Math Grade 7 Pre-AP Overview
2019-2020

This document is designed to provide parents/guardians/community an overview of the curriculum taught in the FBISD classroom. Included, is an overview of the Mathematics Instructional Model and Pacing, TEKS, Unit Overview, Big Ideas, Essential Questions, and Concepts for each unit.

Definitions:

Overview – The content in this document provides an overview of the pacing and concepts covered in a subject for the year.

TEKS – Texas Essential Knowledge and Skills (TEKS) are the state standards for what students should know and be able to do.

Process Standards – The process standards describe ways in which students are expected to engage in the content. The process standards weave the other knowledge and skills together so that students may be successful problem solvers and use knowledge learned efficiently and effectively in daily life.

Unit Overview – The unit overview provides a brief description of the concepts covered in each unit.

Big Ideas and Essential Questions - Big ideas create connections in learning. They anchor all the smaller isolated, facts together in a unit. Essential questions (questions that allow students to go deep in thinking) should answer the big ideas. Students should not be able to answer Essential Questions in one sentence or less. Big ideas should be the underlying concepts, themes, or issues that bring meaning to content.

Concept – A subtopic of the main topic of the unit

Instructional Model – The structures, guidelines or model in which students engage in a particular content that ensures understanding of that content.

Parent Supports:

The following resources provide parents with ideas to support students in mathematical understanding

- Advice for Parents: Helping Children with Math
- How Math Should be Taught
- The Most Important Mathematical Habit of Mind
- Math: Why Doesn’t Yours Look Like Mine?
Instructional Model:

The instructional model for mathematics is the Concrete-Representational-Abstract Model (CRA). The CRA model allows students to access mathematics content first through a concrete approach (“doing” stage) then representational (“seeing” stage) and then finally abstract (“symbolic” stage). The CRA model allows students to conceptually develop concepts so they have a deeper understanding of the mathematics and are able to apply and transfer their understanding across concepts and contents. The CRA model is implemented in grades K-12 in FBISD.

Math Workshop:

During math instruction in grades K-8 in FBISD, we follow the Math Workshop structures. Instruction during a math class follows one of the three structures: Task and Share, Mini Lesson, Guided Math and Learning Stations, and Guided Math and Learning Stations. The structure that is used each day is determined by the content covered as well as student need.

<table>
<thead>
<tr>
<th>Task and Share</th>
<th>Mini Lesson, Guided Math and Learning Stations</th>
<th>Guided Math and Learning Stations</th>
</tr>
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<tbody>
<tr>
<td>Number Sense Routine</td>
<td>Number Sense Routine</td>
<td>Number Sense Routine</td>
</tr>
<tr>
<td>Math Task</td>
<td>Mini Lesson</td>
<td>Guided Math Learning Stations</td>
</tr>
<tr>
<td>Task Share and Student Reflective Closure</td>
<td>Student Reflective Closure</td>
<td>Student Reflective Closure</td>
</tr>
</tbody>
</table>

**Number Sense Routine** – An engaging accessible, purposeful routine to begin math class that promotes a community of positive mathematics discussion and thinking.

**Math Task** – A problem-solving task that students work on in small groups. The teacher monitors and probes student thinking through questions. The task should have multiple entry points, allowing for all students to have access to the problem.

**Task Share with Student Reflective Closure** – Students come together as a whole class and discuss the various strategies they used to solve a rich mathematical task. Students ask questions, clarify their thinking, modify their work, and add to their collection of strategies.

**Mini Lesson** – A well-planned whole group lesson focused on the day’s learning intention and accessible to all levels of learners.

**Guided Math** – Small group instruction that allows the teacher to support and learn more about students’ understandings and misconceptions. Can include intervention, more on-level support, or enrichment.

**Learning Stations** – Activity in which students engage in meaningful mathematics and are provided with purposeful choices. Could include individual, partner or group tasks.

**Student Reflective Closure** – A deliberate and meaningful time for students to reflect on what they’ve learned and experienced during a math task, at activities in learning stations, or in a guided math group.
Adopted Resources:

Middle School: https://www.fortbendisd.com/Page/93918

Supplemental Resource and Tool Designation

- The TI Nspire CX calculator is a standardized technology integration tool used for Mathematics and Science in FBISD.

Mathematical Process Standards:

The student uses mathematical process to acquire and demonstrate mathematical understanding. The student is expected to:

7.1A Apply mathematics to problems arising in everyday life, society, and the workplace
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
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
7.1D Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate
7.1E Create and use representations to organize, record, and communicate mathematical ideas
7.1F Analyze mathematical relationships to connect and communicate mathematical ideas
7.1G Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication

Grading Period 1

Week of Inspirational Maths
Estimated Date Range: Aug. 14 – Aug. 20

Unit Overview: This unit is a set of 5 lessons to begin the school year. Lessons focus on growth mindset and how we learn mathematics.

<table>
<thead>
<tr>
<th>Themes for the Week</th>
<th>TEKS (Link to Math TEKS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The themes for the week promote important mathematical ideas such as:</td>
<td>7.1A, 7.1B, 7.1C, 7.1D, 7.1E, 7.1F, 7.1G</td>
</tr>
<tr>
<td>• learning from mistakes</td>
<td></td>
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<tr>
<td>• doing mathematics visually</td>
<td></td>
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<tr>
<td>• productive struggle</td>
<td></td>
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<tr>
<td>• working together</td>
<td></td>
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<tr>
<td>• communicating about mathematics</td>
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</table>
Unit 1: Represent and Apply Real Numbers
Estimated Date Range: Aug. 21 – Sept. 18

Unit Overview: In this unit, students will continue to examine the relationship of sets and subsets of rational numbers to discover the real number system including irrational numbers. Students will use prior knowledge of exponents and square units as a measure of area to build models to represent square roots and approximate square root numbers to locate the numbers on a number line. Students will build on prior knowledge of ordering rational numbers by comparing and ordering all real numbers by their magnitude. Students will also define radical and square root for both rational and irrational numbers as a subset of the real number system, convert between standard decimal notation and scientific notation, order a set of real numbers to include both rational and irrational numbers in both mathematical and real-world contexts. Students will also examine right triangles more closely within this unit by using models to explain the Pythagorean Theorem, use Pythagorean Theorem and its converse to solve problems, and apply these understandings to determine the distance between two points on a coordinate plane.

Big Ideas:
- The relationship between real numbers can be compared and contrasted categorically and numerically.
- Numbers can be compared by their relative values.
- The relationship of a shape's attributes can be used to determine different measures within the shape.
- Geometric applications, such as Pythagorean Theorem, can be used to solve real-life problems that include a right triangle.

Essential Questions
- How are different sets and subsets of numbers related?
- How do you estimate irrational numbers by comparing them to rational numbers?
- What are the properties of special right triangles and how are these properties used?
- What are the applications of the Pythagorean Theorem and its converse?
- How is Pythagorean Theorem used to solve real world problems?

Concepts within Unit #1
<table>
<thead>
<tr>
<th>Concept #1: Representing Real Numbers</th>
<th>TEKS (Link to Math TEKS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept #2: Modeling Pythagorean Theorem</td>
<td>8.6C</td>
</tr>
<tr>
<td>Concept #3: Application of Pythagorean Theorem</td>
<td>8.6C, 8.7C, 8.7D</td>
</tr>
</tbody>
</table>

Unit 2: Similarity and Transformations
Estimated Date Range: Sept. 19 – Oct. 10 and Oct. 15 – Oct. 21

Unit Overview: In this unit, students will name similar figures with corresponding vertices and similarity symbol, write an extended proportion of corresponding sides of a similar figure using the endpoints of the sides and using the lengths of the sides. Students will also discover the relationship of corresponding angles and corresponding sides of similar figures, write generalizations, and determine if figures are similar. Students will determine missing measurements from similar figures and then solve real world problems involving similar figures. After the conceptual development of similar figures students will use their knowledge of the coordinate plane and expressions to solve problems involving Dilations, Translations, Rotations, and Reflections on a coordinate plane. Starting with dilations and making the connection to similar figures and scale factors students will determine algebraic expressions to represent dilations and analyze the effect of a scale factor on linear and area measurement for 2-D figures. Students will then analyze the effects that transformations have on a figure. Students will represent translations, reflections, and rotations algebraically and on the coordinate plane. They will be able to determine which transformations preserve orientation and/or congruence.

Big Ideas:
- Proportional reasoning can be used to describe and solve problems in everyday life.
- Algebraic representations may be used to explain the effect of transformations across the coordinate plane.
Objects can be transformed in an infinite number of ways, and those transformations can be described and analyzed mathematically.

**Essential Questions**
- How do you determine if two figures are similar?
- What effects do the different transformations have on a figure?
- How can transformations be represented?

<table>
<thead>
<tr>
<th>Concepts within Unit #2</th>
<th>TEKS (Link to Math TEKS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept #1: Similar Figures</td>
<td>7.5A, 7.5C</td>
</tr>
<tr>
<td>Concept #2: Translations, Rotations and Reflections</td>
<td>8.10A, 8.10B, 8.10C</td>
</tr>
<tr>
<td>Concept #3: Dilations</td>
<td>8.3A, 8.3B, 8.3C, 8.7D, 8.8D, 8.10C</td>
</tr>
</tbody>
</table>

**Grading Period 2**

**Unit 2: Similarity and Transformations (Continued)**
Estimated Date Range: Sept. 19 – Oct. 10 and Oct. 15 – Oct. 21

Note: This unit is continued from Grading Period 1. Please refer to Grading Period 1 for the Unit Overview, Big Ideas, and Essential Questions for this unit.

<table>
<thead>
<tr>
<th>Concepts within Unit #2</th>
<th>TEKS (Link to Math TEKS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept #1: Similar Figures</td>
<td>7.5A, 7.5C</td>
</tr>
<tr>
<td>Concept #2: Translations, Rotations and Reflections</td>
<td>8.10A, 8.10B, 8.10C</td>
</tr>
<tr>
<td>Concept #3: Dilations</td>
<td>8.3A, 8.3B, 8.3C, 8.7D, 8.8D, 8.10C</td>
</tr>
</tbody>
</table>

**Unit 3: Linear Relationships**
Estimated Date Range: Oct. 22 – Nov. 11

**Unit Overview:** In this unit, students will develop the formula for slope of a line from similar right triangles by determining the vertical change over the horizontal change is the same between any two points on a line. They will make the connection between unit rate and slope of a line in proportional situations. Students will then determine slope and y-intercept of linear relationships when provided with a table, graph, or situation.

**Big Ideas:**
- Mathematical relationships can be represented and analyzed using words, tables, graphs, and equations.
- The slope of a line that represents a linear proportional relationship is equivalent to the unit rate of the situation.
- A graph of a relationship can be analyzed with regard to the change in one quantity relative to the change in the other quantity.

**Essential Questions**
- How can one represent or analyze different mathematical relationships?

<table>
<thead>
<tr>
<th>Concepts within Unit #3</th>
<th>TEKS (Link to Math TEKS)</th>
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<tbody>
<tr>
<td>Concept #1: Rate of Change and Slope</td>
<td>7.4C, 8.4A, 8.4B</td>
</tr>
<tr>
<td>Concept #2: Understanding Linear Functions</td>
<td>7.7A, 8.4C</td>
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**Unit 4: Equations and Inequalities**
Estimated Date Range: Nov. 12 – Nov. 22 and Dec. 2 – Dec. 21
Note: Includes 7 days for Semester Exams and review

**Unit Overview:** In this unit, students will write real world situations from an equation or inequality as well as write equations and inequalities from verbal situations where there is a variable on both sides of the symbol. Students will also use concrete models, manipulatives, and inverse operations to solve equations with variables on both sides of the equal sign, represent solutions to equations, and determine if a solution makes an equation true. In order to build conceptual
understanding for solving equations it is essential that all the students have practice with writing equations, then representing and solving with models before solving using inverse operations.

**Big Ideas:**
- Rules of arithmetic and algebra can be used together with notions of equivalence to transform equations and inequalities so solutions can be determined.
- A solution represents a value(s) that make a statement true in mathematical and real-world situations.
- The process to solve an equation must preserve equivalence, and that equivalence can be preserved using inverse operations, graphing, and modeling, using concrete and pictorial manipulatives.

**Essential Questions**
- How can you interpret the solution to an equation?
- What strategy can you use to solve an equation with variables on both sides?
- How can you determine if a solution is reasonable?

<table>
<thead>
<tr>
<th>Concepts within Unit #4</th>
<th>TEKS</th>
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<tbody>
<tr>
<td>Concept #1: Writing Equations and Inequalities</td>
<td>8.8A, 8.8B</td>
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<tr>
<td>Concept #2: Model and Solve Equations</td>
<td>7.11A, 8.8A, 8.8C, 8.9A</td>
</tr>
<tr>
<td>Concept #3: Geometric Applications of Equations</td>
<td>7.11A, 7.11C, 8.8C, 8.8D</td>
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**Grading Period 3**

**Unit 5: Circumference & Area of 2-D Figures**

**Estimated Date Range:** Jan. 8 – Jan. 30

**Unit Overview:** In this unit, students will discover Pi and how it is the ratio of the circumference to the diameter. Students will need to be able to represent the relationship between the parts of the circle and circumference pictorially, graphically, and algebraically. Based on the ratio of circumference to diameter, students will identify how to determine circumference of a circle when provided with the radius or the diameter. Students will then explore and determine how to calculate area of circles based on what they know about the area of a parallelogram by using manipulatives and technology to make the connections. Students will need to be able to apply the knowledge of area and circumference to different real-world situations. In this unit, students will also use their prior knowledge of area of squares, rectangles, triangles, parallelograms, trapezoids as well as area of circles to determine area of composite figures.

**Big Ideas:**
- Geometric attributes and their measures can be used to describe figures and their relationships.
- Mathematical operations and strategies may be used to represent and solve a variety of problem situations involving area and volume.

**Essential Questions**
- How are the parts of a circle related to circumference and area of a circle?
- How are area and volume problems solved?

<table>
<thead>
<tr>
<th>Concepts within Unit #5</th>
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<tr>
<td>Concept #1: Circumference and Area of Circles</td>
<td>7.5B, 7.8C, 7.9B</td>
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<tr>
<td>Concept #2: Area of Composite Figures</td>
<td>7.9B, 7.9C</td>
</tr>
<tr>
<td>Concept #3: Effects of Dilation</td>
<td>8.10D</td>
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**Unit 6: Volume & Surface Area of 3-D Figures**

**Estimated Date Range:** Jan. 31 – Mar. 6

**Unit Overview:** In this unit, students will make the bridge from 2-D shapes into 3-D shapes from composite area to finding the surface area using nets. Students will only focus on rectangular prims and pyramids and triangular prisms and pyramids. Students will need to be able to determine the net of these figures when given a 3-D picture or model. They will need to be
able to identify the location of the dimensions when the prisms or pyramids are drawn 3-D or 2-D in the shapes' nets. Students will need to be able to calculate the lateral and total surface area of the figures and be able to understand and explain the difference between the two as well as apply it to real-world scenarios. As the students move into volume of the same figures (rectangular prisms and pyramids, triangular prisms, and pyramids), the students need to be able to model and understand how the volume formula is derived as well as the relationship between prisms and pyramids with congruent bases and heights. Once the formula and relationship is understood students will solve real-world application problems involving volume of those four figures.

**Big Ideas:**
- Geometric Attributes and their measures can be used to describe figures and their relationships.
- Mathematical operations and strategies may be used to represent and solve a variety of problem situations dealing with area and volume.

**Essential Questions**
- How do geometric relationships and the application of measurements help us to solve authentic problems in life? Does a constant relationship exist between the dimensions and volumes of different shapes? If so, why? If not, why not?

<table>
<thead>
<tr>
<th>Concepts within Unit #6</th>
<th>TEKS</th>
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<tbody>
<tr>
<td>Concept #1: Surface Area</td>
<td>7.9C, 7.9D, 8.7B</td>
</tr>
<tr>
<td>Concept #2: Volume of 3-D Figures</td>
<td>7.9A, 8.6A, 8.6B, 8.7A</td>
</tr>
</tbody>
</table>

**Grading Period 4**

**Unit 7: Data & Probability**
**Estimated Date Range: Mar. 16 - April 6**

**Unit Overview:** In this unit, students will create sample spaces using tree diagrams and lists as well as using manipulatives and technology to understand probability of outcomes in simple and compound events. Students will identify the probability of a simple event and its complement and describe the relationships between the two. Students will explore and understand the difference between theoretical probability and experimental probability for various events. Students will also create simulations of different events with or without technology to make predictions and compare different events. Students will make predictions with simple and compound events based on experimental data and/or theoretical probability.

**Big Ideas:**
- Models may be used to simulate real-world events, enabling us to make predictions.

**Essential Questions**
- How can you make predictions for an event?

<table>
<thead>
<tr>
<th>Concepts within Unit #7</th>
<th>TEKS</th>
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<tbody>
<tr>
<td>Concept #1: Foundations of Probability</td>
<td>7.6A, 7.6B</td>
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<tr>
<td>Concept #2: Determining Probability of Simple and Compound Events</td>
<td>7.6A, 7.6B, 7.6E, 7.6I</td>
</tr>
<tr>
<td>Concept #3: Making Predictions with Simple and Compound Events</td>
<td>7.6C, 7.6D, 7.6H</td>
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**Unit 8: Data & Statistics**
**Estimated Date Range: April 7 – April 24**
**Note: Includes 1 day for state testing**

**Unit Overview:** In this unit, students will use proportional reasoning to compare data and solve data problems represented in bar graphs, dot plots, and circle graphs. Students will use part-to-part and part-to-whole comparisons and equivalencies to solve problems involving data from bar graphs, dot plots, and circle graphs. Students will compare the shape, center, and spread of data using comparative plots, measures of central tendency, and distribution of the data. Students will need to understand what a random sample is and determine whether or not a sample is valid. Students will also use data to make connections between random samples and populations and make inferences from random samples of data using proportional reasoning. Students will also compare two populations based on the data in random samples to make
inferences about similarities and differences. Students will also look for variances in bivariate data in order to better understand and form conjectures between the samples, this is done through calculating absolute mean deviation and generating random samples.

**Big Ideas:**
- Statistical data can be represented and described in various ways.
- Proportional reasoning can be used to make predictions and solve problems.

**Essential Questions**
- How can you analyze and compare data?
- How can proportional reasoning be used to make predictions using data?

<table>
<thead>
<tr>
<th>Concepts within Unit #8</th>
<th>TEKS</th>
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<tbody>
<tr>
<td>Concept #1: Analyzing Data in Bar Graphs, Dot Plots, and Circle Graphs</td>
<td>7.6F, 7.6G, 8.11B</td>
</tr>
<tr>
<td>Concept #2: Making Inferences with Data</td>
<td>7.12B, 7.12C, 8.11C</td>
</tr>
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</table>

**Unit 9: Financial Literacy**
Estimated Date Range: Apr. 23 – May 28
Note: Includes 2 days for state testing and 7 days for semester exams and review

**Unit Overview:** In this unit, students will differentiate between taxable and non-taxable items and calculate sales tax. Students will need to be able to use a pay stub to calculate income tax, payroll tax (Medicare and social security), calculate and estimate paycheck withholdings and net income. Students will utilize net income to calculate a budget, categorize expenses, and identify fixed and variable expenses as well as target salaries and occupations that support them. Students will analyze assets and liabilities to identify net worth. Students will compare simple and compound interest and analyze total interest earned. Students will also learn the basic concepts of financial literacy in regards to spending and the importance of saving for the future. Students will use technology to solve problems comparing the interest rate and loan length and calculate the cost of repaying a loan. Students will formulate strategies for making good financial decisions by investigating the different types of credit, loans, and the costs associated with borrowing money and various methods of payment. Students will conclude the unit by identifying situations that represent financially responsible decisions, and estimate the costs of attending various education institutions.

**Big Ideas:**
- Developing an economic way of thinking and problem solving is useful in one’s life as a knowledgeable consumer and investor.

**Essential Questions:**
- Why do we study financial literacy?

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<thead>
<tr>
<th>Concepts within Unit #9</th>
<th>TEKS</th>
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<tbody>
<tr>
<td>Concept #1: Purchasing Power</td>
<td>8.12E</td>
</tr>
<tr>
<td>Concept #2: Financial Responsibility</td>
<td>7.13C, 7.13D, 8.12F</td>
</tr>
<tr>
<td>Concept #3: Interest, Borrowing and Saving</td>
<td>7.13B, 8.12A, 8.12B, 8.12C, 8.12D, 8.12G</td>
</tr>
</tbody>
</table>