**Main Problem #3**

Topic: *Proper Fractions on a Number Line*

Problem: Your friend Julio invited you to join him on a trip to the Caribbean where he recently discovered a hidden cove near Spirit Bay. After 2 hours of exploring you notice a bright golden light at the far end of the cove and, upon arriving, you see a giant treasure chest filled with gold bars. Julio counted 16 gold bars, each of length 10 inches. Before you had the chance to dream about your future expenses, Julio warned you about the curse of *El Espíritu*. According to the legend, you must not take more than half of what you find unless you wish to be haunted for the rest of your life.

Knowing this, you and Julio devised a plan to avoid the curse. You started out by aligning all the gold bars on a line to figure out how much you guys will take.

Q1. How long should the total length of the gold bars be to avoid the curse? Express your answer in terms of inches.

Q2. Out of the 16 gold bars, how many bars will you leave behind? Out of 16, what fraction does do the leftover bars represent? Plot the fraction on a number line.

Q3. Your best friend Maria went on the same trip after you, and she was tasked with the same questions. Repeat Q1 and Q2 for this scenario and plot the fraction for Q2 on the same number line.

Q4. A wandering explorer named Reynaldo came across the treasure when he was exploring the hidden cove. He picked up 3 gold bars and left the cave quietly. Will Reynaldo be cursed? Justify your answer with fractions and a number line.

A1. This question requires a bit of multiplication and division, but it’s pretty straightforward. Since you and Julio are only allowed to take half of what you find, the total amount of gold bars you guys can take is 8 since $(16 ÷2)=8$. The total length of all 8 bars is 80 inches since$(8⋅10 in.)=80 in.$

A2. Since you are only allowed to take half of what you find, you must therefore leave the other half behind. Of the 16 gold bars, you will leave behind 8. The (proper) fraction representation is $\frac{8}{16}$, or $\frac{1}{2}$since $\frac{8}{16}=\frac{1}{2}$. Note: Students will learn about equivalent fractions later on, so it’s recommended that they don’t convert/simplify the fraction. The conversion will make it a harder for them to plot the other points on the number line if they don’t know how to perform such operation.

{THE NUMBER LINE IS ON THE OTHER PAGE}

A3. Q1: Since 8 gold bars were left behind, Maria can only take half of 8 which is 4. The total length of all 4 bars is 40 inches. Q2: To avoid the curse, Maria must leave behind 4 gold bars. Out of 16 gold bars, the leftover amount represents $\frac{4}{16}$, or $\frac{1}{4}$since $\frac{4}{16}=\frac{1}{4}$.

 $\frac{4}{16}$ $\frac{8}{16}$ $\frac{16}{16}$

A4. After Maria’s trip, the remaining amount of gold bars is 4. $\frac{1}{2}$ of 4 bars is 2, meaning Reynaldo can only take up to 2 gold bars. However he decided to take 3 gold bars (one more than half), therefore he took $\frac{3}{4}$of the remaining amount. Thus Reynaldo will be cursed. On a number line, students can plot the points and see where two fourths (red) and three fourths (green) are located.