

Name _____

Scaling, Sinking, and the Shape of Science Answer Key

1. Density remains **2.7 g/cm³** — cutting doesn't change density.
2. $D = m/V = 193/10 = 19.3 \text{ g/cm}^3 \rightarrow$ for 1 cm³: mass = **19.3 g**
3. Both float the same (same density); **size doesn't affect floating height.**
4. $D = 20/30 = 0.67 \text{ g/cm}^3 \rightarrow$ increased density (object may now sink).
5. Same density - density depends on material, not size.
6. **d) 8** — volume \propto radius³, so doubling radius $\rightarrow 8\times$ volume.
7. The **boat's shape** traps air, lowering its *overall average density* below that of water \rightarrow it floats.
8. 60% underwater $\rightarrow D = 0.60 \times 1.0 = 0.60 \text{ g/cm}^3$.
9. Same density (2.0 g/cm³), but the **dish shape** displaces more water, so it can **float temporarily** even though the material itself is dense.