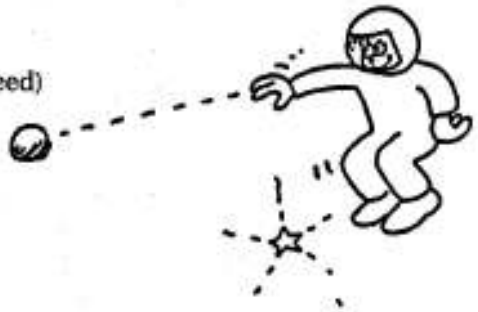
1. (*Circle the correct answer.*) An astronaut in outer space away from gravitational or frictional forces throws a rock. The rock will

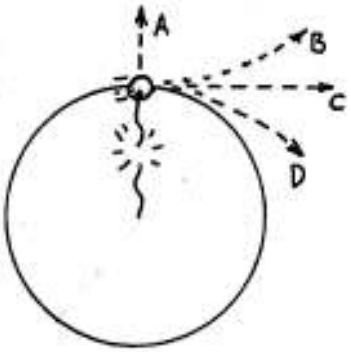
   (gradually slow to a stop)

   (continue moving in a straight line at constant speed)



   The rock's tendency to do this is called

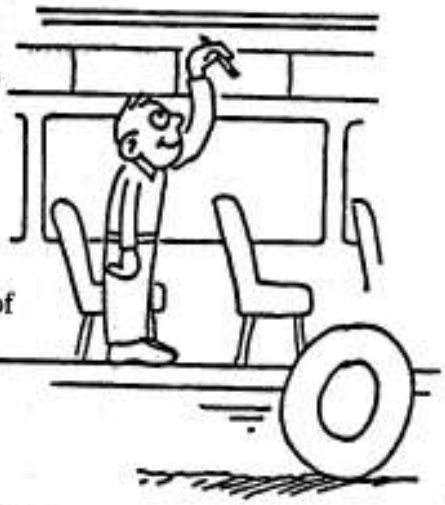
   (inertia) (weight) (acceleration)

2. 

   The sketch shows a top view of a rock being whirled at the end of a string (clockwise). If the string breaks, the path of the rock is

   (A) (B) (C) (D)

3. Suppose you are standing in the aisle of a bus that travels along a straight road at 100 km/h, and you hold a pencil still above your head. Then relative to the bus, the velocity of the pencil is 0 km/h, and relative to the road, the pencil has a horizontal velocity of



   (less than 100 km/h) 100 km/h) (more than 100 km/h)

   Suppose you release the pencil. While it is dropping, and relative to the road, the pencil still has a horizontal velocity of

   (less than 100 km/h) (100 km/h) (more than 100 km/h)

   This means that the pencil will strike the floor at a place directly

   (behind you) (at your feet below your hand) in front of you)

   Relative to you, the way the pencil drops

   (is the same as if the bus were at rest)

   (depends on the velocity of the bus)

   How does this example illustrate the law of inertia?

   _____

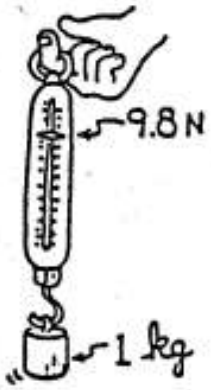
   _____

   _____

4. Use the words *mass*, *weight*, and *volume*, to complete the table.

The force due to gravity on an object	
The quantity of matter in an object	
The amount of space an object occupies	

5. Different masses are hung on a spring scale calibrated in newtons.



The force exerted by gravity on 1 kg = 9.8 N.

The force exerted by gravity on 5 kg = _____ N.

The force exerted by gravity on _____ kg = 98 N.

Make up your own mass and show the corresponding weight:

The force exerted by gravity on _____ kg = _____ N.

6. By whatever means (spring scales, measuring balance, etc.), find the mass of your physics book. Then complete Table I.

Table I

OBJECT	MASS	WEIGHT
MELON	1 kg	
APPLE		1 N
PHYSICS BOOK		
UNCLE HARRY	90 kg	

7. Why isn't the girl hurt when the nail is driven into the block of wood?

_____

_____

Would this be more dangerous or less dangerous if the block were less massive _____? Explain.

_____

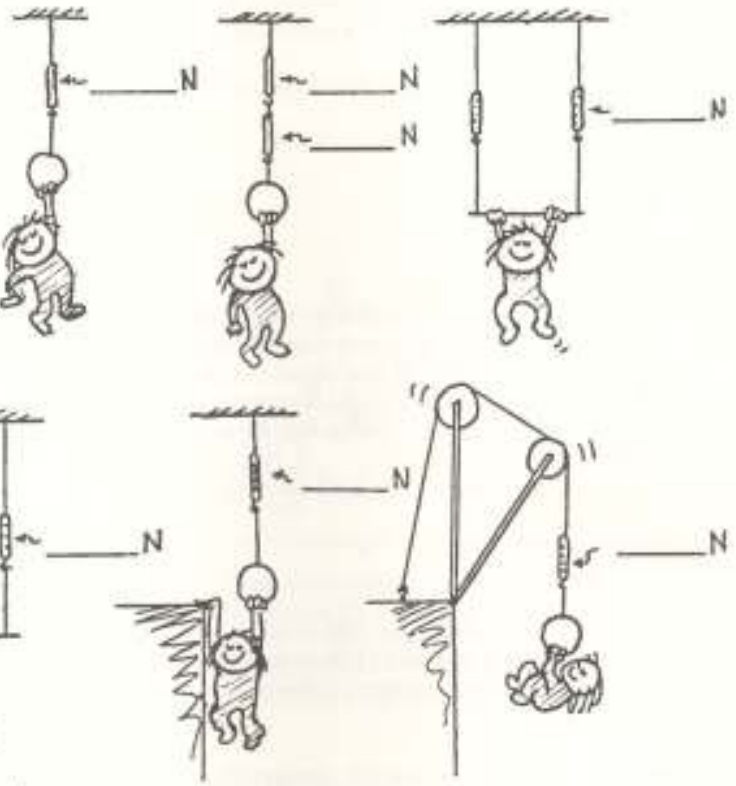
_____

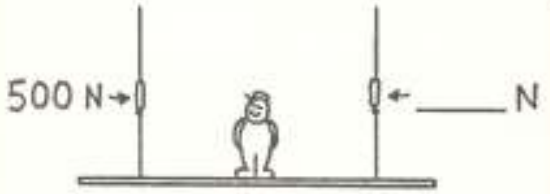
_____

CAUTION: Safety dictates you not try this experiment yourself.

Statics

1. Little Nellie Newton wishes to be a gymnast and hangs from a variety of positions as shown. Since she is not accelerating, the net force on her is zero. This means the upward pull of the rope(s) equals the downward pull of gravity. She weighs 300 N. Show the scale reading for each case.

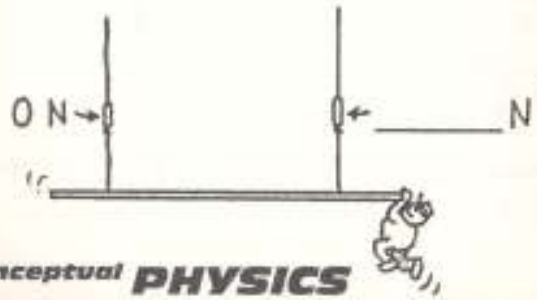




2. When Burl the painter stands in the exact middle of his staging, the left scale reads 500 N. Fill in the reading on the right scale. The total weight of Burl and staging must be

_____N.

3. Burl stands farther from the left. Fill in the reading on the right scale.



4. In a silly mood, Burl dangles from the right end. Fill in the reading on the right scale.