Fractions: Sample Lesson Grade 3

Oklahoma C3 Standards: 3.NF.1; 3NF.3b; 3.NF.3d; 3.G.1; 3.G.2; MP.2; MP.4; MP.5

This lesson addresses the above standards and builds a foundation for understanding fractions and equivalence. Students need multiple exposures to and work with fractions using concrete models and pictorial representations prior to achieving procedural fluency.
Adapted from *Lessons for Introducing Fractions* by Marilyn Burns

Stage	Actions	Resources
Engage	Give students time to explore the pattern blocks. As them to categorize the blocks in some way according to attributes of the shapes. Once each students has the blocks categorized, discuss the names of each of the pattern blocks: Triangle Square Parallelogram Rhombus Trapezoid Hexagon **Could any of the pattern blocks be called more than one of the names you listed on the board?** (Listen as students talk about the difference in parallelogram, rhombus, quadrilateral, etc.)	**Pattern Blocks**
Explore	**Your task is to find different ways to put blocks together and build hexagons that are exactly the same size and shape as the yellow hexagon.** Demonstrate using the two trapezoids to equal the hexagon. Discuss the term congruent. Students should find all possible combinations of blocks used to make 1 hexagon, first using only blocks that have equal areas. For example, the trapezoid represents the hexagon partitioned into 2 parts each with equal area. The area of each part is ½ of the area of the hexagon. (1 whole is portioned into 2 equal parts.) The other combinations with equal areas are listed below:	**Pattern Blocks**

2 red trapezoids
6 green triangles
3 blue rhombi

Next, ask students to explore all possible combinations of blocks used to make 1 hexagon. In addition students should not count a different arrangement of the same pattern blocks as a different way. Do not tell the students that there are 7 different ways, or 8 if you count the yellow hexagon:

1 yellow hexagon
2 red trapezoids
6 green triangles
3 blue rhombi
1 red trapezoid, 1 blue rhombus, 1 green triangle
1 red trapezoid, 3 green triangles
2 blue rhombi, 2 green triangles
1 blue rhombus, 4 green triangles

After several groups have solved the problem, ask students to describe solutions and record them on the board. Have each group check to see if they built that arrangement.

Explain

After the students have shared their solutions to the task ask students the following questions:

Write ½ + ½ = 1 on the board.

Who can tell me which of the arrangements this mathematical sentence describes? What do we know about the area of each part? How many halves are equivalent to 1 whole?

Next write 1/3 + 1/3 + 1/6 +1/6 = 1.

Talk to your partner about which arrangement this sentence describes. Is there a way we can combine the fractions to shorten the sentence? Use the models to demonstrate your reasoning.

On a sheet of paper, list the ways that you built the hexagon.
Next to each one, write a fraction sentence that describes what you built.

	How did you determine which fractions to record? **What does the numerator represent?** **What does the denominator represent?** **What does the hexagon represent?**	
Elaborate/ Extend	Tell students that they will play the game *Eliminate* to apply what they have learned. **The idea is to be the first to get rid of your pattern blocks. When one student eliminates all of the blocks, the game is over. To start, each person has to take one, two, or three hexagons. You can decide how many to use, but both partners have to start with the same number. You will use a die with fractions labeled on each face. You have three choices: you can remove a piece that represents the fraction that you rolled, make an exchange that is equivalent, or do nothing.** **Before you begin, what do you think is the least amount of rolls that would allow you to remove all of the pieces?** After all students have had an opportunity to play the game, ask students to respond to the following questions: **How many thirds are there in the whole?** **How many sixths are in the whole?** **If you know that 2/6 = 1/3, how many sixths are in 2/3?** **What strategy did you use to remove your pieces first?** **How many sixths are in 3/3?** **What is another way to write 1 whole?**	**Pattern Blocks** Fraction dice (1 pair of fraction dice labeled ½, 1/3, 1/3, 1/6 1/6, 1/6 per pair of students). These can be made using cubes and round sticky labels.
Evaluate	Assess students informally as they build their hexagons, explain their combinations, and play the game of Eliminate. Students need multiple exposures to and work with fractions using concrete models. The Fraction Exploration pages can also be used to assess student understanding.	

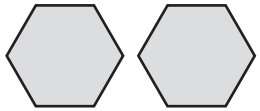
Fraction Exploration

Use the hexagon to represent one whole. As you go through the tasks, continue to use the hexagon as a whole and place the other blocks on top of the hexagon when building.

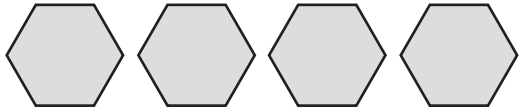
Exploration 1:

How many trapezoids does it take to make one whole hexagon?

Build 2 wholes using the trapezoids. How many trapezoids did it take? Is there another way to write 2 wholes?



Place 4 trapezoids on top of the hexagons. Record your observations? Is there another way to write the quantity shown?

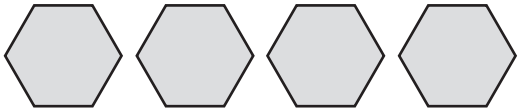


Use the hexagon to represent one whole. As you go through the explorations, continue to use the hexagon as a whole and place the other blocks on top of the hexagon when building.

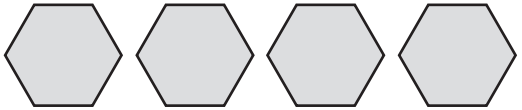
Exploration 2:

How many rhombi does it take to make one whole hexagon?

Build 4 wholes using rhombi. How many rhombi did it take? Is there another way to write 4 wholes?



Place 9 rhombi on top of the hexagons. Record your observations? Is there another way to write the quantity shown?

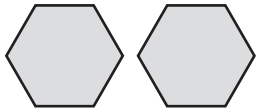
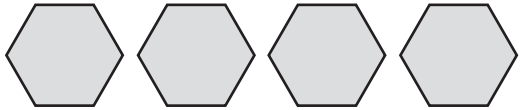


Use the hexagon to represent one whole. As you go through the tasks, continue to use the hexagon as a whole and place the other blocks on top of the hexagon when building.

Exploration 3:

How many triangles does it take to make one whole hexagon?

Build 2 wholes and draw a picture of what you built. How many triangles did it take? Is there another way to write 2 wholes?



Place 18 triangles on top of the hexagons. Record your observations? Is there another way to write the quantity shown?