Another quantity that we measure is temperature. Just like length, surface area and volume, we can measure temperature in different units. The US uses the Fahrenheit scale (°F) of the imperial system, while Canada uses the Celsius scale (°C) of the SI.

Water freezes at 0°C or 32°F and boils at 100°C or 212°F. Since water freezes at 0°C and 32°F, the relationship between the two temperature systems can be calculated with the following formulas, where C represents degrees Celsius and F represents degrees Fahrenheit.

$$C = \frac{5}{9}(F - 32)$$

Changing F to °C:

Ex. 1) While visiting Florida, you heard a local person say that it had been very cold overnight, as it was only 42°. At first, you thought this was not cold, but then you realized the person meant degrees Fahrenheit. What was the temperature in degrees Celsius?

$C = \frac{5}{9}(F - 32)$	Write down the formula
$C = \frac{5}{9}(42 - 32)$	Put the number for "F" in the formula
$C = \frac{5}{9}(10)$	Brackets first: 42-32
$C = \frac{50}{9}$	Then multiplication & division
$C = 5.6°C$	Round to 1 decimal place and include the units!

The temperature is about 5.6°C (which would be very cold in Florida.)

Ex. 2) Mrs. Moore went to Disneyland with her family. The day they arrived it was 114°F. It was record breaking hot. What would that temperature convert to in °C?

$$C = \frac{5}{9}(F - 32)$$

$$C = \frac{5}{9}(114 - 32)$$

$$C = \frac{5}{9}(82)$$

$$C = \frac{410}{9} \qquad C = 45.6°C$$

114°F. is equal to 46°C.

<u>Temperature Ranges:</u>

Ex. 3) Chinook winds are known to cause great changes in temperature over a short period of time. The most extreme temperature change in a 24-hour period occurred in Loma, Montana, on January 15, 1972. The temperature rose from −54°F to 49°F.

a) What were the minimum and maximum temperatures in degrees Celsius?

$$C = \frac{5}{9}(F - 32)$$ Write down the formula

Starting temp: *Final Temp:*

$$C = \frac{5}{9}(-54 - 32)$$ $$C = \frac{5}{9}(49 - 32)$$

$$C = \frac{5}{9}(-86)$$ $$C = \frac{5}{9}(17)$$

$$C = \frac{-430}{9}$$ $$C = \frac{85}{9}$$

$$C = -47.8°C$$ $$C = 9.4°C$$

b) What was the change in temperature in degrees Celsius?

Temp. change = final temp − starting temp

Temp. change = 9.4°C − (−47.8°C)   Two negatives = a positive!

Temp. change = 9.4°C + 47.8°C = 57.2°C

The temperature increased by 57.2°C.

Name:_____   Block:_____   Date:_____

When you have the temperature in °C and want to know the temperature in ° you use this formula:

$$F = \frac{9C}{5} + 32$$

<u>Changing °C to F</u>:

Ex. 1) You were paving a road with heated tar during a hot summer day. You noted that the external temperature of the tar was 48°C. What was this in degrees Fahrenheit?

$F = \dfrac{9C}{5} + 32$	1) Write out the equation.
$F = \dfrac{9\,(48)}{5} + 32$	2) Replace the C with the temperature in C.
$F = 86.4 + 32$	3) Do multiplication / division: 9 X 48 ÷ 5
$F = 118.4°C$	4) Do addition: + 32

<u>Temperature Ranges</u>:

Ex. 2) Chinook winds are known to cause great changes in temperature over a short period of time. The most extreme temperature change in a 24-hour period occurred in Loma, Montana, on January 15, 1972. The temperature rose from –47.8°C to 9.4°C.

b)   What were the minimum and maximum temperatures in degrees Celsius?

$F = \dfrac{9C}{5} + 32$	Pick the right formula. What you want is in front.
Starting temp:	*Final Temp:*
$F = \dfrac{9\,(-47.8)}{5} + 32$	$F = \dfrac{9\,(9.4)}{5} + 32$
Multiplication & Division	
$F = -86 + 32$	$F = 16.9 + 32$
Addition last	
$F = -54°$	$F = 48.9°$

a)   What was the change in temperature in degrees Fahrenheit?

Temp. change = final temp – starting temp

Temp. change = 49°F – (–54°F)   Two negatives = a positive!

Temp. change = 49°F + 54°F = 103°F

The temperature increased by 103°F.