

Name \_\_\_\_\_ Hour \_\_\_\_\_

## BALLOON CAR LAB and Review for Quiz

### Procedure:

1. Working with the materials provided, design and build a single axle car powered by the balloon. (It should look like a chariot)
2. Test and modify your car until it can travel between **1-2 meters in a straight line**.
3. Record data for **time** and **distance** in the data table.
4. Find the **mass** of your car.
5. Return all reusable items to the supply area. (Straws, stick, wheels)

### Data and Observations:

**Mass** of car 14.3 g      0.0143 kg

**Distance** car traveled 2 m      **Time** 1.47 seconds

### Analysis Questions:

1. What is the **outside force** causing your balloon car to stop its motion? \_\_\_\_\_
2. Calculate the **acceleration** of your balloon car using the data you gathered.
3. Calculate the **force** (in N) of the air leaving the balloon.
4. Calculate the **weight** of your balloon car in **Newtons**.

## What I should know right now:

1. **Force information and bucket questions** (multiple choice about these questions)

### 2. Newton's 3 Laws:

**1<sup>st</sup> Law** is the Law of \_\_\_\_\_

What is inertia? \_\_\_\_\_

**2<sup>nd</sup> Law** is \_\_\_\_\_

1. If you increase the mass, what should happen to acceleration? (force is constant)
2. If you increase the force, what should happen to the acceleration? (mass constant)
3. Force and mass are \_\_\_\_\_ related.
4. Mass and acceleration are \_\_\_\_\_ related.
5. Force and acceleration are \_\_\_\_\_ related.

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6. A car ( $m=1400$  kg) moving initially at a speed of 55.5 **mph** is brought to a stop in a distance of 25.4 m.
  - a. Calculate the time required to stop. (2.05 sec)
  - b. Calculate the force acting on the car. (-16950 N)
  - c. Calculate the weight of the car in Newtons. (-13,720 N)

**3<sup>rd</sup> Law** is \_\_\_\_\_

1. If I exert a force of 500 N on the floor, how much force does the floor exert on me? \_\_\_\_\_
2. A hammer hits a nail with a force of 20 N.
  - a. How much force does the nail hit the hammer with? \_\_\_\_\_
  - b. Which one should accelerate at a greater rate and **WHY**?

**Weight vs. Mass:**

Mass is the amount of \_\_\_\_\_ measured in \_\_\_\_\_

Weight is the pull of \_\_\_\_\_ on your \_\_\_\_\_ measured in \_\_\_\_\_

**Weight is a FORCE!!!!** The equation to solve for weight is \_\_\_\_\_

1. Find your weight in Newtons if you weigh 157 lbs. (-699 N)
2. Find your weight in lbs if you weigh -788 N. (177 lbs)

**Equilibrium:**

Equilibrium occurs when there is no change in an object's \_\_\_\_\_

What are the 2 times equilibrium occurs?

The net force of an object in equilibrium is \_\_\_\_\_

When an object is in equilibrium, are there any forces acting on it? \_\_\_\_\_

What is terminal velocity?