



Conceptual Physics Labs – Chs 1 & 2

Name _____

Where appropriate – ALWAYS show your formulas and your work!
Use the back of your paper if you need to.

Precision Measurement

Record your measurements in the boxes. Use the correct units.

Use a metric ruler and measure the dimensions of your textbook. Length: Width: Depth:	Use a thermometer in a cup of warm water.
Use a spring scale and weigh the object given.	Use a protractor and measure the angle of the object given to you.

Unit Conversion

Earth's diameter is 12,756 kilometers. How many meters is this?

Earth's moon is covered with impact craters. Crater Aristarchus is 3.6 kilometers deep. What is this distance in millimeters?

A mature sugar maple tree produces about 40 liters of sap each season. How many milliliters is this?

A baby blue whale will drink between 23 and 90 kilograms of milk each day. Express these masses in grams.



Conceptual Physics Labs – Chs 1 & 2

Significant Figures

Find the number of significant digits:

Value	# of Significant Digits	Value	# of Significant Digits
36.33 minutes		42 students	
100 miles		0.010 kilograms	

Speed and Velocity

Build a hot wheels track and measure the length in centimeters: _____

Use a stopwatch, leave the track flat, set the car on the end – let go. Measure how fast it travels. Calculate the speed.

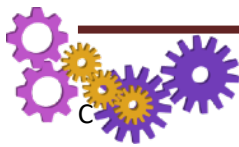
Trial #	Time (seconds)	Calculate the speed (cm/s)
1		

Now, raise one end of the ramp by 10 cm. Let go of the car and record the time for three trials.

Trial #	Time (seconds)	Calculate the speed (cm/s)
1		
2		
3		
	AVERAGE SPEED	

And, lastly, raise the end of the ramp to 60 cm. Record three trials.

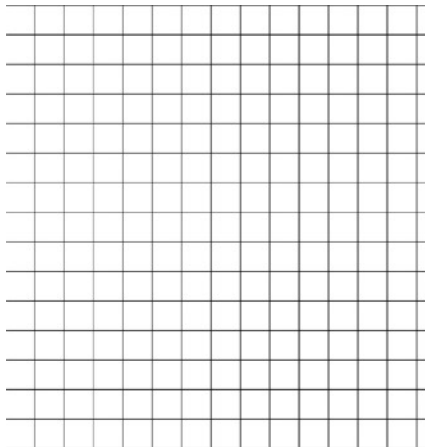
Trial #	Time (seconds)	Calculate the speed (cm/s)
1		
2		
3		
	AVERAGE SPEED	



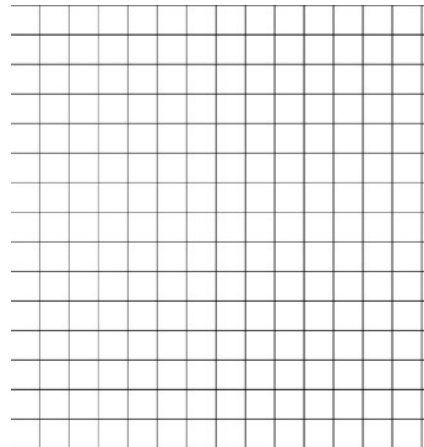
Conceptual Physics Labs – Chs 1 & 2

You will not have clocked the speed at each second, but give an example of what a **Velocity vs. Time graph** would have looked like for the two raised ramp situations. Show a clear difference between the two. *Be sure to label your axes.*

Ramp raised to 10 cm



Ramp raised to 60 cm



Variables:

In the above lab, identify the control variables: _____

Identify the experimental variable: _____

Why do we do multiple trials and calculate the average speed?

Acceleration:

Using the data in the chart, calculate the acceleration in the last column. (Show your work on the back)

Distance from A to B (cm)	Time from A to B (s)	Velocity through Point A (cm/s)	Velocity through Point B (cm/s)	Acceleration (cm/s ²)
10	0.1430	58.5	94.3	
20	0.2414	58.8	119.0	
30	0.3188	59.2	140.8	



Slope and Motion Graphs

This graph represents an object (circle the correct one)

- At rest
- Speeding up as it moves away from the origin
- Speeding up as it moves toward the origin
- Moving away from the origin at a constant rate

Calculate the object's acceleration (show your work!)

