Answer on Question 68521, Physics, Mechanics | Relativity

Question:

A student is given a spring balance that has a scale in newtons. The student is told that the acceleration of free fall is 10 m/s^2. Describe how the student can find the mass of an irregular solid object.

Answer:

Let's consider an irregular solid object that hangs from the spring balance. There are two forces that act on the object: the tension in the spring directed upward (or the read of the spring balance) and the force of gravity directed downward. Let's apply the Newton's Second Law of Motion:

$$\sum F_y = ma_y = 0,$$

$$T - mg = 0,$$

$$T = mg.$$

From this formula we can find the mass of an irregular solid object:

$$m = \frac{T}{g}.$$

Therefore, in order to find the mass of an irregular solid object, we need to hang it from the spring balance and measure the reading of the spring balance in Newtons and, finally, divide that reading by the acceleration of free fall.