Objective: Test the relationship between speed, mass and incline.

Materials:

Meter stick

Ramp

3 marble types

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | | Marble 1  Mass: \_\_\_\_\_\_\_ | Marble 2  Mass: \_\_\_\_\_\_\_ | Marble 3  Mass: \_\_\_\_\_\_\_ |
| Height (cm): | | | | |
| trial | 1 |  |  |  |
|  | 2 |  |  |  |
|  | 3 |  |  |  |
| Height (cm): | | | | |
| trial | 1 |  |  |  |
|  | 2 |  |  |  |
|  | 3 |  |  |  |
| Height (cm): | | | | |
| trial | 1 |  |  |  |
|  | 2 |  |  |  |
|  | 3 |  |  |  |

Procedure:

1. Use digital scale to measure mass of marbles
2. Set up ramp at small angle, measure height in cm and record
3. Place meter stick on ramp and measure 1 meter, this will be the length of your track
4. Use lab quest as stopwatch. Instead of using stylist use your finger to save screen
5. Release marble and record time
6. Record 3 trials for each marble
7. Increase angle (try and make increase whole numbers)
8. Repeat #6 and 7
9. Calculate average times for each marble and angle
10. Calculate velocity and acceleration

Average Time

|  |  |  |  |
| --- | --- | --- | --- |
|  | Marble 1 | Marble 2 | Marble 3 |
| Average time  Height 1 |  |  |  |
| Average time  Height 2 |  |  |  |
| Average time  Height 3 |  |  |  |

Average Velocity

|  |  |  |  |
| --- | --- | --- | --- |
|  | Marble 1 | Marble 2 | Marble 3 |
| Average velocity  Height 1 |  |  |  |
| Average velocity  Height 2 |  |  |  |
| Average velocity  Height 3 |  |  |  |

1 time graph for each of the 3 heights: left page

(Use different colors for each marble and height)

1 average velocity graph for each of the 3 heights: right page

(Use different colors for each marble and height)

1. Use calipers to measure diameter of marbles\*

1 average acceleration graph for each of the 3 angles (use different colors for each angle)