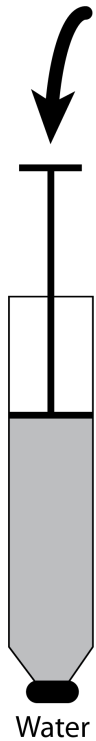


Name: _____

Period #: _____ Date: _____

Pre-Lab:

Imagine you have two **sealed** syringes. One is filled with water, and one is filled with air. Predict what will happen if you push down on each of the plungers.



If I push down on the plunger of the syringe containing **water**, I predict ...

I think so because ...



If I push down on the plunger of the syringe containing **air**, I predict ...

I think so because ...

Now it's time to build your Water Car. Follow the instructions on page 5-6 of the manual.

Experiment 1 – You will need: water car, water, test track that can get wet.

Follow the instructions on page 7 of the manual.

What did you notice when you removed the clamp from the nozzle of the bottle when it was **half-full** of water?

What did you notice when you removed the clamp from the nozzle of the bottle when it was filled with **air only**?

Experiment 2 – You will need: compressed air bottle, a marshmallow, a marble (or something hard).

Follow the instructions on page 9 of the manual.

What did you notice happened to the **marshmallow** when you pumped the bottle with air? Draw a picture and think about what's going on with the air molecules and the marshmallow molecules.



What did you notice happened to the **marble** when you pumped the bottle with air? Draw a picture and think about what's going on with the air molecules and the marble molecules.



Experiment 3 – You will need: water car, meter stick, tape (or chalk or other way to mark the ground), water, test track that can get wet.

Follow the instructions on page 13 of the manual.

Directions: With a meter stick, lay out a two-meter-long test track that can get wet. Mark the ground at regular intervals (every 10 cm or so) with chalk if you are outside or tape if you are inside.

Part A:

- For each trial, you will fill the bottle half-way with water.
- You will change the number of times you pump the car before releasing the clamp.
- Perform three trials for every number of pumps that you are testing.
- For each trial, you will measure the distance that your car travels. Then you will calculate the average distance.

Hypothesis – Part A: What do you think is going to happen?

What is the independent variable (what are you changing in Part A)? _____

What is the dependent variable (what are you measuring in Part A)? _____

Data collection:

Number of pumps	Distance in meters (how far did your car travel?)			Average distance
	Trial 1	Trial 2	Trial 3	
0				
10				
30				
50				
_____ (you decide)				

Data analysis: What did you notice? (Hint: refer specifically to your data)

Part B:

- For each trial, you will pump 25 times.
- You will change the amount of water in the bottle before releasing the clamp.
- Perform three trials for every number of pumps that you are testing.
- For each trial, you will measure the distance that your car travels. Then you will calculate the average distance.

Hypothesis – Part A: What do you think is going to happen?

What is the independent variable (what are you changing in Part A)? _____

What is the dependent variable (what are you measuring in Part A)? _____

	Distance in meters (how far did your car travel?)			
Volume of water in the bottle at the start of the trial	Trial 1	Trial 2	Trial 3	Average distance
No water				
30 ml (1/5 full)				
60 ml (2/5 full)				
90 ml (3/5 full)				
120 ml (4/5 full)				
Completely full				

Independent Variable: _____ Dependent variable: _____

Data analysis: What did you notice? (Hint: refer specifically to your data)