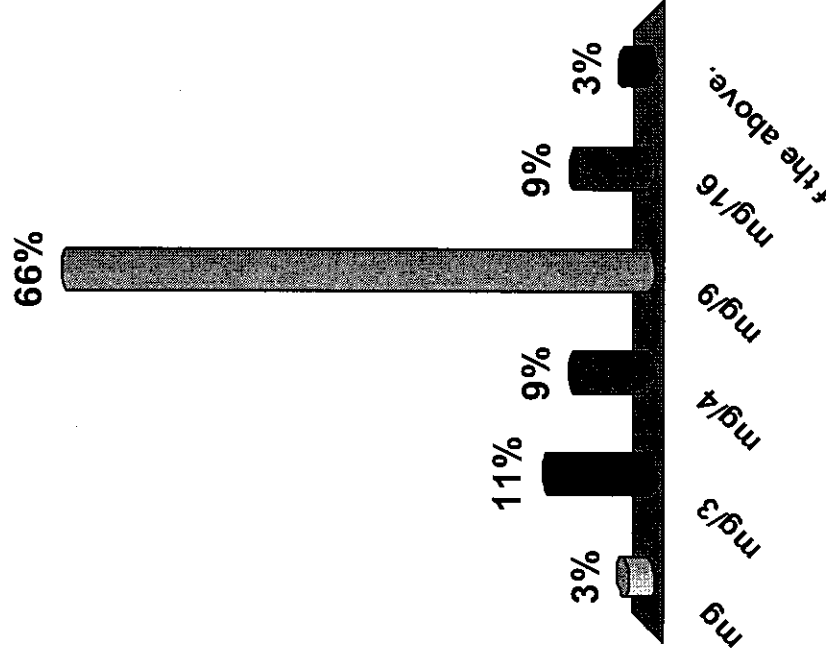


If an object whose weight is $W = mg$ at the earth's surface is at a height ($h = 3 \cdot R_E$) of 3 earth radii above the surface of the earth, it feels a force of gravity, $F_G =$

- 1. mg
- 2. $mg/3$
- 3. $mg/4$
- 4. $mg/9$
- ✓ 5. $mg/16$
- 6. None of the above.



The gravity force felt is $F_G = mg/16$; as follows:

- Because the object is at a distance $D_{ME} = h + R_E = 4R_E$ from the center of the earth the earth's gravitational force is
- $F_G = G * M_E * m / D_{ME}^2 = G * M_E * m / (4R_E)^2$, (a)
- Whereas its weight near the earth's surface is: $W = mg = G * M_E * m / 1 * R_E^2$. (b)
- Therefore, $F_G = mg / (4)^2 = mg/16$.
- (And note the useful equality within (b): $g = G * M_E / R_E^2 = 9.8 \text{ m/s}^2$.)