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| Unit Name: Where Has Poly-gon? | Unit Length: 1 week | | |
| Overview:  In this unit, students participate in a vertically aligned, campus-wide exploration of polygons. This second grade lesson will reinforce the use of formal language when describing the attributes of vertices and sides of two-dimensional figures. Students will be introduced to describing rectangles and squares using two other attributes, square corners and the length of opposite sides. The lesson will also focus on the non-examples of a polygon including a circle and an oval. This geometric study will be extended in later units.  According to research, students need to go beyond merely seeing and naming pictures of shapes. Students must be able to distinguish attributes from one shape to another and describe them using formal geometric vocabulary (NCTM, 1999).  National Council of Teachers of Mathematics. (1999). *Navigating through geometry in prekindergarten-grade 2.* Reston, VA: National Council of Teachers of Mathematics, Inc. | | | |
| ***DESIRED RESULTS*** | | | |
| **Grade 2 TEKS:**  2.7 Geometry and spatial reasoning. The student uses attributes to identify two- and three-dimensional geometric figures. The student compares and contrasts two- and three-dimensional geometric figures or both.  2.7A Describe attributes (the number of vertices, faces, edges, sides) of two-dimensional and three-dimensional geometric figures such as circles, polygons, spheres, cones, cylinders, prisms, and pyramids, etc.  2.7B Use attributes to describe how 2 two-dimensional or 2 three-dimensional figures are alike or different.  2.7C Cut two-dimensional geometric figures apart and identify the new geometric figures formed.  **Process TEKS:**  2.13 Underlying processes and mathematical tools. The student communicates about Grade 2 mathematics using informal language.  2.13A Explain and record observations using objects, words, pictures, numbers, and technology.  2.13B Relate informal language to mathematical language and symbols.  2.14 Underlying processes and mathematical tools. The student uses logical reasoning.  2.14A Justify his or her thinking using objects, words, pictures, numbers and technology. | | **Critical Vocabulary**   * circle * oval * polygon * triangle * quadrilateral * rectangle * square * rhombus * pentagon * parallelogram * hexagon * octagon * vertices * sides * attributes * square corner * opposite sides * open figures * closed figures | |
| **Enduring Understandings (Big Ideas) and Guiding Questions:**   * Polygons are figures with specific attributes.   + What is the number of sides for a given polygon?   + What is the number of vertices for a given polygon?   + What is the difference between a side and a vertex?   + What is the least number of sides a figure must have to be a polygon?   + What is the least number of vertices a figure must have to be a polygon?   + What are some attributes that help to distinguish between polygons? * Circles are non-examples of a polygon and have specific attributes.   + Why is a circle not a polygon?   + How is the curved surface of a circle different from other figures with curved surfaces?   + How can you use the center of a circular figure to determine if it is a circle? * Two-dimensional figures can be cut to form other two-dimensional figures.   + — What figures can you make by cutting a given figure? | | | |
| **Learning Goals and Objectives**.   * Students will describe the similarities and differences of attributes among two-dimensional figures using formal and informal language. * Students will create and identify new geometric figures by cutting apart a two-dimensional figure. * Student will be able to complete all goals and objectives with 85% accuracy. | | **Materials Needed**   * *Just a Polygon* song * Open/closed shapes, assorted, organized in baggies * chart paper * math journals * geoboards w/ wiki sticks * string (approximately 2   yards in length)   * crayons * index cards * poster board * straightedge * Digital cameras from technology department * Computers/computer lab | |
| ***ASSESSMENT PLAN*** | | | |
| **Performance Tasks**   * Students will describe the similarities and differences of attributes among two-dimensional figures using formal and informal language. * Students will create and identify new geometric figures by cutting apart a two-dimensional figure. * Students will create a collection of examples of polygons in the world around them through digital photography. | | | |
| ***LEARNING PLAN*** | | | |
| **Engage:** Students write in math journals --- a 1 minute “quick write” of everything they know about polygons. (preassessment as well)  Students will conduct open sort of open and closed figures on sorting mats with “talk out” about their categories and decision making for quick evaluation.  **Explore/Explain1:** Students will discuss and apply steps for making open figures into polygons and label attributes common to all polygons.  **Explore/Explain 2:** Students act as “shape detectives,” exploring and creating polygons on the geoboards. Include exploration of the role of prefixes in naming the n-agons. Students will create t-charts in math journals for future reference.  **Questions students might contemplate**:   1. What do you notice about (shape)? 2. What attributes do you notice all polygons share? 3. What is the same about the shapes you are creating? 4. What is different about the shapes you are creating?   **Explore/Explain3:** Quadrilaterals (narrowing the focus) and non-polygons (comparing attributes)  Formally introduce language of geometry to sort, name and label squares, rhombi, rectangles, and parallelograms. Further study will compare/contrast quadrilaterals with non-polygons such as ovals and circles. Students will brainstorm where such polygons can be found in the school and their neighborhood. Additional entries will be glued into math journals with appropriate information regarding attributes.  **Elaborate/Evaluate** Students will work with geoboards independently following a “Who Am I” format to create polygons as either described or named by the teacher. Extensions into the creation of new shapes by splitting or cutting existing polygons.  **Evaluate/Extend/Elaborate:** Students will take “walking field trip” around school with digital cameras to capture polygons in a “Scavenger Hunt” for shapes. Options for final presentation and display include posters, powerpoints, and artistic representation to be added to school-wide display. | | | 15-20 minutes, Day One  10-15 minutes, Day One  30 - 40 minutes, Day Two  Day 3, 40 minutes  Day 4, 40 minutes  Day 5, 50 minutes (with extensions for presentation development into next week) |
| ***Modifications: Modifications are embedded in the activity due to the open-ended nature of the lesson objectives that lends itself to supported instruction as well as extension. Central to both is the fact that the student takes the lead. Students will work and collaborate with other students.*** | | | |