FLINN SCIENTIFIC

Name_____

Atomic Coatings

Data and Results Table

	Trial 1	Trial 2
Length of galvanized iron (cm)		
Width of galvanized iron (cm)		
Mass of galvanized iron, initial (g)		
Mass of galvanized iron, final (g)		
Mass of zinc coating (g)		
Volume of zinc coating (cm^3)		
Volume of zinc coating per side (cm^3)		
Thickness of coating per side (cm)		
Number of layers of zinc atoms per side		

Post-Lab Calculations

(Show all work on a separate piece of paper. Enter the results of the calculations in the Data and Results Table.)

1. Subtract the final mass of galvanized iron from the initial mass of galvanized iron to calculate the mass of the zinc coating on the piece of galvanized iron.
2. The density of zinc is equal to 7.14 g/cm^3. Calculate the volume of zinc metal corresponding to the mass of the zinc coating on the piece of galvanized iron. *Hint:* Rearrange the formula for density to solve for the volume of zinc.
3. The zinc coating was present on both sides of the piece of galvanized iron. Divide the volume of the zinc coating by two to determine the volume of the zinc coating per side of the galvanized iron.
4. (*a*) The formula for the volume (V) of a rectangular solid is $V = L \times W \times H$. Rearrange this formula to solve for the height (H, thickness) of a rectangular solid if the volume (V), length (L), and width (W) of the solid are known.

   (*b*) Solve the above equation for the thickness of the zinc coating per side of the galvanized iron: Substitute the known values for the volume (per side) and the length and width of the galvanized iron into the formula.
5. The diameter of a single zinc atom is 2.7×10^{-8} cm. Divide the thickness of the zinc coating per side of the galvanized iron by the diameter of a single zinc atom to calculate the number of layers of atoms in the zinc coating.

   $$\text{Number of layers of zinc atoms} = \frac{\text{Thickness of zinc coating per side (cm)}}{\text{Diameter of zinc atom (cm)}}$$
6. The thickness of a ream (500 sheets) of paper is approximately 5.0 cm. Compare the thickness of a piece of paper to the thickness of the zinc coating (per side). This gives a "mental picture" of the thickness of a layer of atoms.