

Name: _____

Guided notes 3a.1
Math 9 – Wolfe

Unit 3a: Proportion and Scale

We just talked about solving proportions in the last unit, so it should be fresh in your mind. Remember that the tried-and-true way of solving a proportion is to

_____.

Example:

In this unit, we will apply our proportions to real-life situations – mostly geometric figures. This means that we have to care about _____.

Let's step back and talk about **ratios and rates**. These are pretty similar, so we will be a bit careless and use them interchangeably in this unit – but usually, ratios will be two things that have the same units. Let's translate the following ratios and rates into math:

Quantity	Written as a ratio	Written as a fraction	Reduced (if necessary)	
3 students out of every 12	3 : 12	3 / 12	1 / 4	Units are students/students, so we can drop them
\$5.00 for 4 cans	\$5.00: 4 cans	\$5.00/4 cans	\$1.25/can	Keep the units since they're different – notice you end up with a unit rate
8 mm every year				
\$0.94 per litre				
92 out of 600 households				
50% of everyone here				

We set up a proportion to compare ratios or find a unit rate:

Ex. If 12 students out of 32 in this class have a dog, how many students out of 670 have a dog?

By the way, this also is how you do percentages, whether you know it or not:

Ex. It took me 2.4 hours to drive 192 km. What was my average speed?

Name: _____

Guided notes 3a.2
Math 9 – Wolfe

You can use proportions to reduce or enlarge something as well. Say you want to make a giant statue in homage of your favourite fruit, the banana:

So you measure the length of the banana and it is 21 cm. You want your statue to be 3.0 m long, so you determine the **scale factor**. It's easiest to work with if your units are the same for the actual item and the model, so let's use



3.0 m = _____ cm.

The scale factor is: _____ compared to _____,

Or

Or even:

Once you know your scale factor, you can calculate all the dimensions of your banana sculpture by measuring the real thing:

	Real measurement	Calculations	Statue
Length	21 cm		300 cm
Circumference at centre	13 cm		
Length of stem	3.8 cm		

And now you're ready to sculpt your monument to the mighty banana!

The scale factor always compares _____ to _____, or _____ to _____ . If it gets bigger, we call that an _____ . If we make a smaller replica, it's a _____.

Let's fill in the following chart just to practice calculating scale factors:

Original	Replica	Calculations	Scale factor	Reduction or Enlargement
14 inches	7 inches			
0.54 m	4.26 m			
1 cm	2500 m			
4" x 10"	6" x 15"			
16 m			3	
	4.80 cm		0.25	

Name: _____

Activity 3a: Making a scale model
Math 9 – Wolfe

In this activity, you will make a scale model of any object of your choosing. You need to show me a few calculations and the finished object.

There are no real restrictions as to how you make it or what you make it out of. In the past, students have attempted to very simple objects recreate a sheet of paper (but got too frustrated when they realized they'd have to measure not just the length and width, but the thickness too!) and more complicated ones such a chair, their house, etc. You have a lot of choice, but before you decide, read over the requirements:



From: piedmontpd.weebly.com



- Include at least three distance measurements in centimetres, each in a different direction (usually length, width, height – but your measurements could include circumference or other things.) (I have left room for more but you are required to do at least 3.)
- State whether it is a reduction or enlargement and the scale factor.
- Include at least one thing written or drawn on as a design detail that is also to scale – for example a word written on a package, pattern or picture, zipper on a jacket, etc.

1. The object I chose is _____

2. It is a _____ and the scale factor is _____.

I chose the scale factor I did because _____

3. Complete chart on next page. Use cm or mm for your measurements, whichever is best for the size of your model.

Dimension measured	Actual length	Calculations	Model length

4. Include pictures of the original object from at least two different angles
5. Include pictures of your scale model from different angles or drop it off at the school.

