**Main Problem #1**

Topic: *Introduction to Fraction*

Problem: Donatello, Michelangelo, Leonardo, and Raphael are four brothers who love eating New York Pizza on Friday nights. This upcoming Friday, the brothers decide to play a game to see who can eat the most pizza slices. For this challenge, they decide to buy 4 pizzas, one for each, and cut each pizza into a different number of slices.

Donatello likes to eat his pizza a third at a time, so he cuts it into 3 equal pieces. Michelangelo eats his pizza a fourth at a time, so he cuts it into 4 equal pieces. Leonardo likes to savor the taste of his slice so he eats his pizza a sixth at a time, and finally Raphael takes his time and eats an eighth at a time.

At the end of the night, Donatello ate 2 slices of his pizza, Michelangelo ate 3 slices of his pizza, Leonardo ate 3 slices of his pizza, and Raphael ate 6 slices of his pizza.

Q1. Who at the most pizza? Justify your answer with a picture and explanation.

Q2. What fraction of the pizza did each person eat, and what fraction was remaining from each pizza?

Q3. If all 4 brothers were to have finished eating their pizza, who would have eaten the most?

A1 & A2: The basic approach to this problem would be to draw several figures - divided into equal shared pieces - that correspond to one of the scenarios listed above. Below are 4 Fraction Circles “cut” into different parts. Note that students could use other shapes to depict the problem as long as the figures are divided into equally sized parts.

*Finished*

Donatello: 2 slices of $\frac{1}{3}$= 2 sections of $\frac{1}{3}$= $\frac{2}{3}$

Michelangelo: 3 slices of $\frac{1}{4}$= 3 sections of $\frac{1}{4}$= $\frac{3}{4}$

Leonardo: 3 slices of $\frac{1}{6}$= 3 sections of $\frac{1}{6}$= $\frac{3}{6}$

Raphael: 6 slices of $\frac{1}{8}$= 6 sections of $\frac{1}{8}$= $\frac{6}{8}$

By looking at the 4 drawings, the Fraction Circles with the portions most shaded, relative to their size, are the second and fourth circles. Students will learn about equivalent fractions in further lessons, but for the meantime, they should understand that some fractions “look the same” as others, in terms of size, despite being written differently. Therefore, Michelangelo and Raphael ate the most pizza.

*Remaining*

Donatello: 1 slices of $\frac{1}{3}$= 1 sections of $\frac{1}{3}$= $\frac{1}{3}$

Michelangelo: 1 slices of $\frac{1}{4}$= 1 sections of $\frac{1}{4}$= $\frac{1}{4}$

Leonardo: 3 slices of $\frac{1}{6}$= 3 sections of $\frac{1}{6}$= $\frac{3}{6}$

Raphael: 1 slices of $\frac{1}{8}$= 1 sections of $\frac{1}{8}$= $\frac{1}{8}$

A3: If all 4 brothers were to have finished eating the remaining number of slices, then they each would have eaten one whole (entire) box of pizza. If we assume that the 4 pizzas were of the same size, then all four brothers would have eaten the same amount of pizzas, regardless of the fact that they ate different number of slices. ($\frac{3}{3}=\frac{4}{4}=\frac{6}{6}=\frac{8}{8}$). Therefore, no one would ate more pizza than the other.