Buoyant Force II

Apparatus

an object (preferably dense, e.g. a metal weight) suspended from a spring balance, a container of water, a weighing scale (for example a set of kitchen scales)

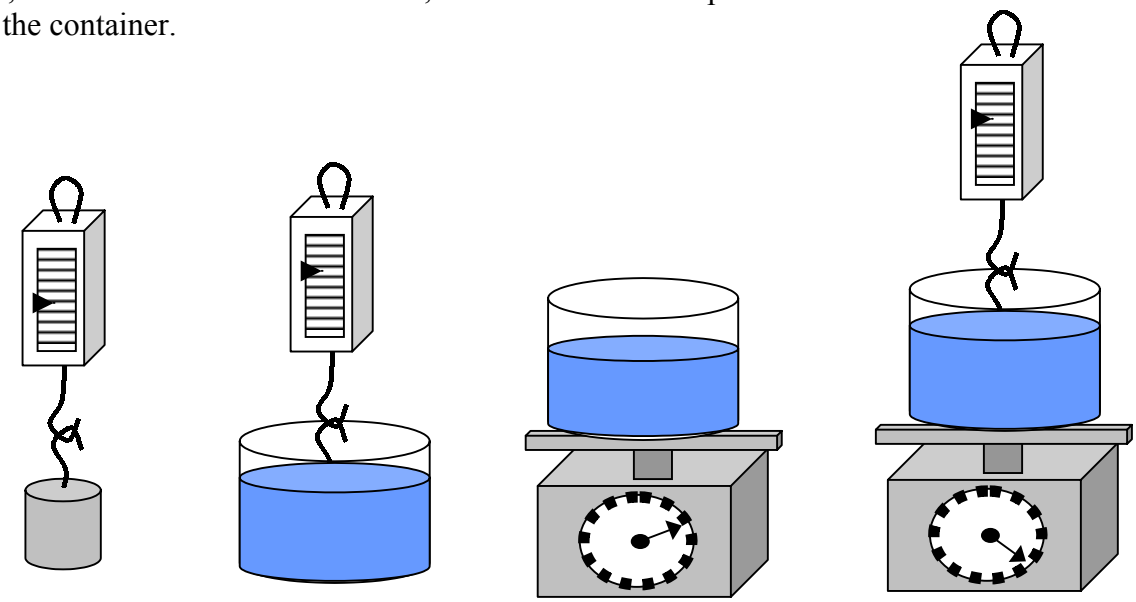
Action

A container of water is placed on a weighing scale. A metal weight, suspended from a spring balance, is immersed in the container of water. The students explain why the reading changes on both sets of scales.

The Physics

The cylinder will weigh less in water than air because water is more dense than air and hence the buoyant force is greater. In both cases $F_B + T = mg$, and the scale measures the tension, T. F_B is greater in water, hence T is less.

The container will weigh more with the cylinder in it because even though the block is not resting on the bottom, it has raised the level of water, hence increased the pressure at the bottom and increased the weight of the container.



Accompanying sheet

Buoyant Force II

An object is suspended from a spring balance.
What happens to the reading when the object is immersed in water? Why?

A container of water is placed on a weighing scale.
The object, suspended from the spring balance, is immersed in the water.

What happens to the reading on the scale? Why?