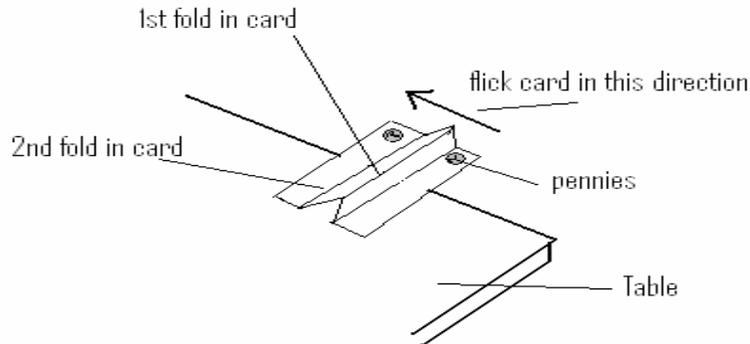


THE FALLING PENNIES

A. Question: *Do two objects which are falling, reach the floor at the same time?*



B. Materials Needed:

1. Two pennies (or other coins).
2. A paper card (3x5" / 7x12cm)

C: Procedure:

1. Fold the paper in half, then fold each side one-third from the end outward.
2. Place the pennies on each side of the center ridge of the card and hold one end on the table edge.
3. Now flick the ridge of the card to the side with the middle finger or your right hand. This will fling one penny about 5m away and at the exact same moment the other penny will drop straight to the floor.
4. Ask the students: "Which of the falling pennies will hit the floor first?" (Anticipated answer: "the straight falling one") Flick the card and listen to the click of the pennies hitting the floor.

D: Anticipated Results:

Students should only hear one click when both pennies fall because they reach the floor at the same time.

E: Thought Questions for Class Discussion:

1. Did you hear one or two loud clicks of the falling pennies?
2. What would it mean if you heard only one click?
3. Does the direction of a falling object have any influence on the speed or rate of fall?
4. What was disregarded in this demonstration?
5. What can we conclude from this demonstration about the rate of fall of objects with different initial directions?

F: Explanation:

As both pennies were released at the same moment, the force of gravity started to work on the pennies at the same time. The downward component of the forces working on each of the pennies is therefore the same, and thus also the acceleration they obtain, resulting in reaching the floor in exactly the same time. This is why only one loud click (first click) is heard of the two pennies falling, regardless of the initial horizontal force imparted on one of them. When one of the pennies is replaced with a marble, the same one click will result, implying that all objects fall with the same rate (in a vacuum). In our case the air resistance was disregarded, because of the relatively short distance of fall.