HPISD Seventh Grade 7/8 Math

UNIT NAME	ESTIMATED DURATION	9 WEEKS			
UNIT 1: DATA AND PROBABILITY **MODULE 2: PROBABILITY AND PERCENTS**	**16 DAYS**	**1**	2	3	4

Unit Overview

The student applies mathematical process standards to develop an understanding of proportional relationships in problem situations.
The student applies mathematical process standards to solve problems involving proportional relationships.

Enduring Understandings

The student will understand that:	• Proportional reasoning involves both a qualitative and quantitative process. • Ratios, rates, and unit rates compare quantities represented in the real world. • Equivalence is used to represent relationships between part-of-a-whole notations. • Units within and between measurement systems can be converted using proportions and unit rates. • Constant rates of change can be determined and represented in mathematical and real-world problems. • Similar figures and scale drawings contain ratios within and between their attributes. • Pi is the relationship between the circumference and diameter of a circle.

Concepts

Ratio	A comparison of two quantities by division
Rate	A ratio that compares two quantities measured in different units
Unit Rate	The distance of a number from zero on a number line.
Equivalence	Any number, measure, numerical expression, algebraic expression, or equation can be represented in an infinite number of ways that have the same value.
Proportion	An equation that states that two ratios are equivalent.
Similar	Figures with the same shape but not necessarily the same size
Scale	The ratio between two sets of measurements
Rate of Change	A ratio that compares the difference between two output values to the difference between the corresponding input values
Percent	A ratio comparing a number to 100
Circumference	The distance around a circle.
Metric System	A system of weights and measures that is used universally in science and commonly throughout the world
Customary System	The measurement system often used in the United States

Guiding/Essential Questions

- How do you use ratios and rates to compare quantities?
- How can you use ratios and rates to make comparisons and predictions?
- How do you represent, describe, and compare additive and multiplicative relationships?
- How can you use rates and proportionality to solve real-world problems?
- How do you find and use unit rates?
- How can you identify and represent proportional relationships?
- How can you use graphs to represent and analyze proportional relationships?
- How can you use ratios and proportions to convert measurements?
- How do you use percent to describe change?
- How do you use percent to solve problems?
- How can you use ratios to determine if two figures are similar?
- How can you use similar shapes to find unknown measures?
- How can you use scale drawings to solve problems?
- What is the relationship between the circumference of a circle and its diameter?

Learning Targets and Progressions

- **Students will use ratios, rates, and unit rates to compare quantities and predict real-world problems.**
  - Apply qualitative and quantitative reasoning to solve prediction and comparison of real-world problems involving ratios and rates
  - Compare two rules to differentiate between additive and multiplicative relationships
  - Give examples of rates as the comparison by division of two quantities having different attributes
  - Calculate unit rates from rates in mathematical and real-world problems
  - Represent constant rates of change in mathematical and real-world problems in various representations
- **Students will convert units within and between measurement systems.**
  - Convert units within a measurement system, including the use of proportions and unit rates
- **Students will describe and solve problems involving proportional relationships in geometry.**
  - Solve mathematical and real-world problems involving similar shape and scale drawings
  - Determine constant of proportionality *(k=y/x)* within mathematical and real-world problems
- **Students will extend their knowledge of percent to include percent increase, decrease, and percent of change.**
  - Represent ratios and percent with concrete models, fractions, and decimals
  - Generate equivalent forms of fractions, decimals, and percent using real-world problems
  - Generalize the critical attributes of similarity, including ratios within and between similar shapes
  - Solve problems involving ratios, rates, and percent, including multi-step problems involving percent increase and percent decrease, and financial literacy problems

Formative Assessments	Summative Assessments

TEKS: Readiness Standards	TEKS: Supporting Standards

6.4B apply qualitative and quantitative reasoning to solve prediction and comparison of real-world problems involving ratios and rates **6.4G** generate equivalent forms of fractions, decimals, and percent using real-world problems, including problems that involve money **6.4H** convert units within a measurement system, including the use of proportions and unit rates **6.5B** solve real-world problems to find the whole given a part and the percent, to find the part given the whole and the percent, and to find the percent given the part and the whole, including the use of concrete and pictorial models **7.4A** represent constant rates of change in mathematical and real-world problems given pictorial, tabular, verbal, numeric, graphic, and algebraic representations, including d=rt. **7.4D** solve problems involving ratios, rates, and percent, including multi-step problems involving percent increase and percent decrease, and financial literacy problems **7.5C** solve mathematical and real-world problems involving similar shape and scale drawings	**6.4A** compare two rules verbally, numerically, graphically, and symbolically in the form of *y=ax* or *y=x+a* in order to differentiate between additive and multiplicative relationships **6.4C** give examples of ratios as multiplicative comparisons of two quantities describing the same attributes **6.4D** give examples of rates as the comparison by division of two quantities having different attributes, including rates as quotients **6.4E** represent ratios and percent with concrete models, fractions, and decimals **6.4F** represent benchmark fractions and percent such as 1%, 10%, 25%, 33 1/3%, and multiples of these values using 10 by 10 grids, strip diagrams, number lines, and numbers **6.5A** represent mathematical and real-world problems involving ratios and rates using scale factors, tables, graphs, and proportions **6.5C** use equivalent fractions, decimals, and percent to show equal parts of the same whole **7.4B** calculate unit rates from rates in mathematical and real-world problems **7.4C** determine constant of proportionality *(k=y/x)* within mathematical and real-world problems **7.4E** convert between measurement systems, including the use of proportions and the use of unit rates **7.5A** generalize the critical attributes of similarity, including ratios within and between similar shapes **7.5B** describe pi as the ratio of the circumference of a circle to its diameter
TEKS Process Standards	
6.1A/7.1A apply mathematics to problems arising in everyday life, society, and the workplace **6.1B/7.1B** use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution **6.1C/7.1C** select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems **6.1D/7.1D** communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate **6.1E/7.1E** create and use representations to organize, record and communicate mathematical ideas **6.1F/7.1F** analyze mathematical relationships to connect and communicate mathematical ideas **6.1G/7.1G** display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication	
Processes and Skills: **What students should be able to DO**	**Facts:** **What students should KNOW**

• Differentiate between additive and multiplicative relationships in the form of $y=ax$ or $y=x+a$ • Make predictions involving ratios and rates • Express fractions and percent using multiple representations • Generate equivalent forms of fractions, decimals, and percent • Convert between and within systems of measurement using proportions • Solve problems to find the whole or part of the whole • Represent constant rates of change in real-world problems • Calculate unit rates from rates • Determine constant of proportionality *(k=y/x)* • Generalize critical attributes of similarity and scale drawings • Describe as a ratio the relationship of circumference and diameter	• Ratios and rates compare two quantities • Difference between ratios and rates • Metric and customary system of measurement • Benchmark fractions of 1%, 10%, 25%, 33 1/3%, and multiples of these values • Relationship between the diameter and circumference of a circle • Relationship between circumference, diameter, and pi in a circle
Topics	
Circumference Constant of Proportionality Constant Rate of Change Percent Percent of Change Percent of Decrease Percent of Increase	Proportions Rates Ratios Scale Drawings Similar Figures Unit Rates
Language of Instruction	
(all units of length, mass, and capacity) (all units of length, mass, and capacity) Circumference Customary System Diameter Equivalent Ratios Indirect Measurement Metric System Missing Side Part of a Whole Proportion	Proportionality Radius Rates Ratios Relationships Scale Drawing Scale Factor Similar Figure Total of 100 Unit Rates
State Assessment Connections	**National Assessment Connections**

Resources
HMH Texas Go Math! Grade 6 Pages 175-230 HMH Texas Go Math! Grade 7 Pages 55-147