Workplace and Apprenticeship 10
Unit 1
Units of Measure and Linear Measurements

WA 10.3

Demonstrate using concrete, and pictorial models, and symbolic representations, understanding of measurement systems including: The Système International (SI), The British Imperial system, The US customary system.

WA 10.4

Demonstrate, using concrete and pictorial models, and symbolic representations, understanding of linear measurement, including units in the SI and Imperial systems of measurement

Name: _____

The Different Systems of Measurements

There are multiple different systems of measurement that we use in our daily life. We often switch between systems without even realizing because different systems have different purposes. In this unit we will become familiar with the different measurements, why we use them, and converting between different measurements.

The SI System

The International System of Units (SI), also called the _____, is a system of measurement with seven different units and where units are related by _____.

The seven different units are:

Second:

Metre:

gram:

Ampere:

Kelvin:

Mole:

Candela:

This system is the most widely used (it is what we use in Canada!) and is what we use in science.

Name: _____

In this system each unit of measure is communicated by a prefix then the unit. For example, centimetres is cm, kilograms is kg. This helps us easily tell what size we are measuring and in what units.

The metric system is also a base 10 system. This makes it very easy to convert between different units. For example, there are _____ meters in a kilometre, _____ cm in a metre, and _____ millimeters in a cm.

Prefix	**Symbol**	**Meaning**	**Power of 10**
Mega-			
Kilo-			
Hecto-			
Deca-			
Base Unit	None	1	10^0
Deci-			
Centi-			
Milli-			
Micro-			

This system is made for easy calculations, which is why it is typically used in science. However a lot of everyday things are measured in a different system.

Name: _____

The Imperial System

The Imperial System of Measurement is a system commonly used in _____. It does not follow the same base 10 system as the metric system, making conversions less obvious. However, we use many of its units in our daily lives.

Common Imperial Units and Conversions:

_____ inches (in or “) = 1 foot (ft or ‘)

_____ inches = 1 yard (yd)

____ feet = 1 yard

_____ feet = 1 mile (mi)

_____ yards = 1 mile

The Imperial system has units such as inches, feet, yards, and miles for length; ounces, pounds, and stones for weight; and fluid ounces, pints, quarts, and gallons for volume. The Imperial system also uses fractions instead of decimals. So we would have $8\frac{3}{4}$ yd instead of 8.75 yd.

Conversions in Imperial units are not as obvious, which is why science typically uses SI units. However, we use Imperial units in many everyday situations such as measuring height or weight.

Conversions in the Same System

In order to convert metric units to a different metric unit we need to multiply or divide by powers of 10. We can use our table to help us. If we are moving up in the table we are dividing, if we move down we are multiplying.

Name: _____

Example:

a) Convert 20cm into mm

b) Convert 1545 kg into g

Converting Imperial units to other Imperial units will require us to know many more conversions. Any necessary conversion rates will be given to you!

In order to convert Imperial units we will set up fractions that will help us convert.

Example:

a) Convert 3520 yd into mi. 1760 yd = 1 mi

b) Convert 6 gallons into ounces. 1 gallon = 8 pints, and 1 pint = 16 ounces

Name: _____

Converting Between Systems

Earlier in the unit we converted measurements in the same system. For example, metric to metric and imperial to imperial.

Recap:

1. Convert 2 km into cm

2. Convert 1500 mm into m

3. Convert 16 miles into inches

4. Convert 14 pints into gallons

Name: _____

Sometimes we need to convert between systems, for example if someone measured their height in meters we would typically convert it to feet or if someone's weight was measured in kg we would want it in pounds.

Converting between systems is very similar to converting imperial units. We will set up fractions that will help us convert. It is important to remember that each fraction has TWO DIFFERENT units in it and that matching units are either both in the numerator or both in the denominator.

1. Convert 12km into miles. 1km is about 1.6 miles

2. Convert 60 gallons into liters. 1 gallon is about 3.8 liters

3. Convert 87 kg into pounds. 1 kg is about 2.2 pounds

Name: _____

Sometimes we need to convert to a better unit in the same system before we convert to a different system

1. Convert 16 ft into mm. 1 inch is about 2.54 cm.

2. Convert 1640 ml into gallons. 1 gallon is about 3.8 liters

3. Convert 9 pounds into mg. 1 kg is about 2.2 pounds

Name: _____

Situational Problems

When dealing with these problems in the real world we need to be able to determine what information is necessary, make any necessary conversions, and decide what operations we need to do.

Example:

1. A wall measures 5 yards and $6\frac{7}{8}$ inches. If a painting is to be hung centered on the wall, how far is the centre of the painting from each of the adjacent walls?

2. 25cm of ribbon is needed to wrap 1 present. How many presents can I wrap if I have 6.5 meters of ribbon?

Name: _____

3. In a parking lot, each spot is 8 feet wide. If the parking lot has 24 spots side by side, how wide is the parking lot in yards?

4. How many lengths of $\frac{1}{3}$ of a yard can be cut out of a log measuring $5\frac{1}{2}$ yards?