Name:_____ Period: 5 #:_____

Acceleration is the rate at which velocity changes.

Newton's 2nd law of Motion is the greater the force, the greater the acceleration. The greater the mass, the greater the force needed for same acceleration.

This law can be written as an equation, write that equation here. F = m x a

If the force stays the same, explain the relationship between MASS and ACCELERATION Remain the same

If the MASS is increased, then the ACCELERATION will decrease } inversely proportional

If the MASS is decreased, then the ACCELERATION will increase }

**Problem:**

What is the effect of mass (IV) on acceleration (DV) of the ball?

F = M x a

**Hypothesis:**

If mass (IV) increases, then acceleration (DV) will decrease

F = m x a

because objects with more mass require more force to accelerate.

**Materials:**

You will be given 1 straw per table. One person is responsible for using the straw.
You be given 3 different sized balls.
Use your timers on your cell phones to measure the time. - be as accurate as possible - take this seriously.
Use ruler or meter stick to measure the distance.
Masking tape
Scale

**Procedures:**

1. Use the masking tape to mark a starting line and a finish line on your ~~desk~~ table. This will be your course.
2. Get one of the three balls. Write the type of ball in the space provided in the data table. Write the mass of the ball in the space provided using the scales.
3. Measure the distance of your race track using a ruler or meter stick. Write this number in your data table.
4. Using the straw, gently blow through the straw, moving the ball from the starting point to the finish line. Try to keep your breath constant. Only use the air from the straw to move the ball. Use your timer to record the time it takes to complete the race.
5. Repeat step 4 for trials 2 and 3.
6. Complete steps 4 and 5 for the remaining balls.
7. Find the average acceleration for each ball.

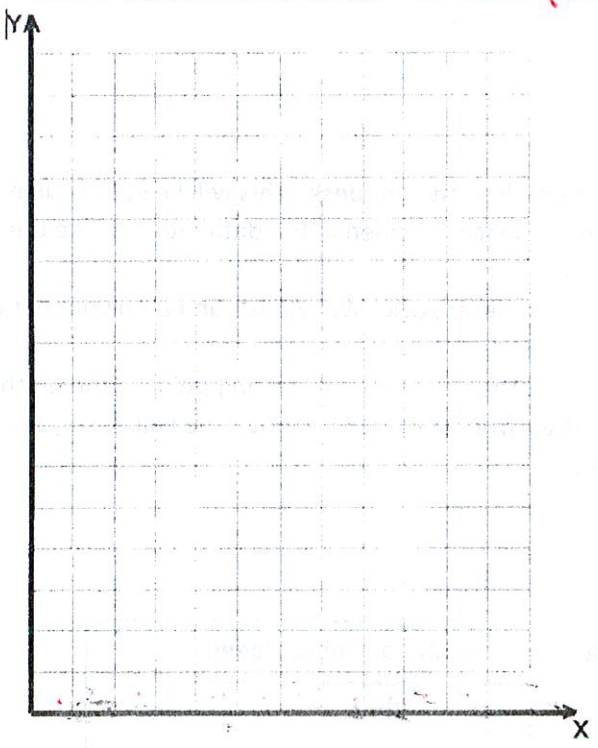
$$\text{Velocity} = \frac{\text{Distance}}{\text{Time}}$$

$$\text{Acceleration} = \frac{\text{Final Speed} - \text{Initial Speed}}{\text{Time}}$$

Name:_____ Period:_____ #:_____

| | Type of ball | Mass (g) | Distance travelled (cm) | Time (s) | Velocity - final (cm/s) | Velocity - initial (cm/s) | Acceleration (cm/s/s) |
|---|---|---|---|---|---|---|---|
| Trial 1 | Small Rubber Ball | | | | | | |
| Trial2 | | | | | | | |
| Trial 3 | | | | | | | |
| Average | | | | | | | |
| Trial 1 | Medium Rubber Ball | | | | | | |
| Trial2 | | | | | | | |
| Trial 3 | | | | | | | |
| Average | | | | | | | |
| Trial 1 | Floor Hockey Ball | | | | | | |
| Trial2 | | | | | | | |
| Trial 3 | | | | | | | |
| Average | | | | | | | |

Measuring Acceleration of Balls with Different Masses ($cm/s^2$)




Acceleration ($cm/s^2$)

DV

Mass/Type of Ball

IV

Graph your results. Make sure you Title your graph and label each axis. The Independent Variable goes on the X Axis. The Dependent Variable goes on the Y Axis. You ~~can~~ will use a bar graph.