1. Calculating Density from Composition (For the Page 1 Chart)

To find the theoretical density of a moon based on given rock and ice percentages, use this linear mixture formula:

$$\text{Density of Moon} = \frac{(\%\ \text{Rock} \times \text{Density of Rock}) + (\%\ \text{Ice} \times \text{Density of Ice})}{100}$$

Since **Density of Rock = 3.5 $\mathbf{g/cm^3}$** and **Density of Ice = 0.9 $\mathbf{g/cm^3}$**:

$$\text{Density of Moon} = \frac{(\%\ \text{Rock} \times 3.5) + (\%\ \text{Ice} \times 0.9)}{100}$$

2. Calculating Composition from Density (For the Page 2 Chart)

To work backward mathematically without looking at the line graph, use the rearranged linear formula to extract the precise percentage of rock:

$$\%\ \text{Rock} = \frac{\text{Density of Moon} - 0.9}{2.6} \times 100$$

Grid Set Up

- **Horizontal Axis (X-Axis):** Label this axis **Percent Rock**. Set the scale boundary from **0% to 100%**. Create tick marks in uniform increments of **20%**.
- **Vertical Axis (Y-Axis):** Label this axis **Density ($\mathbf{g/cm^3}$)**. Set the scale boundary from **0.0 to 4.0**. Create tick marks in uniform increments of **0.5**.

Planet	Moon	Density (g/cm^3)	Percentage of Rock
Jupiter	Io	3.5	**100%**
	Europa	3.0	**81%**
	Ganymede	1.9	**38%**
	Callisto	1.8	**35%**
Saturn	Mimas	1.2	**12%**
	Dione	1.4	**19%**
	Rhea	1.3	**15%**
	Titan	1.9	**38%**
Uranus	Miranda	1.4	**19%**
	Ariel	1.7	**31%**
	Umbriel	1.5	**23%**
Neptune	Triton	2.1	**46%**

Percent Rock	Percent Ice	Calculated Equation	Density of Moon (g/cm^3)
100	0	$\frac{(100\times3.5)+(0\times0.9)}{100}$	**3.5**
80	20	$\frac{(80\times3.5)+(20\times0.9)}{100}$	**3.0**
60	40	$\frac{(60\times3.5)+(40\times0.9)}{100}$	**2.5**
40	60	$\frac{(40\times3.5)+(60\times0.9)}{100}$	**1.9**
20	80	$\frac{(20\times3.5)+(80\times0.9)}{100}$	**1.4**
0	100	$\frac{(0\times3.5)+(100\times0.9)}{100}$	**0.9**