8th Grade Math
PISD Curriculum: Year at a Glance

Bundle	Title	
	Big Ideas/Enduring Understandings	Guiding Questions
1	***Rational Numbers, Scientific Notation and Order of Operations***	
	Different forms of rational numbers are appropriate for use in different situations.	1. In what ways can rational numbers be represented? 2. In what situations would you want to use percents? Decimals? Fractions? Scientific notation? 3. What form of rational numbers would be best to compare and order numbers? 4. How do you choose the best operation(s) to use in given situations with positive and negative rational numbers? 5. Why does society need a conventional "order of operations" and what is the order of operations that our society uses?
2	***Linear Relationships and Proportionality***	
	Examining the rate of change and the starting point of a relationship can determine if a relationship is proportional or non-proportional.	1. How can you determine the rate of change and starting point of a linear relationship from a graph? A table? Equations? 2. How do you determine if a relationship is proportional or non-proportional?
	Rates and starting points allow us to represent and solve problems such as determining the best bargains and average rate of travel.	1. How do you determine a unit rate? 2. How do unit rates help to determine which deal is best?
	Different societies use different measurement systems and it is necessary to convert between customary and metric systems.	1. How do you convert metric units to customary units and why is it useful? 2. How are measurement conversions related to ratios and proportionality?
3	***Multiple Representations, Arithmetic Sequences, and Proportions***	
	Patterns can be identified in sequences of numbers found in real life situations that can be used to predict values for any position in the sequence.	1. How do we determine the terms of a sequence? 2. What strategies can be used to determine relationship between independent and dependent variables?
	Patterns in a sequence of numbers can be seen in graphs, tables and equations.	1. How can representing data in multiple ways be useful? 2. How can we use multiple representations of data to make predictions? 3. How can we determine different representations given one representation?
4	***Percent Proportions and Introduction to Similarity***	
	Percents are used in the real world in the form of sales tax, discounts, commissions, simple interest, percent of increase/decrease, etc…	1. What methods can be used to solve problems in real world situations like sales tax, discount, etc.?
	Similar figures are the same shape, but can be different sizes. The scale factor between similar figures is the factor by which the image/object is reduced or enlarged, and can thereby help to determine lengths of un-known sides.	1. What are the properties of similar figures? 2. How can you use proportional relationships in similar two-dimensional figures to find missing measurements? 3. How is solving a problem about similar figures and solving a percent application problem similar? How are they different?
5	***Similarity and Transformations***	
	Similar figures are the same shape, but can be different sizes. The scale factor between similar figures is the factor by which the image/object is reduced or enlarged, and can thereby help to determine lengths of un-known sides.	1. What methods can be used to determine the scale factor of an enlargement or reduction? 2. What methods can be used to determine the missing length of similar figures?
	Reflections and translations are transformations that keep the size and shape of an object the same, so the image is equivalent to the original object with a different orientation. Dilations are transformations that enlarge or reduce an object proportionally, creating a figure similar to the original object but not equivalent.	1. What is the resulting effect on a figure when reflected over a horizontal axis or a vertical axis? 2. What is the resulting effect on a figure when a value is added/subtracted from the original coordinate values? 3. What is the significance of scale factors being less than one or greater than one?
	When all of the dimensions of a shape are changed proportionally, the value of the perimeter and area are affected by the changes in all dimensions.	1. If each dimension of a shape is doubled/halved, is the perimeter also doubled/halved? Why or why not? 2. If each dimension of a shape is doubled/halved, is the area also doubled/halved? Why or why not?
6	***Pythagorean Theorem and Applications, Square Roots***	
	The square root of a number, *n*, can be represented by the length of the side of a square with area = *n*.	1. What is the relationship between the area of a square and the side lengths of the square? 2. What methods can be used to estimate the values of square roots of whole numbers?

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6	The Pythagorean Theorem can be used to find unknown measurements on right triangles, which can model many real life situations.	1. What type of triangle is used with the Pythagorean Theorem? 2. What is the relationship between the legs and the hypotenuse of a right triangle? 3. What process can be used to determine if 3 lengths can be put together to form a right triangle? 4. What are some real-world situations in which the Pythagorean Theorem can be useful?
7	***Perspective Drawings, Perimeter, Surface Area, and Volume***	
	The understanding and application of formulas, along with the skills necessary to determine the reasonableness of answers, will provide a foundation in which we develop measurement skills in situations by using estimation, models and nets.	1. How does the volume of a cube compare to the volume a square pyramid? A cone to a cylinder? A sphere to a cylinder? 2. What strategies can be used to determine the surface area of a 3-dimensional figure? 3. How do you determine which formula is appropriate to use in different situations?
	Being familiar with perspective views allows us to compare 3-dimensional models using 2-dimensional face images.	1. How can a three-dimensional figure be shown using two-dimensional side views? 2. What techniques are used to create a 3-dimensional appearance?
8	***Statistics***	
	Mean, median, mode, and range are all useful information points about a set of data and can be used to determine the characteristics of the data set.	1. How does changing a set of data affect the measures of central tendency and range? (Low number replaced with high number or vice versa, and additional number is added to the set, a number is taken out of the set, etc…) 2. What factors help to determine which measure of central tendency or range is the better representation for a given situation? 3. What effect does an outlier(s) have on a set of data? 4. What information does inter-quartile range (IQR) provide? 5. How can measures of central tendencies be used to misrepresent data?
	Looking at multiple representations of a data set can make it easier to recognize relationships and patterns in the data, and allows us to interpret, analyze, and make decisions based on the data.	1. Which type of graph is best used to represent a set of data? 2. In what ways can graphs be misleading? 3. In a scatterplot, how can you see the correlation in a data set?
9	***Probability***	
	Understanding how to use part to whole ratios in probability allows us to make predictions based on theoretical and experimental results.	1. What's the difference between theoretical and experimental probability? 2. What effects does replacing an object have on the outcome in a compound event? What if the object is not replaced? 3. How can you determine when compound events are independent/dependent? 4. How can knowing the theoretical probability of an event be used to make predictions?
10	***Direct Variation, TAKS Review***	
	Being able to solve a problem using different strategies is essential to mathematical understanding.	1. How are mathematical ideas communicated? 2. Explain strategies used to determine the solution to given situations. 3. How do you evaluate the effectiveness of different representations to communicate ideas? 4. How can you choose the best type of representation for different situations?
11	***Direct and Inverse Relationships***	
	Being able to solve a problem using different strategies is essential to mathematical understanding.	1. How are mathematical ideas communicated? 2. Explain strategies used to determine the solution to given situations.
	In order to generate different representations we need to be able to read, interpret and analyze different representations of data.	1. How do you evaluate the effectiveness of different representations to communicate ideas? 2. What type of representation is best for different situations?
12	***Expressions and Equations***	
	In order to generate different representations we need to be able to read, interpret and analyze different representations of data as well as provide justification.	1. How are mathematical ideas communicated? 2. Explain strategies used to determine the solution to given situations. 3. How do you evaluate the effectiveness of different representations to communicate ideas? 4. What type of representation is best for different situations?