MIND TREKKERS
Marble Madness Lesson Plan

Amount of time Demo takes: (3 min)

Materials (be as thorough as possible):
1. Seven Marbles (same size)
2. One ruler with "center groove"
3. One level (measurement device)

Set up instructions: (if any)
1. Prepare demo(once for the day):
   a. Tape the ruler to a countertop (place a piece of tape at each end of the ruler.)
   b. Use level to verify the countertop is level.
   c. Place 5 marbles in the central groove of the ruler so they are touching each other.

SAFETY!
1. Keep track of all marbles; have only the marbles you need out of the bag.
2. Small children (under 6) could swallow the marbles / choke on them.

Lesson’s big idea
- Momentum of one marble transferred down the line of marbles causes the marble on the end to move away from the group.
- The momentum is doubled when two marbles are used; two end marbles move.

Instructional Procedure
1. Roll a 6th marble down the central groove of the ruler into the 5 marbles (which should be touching each other)
2. The kinetic energy of the 6th marble will be transferred to the end marble in the row of 5 marbles
3. The end marble will move away from the group of 5 marbles
4. This occurs because the momentum of the initial marble is transferred through the marbles in between in the form of a shock wave (acting as springs without dissipating the energy as heat), resulting in the energy being transferred to the marble that is on the end of the line, causing it to leave the group.
5. The movement of two marbles into the group of five marbles causes two marbles to leave the end of the group when the initial two come to rest.
Assessment, Sample questions you can ask:
1. Why does the 1st marble move when the 6th marble collides with the group of 5 marbles?
   The momentum of the 6th marble is transferred as a shock wave to the first marble.

2. Why do two leave when two come to join?
   Because the momentum of two marbles was transferred, two marbles left.

Clean Up
- Put materials back into bin
- Make sure each bag still has 50 marbles total
- Check floor of surrounding area for any stray marbles

References
- Bill Nye and Nye Labs, LLC. © 2001

National K-12 Science Standards
- List by K-4, 5-8, 9-12 for each standard covered