**Main Problem #2**

Topic: *Fractions on a Number Line*

Problem: You and your friend were out fishing for salmon in Alaska when all of a sudden your friend’s fishing line starts to shake widely. Your friend calls you and you run to help him reel in the fish. After 2 minutes of intense fishing, a giant Alaskan salmon weighing 60 pounds splashes out of the water. You and your friend are beyond happy, but also hungry, so you both go out to a local fish market to have your salmon cut into 3 giant equally sized pieces. Along the way, three men from different sushi restaurants ask to buy a portion of each piece.

Okinawa Sushi Buffet would like to buy one fourth of the first piece, Tokyo Sushi To-Go would like one fifth of your second piece, and Hosaka Sushi House wants to buy one half of the third piece.

Q1. Assuming your pieces were cut into rectangular pieces, which sushi restaurant bought the biggest portion of a piece? Justify your answer with a number line and an explanation.

Q2. How many pounds of salmon did each sushi restaurant buy? Remember, the pieces are of equal size.

Q3. At the end of the day, what portion of each piece remained? Express answers as fractions and justify with a drawing.

A1. One approach to this problem would be to draw three number lines with endpoint 0 and 1, plot the points, and see which unit fraction is closest to 1. Note that students should draw accurate number lines to depict the right fraction.

Okinawa Sushi Buffet

Tokyo Sushi To-Go

Osaka Sushi House

By looking at the 3 number lines, the unit fraction closest to 1 (i.e. the biggest unit fraction from the three) is $\frac{1}{2}$. Therefore, Hosaka Sushi House bought the biggest portion of a piece.

Another approach to this problem would be to compare adjective-nouns for each portion. Since the adjective for all three is *one*, we only need to compare the nouns. Between a *fourth,* a *fifth*, and a *half,* the biggest fraction would be the *half*, therefore Osaka Sushi House*.* Student should think about the meaning of adjective-nouns in this topic for it will help them think faster when comparing fractions.

A2. For this problem, students should first know that each piece of the 60 pound salmon weighs 20 pounds since they were all cut into 3 equally sized pieces. With this information, students can proceed to the main problem.

Since all requests represent a unit fraction, students can convert the nouns (*fourth, fifth, and half*) into fractions ($\frac{1}{4}, \frac{1}{5}, \frac{1}{2}$). By the definition of a unit fraction, each (sub)piece given to a restaurant represents one part of a whole (20 pound piece) that has been divided into *x* number of pieces. Therefore

Okinawa Sushi Buffet: $\frac{1}{4}$=> 4 pieces

Tokyo Sushi To-Go: $\frac{1}{5}$=> 5 pieces

Osaka Sushi House: $\frac{1}{2}$=> 2 pieces

Using this information, we can calculate the amount of salmon, in pounds, given to each restaurant. Therefore

Okinawa Sushi Buffet: 20 pounds ➗ 4 = 5 pounds

Tokyo Sushi To-Go: 20 pounds ➗ 5 = 4 pounds

Osaka Sushi House: 20 pounds ➗ 2 = 10 pounds

A3: 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 3 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.

Students should shade in the fraction representing the portion each restaraunt requested. The “unshaded” regions represent the leftover portions at the end of the day. Therefore, the remaining amount for the first piece $\frac{3}{4}$, $\frac{4}{5}$for the second piece, and finally $\frac{1}{2}$for the third piece.