

THE BALL THAT GAINS WEIGHT

A. Question: *Can air be heavy?*

B. Materials Needed:

1. A basketball or volleyball with a valve
2. A hand pump (to pump up the ball)
3. A technical scale or balance

C: Procedure:

1. Place a rather soft basketball or volleyball on the pan of the technical scale and determine the weight.
2. Connect the hand pump to the ball and pump ten strokes of air into the ball.
3. Disconnect the pump and read off the new weight of the ball. How much did the ball gain in weight?
4. Repeat steps 2 and 3, and have students predict what the gain in weight would be after 5, 10, 15, 20, and 25 strokes of the pump.

D: Anticipated Results:

The students will see how an increase in air to the ball also increases its weight.

E: Thought Questions for Class Discussion:

1. What made the ball gain in weight?
2. What can we say about the relationship between the number of pump strokes and the gain in weight of the ball?
3. How can we make the ball lose weight?
4. How much would a beach ball gain in weight when pumped with 5, 10, or 15 strokes of the same hand pump?
5. Would an airtight bottle gain weight if air were pumped into it?

F: Explanation:

This demonstration shows that air has weight. By adding air to the ball, it increases in weight. The same number of pump strokes should result in the same gain in weight. Half the number of pumps gives half the gain in weight. The number of pump strokes is therefore directly proportional to the increase in weight. If the data were plotted on a graph, a straight line relationship would be obtained between the number of pump strokes and the weight of the ball. Whether a ball or an air mattress or an airtight bottle is pumped, the increase in weight should be the same, provided that the same pump is being used and the same number of strokes is applied.