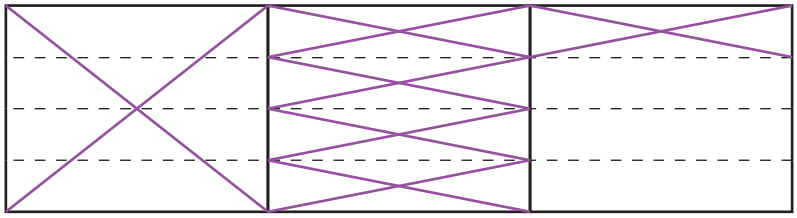
BUILDING A BETTER BIKE

Coosing a Factory

You need to decide between two different factories to manufacture your bike. Each factory makes the tubing in long pieces that are later cut to size. You will need to compare the lengths to the amount you need so that you can decide which factory will have the least amount of wasted material.

Factory A

At Factory A, your top tube will take $\frac{1}{3}$ of a piece of tubing and your seat tube will take $\frac{5}{12}$ of a piece. What fraction of one piece of tubing is used to make a top tube and a seat tube? Use a visual fraction model such as an area model or a bar diagram to explain your answer.



I can divide the whole into 3 pieces and cross off one piece for the 1/3. To get 12 pieces I know that each of the thirds needs to be divided into 4 pieces (3 x 4 = 12). I can now cross off 5 of the small pieces which will be the same as 5/12. If I count up the total number of pieces I have crossed off, I get 9 pieces. If I count up the total number of pieces I get 12 pieces. So, I have used 9/12 pieces, which is the same as 3⁄4.

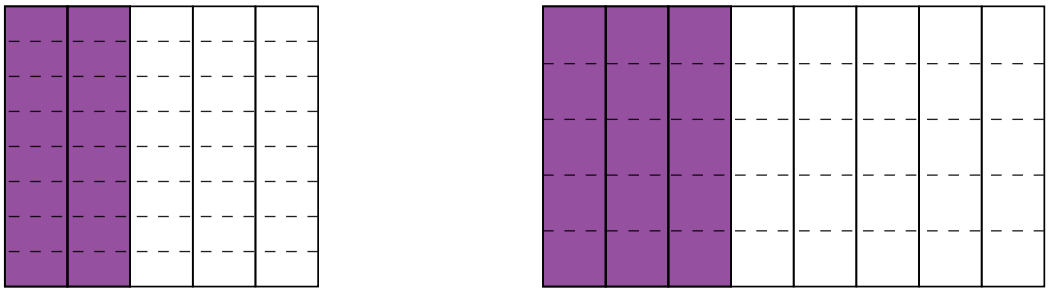
Use equivalent fractions to determine what fraction of the tubing will be left over. Show or explain how you found the answer.

$1 - \frac{3}{4} = ?$ $\frac{(1x4)}{(1x4)} - \frac{3}{4} = ?$ $\frac{4}{4} - \frac{3}{4} = \frac{1}{4}$

I know that 1 is the same as 1/1. To make both fractions have the same denominator, I multiplied the top and bottom numbers in 1/1 by 4. Once I had 4/4 -3/4, I just subtracted the numbers on top and ended up with 1⁄4.

Factory B

At Factory B, your top tube will take $\frac{2}{5}$ of a piece of tubing and your seat tube will take $\frac{3}{8}$ of a piece. What fraction of one piece of tubing is used to make a top tube and a seat tube? Use a visual fraction model such as an area model or a bar diagram to explain your answer.



I can divide the whole into 5 pieces and shade-in two pieces to show the 2/5. I can also divide the whole into 8 pieces and shade-in three of those. I need to divide each of the models in the other direction so that they both have the same number of pieces. Then, I can just add the number of shaded pieces. The model on the left has 16 shaded pieces and the model on the right has 15 shaded pieces for a total of 31 shaded pieces. There are 40 pieces all together, so the fraction used is 31/40.

Use equivalent fractions to determine what fraction of the tubing will be left over. Show or explain how you found your answer.

$1 - \frac{31}{40} = ?$ $\frac{(1x40)}{(1x40)} - \frac{31}{40} = ?$ $\frac{40}{40} - \frac{31}{40} = \frac{9}{40}$

I know that 1 is the same as 1/1. To make both fractions have the same denominator, I multiplied the top and bottom numbers in 1/1 by 40. Once I had 40/40 -31/40, I just subtracted the numbers on top and ended up with 9/40.

Use equivalent fractions to determine the difference in the amount of waste at the two factories. Show or explain how you found the answer.

$\frac{1}{4} - \frac{9}{40} = ?$

$\frac{(1x10)}{(4x10)} - \frac{9}{40} = ?$

$\frac{10}{40} - \frac{9}{40} = \frac{1}{40}$

I know that 1 is the same as 1/1. To make both fractions have the same denominator, I multiplied the top and bottom numbers in 1/4 by 10. Once I had 10/40 -9/40, I just subtracted the numbers on top and ended up with 1/40.

Explain which factory you will use to make your bike and why.

I would have my bike made at Factory A, because it has slightly less waste. Even though it is only 1/40 less than the amount of waste at Factory B it is still less. If you made a lot of bikes and 1/40 more was wasted each time, this would start to add up.