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PH114-08

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Projectile Motion

Statement of Purpose:

Our group will observe the flight of a small marble during its descent from a guided track to the table top and collect data on the relation between its starting height, flight height, and horizontal flight distance.

Introduction:

Our group learned that there was an intrinsic relation between both the starting height of the marble, the free fall height of the marble, and the distance that the marble travelled horizontally during free fall. For the experiment we set up a PVC track that deposited the marble near the horizontal on a heightened block.

Equipment:

Marble, paper, carbon paper, track, ring stand, meter stick, nail, blocks.

Procedure:

1. Set up the track on the ring stand.
2. Place blocks under track so that it exits at 18cm above the table.
3. Place the nail in the top hole and set marble above it.
4. Arrange carbon paper on table under the drop zone.
5. Pull nail and let the marble drop. Record results.
6. Repeat four more times.
7. Repeat 3-6 for each hole in the PVC track.
8. Reset track, and then repeat 3-6 again for each height of the stack blocks under the track.

Data:

On data sheet.

Analysis:

The data we collected in this experiment displays a relation between the drop height of the marble and the resulting velocity of its flight. As the drop height decreases, so does the velocity. Because of the usage of constant g in the velocity formula, our group determined that a lower value for g would result in a lower value for v, but a larger value for x. Similarly, if the end of the pipe had been angled upwards, the resulting velocity would have been slightly less, but we believe the x value would be larger due to increased hang time.

Conclusion:

In our experiment we discovered the relation between drop height, end height, and velocity. The longer an item has to fall, the greater its resulting velocity becomes due to the acceleration of gravity. We did not conspicuously view any affects of rotational inertia during the tests, which was a concern due to the nature of the PVC track and marble system. Supplied materials did not allow for accurate or precise record keeping and data collecting as our group had hoped for, as the carbon paper moved with impacts and had no device to affix it to the table. Data collection was also impaired by the use of a meter stick to project the location of points on a paper by line of sight.