

Vocabulary Review Sheet Lesson – Volume and Housing Density (Apartments vs. Single Homes)

How to Use

- Review each term before your quiz.
- Study the **math**, **real-life**, and **fairness** examples to see how volume connects numbers to neighborhood conditions.
- Keep this sheet in your *Equity in Numbers Student Journal*.
- Remember: *Math helps build fair and healthy communities — one cubic foot at a time.*

Volume

- **Definition:** The amount of space inside a 3-D shape.
- **Math Examples:**
 - $(V = l \times w \times h)$
 - $(120 \times 60 \times 80 = 576,000 \text{ ft}^3)$
- **Real-Life Example:** Measuring how much living space an apartment building or home provides.
- **Fairness Example:** Comparing volume per person shows who has crowded living conditions and who has spacious ones.

Cubic Units (ft^3 , m^3)

- **Definition:** Standard units used to measure volume; each represents a $1 \text{ ft} \times 1 \text{ ft} \times 1 \text{ ft}$ cube.
- **Math Examples:** A building volume of $576,000 \text{ ft}^3$ means it holds 576,000 one-foot cubes.
- **Real-Life Example:** Contractors use cubic feet to estimate air space for heating or cooling systems.

- **Fairness Example:** Using the same unit across neighborhoods makes comparisons fair and accurate.

Rectangular Prism

- **Definition:** A three-dimensional figure with six rectangular faces (like a building or room).
- **Math Examples:** Dimensions $80 \times 40 \times 50 \rightarrow (V = 80 \times 40 \times 50 = 160,000 \text{ ft}^3)$.
- **Real-Life Example:** Modeling an apartment tower as a rectangular prism to find its space.
- **Fairness Example:** Different-sized prisms show how some families live in tight buildings while others have larger, airier homes.

Length, Width, Height

- **Definition:** The three measurements needed to find a solid's volume.
- **Math Examples:** ($l = 100 \text{ ft}, w = 50 \text{ ft}, h = 60 \text{ ft} \rightarrow V = 300,000 \text{ ft}^3$).
- **Real-Life Example:** Architects measure these when designing floor plans.
- **Fairness Example:** Small heights or widths in low-income buildings can mean less air and light for families.

Formula

- **Definition:** A math rule written with symbols that tells you how to calculate something.
- **Math Examples:** Volume formula ($V = l \times w \times h$).
- **Real-Life Example:** Builders use this to estimate materials and room capacity.
- **Fairness Example:** Using formulas to compare different homes creates evidence for equitable housing policies.

Density

- **Definition:** How much space is shared by a certain number of people or units.
- **Math Examples:** ($\text{Volume per person} = \frac{\text{Total Volume}}{\text{Residents}}$).
- **Real-Life Example:** An apartment complex with 240 people in 576,000 ft³ → 2,400 ft³ per person.
- **Fairness Example:** Higher density means crowding; math shows where communities need more space and investment.

Volume per Person

- **Definition:** The amount of living space each individual has.
- **Math Examples:** ($24,000 \div 4 = 6,000 \text{ ft}^3$) for a single home with 4 people.
- **Real-Life Example:** Helps compare comfort between apartments and houses.
- **Fairness Example:** Low volume per person can highlight inequities in housing design and city zoning.

Housing Density

- **Definition:** The number of people or units within a certain space or area.
- **Math Examples:** If 200 residents share 100,000 ft³ → 500 ft³ per person.
- **Real-Life Example:** Cities measure housing density to see how crowded a neighborhood is.
- **Fairness Example:** Dense housing often appears in under-resourced areas — math can support calls for better planning and design.

Compare

- **Definition:** To look at two or more values and see how they differ.
- **Math Examples:** Apartment 2,400 ft³/person vs. Single Home 6,000 ft³/person.
- **Real-Life Example:** Comparing housing types helps explain space differences.

- **Fairness Example:** Comparison shows where some families have half the space others do — a powerful equity conversation.

Equity

- **Definition:** Fair access to resources, comfort, and healthy living conditions for everyone.
- **Math Examples:** Using volume data to compare housing types and advocate for change.
- **Real-Life Example:** Designing communities so families in apartments and houses both have enough space.
- **Fairness Example:** Equity means building cities where every child has room to learn, play, and grow — no matter their address.

Summary of Math + Fairness Connections

Concept	Math Focus	Fairness Connection
Volume	Measures 3-D space	Shows how much living room families have
Density	Space divided by people	Reveals crowding vs. comfort
Volume per Person	Fair-share calculation	Compares housing equity
Compare + Equity	Analyzes data across homes	Promotes fair design and policy
Rectangular Prism & Formula	Models buildings mathematically	Connects geometry to justice