

Fraction Fun

Summary

These activities allow students to divide regions and sets of objects into parts using a variety of models and illustrations.

Materials

Fraction Journal

Four paper CD holders

Circle Fractions

Four squares of paper cut 4 3/4" to fit inside the CD envelopes for each student

Yarn or string 18" long

Trace the fraction circles that represent 1/2, 1/4, 1/3, 1/6, onto the squares that have been cut to fit inside the CD holders. Students can color them a variety of different colors or patterns. (Diagram 1)

Slide the squares in the holders. Have students write simple statements that relate to each specific fraction around the outside of the circle. (Diagram 2)

Stack the paper holders together. Bind them together with a piece of string or yarn to create a small fraction journal. (Diagram 3)

Students use this journal for reference when discussing fractions.

Fraction Action

Chart paper

- [Animal Graph Pictures](#) pdf

Crayons

Scissors

Glue

Instructional Procedures

Fraction Circles

- [Fraction Circle Template](#) pdf

Scissors

Ziploc bag

1/2 Alias 2/4

Poster boards

Tape or glue

Chart paper

Overhead projector

Overhead fractions pieces

Take My Order Please ---Build A Pizza!

Fraction Circle pieces

Fraction dice

Paper

Crayons/colored pencils

- [Build a Pizza](#) pdf

Serve Up Fractions!

6-inch paper plates

Scissors

Crayons

Small board

Nail
Hammer
Fraction Circle pieces

Additional Resources

Books

- *Fraction Fun*
, by David Adler; ISBN 0823412598
- *The Doorbell Rang*
, by Pat Hutchins; ISBN 0688092349
- *Give Me Half*
, by Stuart Murphy; ISBN 0590136917
- *Fraction Action*
, by Loreen Leedy; ISBN 082341244- X
- *Funny and Fabulous Fraction Stories*
by Dan Greenburg; ISBN 059096576-X

Background for Teachers

One-fourth...One half...One third...whole...what are they? They are fractions! A fraction describes a *part of a whole* when the whole is divided into equal parts. Fractions can also be *parts of a group*. For example, if there is a group of animals consisting of six cats and three dogs, what fraction of the group are dogs? There are nine parts and three dogs...three out of nine are dogs. The fraction is written as $\frac{3}{9}$.

Important mathematical vocabulary should be taught and used by the teacher. The following are important vocabulary concepts for 4th grade students.

Fraction: A fraction describes a part of a whole.

Denominator: The bottom number in a fraction tells how many equal parts are in the whole.

Numerator: The top number in a fraction that tells how many equal parts the fraction represents.

Equivalent fraction: Fractions that are equal and represent the same amount. ($\frac{2}{4} = \frac{1}{2}$)

Improper fraction: The denominator is greater than or equal to the numerator.

Mixed Fraction: A fraction that is a whole number and a fraction. ($3 \frac{1}{4}$)

Intended Learning Outcomes

1. Develop a positive learning attitude toward mathematics.
4. Communicate mathematical ideas and arguments coherently to peers, teachers and others using the precise language and notation of mathematics

Instructional Procedures

Invitation to Learn

Fraction Action

The objective of the activity is for the students to create a picture graph and create fractions from the results.

Each student will select a picture that represents an animal they would like for a pet using *Animal Graph Pictures*.

Students color the picture, cut it out and place it on the graph. Discuss the results of the graph.

Guide the students to understand that the number of pictures on the graph represents the denominator of a fraction or the number of equal parts in the entire graph.

Demonstrate a few fractions such as 10 out of 22 animals are dogs. Write it as a fraction $\frac{10}{22}$.

Ask each student to share his fractions with the class. If the students haven't discovered it, point

out the fractions in just one column.

Instructional Procedures

Distribute fraction circle pieces to each pair of students. If using the *Fraction Circle Template*, have students cut templates out. Save fraction circles to use for other fraction activities. Give students time to manipulate the materials, reminding students to make notes about anything they notice as they "play" with the materials.

Share observations with their partner.

Facilitate a discussion about their observations.

a. Did you notice anything that was the same about these fraction pieces?

b. What was different?

c. Did you notice any two pieces that covered the same area?

d. What different combinations can you use to make a whole piece?

If needed, review the basic concepts of fractions. Remind students that fractions represent a part to whole relationship.

Demonstrate, as needed, with the circle fraction pieces. For example: $\frac{2}{4}$ is the same as 2 of the 4 pieces that make the whole. $\frac{3}{4}$ is the same as 3 of the 4 pieces that make the whole.

Use the words *numerator* and *denominator* informally to discuss the parts of a fraction number and what they mean.

Exploration by Discovery -- Naming Fraction Circles

Have the students sort the parts of their fraction pieces by color, putting each color in a separate group. Ask the students to find the largest piece (whole circle).

Ask them describe the circle, directing them to name it as one whole. Talk about this shape as one whole region.

Next, ask the students to find the two pieces that cover the whole region. Have them hold up the halves and arrange the pieces to form a circle. Direct discussion about what students notice about these pieces demonstrate on overhead. Lead students to recognize that the pieces fit together to form a whole circle, that both pieces are the same size (equal parts), and that each piece is a half. Encourage them to compare and describe the pieces they have named so far. (Answer: 1 whole = 2 halves.)

Direct students to find the corresponding pieces in their sets. Ask, "What part of a circle is each piece?" (Answer: $\frac{1}{2}$) Ask them to think about what each number in the fraction might represent in each piece. (Answer: $\frac{1}{2}$) Ask them to think about what each number in the fraction might represent, reminding them that the denominator tells the number of parts in the whole, and the numerator tells the number of parts counted.

Continue guiding and questioning students as they identify thirds, fourths, fifths, sixths, eighths, and tenths.

Informally assess the students understanding of "parts of a whole" by observing them during the exploration and manipulation section of the activity.

Exploring Equivalent Fractions $\frac{1}{2}$ Alias $\frac{2}{4}$

Place students in groups of four.

Distribute fraction pieces.

Students are to place the " $\frac{1}{2}$ " piece on the left side of the pizza circle and use any of their other pieces to complete the right side of the circle.

All of the pieces need to be of the same size and color on the other half.

Say, "Find all the fraction pieces that are equivalent to one-half."

Each time a student discovers an equivalent fraction they will trace the equivalent fraction pieces on chart paper.

Students will repeat this activity until all equivalent fractions to $\frac{1}{2}$ have been discovered and recorded. (5 equivalent fractions)

After exploring, instruct each student to choose one of the equivalent fractions they discovered to record on the pizza circle on the *1/2 Alias 2/4 activity sheet*. Color and record the fraction in the space provided.

Have students share their findings. When list is complete, highlight to the class that even though these fractions look different, they are all names for $\frac{1}{2}$.

Instruct students to divide their poster board into fourths. Each student will have $\frac{1}{4}$ of the board to display their work.

Next, students will glue her *1/2 Alias 2/4 activity sheets* in their $\frac{1}{4}$ space. Remind them to leave room in their space for the *Pizza Circle recording sheet*. Encourage them to decorate their poster to look like a pizza.

Take My Order Please ---Build A Pizza!

Distribute fraction circle pieces, fraction dice, sheet of paper, and crayons/colored pencils to each pair of students.

The first player rolls the die and places the fraction pieces which correspond to the number rolled on to the "whole" fraction piece.

Continue to take turns until the "pizza" circle is completely covered with fraction pieces.

A player may either add pieces to the circle or replace a piece (s) on his turn.

Skip a player's turn if he rolls a fraction that cannot fit the circle.

When the pizza circle is complete, each student will record his the final circle, tracing the fraction pieces on the Build a Pizza activity sheet. Write the fraction in each section of the completed circle ($\frac{1}{4}$ - Cheese + $\frac{2}{8}$ = pepperoni + $\frac{2}{6}$ = tomatoes + $\frac{3}{12}$ = Olives = 1 whole).

Color finished pizza according to their desired pizza toppings.

Each student places his or her finished *Build a Pizza activity sheet* on his or her $\frac{1}{4}$ of the poster. Display poster.

Serve Up Fractions!

A fast, efficient and easy way to mark the radius of 30 plates in 3 minutes or less!

Before activity do the following:

Measure exact radius on one six-inch plate

Place small, flat board on a solid surface.

Stack about 10+ plates on the board, pattern on top

Gently drive nail through the radius hole and through the stack of plates

Repeat using another "hole in the middle " plate as a guide

Color one paper plate, topside only. (A peeled crayon works fast and efficiently)

Cut a slit from the outer edge of the plate to the hole in the center (radius) of the plate.

Place one plate on the other plate aligning the slits and pull the bottom plate's edge through the top plate's slit, overlapping the plates and then rotating the plates. The bottom plate should now slide around the top plate.

Provide each group with Fraction Circles (commercial) or *Fraction Circle Template*. The cardstock templates can be pre- cut and re-used by the teacher.

Activate Prior Knowledge: Relate the whole fraction circle plate to a large, yummy cookie.

Explain that we will see how big of a piece of cookie each person gets. Make up interesting "food/ cookie" problems when giving fractions.

Students will respond to the teacher's requested fraction by displaying the fraction on their circular fraction model plate.

The teacher will say, "Show me $\frac{1}{3}$ (color). One-two-three- go." After about 10 seconds say, "One-two-three-Show." Direct everyone to hold up his or her plates. Students should have slid the paper plates around so that one-third of the color called out shows. Ask students, "Does yours look like mine?" while showing the class the correct answer. If not go ahead and make necessary adjustments.

Continue with the game by requesting students show fractions less than one whole. Use the "one-two-three-go" and "show" steps to visually check for accuracy.

Students can use Fraction Circles to check for accuracy by placing the tip of the chosen fraction piece on the radius hole. The templates fit the 3" inner circle and provide an accurate self-checking tool.

Students can do the activity independently, using the templates to check for accuracy.

Pair up students and challenge each other to create the fraction requested by their partner.

Use templates to check accuracy.

Fraction plate can also be used to review telling time.

Extensions

Ask students if they can think of any other names for $\frac{1}{2}$ even though they may not have the fraction pieces available.

Make up word/story problems using fractions.

Compare and contrast the different size of the fractions pieces. Order them from smallest to largest.

Family Connections

Students instruct family members how to construct a fraction plate and create fraction games to play with the family.

Play Frac-tominoes and Fraction Hunt with family.

Assessment Plan

Ongoing teacher assessment by observing accuracy in completing student resource pages, proper completion of fraction activities, and proactive participation in groups.

Students draw and shade in equivalent fractions, $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{3}$.

Assess students with shapes other than circles.

Teacher will observe students during the plate model activity making sure that the students made the necessary adjustments as needed.

Bibliography

Research Basis

Tharp, R.C., (1997). From at-risk to excellence: Research, theory, and principles for practice.

Retrieved January 10, 2007 from <http://www.cal.org/crede/pubs/>

Current research states that it is important to meet the needs of culturally diverse and other at-risk students by providing a challenging curriculum. It also requires careful leveling of tasks, so that students are stretched to reach within their zones of proximal development. Small groups, hands-on activities, and instructional conversations with the teacher make teaching a collaborative experience between teacher and student.

Dalton, S.S., (1998). Pedagogy Matters: Standards for effective teaching practice, *Research Report No. 4*, Center for Research on Education, Diversity & Excellence, University of California, Santa Cruz. When experts and novices work together toward a common product or goal and have opportunities to converse about the activity (Moll, 1990; Tharp & Gallimore, 1988; Wertsch, 1985), learning is a likely outcome. Current research on cooperative learning shows that students, especially minority students, who participate in integrated classrooms, increase their academic achievement, motivation, self-esteem, and empathic development.

Authors

[Utah LessonPlans](#)