Curriculum Parent Overview (Grade 5)

MATHEMATICS

UNIT #5 TEMPERATURE, HEIGHT, AND GROWTH (Analyzing Patterns and Rules)

CONTENT FOCUS:

Students represent temperature and height over time on coordinate grids. They interpret the meaning of points on the coordinate grid and the shape of the graph in terms of the situation. They represent, analyze, and compare fictitious animals with growth rates governed by rules relating height and age.

Students develop and compare rules for numerical patterns generated when the area or perimeter of a rectangle is changing in regular ways. They use tables, coordinate graphs, and equations to model the mathematics of these situations. They extend this work to other patterns generated by geometric shapes.

UNIT FOCUS:

- Reading and constructing coordinate graphs: Students are introduced to coordinate graphs in this unit. Coordinate graphs are used to show a correspondence between two quantities. Points placed on a coordinate grid show this correspondence. For example, students will graph their height, and each point on their graph will show a particular age and a corresponding value for height. Students can see that the height is increasing and can also describe and compare the rate of that increase over time.   The correspondence of the two values represented by a point on the coordinate grid can be shown as an ordered pair. Coordinate graphs are very different from the line plots and bar graphs students have worked with in the past. Each point on the coordinate grid will represent two different values.

- Modeling situations with mathematics: graphs, ordered pairs, tables, and symbolic notation: Students will use many tools to model math in real-world and mathematical situations in which one quantity varies in relation to another. Specifically, they use data related to temperature and height to show changes over time. They will also analyze geometric relationships to determine how the area of a square changed in relation to the length of a side.

  One way students will model situations in which two varying quantities are related is to use a list of ordered pairs in chart form. Focusing on the two values will help them describe the relationship of the values and how one may change. Students will use these ordered pairs to create graphs to show visualizations of change over time.

  Another way of modeling this is using general rules. Students will express rules in words and model them using symbolic notation to express the relationship between the two changing quantities.

- Analyzing and comparing mathematical patterns and relationships: Students work with many contexts in which the two varying amounts can be represented by a rule. Students will encounter several situations in which one quantity can be determined but is not constant. In these situations, the rate of change is changing in some regular way.

- Once students have modeled the mathematics of the contexts with tables, graphs, and equations, they will use these models to make predictions, solve problems, and compare different solutions.

- For example, "Can you find the perimeter of a rectangle made with 20 rows of square centimeters, with three squares in each row, by doubling the perimeter of a rectangle with ten rows of squares?"

Students examine number patterns in the tales and the shapes of the graphs to predict how these patterns will continue. They write rules in words and equations to represent the relationship between two quantities. They will also compare different situations within each context.

MATHEMATICAL PRACTICES:

MP4: Model with mathematics.

MP5: Use appropriate tools strategically.

CONNECTIONS TO PREVIOUS CONTENT:

This unit builds on the work in Grades 3 and 4 in which students investigated mathematical situations and patterns governed by rules. For example, in Grade 4, they worked with the context of a Penny Jar, which starts out containing a certain number of pennies, and then the same number of pennies is added to the jar in successive "rounds." This work led students to articulate general rules for calculating the value of one varying quantity (e.g., the total number of pennies in the jar) when the corresponding value of the other varying quantity (e.g., the number of rounds) is known. It is expected that most students are familiar with using tables to model situations, including tables in which not every sequential value is shown in the first column. They have also had experience in articulating rules about how two varying quantities are related and writing equations that model those rules.

CONNECTIONS TO FUTURE CONTENT:

As students continue their work in mathematics, they will encounter both situations in which one quantity varies at a constant rate in relation to another and situations in which the amount of change varies according to some rule. Their work with tables, graphs, and symbolic notation in this unit, connected to situations that students can describe and understand, lays the foundation for further study in middle school and high school of functions and their symbolic notation.

MATH AT HOME:

- **Marble Jar:** Start with 4 objects in a jar (marbles, pennies, paper clips, or some other small objects). Each day add 6 more of the same object. Help your child record how many objects are in the jar at the end of each day. Have your child predict how the number of objects in the jar will change over the next few days. For example, "How many marbles will be in the jar after 5 days? After 10 days?" Repeat the Marble Jar activity with other numbers (e.g., start with 5 objects and add 9 each day; start with 100 objects and subtract 6 each day).
- **Change Situations:** Together with your child, look for things that change in different ways and at different speeds. *Can you find some things that change more and more quickly? Can you find things that change steadily? Can you find anything that changes by gradually slowing down, or by gradually shrinking?* Here are some ideas to start with:
  - The growth of a plant over time
  - The speed of a bicyclist over the course of a race
  - The growth of your child (and siblings) over time

  Consider making graphs of any of these situations.
- Review the Math Words and Ideas videos for this unit on Savvas Site