Name _____

The Great Density Challenge Answer Key

1. $D = \frac{540}{200} = 2.7\,\text{g/cm}^3$
2. $m = 2.5 \times 40 = 100\,\text{g}$
3. $V = \frac{150}{3.0} = 50\,\text{cm}^3$
4. Volume = $4^3 = 64\,\text{cm}^3$;
   $D = \frac{1680}{64} = 26.25\,\text{g/cm}^3$
5. $D = \frac{3.25}{2500} = 0.0013\,\text{g/mL}$
6. Densities < 1.0 g/mL float → **A (0.75)** and **C (0.99)** float; **B (1.15)** sinks.
7. Volume ↓ by ½, mass same → Density **doubles** (since $D = \frac{m}{V}$).
8. Both have $D = \frac{60}{20} = 3.0\,\text{g/cm}^3$ and $\frac{180}{60} = 3.0\,\text{g/cm}^3$.
   → **Same density**, proving density is independent of size.
9. $2.7\,\text{g/cm}^3 = 2700\,\text{kg/m}^3$
10. Total mass = (100 × 0.9) + (200 × 1.0) = 90 + 200 = 290 g
    Total volume = 100 + 200 = 300 mL
    $D_{\text{avg}} = \frac{290}{300} = 0.97\,\text{g/mL}$