

Magnetic Accelerator ENERGY

Materials:

- ✓ 1 – magnetic sphere
- ✓ 5 – nonmagnetic metallic spheres
- ✓ 1 – wooden half pipe track



Background Research:

1. Define the following terms
 - a. ENERGY
 - b. Isolate/Closed System
 - c. Law of Conservation of Energy
 - d. Collisions (physics definition)
 - e. Elastic Collision
 - f. Acceleration
 - g. Magnetic Field
2. How is kinetic energy normally effected by a collision?

SCIENTIFIC INVESTIGATION:

- Set up your wooden track on a stable flat surface. Your workspace should be clear of any clutter.
- Set aside the magnetic Ball
- Starting with one of the nonmagnetic metallic spheres start it at either end of the wooden ramp, let it roll till it stops.
- Leave the sphere on the track.
- Now use the magnetic sphere, put it on the track and let it roll.
 - Make note of the results of this.
- Clear the track, start over with the nonmagnetic metallic sphere and let it roll.
- Once the first sphere has settled on the bottom of the track, put the second nonmetallic sphere at the top and let it roll.
- Once they have settled you should now have 2 spheres resting on the track.
- Repeat process for the 3rd and 4th spheres.
- You should now have 4 spheres resting on the track.
- Place the magnetic ball on the track and let it roll
 - Make note of the results of this.
- (5th ball option) Finally place the 5th sphere on the track and let it go
 - Make note of the results of this.

ANALYSIS:

3. Describe the relationship of potential energy (E_p) and kinetic energy (E_k) as the first marble accelerates, stops moving and accelerates again, over and over again.
4. You had the marble on the track in 3 different scenarios. Use the information from your background research to explain the physics of what you see throughout all 3 scenarios.
 - a. Scenario 1: one resting metallic sphere and 1 rolling magnetic sphere.
 - b. Scenario 2: four resting metallic spheres and 1 rolling magnetic sphere.
 - c. Scenario 3: (if we had enough spheres), 4 resting metallic spheres, 1 resting magnetic sphere, 1 rolling metallic sphere.
2. Think about conservation of energy. Discuss the transition of E_k to sound and/or heat in the various scenarios.

COMMUNICATING RESULTS:

5. Create a 5-minute max video communicating your results. You should use the vocabulary and information you gathered when completing your background research. You Should recreate all three scenarios, whilst explaining the physics to the viewer. If you have to show some of the scenarios multiple times to get your point across, that's absolutely OK!