

Improving Teacher Quality Program

Mathematics Within: Algebraic Processes and its Connections to Geometry

Renee Jaroscak

Context of the lesson:

- 1. Explain where this lesson occurs within a unit or series of lessons. Describe what led up to this lesson and what will follow.**

This is an introductory activity/lesson for the fifth grade fraction/decimal/percentage unit.

- 2. What is the purpose of this lesson?**

The purpose of this lesson is to engage, motivate, and reconnect students to previously learned fraction concepts; and to provide grouping foundation and context for future fraction/decimal/percentage exploration.

- 3. What do you anticipate taking place?**

Interested students will be working together and supporting each other in small groups, individually, and as a whole class.

- 4. What strategies or techniques will you use to monitor learning?**

Learning will be monitored by teacher observation, discussion, participation, written work, drawings, manipulative demonstration, checklists, and conferencing.

- 5. How will you know if students have achieved the objectives?**

I will know that students have succeeded by observing their actions and responses to instruction, and by verbal and written explanations, including drawings.

Improving Teacher Quality Program

Mathematics Within: Algebraic Processes and Its Connections to Geometry

Renee Jaroscak

Broad Topic: Integrating math within the school day especially during transitions and other spontaneously appropriate teaching times

Subtopic: Fractions leading into decimal and percentage equivalencies and operational work

Grade Level: 5

Time Frame: 20 or more days

Aim: To reinforce topics/concepts (fractions) learning during the regular math period for the purpose of building fluency, memory storage and retrieval, application, connections, student comfort, motivation, success, and fun.

Specific Objectives:

- Identify & Define fractions
- Label the parts of a fraction
- Express fractions in multiple ways
- Identify and create equivalencies
- Combine (add) and subtract fractions

Materials/Supplies:

- | | |
|---|--|
| <ul style="list-style-type: none">• fractional parts (pie pieces - $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{6}$), each on a string• whole pie outlines• markers• paper/pencil/scissors | <ul style="list-style-type: none">• overhead transparencies and projector• large drawing of a pie (family circle) outline on the board or chart paper |
|---|--|

References:

- Name That Portion (Investigations math curriculum)
- fraction posters
- Calendar Math bulletin board

Day 1

Desks have been prearranged to correspond with the number of like denominators represented by fraction pieces each student receives. Desks will remain like this and students will sit at the same place during the fraction/decimal/percentage unit.

1. Each student will pick a string with a fractional piece out of a container. "Please wear this '10' around your neck during class time for the next several weeks."
2. Teacher will say, "Look at your 10. Group yourselves into families. Try to find other family members. Talk together and be ready to explain why you are a family, and what your family has in common. If they group according to color, ask them to see if they can find another way that has nothing to do with color. When they are grouped according to common denominators, then continue."
3. After they have discovered their grouping, ask them to find a "house" (prearranged group of desks) with exactly the right number of chairs for each member. Pass out whole pie outlines (family circles).
4. Ask them to create a family name for themselves, i.e., Silly Sixths, Fabulous Fourths, Thrifty Thirds, etc. Instruct them to label their pie outline and place (draw) themselves together within the "family circle," labeling each fraction piece with their own first name and fraction 10. Then, ask them to identify the quantity that represents their family and place this number under the name label on the whole pie paper.
5. When this is complete pose these discussion questions: How would you describe your family mathematically, in terms of your "family circle?" Is your entire family circle covered? Could you write this using numbers? Numbers and words? Pictures? Would you share this with the class? How did you get your answer? How would you describe the part not filled in by family members? Are there any other ways you could express these relationships, mathematically?

Day 2

On a large sheet of chart paper before your Morning Meeting (ala Responsive Classroom) write Numerator at the top of one column and Denominator on top of the other. Write these instructions above the columns: "Put your name underneath the column where it belongs. Do not discuss this with anyone. Try to make a decision that makes sense."

1. At the start of the class, ask students to read and follow the instructions on the chart paper. Don't say anything else. Let them try to figure it out and make their own sense of it.
2. When they are done, read out loud the names under each column.
3. Ask, "Why did you place your name under the column of your choice?"
4. After awhile ask them, "Could you reasonably place your name under both columns?"

5. Everyone will be validated who has an explanation. Use this discussion to further explore what a numerator and denominator are, writing words and definitions in a prominent place within the classroom.

Transition spin-offs during the day: "Would a family with a numerator of 3 pass out the handouts?" "If your family members equal $\frac{1}{2}$ please line up." "Denominators of 8 put the desks away." "If you family is more than $\frac{1}{2}$ of your family circle would you go to the spelling station?"

Days 3 through 20 or more: Possible Ideas

1. Together draw a picture (not abstract) using your family's IDs (use as many as you need- you may use each piece more than once). Then ask: "How would you represent the total ID's used mathematically?" "Find a group who used less (more). Can you express the difference mathematically?" "How might you combine your ID's to create a picture and express this mathematically? Try it."
2. "Find other students you can combine with to create $\frac{1}{2}$ or 50%, $\frac{3}{4}$, 2, etc."
3. Newspaper activity (i.e., StarTribune): "Try to find your numerical name somewhere in the newspaper. Be ready to explain to the class how it is used in the newspaper and what it means within context." *Prepare a bulletin board beforehand to display the "Family Circles," webbing related information about each family in a designated area around the circle. Place the newspaper info within their family area. Challenge them to find other related facts, information, pictures, graphics, etc. in school, at home, or anywhere to place in their "web site."*
4. Tell the groups that when one of their family members is absent their name will change for the day (i.e., $\frac{4}{6}$'s to $\frac{3}{6}$'s).
5. Have each family suggest a possible lunch selection using their family name for the quantity, write to the lunch coordinator proposing the use of this food, offer to make a poster representing the mathematical portion to display along with the food in the lunchroom, and then serve it to the student population (i.e., eighth day - $\frac{1}{8}$ of a pizza, half day - $\frac{1}{2}$ of an orange, fourth day - quarter-pound hamburgers, etc.).
6. Regroup, using color families. Explore greater than, less than, create equivalences, add, subtract, etc.
7. Designate each Friday as a "family" day. If it is the fourth's turn, then exploration, emphasis, games, treats, etc. will have to do with fourths. Let each family plan their own day.
8. "Are there any other families that you're related to? How? Explain. Is it possible that you could be related to everyone? If so, how? Which families might be closer (i.e., analogies: cousins, grandparents, etc.)?"
9. "How could you find out how many more family members you would need to fill your circle and make one whole? Show us. Why is it that the fourths only need one more member to make a whole and the eighths need three and yet the fourth's 4 equals the eighth's 8? Does it make sense to say that $\frac{4}{4} = \frac{8}{8}$? Why? Is there a rule here? etc.

10. "Is there a way to combine two families with unlike denominators? Try it. How? Explain."
11. "If there were three other families with the same name (denominator) and number of family members, could we find the total of all three? How? What about 8 families? 15?"
12. During the day when lining up, etc., refer to the students using their fractional parts. "Would the thirds and eighths line up?" Later, as the days go by, this can get more complex, i.e., "If you are half of $1/3$, please line up." "If you are larger than $3/16$... (some place in the room, provide manipulatives for use at any time).
13. Find another way to represent your family group, mathematically. Use edible manipulatives such as: Goldfish, raisins, nuts, Chex, Cheerios, oyster crackers, tootsie rolls, breadsticks, saltines, graham crackers, etc.
14. Introduce decimals and percentages: Sometimes there are different ways to say the same thing, i.e., synonyms (walk, talk, etc. - ask students to suggest synonyms for these). Also, names are spelled and pronounced differently in different languages/countries (i.e., John, Jacques, Sean, Johann, Jose, etc.). Depending upon where you are or what you are doing (context), usage will change. It's like that with percentages, fractions and decimals. After more work with this, place the percentage and decimal equivalencies to their family circles on the bulletin board.

Application/assessment:

- observation (use of manipulatives and verbal reasoning abilities) -- student written response, drawings, and graphic representations -- group discussion
- individual conference
- several small formal assessments throughout the unit