Stirring up Fractions

Summary

These activities have students separate geometric shapes into halves, thirds, and fourths.

Main Core Tie

Mathematics Grade 2

Strand: GEOMETRY (2.G) Standard 2.G.1

Materials

Let's Get Cooking

Recipe boxes

- Let's Get Cooking Recipe Cards (pdf)

Manipulatives

- Let's Get Cooking Work Mats (pdf)

GRAB My Fair Share

- *Divide and Ride*

Manipulatives

- Grab My Fair Share Recording Sheet (pdf)

Eating My Part

- *Eating Fractions*
- Eating My Part Pastries (pdf)
- Eating My Part Fraction Cards (pdf)

Additional Resources

Books

- *GO, Fractions*
  , by Judith Bauer Stamper; ISBN 0-448-43113-0
- *Piece+Part=Whole*
  , by Scott Gifford; ISBN: 0-439-74054-1
- *Safari Park*
  , by Stuart J. Murphy; ISBN: 978-0-06-446245-7
- *Seven Blind Mice*
  , by Ed Young; ISBN: 0-590-46971-1
- *Pizza Counting*
  , by Christina Dobson; ISBN: 0-439-63243-9
- *Give Me Half!*
  by Stuart J. Murphy; ISBN: 0-590-13691-7
- *Fraction Action*
  , by Loreen Leedy; ISBN: 0-8234-1244-X
- *Fraction Fun*
  , by Davis A. Adler; ISBN:0-8234-1341-1
- *The 512 Ants on Sullivan Street*
  , by Carol A. Losi; ISBN: 0-439-79854-X
- *Pizza Pat*
  , by Rita Golden Gelman; ISBN: 0-679-99134-4

- *Divide and Ride*
  , by Stuart J. Murphy; ISBN: 978-0-06-446710-0
- *Eating Fractions*
  , by Bruce McMillan: ISBN: 0-590-43771-2

Background for Teachers

The most important aspect of fractions is learning and understanding the relationship of part to whole. Students should be able to understand parts of a whole within solid objects and parts of a whole of a given set. They need to understand how many in each group when separating given sets into equal groups and represent the answer as a fraction. Finally, students should be encouraged to apply their knowledge of parts of a whole and separating given sets to solve word problems that have meaning in their lives. Through continuous practicing of these concepts, students will gain a clearer understanding of relationships of part to whole and representing it as a fraction.

Intended Learning Outcomes

1. Demonstrate a positive learning attitude towards mathematics.

Instructional Procedures

Invitation to Learn

As the students come to class, ask them to graph a pastry on the graph in the front of the room. Have four or five choices to pick from (e.g., apple pie, blueberry muffin, glazed donut, chocolate chip cookie, granola bar). Have each student pull a picture of a pastry out of a Krispy Kreme box. Have each student attach his or her pastry to the graph. Talk to the students about the different choices that are represented on the chart and how many people are in each one. Talk about the different main ingredients that are in the different choices. The teacher can ask a certain "pastry" group questions about them. For example, have the apple pie group come up in front of the class and ask "How many of you like red apples?" You may want to have only four students come up. Talk about the fraction that is represented.

Instructional Procedures

Let's Get Cooking

This is an activity that connects identifying parts of a whole with separating given sets into equal parts in a word problem format.

Ask students if they have ever seen their mom make an apple pie. Show students that you have brought ingredients today to make pies. Show the students a basket of 10 apples. Lay out five pie tins and mention you want to make five pies. Invite the student to help you separate the apples into the pie plates so that each pie has an equal amount of apples. Ask students how they were able to determine how many apples would be in each pie.

Continue this activity changing the number of apples to separate. You can also change the types of fruit for the pies.

Tell the students they are going to be chefs today and are going to be separating things into equal groups.

Put students into groups of four. Give each group a recipe box loaded with *Let's Get Cooking Recipe Cards*, a tub of manipulatives and *Let's Get Cooking Work Mats* for each group of students.

Have students work in cooperative groups pulling out recipe cards and working together to solve the problem using the manipulatives and work mats. Invite the students to share with each other how they came up with the amounts for each group.

Walk among the groups and ask students how they got their answers. Ask them how many apples were put in each pie pan to share the apples equally. Remind the students to re-read the

card and answer the question on the card.

After sufficient practice as a group, have students answer cards individually then pass the card to the person sitting on their right. The students continue to do each of the cards in their group.

For as many sessions as necessary, provide students with the recipe box and different situations to answer. You can continue with the cooking theme or use questions that would be of interest in your class.

When the majority of students are proficient at solving the problems with manipulatives, hand out the recipe cards again and do the same activity asking students to make a picture or use words to solve the problem rather than using the manipulatives. Some students may need to use the manipulatives to help them make the picture. Walk around observing the work and invite students to come up and share their pictures and explanations with the class.

To reinforce understanding of how many are in each set, each day--or one day per week--place one of the cards under a desk or chair of a student for either the student or the class to solve as the problem for the day. Have students explain how they solved it.

GRAB My Fair Share

This is another option for helping students understand how many are in each set.

Read *Divide and Ride*. Explain to students that they are a part of the equal group. Have students get into groups of two, three, or four players. Have the students select a manipulative from the tub to use. A student takes a handful of manipulatives. Each student needs a *Grab My Fair Share Recording Sheet* to record points.

Each student tries to separate his/her handful of manipulatives into two equal groups. If it can be done, they score two points. Next, students try to separate their same handful into four equal groups. If they can, they score four more points. If a student can make equal groups of two and four then he/she goes to the bonus round where they will be separating them into equal groups of three. If successful, they get a bonus of three points. When that player's turn is finished, the next player takes a turn.

Talk about the different amounts that were best to grab. Ask which would earn them the highest points? Keep playing the game. Circle the numbers that score the most points.

Discuss the numbers that are best for sharing into equal groups.

Eating My Part

This activity gives students practice in separating geometric shapes into halves, thirds, and fourths.

Read *Eating Fractions*. Tell the students to look at the different fractions shown in the book, (1/2, 1/3, 1/4). Discuss how each of the parts makes a whole.

Tell the students that they are going to get to make their own pastry. Provide students with *Eating My Part Pastries*. Have the students color or decorate their own pastry that will be shared with the class.

Once the pastries are completed then give them an *Eating My Part Fraction Card* that will tell them how to separate their pastry. This will allow the teacher to take a quick visual assessment to see if the student understands parts of a whole. Ask the students to tell how many parts of their pastry they would get.

Make a class bakery display where the students put all of the pastry fractions into nice displays of fraction sets. (e.g., All of the halves together, all of the thirds together, etc.).

Extensions

The teacher may need to adapt the recipe and fraction cards for differentiated learning in the classroom.

Some students may need more practice with manipulatives before moving onto the symbolic level.

Print out a "fill-in" format for students' journal entry for those who have writing difficulties.

A struggling reader may need to have more pictures with the words. Have a "student" partner that will assist them in the reading portion of the cards or have the students work with a partner when doing the manipulatives.

An accelerated learner may need to have recipe and fraction cards that are higher numbers and a little more difficult to figure out. The learner can create his/her own separation problem and illustrate it. Allow them to share it with a friend or the class.

Have students keep a fraction journal to write down the different ways that they have seen parts of a whole in real life. Have them draw a picture if they cannot explain it in words.

Family Connection

Have students bring a small paper bag full of items that need to be divided out. Remind the students that the items that they bring will not be returned. Have them create a recipe card for their item. Bring to class and share.

Have students practice sorting socks into equal piles, the laundry, or other household items.

Assessment Plan

Journaling Activity: Have students write about what their favorite pie would be. Have them tell how many apples or whatever fruit they choose to begin with. How many pies would they make? How many pieces of the fruit would go into each pie? Would there be any left or would they be separated evenly?

Use the pastry picture as a pre-assessment to the level of understanding a student has for simple parts of a whole.

Having a student do the problem of the day with the recipe card under their desk each day will allow for a formal assessment of the level of understanding of the individual personally.

Use the problem of the day recipe card activity to make a quick informal assessment. A variation of this would be to have the student that received the card, read it and have the whole class show how to solve it and have them turn it in to the teacher.

When the students are playing *Grab My Fair Share*, the teacher can roam the room and make a quick visual assessment of understanding of the students of dividing into equal groups.

Bibliography

Research Basis

Carpenter, T.P., Frank, M.L., Jacobs, V.R., Fennema, E., & Empson, S.B. (1999). *Children's Mathematics: Cognitively Guided Instruction*, Heinemann, Portsmouth, NH. 28, 41.

Direct Modeling is a common strategy that students' use when learning to do mathematical problems of any kind that paves the way to more counting strategies. It is common for children's mathematical thinking to naturally attempt to model the action or relationships in math problems. They first directly model the situations or relationships with physical actions or relationships are at first somewhat visible but become less visible as children's thinking matures. Thus, children's solution strategies are, first, exact models of problems. As thinking progresses to using more counting strategies, their representation becomes more abstract.

Johnson, D.W., and R.T. Johnson. *Learning Together and Alone: Cooperative, Competitive and Individualistic Learning* (5th edition). Boston: Allyn and Bacon, 1999.

Cooperative learning enhances students' enthusiasm for learning and their determination to achieve academic success. Cooperative learning provides unique learning experiences for students and offers opportunities for students to learn through speaking and listening processes as well as through reading and writing processes. In cooperative learning situations, students interact, assist one another with learning tasks, and promote one another's success. Students are held accountable for their own academic progress and task completion.

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