

TPSD 6<sup>th</sup> Math Syllabus  
3rd 9 Weeks

**Unit 9: Ratios and Proportions**

**College and Career Readiness Standards for ELA**

6.RP.1

Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.”

6.RP.2

Understand the concept of a unit rate  $a/b$  associated with 0, and use rate language in the context of a ratio relationship. For example, “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is  $3/4$  cup of flour for each cup of sugar.” “We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger.”

6.RP.3.

Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

- a. Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.
- b. Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?

**Academic Vocabulary/Words to Understand:**

ratio, rate, unit rate, equivalent ratio, conversion factor

**Note**-This is NOT an all inclusive list of skills and terms.

**Unit 10: Percents & Statistics -- Measures of Center**

**Unit Summary:**

This unit will help students learn how to use expressions and equations to model, analyze, and solve mathematical situations. Students will learn the difference between factors and multiples as well as how to factor and use multiples to generate equivalent expressions.

**College and Career Readiness Standards for ELA**

6.RP.3.

Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

- c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means  $30/100$  times the quantity); solve problems involving finding the whole, given a part and the percent.

6.SP.1

Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, “How old am I?” is not a statistical question, but “How old are the students in my school?” is a statistical question because one anticipates variability in students’ ages.

6.SP.2

Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.

6.SP.3

Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

**Academic Vocabulary/Words to Understand:**

percent, distribution, center, spread, shape of data, variability, measure of center, mean, median, mode, measure of variation, range interquartile range, extremes, lower quartile, upper quartile, outlier, mean absolute deviation, line plot, dot plot, histogram, lower extreme, lower quartile, upper extreme, box plot

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## Unit 11: Data Analysis - Developing Graphical Displays

### College and Career Readiness Standards

6.SP.4

Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

6.SP.5

Summarize numerical data sets in relation to their context, such as by:

- a. Reporting the number of observations.
- b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
- c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
- d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered

### Academic Vocabulary/Words to Understand:

distribution, center, spread, shape of data, variability, measure of center, mean, median, mode, measure of variation, range interquartile range, extremes, lower quartile, upper quartile, outlier, mean absolute deviation, line plot, dot plot, histogram, lower extreme, lower quartile, upper extreme, box plot

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## Unit 12: Geometry

### College and Career Readiness Standards

6.G.1

Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

6.G.2

Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas  $V = l w h$  and  $V = b h$  to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

6.G.4

Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

### Academic Vocabulary/Words to Understand:

polygon, triangle, right triangle, quadrilateral, parallelogram, trapezoid, area, square, right rectangular, prism, base, height, volume, cubic unit, right triangular prism, right square pyramid, right tetrahedron, net, surface area

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TPSD 7th Grade Math Syllabus  
3rd 9 Weeks

**Unit 9: Use Sampling to Draw Inferences about Populations**

**College and Career Readiness Standards 7. SP. 1** Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.

**7. SP. 2** Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.

**7. SP. 3** Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.

**7. SP. 4** Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.

**7. RP. 2** Recognize and represent proportional relationships between quantities.

**7. RP. 2b** Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

**7. RP. 3** Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups, and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.

**7. EE. 3** Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making \$25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or \$2.50, for a new salary of \$27.50. If you want to place a towel bar 9 ¾ inches long in the center of a door that is 27 ½ inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.

**Academic Vocabulary/Words to Understand:**

Sample, Population, Random sample, Representative sample  
Centers (measures of centers), Variabilities (measures of variabilities), Mean, Median, Mean absolute deviation, Interquartile range, Rational number, Proportional relationship, Constant of proportionality, Unit rate, Ratios, Percents

**Note**-This is NOT an all inclusive list of skills and terms.

**Unit 10: Probability**

**College and Career Readiness Standards**

**7. SP. 5** Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around ½ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.

**7. SP. 6** Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times

**7. SP.7** Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.

**7. SP. 7a** Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.

**7. SP. 7b** Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?

**7. SP. 8** Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.

**7. SP.8a** Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.

**7. SP. 8b** Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event.

**7. SP. 8c** Design and use a simulation to generate frequencies for compound events. For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood.

**Academic Vocabulary/Words to Understand:**

Likely, Unlikely, Probability model, Uniform probability model, Frequency, Relative frequency

Theoretical probability, Experimental probability, Compound events, Sample space, Tree

diagram, Outcomes, Favorable outcomes, Simulation

**Note**-This is NOT an all inclusive list of skills and terms.

## Unit 11: Finding Probability

### College and Career Readiness Standards

**7. SP. 8** Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.

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### Academic Vocabulary/Words to Understand:

Compound events, Sample space, Tree diagram, Outcomes

Favorable outcomes ,Simulation

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## Unit 12: Solve Problems Involving Geometry

### College and Career Readiness Standards

**7. G. 1** Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a difference scale.

**7. G. 2** Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle more than one triangle, or no triangle.

**7. G. 3** Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

**7. G. 4** Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.

### Academic Vocabulary/Words to Understand:

Scale drawing, Right rectangular prism, Right rectangular pyramid, Radius ,Diameter ,Circumference, Area Pi ,Supplementary angles, Complementary angles, Vertical angles, Adjacent angles, Length, Width ,Base ,Height , Altitude, Area, Surface area, Volume

**Note**-This is NOT an all inclusive list of skills and terms.

TPSD **8th Grade** Math Syllabus  
**3rd Nine Weeks**

**Unit 9: Congruence and Similarity**

**College and Career Readiness Standards:**

G.1

Verify experimentally the properties of rotations, reflections, and translations:

G.1a

Lines are taken to lines, and line segments to line segments of the same length.

G.1b

Angles are taken to angles of the same measure.

G.1c

Parallel lines are taken to parallel lines.

G.2

Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.

G.3

Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

G.4

Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.

**Academic Vocabulary/Words to Understand:**

Alternate interior angles, angle of rotation, center of rotation, congruent, corresponding angles, dilation, enlargement, exterior angle of a triangle, image, line of reflection, reduction, reflection, remote interior angles, rotation, same side interior angles, scale factor, similar, transformation, translation, transversal

**Note-**This is NOT an all inclusive list of skills and terms.

**Unit 10: All About Angles**

**College and Career Readiness Standards:**

G.5

Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. *For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.*

**Academic Vocabulary/Words to Understand:**

alternate interior angles, angle of rotation, center of rotation, congruent, corresponding angles, dilation, enlargement, exterior angle of a triangle, image, line of reflection, reduction, reflection, remote interior angles, rotation, same-side interior angles, scale factor, similar, transformation, translation, transversal

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## Unit 11 Understand and Apply the Pythagorean Theorem

### College and Career Readiness Standards:

G.6

Explain a proof of the Pythagorean Theorem and its converse.

G.7

Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.

G.8

Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

### Academic Vocabulary/Words to Understand:

converse of the Pythagorean Theorem, hypotenuse, leg, proof, Pythagorean Theorem

**Note**-This is NOT an all inclusive list of skills and terms.

## Unit 12 Solve Problems Involving Surface Area and Volume

### College and Career Readiness Standards:

G.9

Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

### Academic Vocabulary/Words to Understand:

composite figure, cone, cylinder, sphere

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