# Newton's First Law

You may work with a partner during this activity but be sure you both try each of the following.

## Part 1 Quarter in a Cup

1. Cover the top of a small cup with an index card or piece of a manila folder and place a quarter on it.

2. Without touching the quarter or the cup, and using only horizontal motion, push, pull, or flick only the index card or manila folder to get the quarter in the cup.

3. Practice this a few times if necessary. If you were successful, what did you need to do? Why?

## Part 2 Moment of Inertia Device

4. Place the silver card on top and centered on the device, then place the ball in the middle and be sure that it is balanced and not moving.

5. Hold the base of the device, pull the metal strip back no more than about 5 cm and quickly release it. You may need to practice this a few times.

6. Describe what happened to the ball and the silver card.

## Part 3 Quarter Stack

7. Stack 5 to 10 quarters on the table.

8. Get another quarter and place it several centimeters from the stack. The better your aim, the farther away you can put this quarter from the stack.

9. Flick the quarter with your fingers, trying to replace the bottom quarter in the stack with the flicked quarter. This may take a little practice.

10. If you were successful at replacing the bottom quarter with the flicked quarter, other than having good aim, why were you successful?

## Part 4 Mass on a String

11. Tie a thread to the ring on a ring stand. Attach a hooked mass to the thread. You can decide which mass you want to use, but be sure that it isn't too heavy and that it doesn't break the thread when you attach it. Attach another thread to the hook on the bottom of the hooked mass.

12. Be sure that the mass will drop on the desk or lab bench and not on anyone's hands or feet!

13. Pull down (not from side to side) on the bottom string slowly. What happens? Why?

14. Set up the threads and mass again.

15. Now pull down (not from side to side) quickly on the bottom thread. What happens? Why?

## Conclusion

16. What law of physics made each of the above possible? Explain. Be specific.