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Tennessee Mathematics Standard: Strand 4, Geometry & Measurement

Grade 4

GLE 0406.4.4- Understand the representation of location and movement within the first quadrant of a coordinate system.

SPI 0406.4.3 Construct geometric figures with vertices at points on a coordinate grid.

**Station One- Hidden Positions (Jessica)**

**What do students do:** Two students sit with a “screen” separating their desktop space so that neither student can see the other’s grid. Students will place four different pattern blocks on their game board, which is a 3 by 3 grid. The first player paces a block on four different sections of the grid. He then tells the other player where to put blocks on her grid to match his own. When all four pieces are positioned, the two grids are checked to see if they are alike. Then the players can switch roles.

**What do students learn:** This activity is to introduce specifying locations for the coordinate grid. They learn positional descriptions like over, under, near, far, between, left, and right. This helps students refine the way they answer questions of direction, distance, and location. This activity serves as a readiness task for coordinates and helps students see the value of having a way to specify location without pointing.

**What do students produce:** Each student will produce a grid with four different pattern shapes, and then they will direct their partner to produce the same grid, with the four patterns in the exact same place.

**Differentiation:** This activity is an introductory lesson to coordinates. For gifted students you can make a 6 by 6 grid, this way it is harder and keeps them involved in this activity longer. For lower level students the teacher can direct them by giving them words to keep in mind like: over, under, near, far, between, left, and right.

**References:**

Page 424-425

John A Van De Walle, *Elementary and Middle School Mathematics: Teaching Developmentally*. 7th edition. Allyn & Bacon: Pearson Education

**Station Two: Coordinate Reflections (Megan)**

**What do students do:** In order to complete this activity, students will be using previously learned skills while also gaining new skills. In this activity, students are to use grid paper to draw a five-sided shape, in the first quadrant, using grid points for vertices. They are to label the figure ABCDE and name it figure 1. Next the students will use the y-axis as a line of symmetry and draw the reflection of the shape in the second quadrant. They should label this figure’s vertices A’B’C’D’E’ and name it figure 2. Now using the x-axis as a line of symmetry, this continues until there is four shapes drawn, one in each quadrant. Each shape should be a reflection of the previous shape. Then the students should label the coordinates and list the vertex for each figure.

**What do students learn:** This activity was created for the students to learn about location and reflections of figures on a coordinate grid, by using the x and y axis as symmetry lines.

**What do students produce:** Students will produce a graph, on grid paper, with their results from there drawn figures. The students will then be able to compare each figures similarity and the results of reflection.

**Differentiation:** This activity is very visual. It allows the student to be more independent with choosing their shape and placing it on the grape (coordinates). Sometimes it may be difficult to understand placement and reflection, until you visually see and move the figure on the graph. This activity allows the students to see and grasp a better understanding of location and its similarities with reflection.

**References:**

Page 426-427

John A Van De Walle, *Elementary and Middle School Mathematics: Teaching Developmentally*. 7th edition. Allyn & Bacon: Pearson Education

**Station Three- Coordinate Dilations (Ashley)**

**What do students do:** Students begin with a four sided shape in the first quadrant. Make a list of plotted points. Make a new set of coordinates by multiplying each of the orginal coordinates by 2. Plot the resulting shape. What is the result? Now students multiply each of the orginal coordinates by 1/2 and plot that shape. What is the result? Next have students draw a line from the orgin of the graph through the end vertices of each shape and observe!

**What do students learn:** The shape either gets larger or smaller. The size is changed but not the shape. The new shape is similar to the old. This is called a ***Dilation***.

**What do students produce:** Dilations with coordinates in one quadrant on graph paper. ( three- 4 sided shapes)

**Differentatiation:** Other activities are at the table for students of all ability levels however within this actvity for a lower level students: discuss how to plot coordinates vs. higher level students: reflect on how do the lenghs of sides and the shapes compare when coordinates are multiplied by 2? What if they are multiplied by 3 or 1/2?

**References:** *Elementary amd Middle School Mathematics 7th Edition*

**Station Four- Paths (Courtney)**

**What do students do**: Using a sheet of 2-cm grid paper, students will mark two different points A and B. They will describe a path from A to B. Students will draw three paths on their papers from A to B using different-colored crayons. For each path they write directions that describe their paths.

**What do students learn**: Students learn about the notion of different paths on a grid.

**What will students produce**: Students will produce a piece of grid paper that has two points with three different paths that lead to the points.

**Differentiation**: This is a hands on activity that kinesthetic learners will benefit from. Some students may need to have a visual representation of the activity. A big chart with moveable pieces may help some students visualize the process of determining the location of points on a grid.

**References:** Page 425

John A Van De Walle, *Elementary and Middle School Mathematics: Teaching Developmentally*. 7th edition. Allyn & Bacon: Pearson Education