

#67080 Chemistry, Other

The ratio of the acceleration due to gravity inside a deep mine and that on the surface of the earth is 0.99. Find the depth of the mine, assuming that the density of the earth is uniform throughout and the radius of the earth is 6300 km?

**Answer:**

$$g/g_1 = 0.99$$

$$g = 9.81 \text{ m/s}^2$$

$$g_1 = 9.81/0.99 = 9.91 \text{ m/s}^2$$

$$g_h = g \left(1 - \frac{2h}{R}\right)$$

$$9.91 = 9.81 \cdot \left(1 - \frac{2h}{6300}\right)$$

$$9.91 = 9.81 - \frac{19,62 \cdot h}{6300}$$

$$\frac{19,62 \cdot h}{6300} = -0.1$$

$$h = -32.11 \text{ m}$$

Therefore, mine depth is around 32 m.