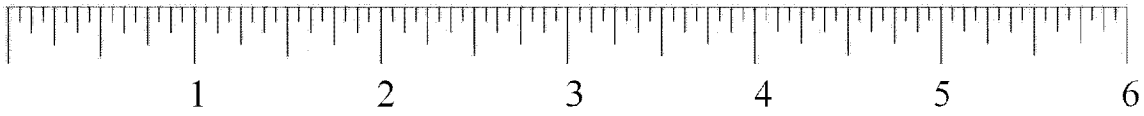
Measuring

History:

When woodworking, we do not use the Metric system, but instead use the Standard, or English system of measurement, meaning we measure in feet and inches, not in centimeters.

In the Standard system of measurement, inches are broken down in to fractions. In this class, we will use rulers which have each inch broken into 16 sections. Each of these sections is $^1/_{16}$ of an inch.



On this ruler, notice that each inch is broken into 16 parts. Also notice that only the inches are numbered. The lines that divide each inch are different lengths, but they are not numbered. If every line were numbered, the ruler would have way too many numbers on it, and would just get confusing.

People often ask why inches are broken into 16 sections, and not 10 or 14 or 19 or anything else. An inch is broken into 16 sections because that is what we end up with if we keep taking half of something.

Before accurate ways to measure and weigh things existed, this was a simple way to divide things into equal portions quite accurately.

Example:

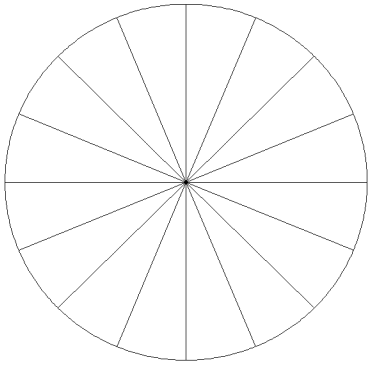
Let's say you had a bucket of rice to sell at a market. If someone came up to you and said, "I would like to purchase $^1/_{10}$ of that rice, it would have been very difficult to measure out exactly that amount of rice without precise measuring devices.

But if you had a simple balancing scale, you could very accurately divide the rice in half. You could then divide each half in half, ending up with $^1/_4$ of a bucket. You could then easily divide each $^1/_4$ in half to get exactly $^1/_8$ of a bucket of rice. By doing this, you could assure the person who was buying your rice that they were getting precisely $^1/_8$ a bucket of rice.

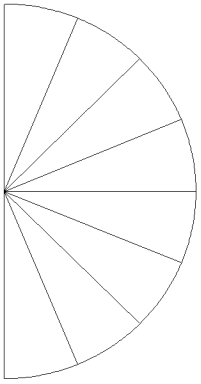
Another way to explain this is to talk about how pizzas are cut up, as shown in the following example.

Pizza Example:

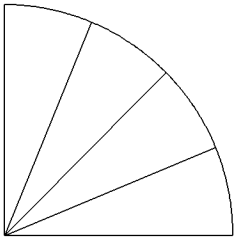
Have you ever noticed that a large pizza is most often cut into 8 or 16 pieces. This is because the person cutting a pizza first cuts it in half. He then cuts each half in half, ending up with quarters. He then cuts each quarter in half ending up with eighths, and then, if the pizza is big enough, cuts each eighth in half, ending up with 16 pieces.



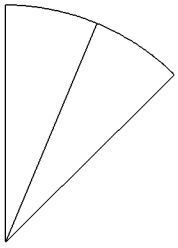
If you have an entire pizza,



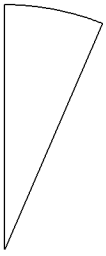
and someone eats half of it, you are left with ½ of a pizza.



If someone then eats half of what is left, you are left with ¼ of a pizza.



If someone eats half of what is left, you are left with ⅛ of a pizza.



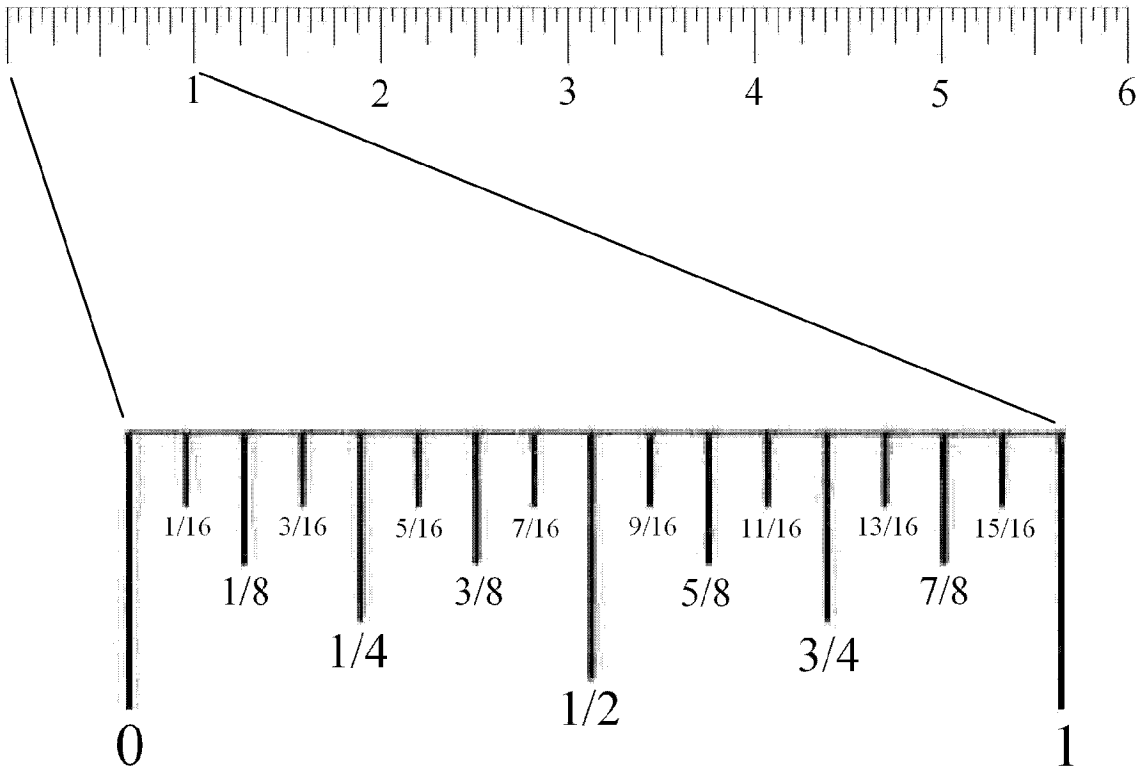
If someone eats half of what is left, you are left with $^{1}/_{16}$ of a pizza.

This is also exactly how an inch is divided into 16 parts.

How we measure, and how we write measurements:

Here is a ruler which is 6" long.

-Each inch is divided into 16 parts



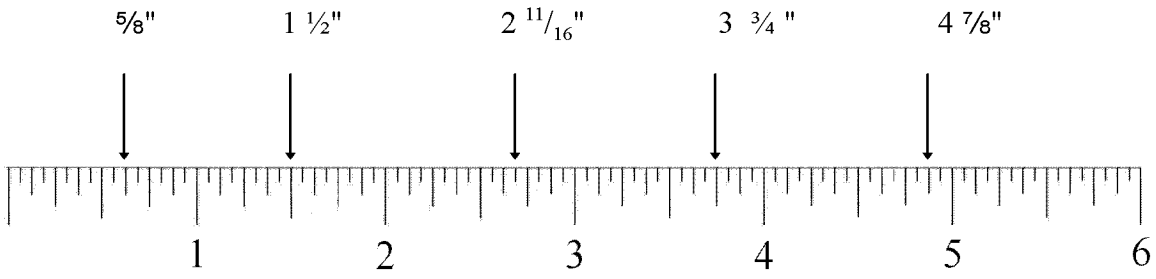
Here is an enlarged picture of the first inch on a ruler.

-Each $^{1}/_{16}$" mark is labeled.

-All fractions are reduced.

If you count over from the beginning of the ruler 5 spaces, you will see that mark labeled as $^{5}/_{16}$". The next mark is not labeled as $^{6}/_{16}$", but is instead reduced down to $^{3}/_{8}$".

Use this page as a reference for the exercises on the following pages.



Notice how the 5 different measurements shown on this ruler are written:

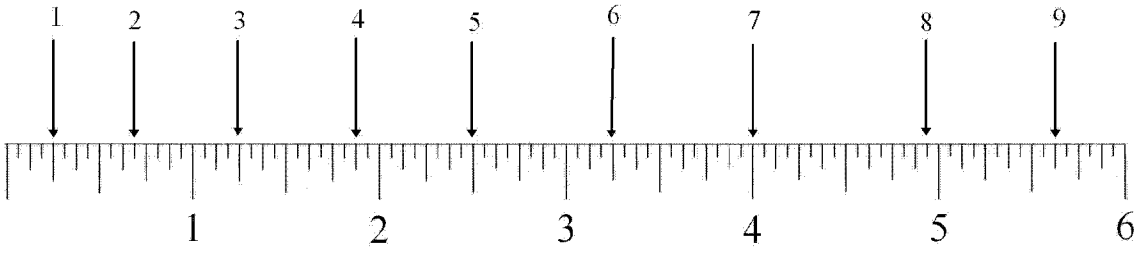
-The first one, 5/8", is 10 spaces over from the beginning of the ruler. It could be written as $^{10}/_{16}$", but we reduce that fraction to 5/8".

-The next one, 1 ½", is 8 spaces past the 1" mark. It could be written as 1 $^{8}/_{16}$", but we reduce it to 1 ½".

All of these measurements are written in the correct way. Use this page as a reference for the following worksheets.

Exercise 1

Correctly write the measurements for the following 9 locations.



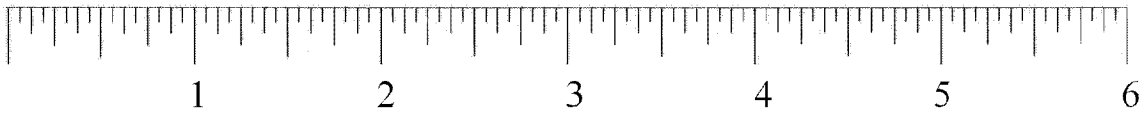
1._____ 2._____ 3._____ 4._____ 5._____

6._____ 7._____ 8._____ 9._____

Exercise 2

On this ruler, make and label an arrow for each of the following measurements.

$\frac{3}{8}$"	$\frac{3}{4}$"	$1\frac{1}{8}$"	$1\frac{9}{16}$"	$2\frac{5}{8}$"
$3\frac{3}{4}$"	$4\frac{1}{16}$"	$4\frac{13}{16}$"	$5\frac{5}{16}$"	6"



Exercise 3

On this ruler, make and label an arrow for each of the following measurements.

$\frac{5}{8}$"	$\frac{7}{8}$"	$1\frac{1}{4}$"	$1\frac{11}{16}$"	$2\frac{7}{8}$"
$3\frac{13}{16}$"	$4\frac{7}{16}$"	$4\frac{15}{16}$"	$5\frac{1}{2}$"	$5\frac{3}{4}$"