Engineering Motion with Paper Roller Coasters

Florida State Standard: SC.4.P.10.1 - Observe and describe some basic forms of energy, including light, heat, sound, electrical, and the energy of motion.

Materials Required:

- Cardstock or thick paper
- Scissors
- Clear tape
- Ruler
- Marbles or small balls
- Cardboard bases (optional, for stability)
- Pencils and paper (for design sketches)

Safety Precautions:

- Handle scissors carefully and cut away from the body.
- Keep all materials on your desk or workspace to avoid tripping hazards.
- Ensure that roller coaster structures are securely taped to prevent sections from falling during testing.
- Avoid placing roller coaster tracks too high or in positions where they might fall over.

Procedure:

1. **Design Planning:**
    - Sketch a rough design of your paper roller coaster on a piece of paper.
    - Plan for features such as drops, loops, and curves that will keep the marble moving while illustrating concepts of potential and kinetic energy.
2. **Building the Track:**
    - Cut strips of cardstock for the main track and secure them to the base with tape.
    - Add curves and loops by bending or folding the paper. Attach additional strips for stability as needed.
    - Build a starting platform at a high point on your structure to allow the marble to gain potential energy before descending.
3. **Testing and Adjustments:**
    - Place a marble at the top of the track and let it go. Observe the marble's movement, noting where it speeds up, slows down, or stops.
    - Make adjustments to the track's angle, support structures, or curves to improve stability and allow for smooth motion.

4. **Observations and Learning:**
    - Observe how changes in the track affect the marble's speed. Discuss with your team how height (potential energy) and angle influence speed (kinetic energy).

Note 1: Clean Up
After the activity, ensure all materials are collected and stored or discarded properly. Remove tape from desks or surfaces, and safely dispose of any leftover paper scraps.