapes (this should be a set of six circles: one that is whole, one that is divided in half, one that is divided into thirds, one that is divided into fourth, one that is divided into fifths, and one that is divided into sixths).
- C. Give each student a piece of construction paper or paper plates on which to collect his/her shapes.
- D. Instruct students to play the game as follows:
 1. Each player throws the die in turn and takes a piece that corresponds with the fraction thrown. The object of the game is to form as many whole shapes as possible. If there is not a piece that corresponds to the fraction on the die, the player receives nothing and passes the die. When there are no more pieces left in the middle, the players count their number of whole shapes. The player with the most number of completed shapes wins the game.
 2. When the students become proficient with this game, you can allow the players to take pieces from the other players’ plates, IF they have not completed their shape. A player cannot separate a shape that has already been made whole.

(This is a modification of a game called Fruit Salad from Child's Play, 1989)

- E. After playing the game, have the students complete the final assessment. (See Appendix H)

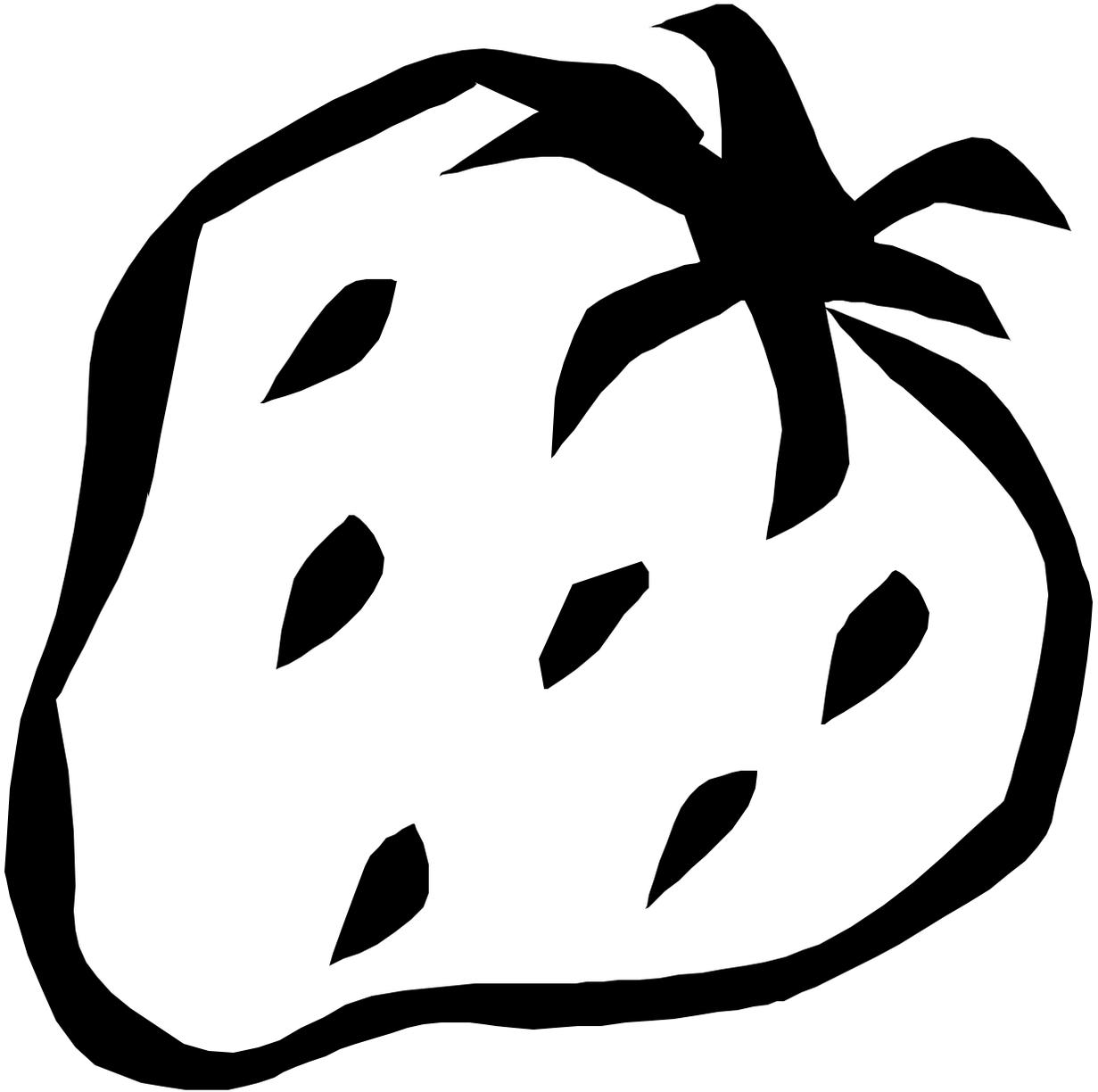
VII. HANDOUTS/WORKSHEETS

- A. Appendices A-H

VIII. BIBLIOGRAPHY

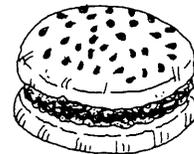
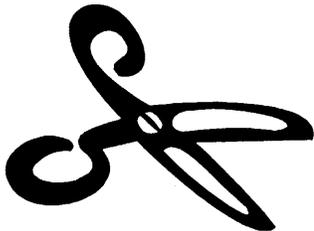
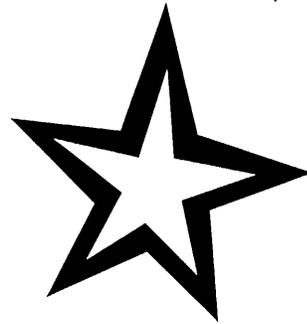
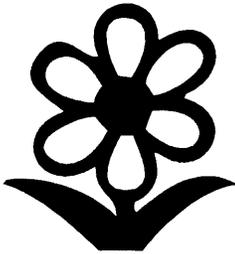
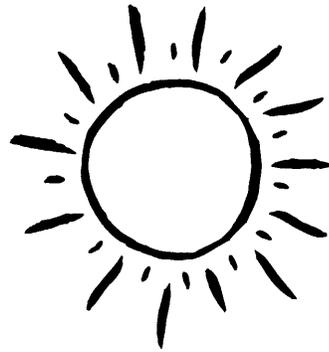
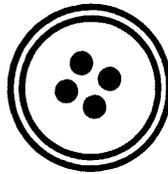
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Appendix A



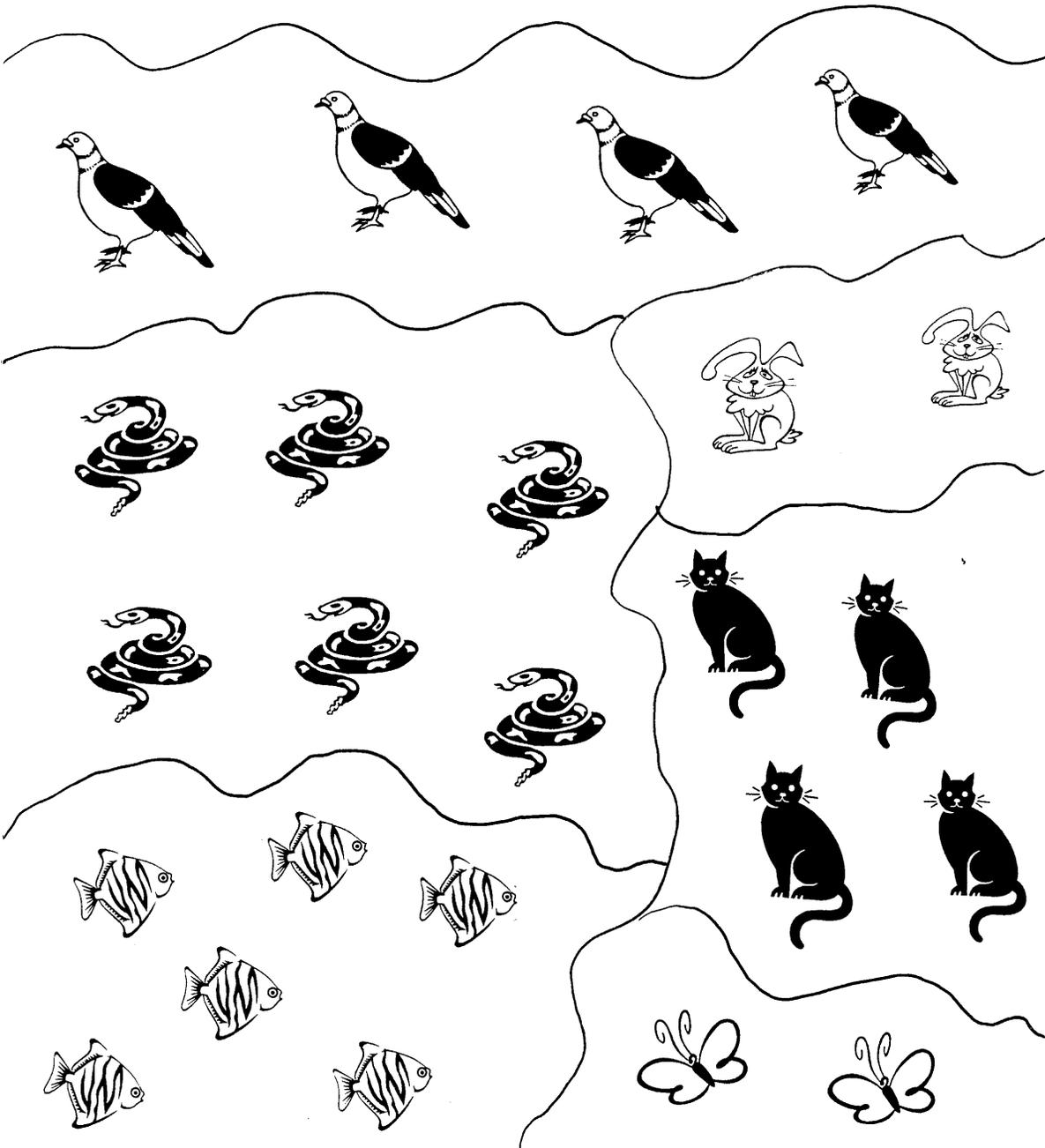
Name _____ Date _____

Draw a line using a crayon to split each object in **half**
Label each half of the object with $\frac{1}{2}$.



Name _____ Date _____

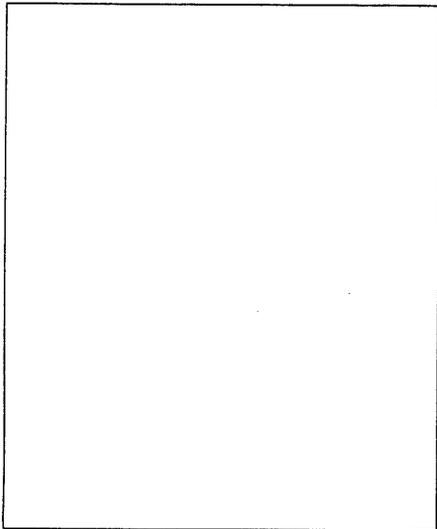
Draw a line to split each group of animals in half



Eating Fractions



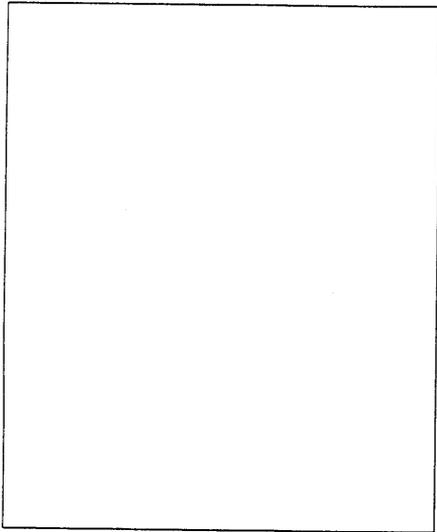
**Tomato, Cucumber, Carrot, Celery, Mushrooms,
and Green Beans!**



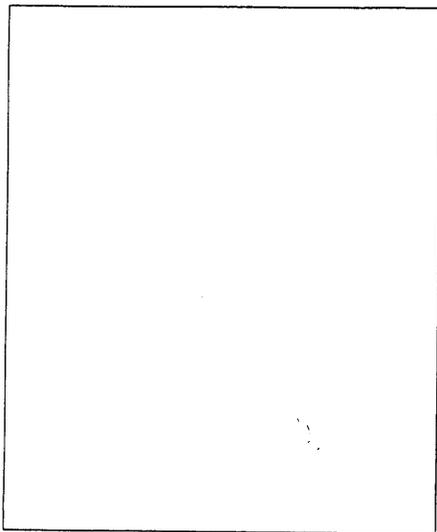
Today,

I ate _____

Of a



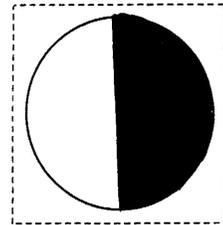
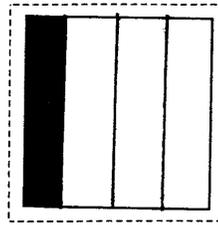
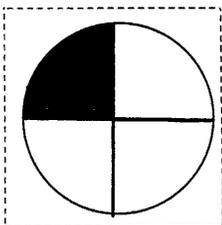
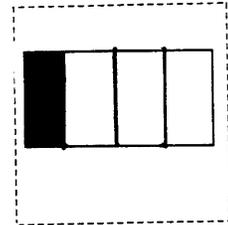
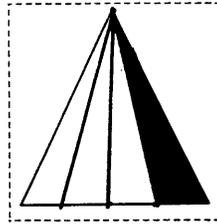
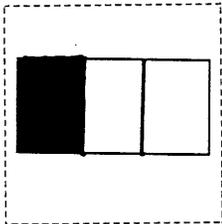
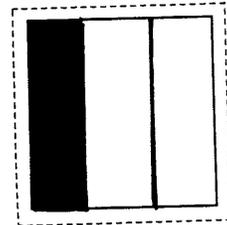
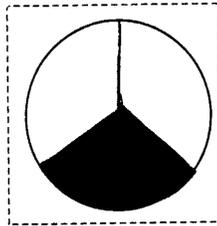
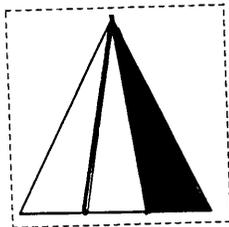
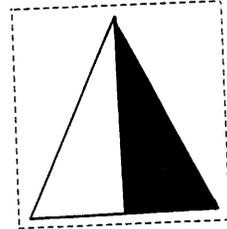
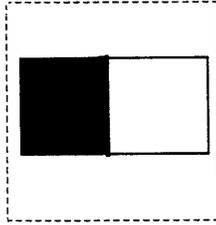
Today,
I ate _____
Of a



Today,
I ate _____
Of a

Appendix D

Cut and paste these objects onto your fraction chart



Appendix D

Name _____

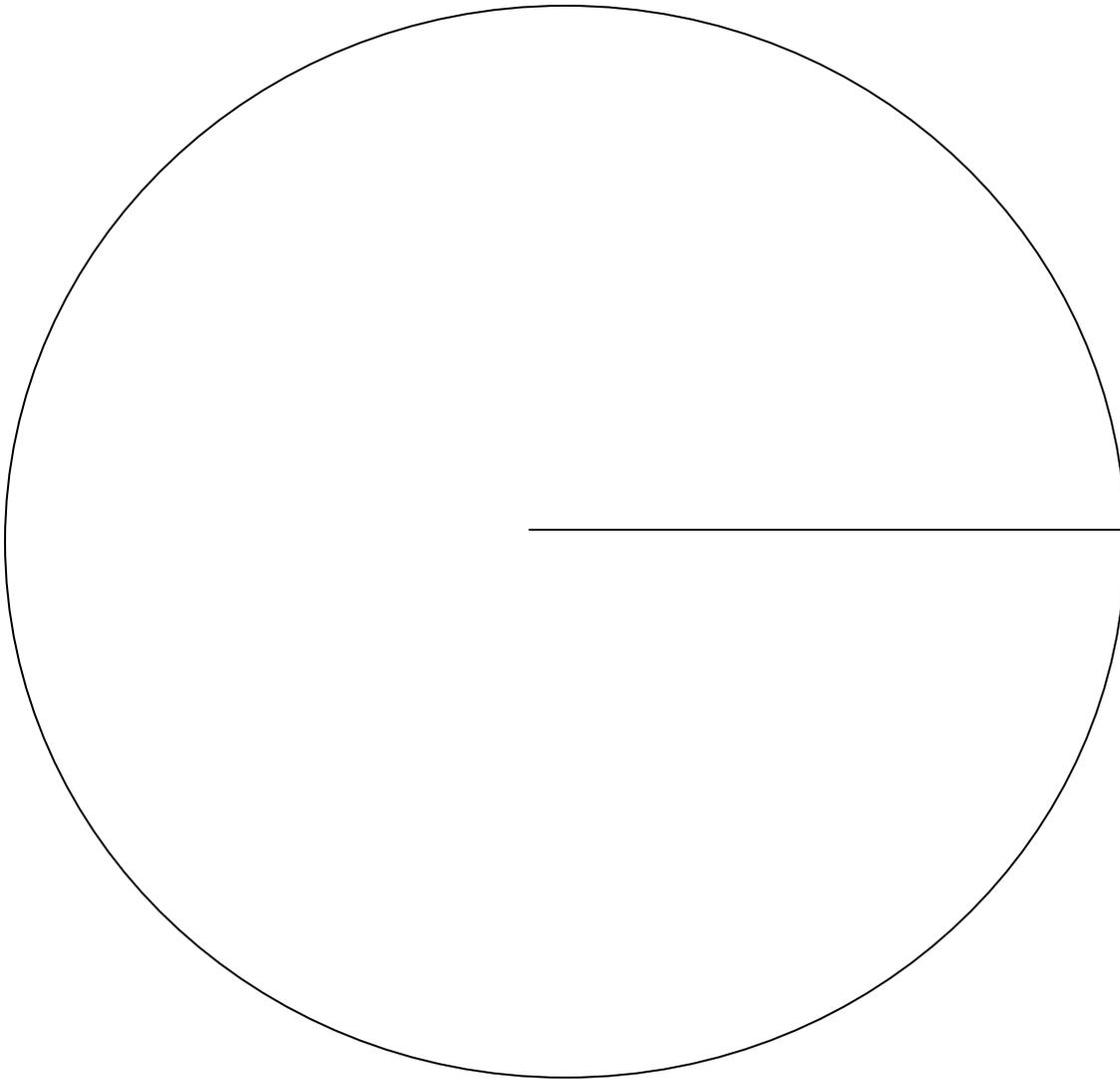
Cut out the shapes and paste them under the correct fraction.

$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{4}$

Appendix E

Fraction Wheel

Cut out two circles using a different color for one of the circles. Fit circles together using the slit. Slide the circle wheel around to form different fractions.

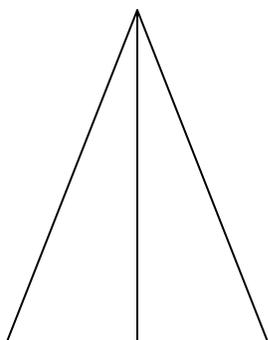
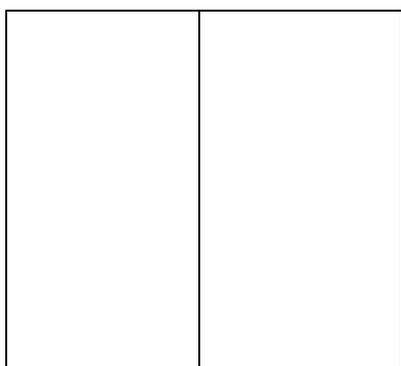
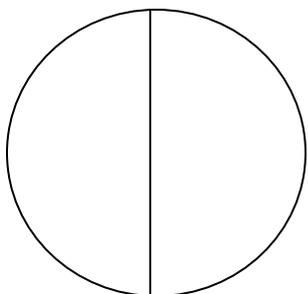


Appendix F

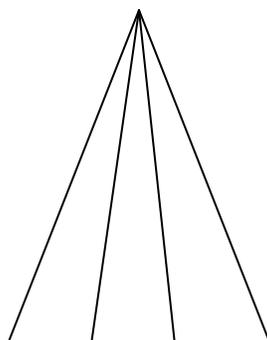
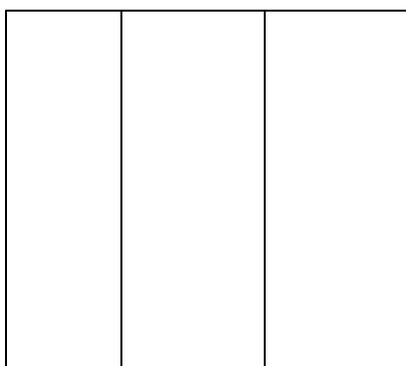
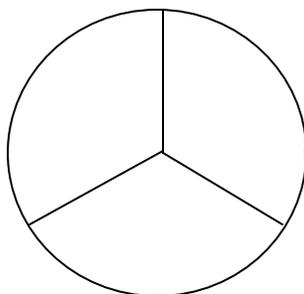
Name _____ Date _____

Shade in the correct fraction

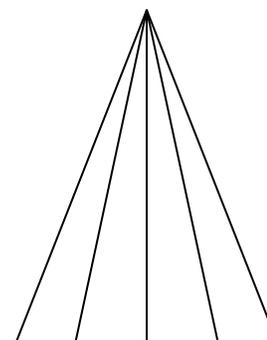
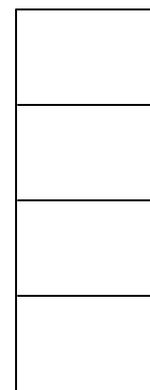
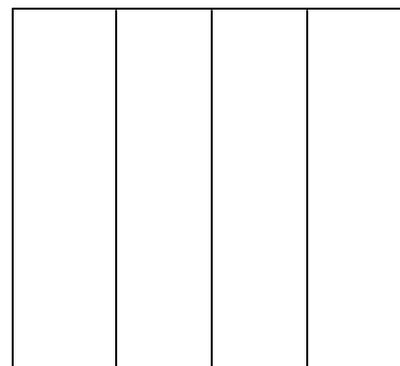
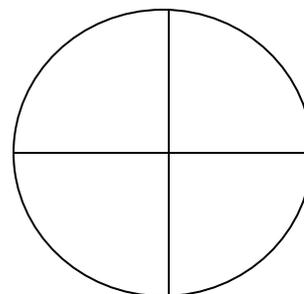
$\frac{1}{2}$



$\frac{1}{3}$



$\frac{1}{4}$

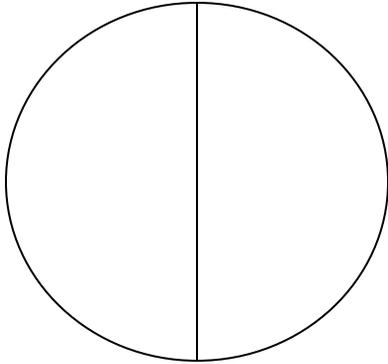


Appendix H

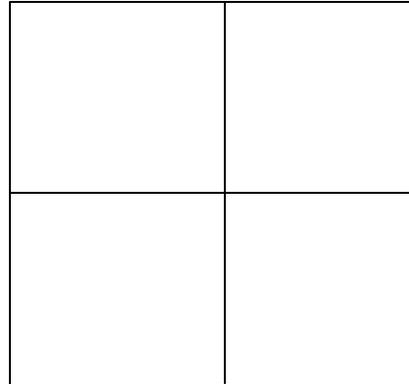
Name _____ **Date** _____

Fractions Test

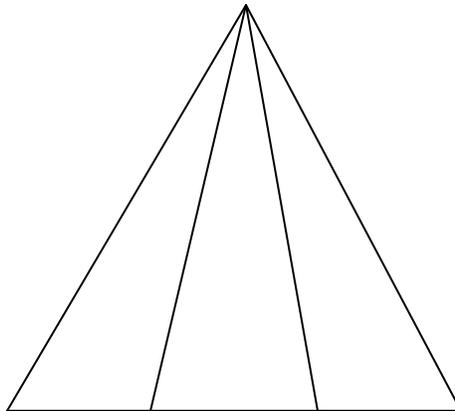
Color $\frac{1}{2}$ of the circle



Color $\frac{1}{4}$ of the square



Color $\frac{1}{3}$ of the triangle



Name one place you could find a fraction. _____

What fraction would it be? _____