

Name \_\_\_\_\_ Date \_\_\_\_\_ Per \_\_\_\_\_

### Newton's 3rd Law of Motion Lab

**Fill in the following: (4 pts.)**

Newton's 3rd Law States:

---

---

---

#### Part I - Newton's 3rd Law with Balloons:

Materials: 1 balloon, Meter stick, Metric tape measure, 1 cut straw, 5m of string, 2 or 3 2-inch pieces of masking tape

#### Hypothesis (2 pts.)

If an inflated balloon is secured to a string and we let it go then,

---

because \_\_\_\_\_

#### Data Table (10 pts.)

Trial # Lg. Balloon	Circumference (cm)	Distance (cm) or (m)?	Avg. Distance Lg. Balloon (cm) or (m)?
1			
2			
Trial # Sm. Balloon	Circumference (cm)	Distance (cm) or (m)?	Avg. Distance Sm. Balloon (cm) or (m)?
1			
2			

1. Blow up balloon to its maximum size without popping - hold onto end (don't tie off)
2. Measure the circumference of the balloon to the nearest tenth of a cm and record in data table for trial #1
3. Slide the 5m piece of string through the straw while holding straw in the vertical position to create a track for the balloon
4. Attach the straw to the balloon - Put the straw on top of the balloon and use 2 or 3 pieces of masking tape to secure it.
5. Now, it's time to let your balloon fly. One lab partner needs to pull the balloon to one side of the string, and another lab partner will hold the opposite end. Let the balloon open and watch it fly on the track. (Procedure continues . . .)
6. Measure the distance traveled using the meter stick and record this in your data table.

7. Repeat 1-6 for a 2nd trial, record second measurement for trial #2
8. **Balloon #2** - Repeat step 1-7 for the second balloon - make it about **half as big** as balloon #1
9. Find the average **distance** traveled for each balloon. You are not averaging the size of the balloon!

**Part II - Newton's 3rd Law with Marbles:**

Materials: 4 Meter sticks, 5 Marbles

**Hypothesis (2 pts.)**

If we place marbles next to each other in a track and

---



---

**Data Table (10 pts.)**

# of Marbles	Distance Traveled Trial 1	Distance Traveled Trial 2	Average Distance (cm or m)	Observations - Describe what happens to the flicked marble and the collision marbles(s)
1				
2				
3				
4				

1. Place one marble (marble #1) in the track at the 20cm mark for the “collision” point
2. Using a second marble (marble #2), place it at the **1cm** mark of the track as the **starting point** and **gently** flick the marble into marble #1
3. Record the distance marble #1 traveled and record observations - how did the marbles move?
4. REPEAT STEPS 1-3 FOR A SECOND TRIAL
5. Find the average distance traveled for the two trials and record in data table
6. Now place two marbles in the track at the 20 cm “collision” point
7. Repeat steps 1-5
8. Continue doing this with 3 marbles in the track and then 4

**Note - Be sure you agree on the force of the “flick.” It should remain constant for all trials.**

**Part III - Newton's 3rd Law with Canisters**

Materials - Baking Powder, water, graduated cylinder, pan, tape measure

**Hypothesis (2 pts.)**

If we place two canisters head to head and cause a chemical reaction that produces a gas then

---

---

1. **Put on goggles and an apron**
2. Fill one film canister with 15 mL water and put the cap on
3. Lay capped canister it on its side so the cap is facing the black line going down the middle of the tray
4. Add 15 mL of water to a second canister
5. Add 1 (heaping) tsp of baking powder to the second canister
6. **QUICKLY snap the cap on while you keep the canister on the table.** Give it a quick shake **keeping your fingers tightly over the cap.** Lay it on its side on the other side of the line, with the cap **facing and touching** the other canister
7. Using the tape measure, measure how far each canister went from the line and record your answer below
8. Rinse out pan and canisters and return them to the station

**Canister Data and Observations (5 pts.)**

**Distance in cm** canisters moved:

**Trial # 1** Canister with just water \_\_\_\_\_ Canister with Baking Powder \_\_\_\_\_

**Trial # 2** Canister with just water \_\_\_\_\_ Canister with Baking Powder \_\_\_\_\_

**Avg distance canister with just water** \_\_\_\_\_

**Avg distance canister with water and baking powder** \_\_\_\_\_

**Observations** - How did the cannisters move in relation to each other and the line?

---

---

---

---

---

---

---