NEW MEXICO
Public Education Department

K.G: GEOMETRY

Cluster Statement: A: Identify and describe shapes.

Additional Cluster (Students should spend the large majority of their time (65-85%) on the major work of the grade/course. Supporting work and, where appropriate, additional work should be connected to and engage students in the major work of the grade.)

Standard Text	**Standard for Mathematical Practices**	**Students who demonstrate understanding can:**
K.G.A.1: Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as *above, below, beside, in front of, behind,* and *next to*.	SMP 4: Students can model with mathematics by describing real word objects using the names of shapes. SMP 6: Students can attend to precision by using position words to indicate the location of shapes.	• Describe the position of objects as above, below, beside, in front of, and next to. • Identify shapes in my environment regardless of their orientation or overall size (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres). **Depth of Knowledge:** 1-2 **Bloom's Taxonomy:** Remember and Analyze
Standard Text	**Standard for Mathematical Practices**	**Students who demonstrate understanding can:**
K.G.A.2: Correctly name shapes regardless of their orientations or overall size.	SMP 6: Students can attend to precision by using clear language to analyze and name two- and three-dimensional shapes. SMP 7: Students can look for and make use of structure by recognizing that shapes with a particular set of attributes will have the same name.	• Identify shapes regardless of their orientation or overall size (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres) • Identify shapes correctly even when their size and orientation is unusual or different.

<table>
<tr><td></td><td></td><td>Depth of Knowledge: 1

Bloom’s Taxonomy:
Remember</td></tr>
<tr><td>Standard Text

K.G.A.3: Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").</td><td>Standard for Mathematical Practices

SMP 3: Students can construct viable arguments by explaining their decisions about shape names.

SMP 6: Students can attend to precision by using clear language to analyze and identify two- and three-dimensional shapes.

SMP 7: Students can look for and make use of structure by describing and defining shapes in terms of attributes (properties.</td><td>Students who demonstrate understanding can:
• Define two-dimensional as being flat.
• Define three-dimensional as being solid.
• Identify two-dimensional shapes.
• Identify three-dimensional shapes.

Depth of Knowledge: 1

Bloom’s Taxonomy:
Remember</td></tr>
<tr><td><u>Previous Learning Connections</u>
• Connect to recognizing circle, triangle, and rectangle which includes squares.
• Connect to recognizing that a shape remains the same shape when it changes position.
• Connect to demonstrating and beginning to use the language of the relative position of objects in the environment and play situations, such as up, down, over, under, top, bottom, inside, outside, in front, behind, between, next to.
• Connect to comparing length and other attributes of objects, using the terms bigger, longer, and taller.
• Connect to arranging objects in order according to characteristics or attributes, such as height.</td><td><u>Current Learning Connections</u>
• Connect to sorting by attributes to investigate measurement and data. (K.MD.1-3)</td><td><u>Future Learning Connections</u>
• Connect to reason with shapes and their defining attributes. (1.G.1)
• Connect to identification of additional shapes (trapezoids, half-circles, quarter-circles) and combining three-dimensional shapes to create larger shapes. (1.G.2)</td></tr>
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Clarification Statement:
K.G.A.1: Students refine their informal language by learning mathematical concepts and vocabulary so as to increasingly describe their physical world from geometric perspectives, e.g., **shape**, **orientation**, **spatial relations** (MP4). They increase their knowledge of a variety of shapes, including **circles**, **triangles**, **squares**, **rectangles**, and special cases of other shapes such as **regular hexagons**, and **trapezoids** with **unequal base**s and **non-parallel sides** of **equal length**. Students also begin to name and describe **three-dimensional shapes** with mathematical vocabulary, such as "**sphere**," "**cube**," "**cylinder**," and "**cone**." Finally, in the domain of **spatial reasoning**, students discuss not only shape and orientation, but also the **relative positions** of objects, using terms such as "**above**," "**below**," "**next to**," "**behind**," "**in front of**," and "**beside**."

K.G.A.2: Students learn to name shapes such as circles, triangles, and squares, whose names occur in everyday language, and distinguish them from **nonexamples** of these **categories**, often based initially on visual prototypes.

KG.A.3: In the domain of shape, students learn to match t**wo-dimensional shapes** even when the shapes have different orientations. The need to explain their decisions about shape names or classifications prompts students to attend to and describe certain features of the shapes. That is, concept images and names they have learned for the shapes are the raw material from which they can abstract common features. They identify **faces** of three-dimensional shapes as two-dimensional **geometric figures** and explicitly identify shapes as two-dimensional ("**flat"** or lying in a **plane**) or three-dimensional ("**solid**").

Common Misconceptions
● Using informal names for shapes

● Incorrectly identifying figures that visually "resemble" shapes but don't possess all the needed attributes as that shape (such as an upside-down heart as a triangle)

● Not recognizing inverted or upside-down shapes as being that shape (especially upside-down triangles)

● Mixing up the terminology for two- and three-dimensional shapes (such as calling a cube a square)

Multi-Layered System of Supports (MLSS)/Suggested Instructional Strategies
Pre-Teach

Pre-teach (targeted)
What pre-teaching will prepare students to productively struggle with the mathematics for this cluster within your HQIM?
For example, some learners may benefit from targeted pre-teaching that uses images/resources (especially those being used the first time) when studying shapes (describing/identifying) because this is the first time that they have seen the shape or the concept of a shape. A visual representation is the best option.

Pre-teach (intensive)
What critical understandings will prepare students to access the mathematics for this cluster?
K.G.A.1- Identify and Describe Shapes (Squares, Circles, Triangles, Rectangles, Hexagons, Cubes, Cones, Cylinders, And Spheres). This standard provides a foundation for work with shapes (identifying and describing because it is the starting point for shapes. If students have unfinished learning within this standard, based on assessment data, consider ways to provide intensive pre-teaching support prior to the start of the unit to ensure students are ready to access grade level instruction and assignments.

Core Instruction

Access:

Physical Action: How will the learning for students provide a variety of methods for navigation to support access?

For example, learners engaging with identifying and describing shapes will benefit when learning experiences ensure information is accessible to learners through a variety of methods for navigation, such as physically responding or indicating selections because students can physically pick random shapes out of a bag and describe and identify the shape. Or the teacher can give a description of the shape and the student has to find the physical shape.

Build:

Effort and Persistence: How will the learning for students provide options for sustaining effort and persistence?
For example, learners engaging with identifying and describing shapes will benefit when learning experiences attend to students attention and affect to support sustained effort and concentration such as creating expectations for group work (e.g., rubrics, norms, etc.) because this motivates students to regulate their learning and provide a working environment for small groups. The students in the small groups can help guide each other's learning.

Language and Symbols: How will the learning for students provide alternative representations to ensure accessibility, clarity and comprehensibility for all learners? (e.g., a graph illustrating the relationship between two variables may be informative to one learner and inaccessible or puzzling to another; picture or image may carry very different meanings for learners from differing cultural or familial backgrounds)
For example, learners engaging with describing and identifying shapes will benefit when learning experiences attend to the linguistic and nonlinguistic representations of mathematics to ensure clarity can comprehensibility for all learners such as pre-teaching vocabulary and symbols, especially in ways that promote connection to the learners' experience and prior knowledge because students will need vocabulary words such as (sides, vertices, face, 3D/2D) in order to describe and identify the shapes.

Expression and Communication: How will the learning provide multiple modalities for students to easily express knowledge, ideas, and concepts in the learning environment?
For example, learners engaging with describing and identifying shapes will benefit when learning experiences attend to the multiple ways students can express knowledge, ideas, and concepts such as using physical manipulatives (e.g., blocks, 3D models, base-ten blocks) because instead of using verbal representations students can build the shapes or identify them through physical representations.

Internalize:

Self-Regulation: How will the design of the learning strategically support students to effectively cope and engage with the environment?
For example, learners engaging with identifying and describing shapes will benefit when learning experiences set personal goals that increase ownership of learning goals and support healthy responses and interactions (e.g., learning from mistakes), such as using activities that include a means by which learners get feedback and have access to alternative scaffolds (e.g., charts, templates, feedback displays) that support understanding progress in a manner that is understandable and timely because students can track their learning and see where they made the mistake. A chart can be used to identify what shapes still need to be learned.

Re-teach

Re-teach (targeted)
What formative assessment data (e.g., tasks, exit tickets, observations) will help identify content needing to be revisiting during a unit?
Examine assessments for evidence of lingering misconceptions (see common misconceptions). If students exhibit one more of these misconceptions, consider addressing the misconception by …For example, students may benefit from re-engaging with content during a unit on shapes (identifying and

describing) by providing specific feedback to students on their work through a short mini-lesson because seeing mistakes or good work will help the student analyze their thinking.

Re-teach (intensive)

What assessment data will help identify content needing to be revisited for intensive interventions? Examine assessments for evidence of students still developing the underlying ideas For example, some students may benefit from intensive extra time during and after a unit Identify And Describe Shapes by <helping students move from specific answers to generalizations for certain types of problems because <students will begin to understand about the attributes that makes a shape as a general, for example what makes a rectangle a rectangle, or a triangle a triangle. ...

Extension

What type of extension will offer additional challenges to 'broaden' your student's knowledge of the mathematics developed within your HQIM?

To extend students learning about, for example, some learners may benefit from an extension such as the application of and development of abstract thinking skills when studying shapes (describing and identifying) because they might need deeper thinking in order to better understand the topic.

Validate/Affirm: How can you design your mathematics classroom to intentionally and purposefully legitimize the home culture and languages of students and reverse the negative stereotypes regarding the mathematical abilities of students of marginalized cultures and languages?

Build/Bridge: How can you create connections between the cultural and linguistic behaviors of your students' home culture and language the culture and language of school mathematics to support students in creating mathematical identities as capable mathematicians that can use mathematics within school and society?

Building Procedural Fluency from Conceptual Understanding: Instruction should build from conceptual understanding to allow students opportunities to make meaning of mathematics before focusing on procedures. When new learning begins with procedures it privileges those with strong prior familiarity with school mathematics procedures for solving problems and does not allow learning to build for more methods for solving tasks that occur outside of school mathematics. For example, when studying Identifying and describing shapes, the types of mathematical tasks are critical because although rote practice increases fluency it usually does not engage children for long because they are based on students' recall or memorization of facts. When students are placed in situations in which recall speed determines success, they may infer that being "smart" in mathematics means getting the correct answer quickly instead of valuing the process of thinking.

Standards Aligned Instructionally Embedded Formative Assessment Resources:

https://achievethecore.org/content/upload/Gr%20K.P.5%20Recognizing%20Squares_Final.pdf

Student should have time to explore and engage with shapes that are similar and different throughout the environment as part of developing an understanding of the attributes used in classifying objects.

Relevance to families and communities:	**Cross-Curricular Connections:**
During a unit focused on identifying and describing shapes, consider options for learning from your families and communities the cultural and linguistic ways this mathematics exists outside of school to create stronger home to school connections for students, for example, learning the different names for shapes in other languages could bring interest and awareness to student cultures and families.	Science: In Kindergarten, the NGSS state students should "develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem." Consider providing a connection for students to identify the shapes of the objects and whether they are two- or three-dimensional.

	Language Arts: Literature can offer connections about shapes such as: *Shape by Shape* by Suze MacDonald and *Perfect Square* by Michael Hall.