

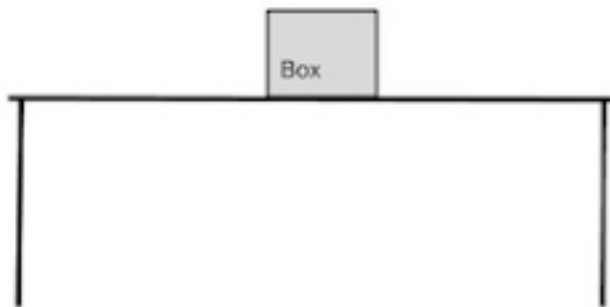
1. The formula of calculation the volume of a sphere is $\frac{4}{3}\pi r^3$. A student measures the radius r of the balloon by using a tape to measure the diameter first, then find the radius to calculate the volume. The measured length of diameter is 87 centimeters, and the uncertainty of measure tool is 1.5 centimeters. Calculate the volume of the sphere with uncertainty.

2. The volume V of a cylinder of radius R and height H is given by $V = \pi R^2 H$. The volume of the cylinder was measured with an uncertainty of 10% and the height was measured with an uncertainty of 6%. What is the uncertainty in the radius of the cylinder?
 3. 1%
 4. 2%
 5. 4%
 6. 8%

7. Gravitational potential energy is calculated by the formula of mgh , where m is the mass, g is the acceleration, and h is the change in height. The gravity of an object has an uncertainty of 5%, and h has an uncertainty of 3%. Calculate the uncertainty of the gravitational potential energy.

8. A student wants to know how much space a stone takes. He uses the water displacement method. The beaker initially has a volume of 50mL. After he puts the stone in, the volume of the beaker becomes somewhere between 70mL and 80mL. Calculate the volume of the stone with its uncertainty.

9. Assume today you bought a solid rectangular wooden brick for you IB visual art class, and you put the brick of height h and mass m on a table. Now, as a student who is very passionate about physics, you wonder the amount pressure applied by the brick. You search on the internet and find out pressure can be calculated by the formula of $P = \frac{F}{A}$, where F is the force applied by the object, and A is the contact surface area between two objects. In the case of the brick and the table, the applied force is the gravity of the brick, calculated by the formula of mg ($g=9.81\text{m/s}^2$). Then you do another research and find out the mass of an object can be calculated by the formula of $m = \rho V$ (ρ is density and V is volume)



- a. Your measured height of the wooden brick by using a ruler with a precision of 0.02 centimeters. The measured height of the box is 75 centimeters, and the density of the box is 2000 gram per cubic centimeter. Calculate the pressure to the table applied the wooden brick with its uncertainty if the contacted surface area between the table and brick is A .