Title: Fruity Fractilicious

Brief Overview:

We will use standard fractions 1/3, 1/4, 1/2, and 1/8 to explore the concept of fractional equity while enjoying cooking in the kitchen.

NCTM 2000 Principles for School Mathematics:

Equity: *Excellence in mathematics education requires equity - high expectations and strong support for all students.*

Curriculum: *A curriculum is more than a collection of activities: it must be coherent, focused on important mathematics, and well articulated across the grades.*

Teaching: *Effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn it well.*

Learning: *Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge.*

Assessment: *Assessment should support the learning of important mathematics and furnish useful information to both teachers and students.*

Technology: *Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning.*

Links to NCTM 2000 Standards:

Content Standards

<u>Number and Operations</u>

Develop an understanding of fractions as parts of unit wholes.
Use concrete materials, models, and drawings to compare the numerical value of fractions.
Use problem solving, mathematical communication, and reasoning to understand fractions as parts of a whole.

<u>Data Analysis and Probability</u>

Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.
Represent data using pie graphs.
Recognize the differences in representing categorical and numerical data.

Process Standards

Problem Solving

Apply and adapt a variety of appropriate strategies to solve problems.

Reasoning and Proof

Students will demonstrate their mathematical ability by identifying and comparing fractions.

Communication

Students will demonstrate their ability to communicate using fractional terms. They will communicate orally, in writing, and through visual representations.

Connections

Students will recognize and apply mathematical strategies to real-life situations.

Representation

Students will create and use various ways to represent fractions (orally, numerically, and through visual representations).

Grade/Level:

Grades 2-4

Duration/Length:

4 Math class periods-45 min. sessions

Prerequisite Knowledge:

Students should have working knowledge of the following skills:

Basic understanding of greater than > and less than<
Number Sense Vocabulary- parts, wholes and equal sharing
Basic computer and keyboarding knowledge for technology portion of unit

Student Outcomes:

Students will:

be expected to read, write and represent simple fractions and whole numbers using symbols and words.

Materials/Resources/Printed Materials:

Real fruit (apples, bananas, pears, oranges)
Large bowl for fruit salad
Student Resource Sheets # 1-5
Fraction Tiles or Tower cubes
Fraction game handout with activity masters 15 & 16
Overhead fraction circles
Student fraction circles
Fraction circles handout
Fraction problems and riddles handout
Paper pizza shell handout
Crayons, colored pencils or markers
Fruity pizza recipe handout
Computer with Excel and Microsoft Word (word processor)
Pizza pie graph and writing assessment handout

Development/Procedures:

I. Day One:

A. Introduction /Review of Simple Fractions

Teachers will introduce or present the simple fractions: 1/2, 1/3, 1/4, and 1/8 to the students using real fruit.

- An apple will be used to represent 1/2.
- A banana will be used to represent 1/3.
- A pear will be used to represent 1/4.
- An orange will be used to represent 1/8.
- The individual piece of fruit will serve as the whole before it is cut into fractional pieces.

After the fruit is cut, it will be added into a bowl to be eaten as fruit salad.
Use Student Resource Sheets # 1-4 to represent the fruit's fractional parts. Students will cut the fractional parts and fold to match the whole part.

II. Day Two:

A. *Equivalent Fractional Parts*

Using Fraction Tiles or Tower Cubes, have students identify the manipulative pieces by using fractional names: 1/3, 1/2, 1/4, 1/8 until all of the pieces are displayed and reviewed.
Have students use the manipulative pieces to create whole numbers from equivalent fractional parts.

Have students use the manipulative pieces to compare other fractional manipulative pieces to find equivalent fractions.
Using the equivalent fractions, have the students express the lesser or greater fractional value.

B. Group Work/Guided Practice

With a partner, have the students identify greater than or lesser than fractional values from a teacher given fraction.
Have the students use a fractional die or a fractional spinner to generate a fractional value to be compared for greater than, less than. (See fraction game Student Resource Sheets # 5, 6 & 7)
When the students become proficient, multiple players can be added to order the fractional values from greater than to less than or vice versa.

C. Independent Practice – Fraction Riddles

Teachers will model the process of solving fraction riddles while students use the Fraction Tiles or Tower Cubes to answer the questions.
Display two or three Fraction Circle pieces on the overhead and have students name them.
Then try to get students to name a fraction by presenting one or more riddles appropriate to students' level of understanding.
Encourage students to check with their partner, use Fraction Circles, and write or tell their answers.

- For younger students, place 1/2, 1/4 and 7/8 pieces on the overhead and present this riddle: I am less that 1/3. Can you name me? [1/4] For older students, I am less that 4/6. If you add me to 2/3, the result is greater than one. Can you name me? [1/2]

Writing Activity- Have students close their eyes, pick a Fraction Circle piece, and write a riddle for this fraction. They should name and sketch the answer to the riddle. For younger students, give a sentence starter.
Create a hall display that features these riddles. Have the students tape a construction paper flap over the answer to the riddle.
Reflect and Connect- Answer orally or in writing in a journal.

1. Which riddle was the most challenging? Explain why?
2. Which riddles had more than one correct answer?
3. Can you think of a new riddle that has more than one correct answer?

III. Day Three

A. Fruity Pizza Pie

Students will read to perform a task of making a real, fruity pizza pie.
Give the students a paper pizza shell (See Student Resource Sheet # 8).
Have the students identify the particular fruits they would like to use on their personal pizza pie.

Have the students choose at least two of the simple fractions to represent in fruit on their pizza. (Note: 1/3 is not recommended)

After the draft is approved, have students use crayons, colored pencils or markers, to draw a sketch of their fruity pizza labeling their simple fractions.

Have the students follow the fruity pizza recipe, on handout, to complete the assignment of making the fruity pizza pie. (Teacher Resource Sheet # 1)

IV. Day Four

A. Culminating Assessment

Take students to the computer lab.

Using the Excel program, have the students create a pie graph representing the fractional parts of their Fruity Pizza.

Directions for technology portion.

Excel Directions

1. Double click on the *Excel* icon.
2. Type names of the fruit used in column A.
3. Type amount of the fruit used in column B. Fractional notation will not be accepted therefore whole number decimal representation must be used.
4. Click the *chart wizard* icon on the tool bar.
5. Choose the *chart type*: pie graph.
6. Choose the *chart sub type*: top left pie graph picture.
7. Click on *next*.
8. Data Range and graph will show: =Sheet1!$A$1:$B$4
9. Click on *next*.
10. Enter your *chart title*.
11. Click on *next*.
12. Click on *finish*.
13. Click on any fractional portion of your pie graph.
14. Then click on the *fill color* paint bucket icon on the tool bar.
15. Choose the appropriate color to match your fruit choice. (example: red-apple)
16. Use the same procedure for the other portions of your pie graph.
17. Once finished completing color changes to your pie, click on the background area of the chart. (this will highlight the whole chart)
18. Left mouse click and choose the *copy* command.
19. Minimize the Excel screen.
20. Open Microsoft Word Document to a blank screen.
21. Left mouse click and choose the *paste* command.
22. Your graph will appear in the document.
23. Have the students use the word processor to complete the writing portion of the lesson.

Have students write an explanation of the process they used to create the fractional represented pie graph. (Writing assignment and pie graph is included in the handout packet- Teacher Resource Sheet # 2)

Performance Assessment:

Students are observed through the daily activities in the unit as part of an ongoing assessment. Students will make a pie graph on the computer and write to explain how the graph was created as their culminating assessment. A rubric is attached to score this assessment. (Teacher Resource Sheet # 3) If access to a computer is not possible, a handwritten assessment is included in the packet.

Extension/Follow Up:

Use other foods to create fractional amounts
Convert fractions to percents or decimals
Literature Connections for fractions (Teacher Resource Sheet # 4)

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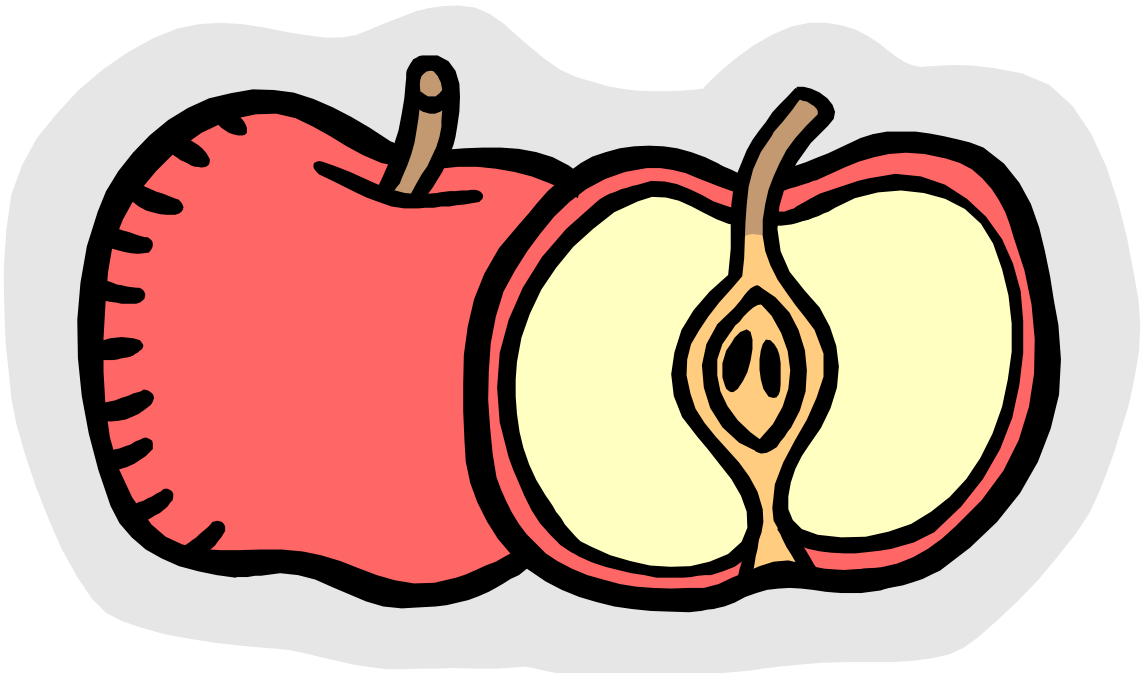
Student Resource Sheet # 1



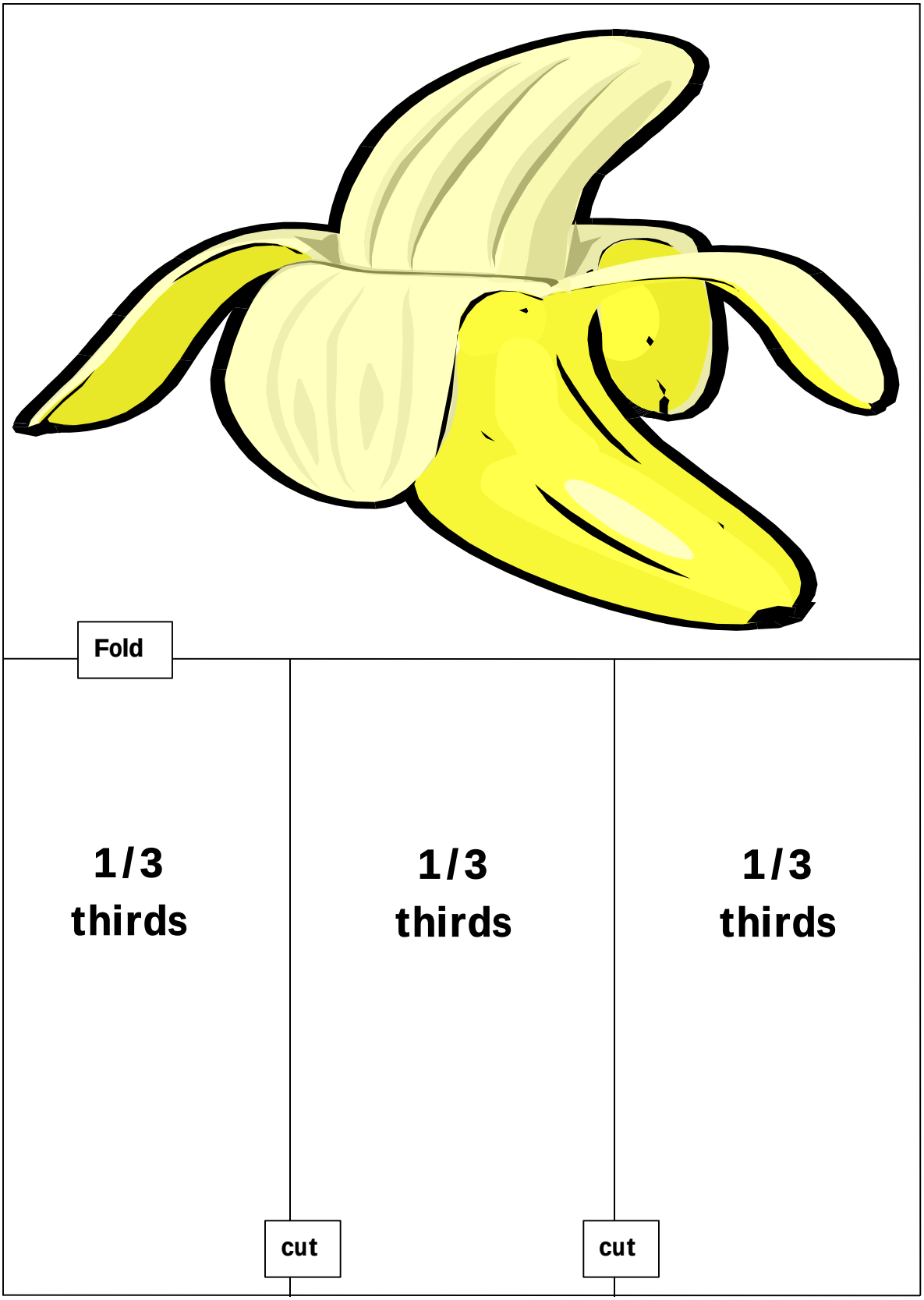
Fold

1/2
half

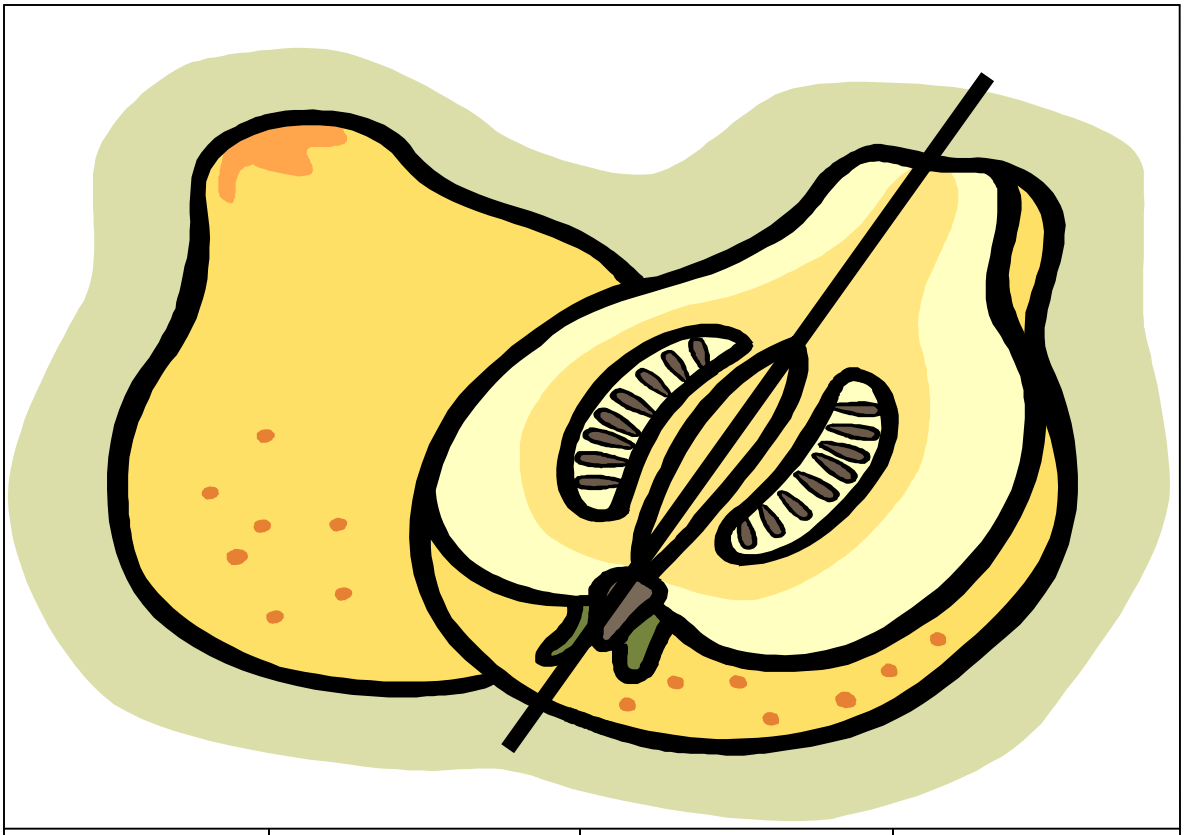
1/2
half

cut

Student Resource Sheet # 2

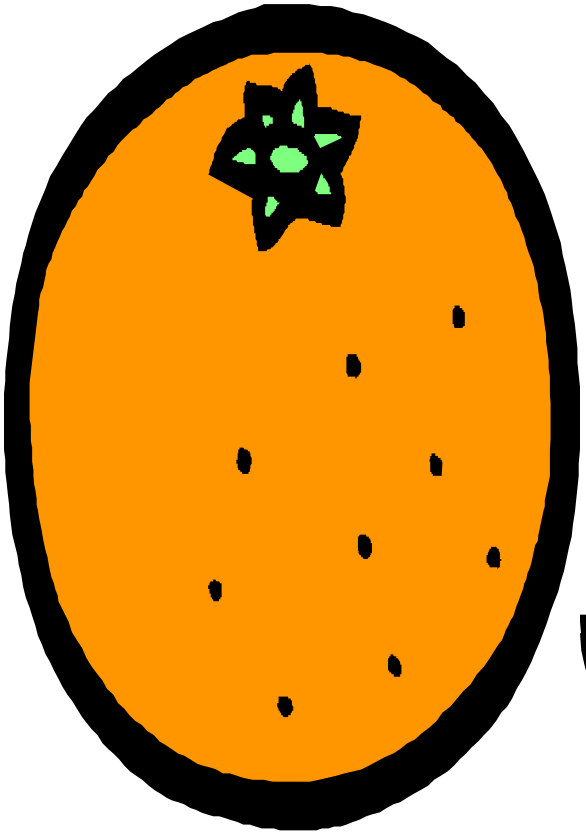


Student Resource Sheet # 3



1/4 fourths	**1/4 fourths**	**1/4 fourths**	**1/4 fourths**

Student Resource Sheet # 4



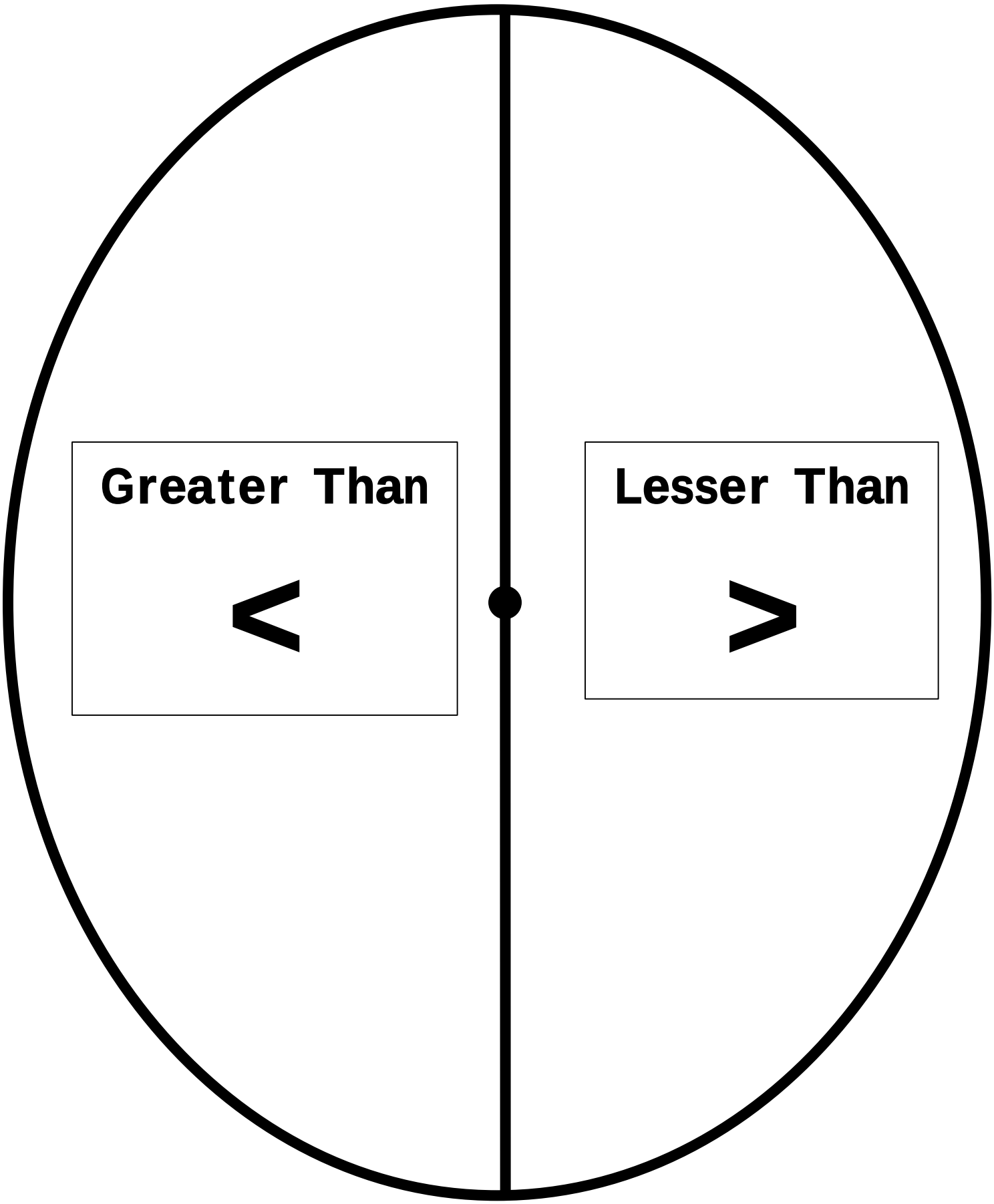
Fold

1/8 eighths	1/8 eighths	1/8 eighths	1/8 eighths	1/8 eighths	1/8 eighths	1/8 eighths	1/8 eighths
	cut	cut	cut	cut	cut	cut	cut

Student Resource Sheet # 5

$\frac{1}{2}$	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{1}{4}$
$\frac{2}{4}$	$\frac{3}{4}$	$\frac{2}{5}$	$\frac{2}{6}$
$\frac{3}{6}$	$\frac{4}{6}$	$\frac{2}{8}$	$\frac{4}{8}$
$\frac{6}{8}$	$\frac{7}{8}$	$\frac{4}{10}$	$\frac{3}{12}$
$\frac{4}{12}$	$\frac{6}{12}$	$\frac{8}{12}$	$\frac{9}{12}$

Student Resource Sheet # 6



Student Resource Sheet # 7

Greater Than > Less Than < Game

Directions:

1. Cut out cards on Student Resource Sheet # 5.
2. Mix the cards and place them face down in a pile.
3. Have each student pick one card.
4. One student spins the spinner.
5. Student makes a statement about the two fractions using the words from the spinner.
6. The spinner determines who takes both cards-the one with the greater fraction or the lesser fraction
7. Continue until all of the cards are gone.
8. Spin one more time.
9. The player, who has the most greater than or less than cards according to what the last spin said, is the winner!

If using refrigerator dough, slice and spread dough on a large pizza dish. Dough should be close together so that when it spreads during baking it will cover the whole bottom of the pan. If using a homemade recipe, place balls of dough close together on pizza dish. Bake in a 450 degrees Fahrenheit oven for 10 minutes. After baking, the entire bottom of the pan should be covered with one giant cookie. Combine cream cheese, confectioner's sugar, and 3 Tbs. lemon juice. Spread on top of the cookie crust. Slice fruit and arrange on top of the cream cheese mixture. Be creative with the fruit, making patterns and various designs.

Combine all glaze ingredients in a saucepan. Cook over a medium heat, stirring constantly, until it boils. Cool. Poor cool glaze on top of pizza. Chill in the refrigerator until ready to serve.

This is a beautiful dessert. It might be nice to serve for Shavous.

From Deena Abraham (dsabraham@juno.com)

Teacher Resource Sheet # 2

FRUIT PIZZA

Crust:

- 1 pkg. Refrigerator sugar cookie dough or: 1 small recipe sugar cookie dough.

"Sauce":

- 1 (8 oz) pkg. cream cheese, softened
- 1 c. confectioner's sugar
- 3 tblsp. lemon juice

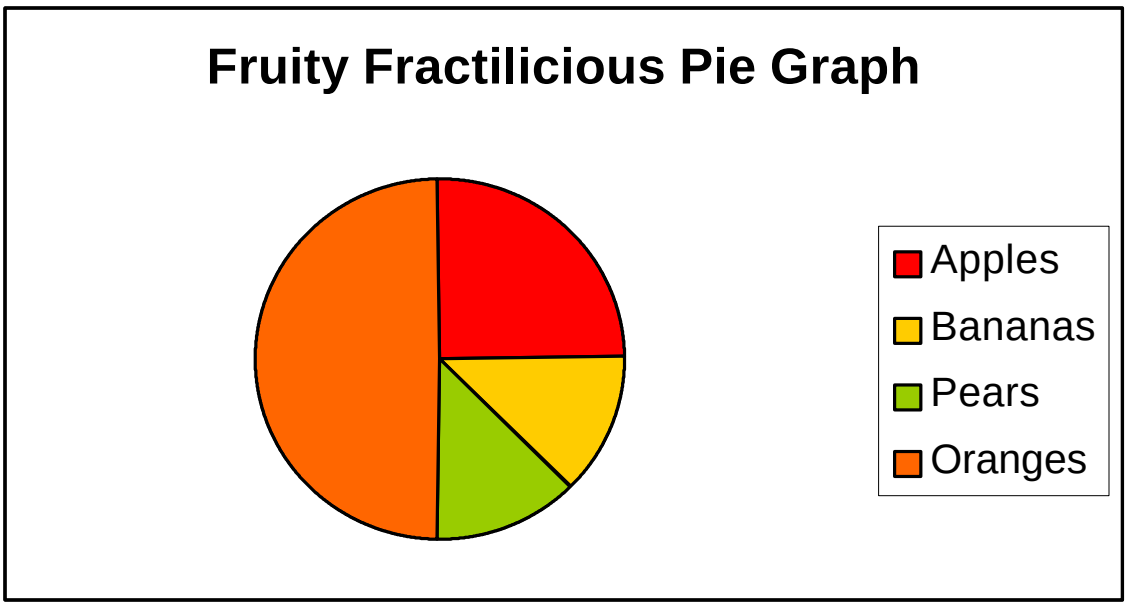
Topping:

- 3 to 4 cups fruit (I use an assortment of strawberries, blueberries, grapes, banana, and kiwi. I have also used peaches)

Glaze:

- 1 c. orange juice
- ½ c. lemon juice
- ½ c. hot water
- 3 tblsp. Cornstarch
- 1 c. sugar

Teacher Resource Sheet # 3



Directions: Your Fruity Fractiliciuos Pie has won first prize in the county fair. Part of the prize is to have your recipe printed in the local newspaper. Write an explanation of how you created your dessert. Use rich math words and details. Write in complete sentences.

Fruity Fractilicious Scoring Rubric

	3	2	1	0
Fraction Identification	ALWAYS identifies the correct fraction	SOMETIMES identifies the correct fraction	SELDOM identifies the correct fraction	NEVER identifies the correction fraction
Greater than / Less than value identification	ALWAYS identifies the correct <, > value	SOMETIMES identifies the correct <, > value	SELDOM identifies the correct <, > value	NEVER identifies the correct <, > value
Excel / graph technology	ALL directions were followed to complete the assignment.	SOME directions were followed to complete the assignment.	FEW directions were followed to complete the assignment.	NONE to the directions were followed to complete the assignment.
Writing prompt	ALL the content is completed in detail.	SOME of the content is completed with details	FEW completed details were given in the content.	NO completed details were given in the content.
Punctuation and grammar	ALL sentences have correct punctuation and grammar	SOME of the sentences have correct punctuation and grammar	FEW sentences have correct punctuation and grammar.	NO sentences have correct punctuation and grammar

Literature Connections for Fractions

Fractions Are Parts of Thing	Richard J. Dennis
Pezzettino	Leo Lionni
Johnny Appleseed	Steven Kellogg
The Philharmonic Gets Dressed	Karla Kuskins
The Half-Birthday Party	Charlotte Pomerantz
Lucy and Tom's 1,2,3	Shirley Hutchins
Half and Half	J. Nelson
A-Apple Pie	Kate Greenway
The Doorbell Rang	Pat Hutchins
The Teacher from the Black Lagoon	Mike Thaler
Gator Pie	Louise Mathews
Eating Fractions	Bruce McMillian
Dad's Diet	B. Comber
The Hershey's Milk Chocolate Book	Jerry Palotta
Fraction Fun	David A. Adler

Student Resource Sheet # 8