TEKS Curriculum Framework for STAAR Alternate

Geometry
## STAAR Reporting Category 1 – Geometric Structure: The student will demonstrate an understanding of geometric structure.

<table>
<thead>
<tr>
<th>TEKS Knowledge and Skills Statement/STAAR-Tested Student Expectations</th>
<th>Essence of TEKS Knowledge and Skills Statement/STAAR-Tested Student Expectations</th>
</tr>
</thead>
</table>
| **Geometry (1) Geometric structure.** The student understands the structure of, and relationships within, an axiomatic system. The student is expected to:  
  (B) recognize the historical development of geometric systems and know mathematics is developed for a variety of purposes;  
  Supporting Standard  
  (C) compare and contrast the structures and implications of Euclidean and non-Euclidean geometries. Supporting Standard  
Recognizes the foundations of geometric concepts. |

### Geometry 1 Prerequisite Skills/Links to TEKS Vertical Alignment

#### Geometric Properties and Relationships
- use pictures or models to demonstrate the Pythagorean Theorem
- draw three-dimensional figures from different perspectives
- graph dilations, reflections, and translations on a coordinate plane
- generate similar figures using dilations including enlargements and reductions
- use geometric concepts and properties to solve problems in fields such as art and architecture
- make a net (two-dimensional model) of the surface area of a three-dimensional figure
- sketch three-dimensional figures when given the top, side, and front views

#### Measurement*

**Comparisons**
- convert measures within the same measurement system (customary and metric) based on relationships between units
- perform simple conversions within the same measurement system (SI (metric) or customary)
- explain the difference between weight and mass
- compare and order two or more objects according to weight/ mass (from heaviest to lightest)
- compare and order two or more containers according to capacity (from holds the most to holds the least)
- compare and order the area of two or more two-dimensional surfaces (from covers the most to covers the least)
- describe the relationship between the size of the unit and the number of units needed to measure the length of an object
- compare and order two or more concrete objects according to length (from longest to shortest)
- compare two objects according to weight/ mass (heavier than, lighter than or equal to)
- compare two containers according to capacity (holds more, holds less, or holds the same)

*Continued*
<table>
<thead>
<tr>
<th>Geometry 1</th>
<th>Prerequisite Skills/Links to TEKS Vertical Alignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• compare the areas of two flat surfaces of two-dimensional figures (covers more, covers less, or covers the same)</td>
<td></td>
</tr>
<tr>
<td>• compare and order two or three concrete objects according to length (longer/shorter than, or the same)</td>
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</tr>
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</table>

*Using Models*

• describe the resulting effect on volume when dimensions of a solid are changed proportionally
• describe the resulting effects on perimeter and area when dimensions of a shape are changed proportionally
• use proportional relationships in similar two-dimensional figures or similar three-dimensional figures to find missing measurements
• use the Pythagorean Theorem to solve real-life problems
• estimate measurements and use formulas to solve application problems involving lateral and total surface area and volume
• connect models of prisms, cylinders, pyramids, spheres, and cones to formulas for volume of these objects
• find lateral and total surface area of prisms, pyramids, and cylinders using concrete models and nets (two-dimensional models)
• estimate measurements and solve application problems involving volume of prisms (rectangular and triangular) and cylinders
• connect models for volume of prisms (triangular and rectangular) and cylinders to formulas of prisms (triangular and rectangular) and cylinders
• estimate measurements and solve application problems involving length (including perimeter and circumference) and area of polygons and other shapes
• measure angles
• select and use appropriate units, tools, or formulas to measure and to solve problems involving length (including perimeter), area, time, temperature, volume, and weight
• estimate measurements (including circumference) and evaluate reasonableness of results
• select and use appropriate units and formulas to measure length, perimeter, area, and volume
• connect models for perimeter, area, and volume with their respective formulas
• estimate volume in cubic units
• use concrete models of standard cubic units to measure volume
• perform simple conversions between different units of length, between different units of capacity, and between different units of weight within the customary measurement system
• estimate and use measurement tools to determine length (including perimeter), area, capacity, and weight/mass using standard units SI (metric) and customary
• use concrete models that approximate cubic units to determine the volume of a given container or other three-dimensional geometric figure
• identify concrete models that approximate standard units for capacity and use them to measure capacity
• identify concrete models that approximate standard units of weight/mass and use them to measure weight/mass
• use concrete and pictorial models of square units to determine the area of two-dimensional surfaces
• use standard units to find the perimeter of a shape
• use linear measurement tools to estimate and measure lengths using standard units

Continued
Geometry 1

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<tr>
<td>• select a non-standard unit of measure such as beans or marbles to determine the weight/mass of a given object</td>
</tr>
<tr>
<td>• select a non-standard unit of measure such as a bathroom cup or a jar to determine the capacity of a given container</td>
</tr>
<tr>
<td>• select a non-standard unit of measure such as square tiles to determine the area of a two-dimensional surface</td>
</tr>
<tr>
<td>• identify concrete models that approximate standard units of length and use them to measure length</td>
</tr>
<tr>
<td>• estimate and measure length using nonstandard units such as paper clips or sides of color tiles</td>
</tr>
</tbody>
</table>

**Measurement skills**

*These prerequisite skills were borrowed from different knowledge and skills banks due to similar content.*

**NOTE:** Under each heading the prerequisite skills are arranged from the highest grade level to the lowest grade level.
### STAAR Reporting Category 1 – Geometric Structure: The student will demonstrate an understanding of geometric structure.

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<tr>
<td><strong>Geometry (2) Geometric structure.</strong> The student analyzes geometric relationships in order to make and verify conjectures. The student is expected to</td>
<td>Makes conclusions about geometric relationships.</td>
</tr>
<tr>
<td>(A) use constructions to explore attributes of geometric figures and to make conjectures about geometric relationships; Supporting Standard</td>
<td></td>
</tr>
<tr>
<td>(B) make conjectures about angles, lines, polygons, circles, and three-dimensional figures and determine the validity of the conjectures, choosing from a variety of approaches such as coordinate, transformational, or axiomatic. Readiness Standard</td>
<td></td>
</tr>
</tbody>
</table>

### Geometry 2

**Prerequisite Skills/Links to TEKS Vertical Alignment**

**Attributes of Geometric Figures**
- use critical attributes to define similarity
- use properties to classify three-dimensional figures, including pyramids, cones, prisms, and cylinders
- use properties to classify triangles and quadrilaterals
- use angle measurements to classify pairs of angles as complementary or supplementary
- describe the relationship between radius, diameter, and circumference of a circle
- identify relationships involving angles in triangles and quadrilaterals
- use angle measurements to classify angles as acute, obtuse, or right
- identify essential attributes including parallel, perpendicular, and congruent parts of two- and three-dimensional geometric figures
- use essential attributes to define two- and three-dimensional geometric figures
- identify and describe parallel and intersecting (including perpendicular) lines using concrete objects and pictorial models
- identify and describe right, acute, and obtuse angles
- compare two-dimensional figures, three-dimensional figures, or both by their attributes using formal geometry vocabulary
- identify, classify, and describe two- and three-dimensional geometric figures by their attributes
- cut two-dimensional geometric figures apart and identify the new geometric figures formed
- use attributes to describe how 2 two-dimensional figures or 2 three-dimensional geometric figures are alike or different
- describe attributes (the number of vertices, faces, edges, sides) of two- and three-dimensional geometric figures such as circles, polygons, spheres, cones, cylinders, prisms, and pyramids, etc.
- use concrete models to combine two-dimensional geometric figures to make new geometric figures

Continued
### Geometry 2

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<thead>
<tr>
<th>Prerequisite Skills/Links to TEKS Vertical Alignment</th>
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<tbody>
<tr>
<td>• describe and identify two- and three-dimensional geometric figures in order to sort them according to a given attribute using informal and formal language</td>
</tr>
<tr>
<td>• describe and identify three-dimensional geometric figures, including spheres, rectangular prisms (including cubes), cylinders, and cones</td>
</tr>
<tr>
<td>• describe and identify two-dimensional geometric figures, including circles, triangles, rectangles, and squares (a special type of rectangle)</td>
</tr>
<tr>
<td>• describe, identify, and compare circles, triangles, rectangles, and squares (a special type of rectangle)</td>
</tr>
<tr>
<td>• recognize shapes in real-life three-dimensional geometric figures or models of three-dimensional geometric figures</td>
</tr>
<tr>
<td>• describe and compare the attributes of real-life objects such as balls, boxes, cans, and cones or models of three-dimensional geometric figures</td>
</tr>
<tr>
<td>• sort a variety of objects including two- and three-dimensional geometric figures according to their attributes and describe how the objects are sorted</td>
</tr>
<tr>
<td>• compare two objects based on their attributes</td>
</tr>
<tr>
<td>• describe and identify an object by its attributes using informal language</td>
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</table>

**Geometry and spatial sense skills**

- create shapes
- name common shapes

**NOTE:** Under each heading the prerequisite skills are arranged from the highest grade level to the lowest grade level.
### STAAR Reporting Category 1 – Geometric Structure: The student will demonstrate an understanding of geometric structure.

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<tr>
<td><strong>Geometry (3) Geometric structure.</strong> The student applies logical reasoning to justify and prove mathematical statements. The student is expected to&lt;br&gt;(A) determine the validity of a conditional statement, its converse, inverse, and contrapositive; Supporting Standard&lt;br&gt;(B) construct and justify statements about geometric figures and their properties; Supporting Standard&lt;br&gt;(C) use logical reasoning to prove statements are true and find counter examples to disprove statements that are false; Readiness Standard&lt;br&gt;(D) use inductive reasoning to formulate a conjecture; Supporting Standard&lt;br&gt;(E) use deductive reasoning to prove a statement. Supporting Standard</td>
<td>Uses reasoning to justify mathematical statements.</td>
</tr>
</tbody>
</table>

### Geometry 3  
**Prerequisite Skills/Links to TEKS Vertical Alignment**

**Attributes of Geometric Figures**
- use critical attributes to define similarity
- use properties to classify three-dimensional figures, including pyramids, cones, prisms, and cylinders
- use properties to classify triangles and quadrilaterals
- use angle measurements to classify pairs of angles as complementary or supplementary
- describe the relationship between radius, diameter, and circumference of a circle
- identify relationships involving angles in triangles and quadrilaterals
- use angle measurements to classify angles as acute, obtuse, or right
- identify essential attributes including parallel, perpendicular, and congruent parts of two- and three-dimensional geometric figures
- use essential attributes to define two- and three-dimensional geometric figures
- identify and describe parallel and intersecting (including perpendicular) lines using concrete objects and pictorial models
- identify and describe right, acute, and obtuse angles
- compare two-dimensional figures, three-dimensional figures, or both by their attributes using formal geometry vocabulary
- identify, classify, and describe two- and three-dimensional geometric figures by their attributes
- cut two-dimensional geometric figures apart and identify the new geometric figures formed

Continued
### Geometry 3

#### Prerequisite Skills/Links to TEKS Vertical Alignment

- use attributes to describe how 2 two-dimensional figures or 2 three-dimensional geometric figures are alike or different
- describe attributes (the number of vertices, faces, edges, sides) of two- and three-dimensional geometric figures such as circles, polygons, spheres, cones, cylinders, prisms, and pyramids, etc.
- use concrete models to combine two-dimensional geometric figures to make new geometric figures
- describe and identify two- and three-dimensional geometric figures in order to sort them according to a given attribute using informal and formal language
- describe and identify three-dimensional geometric figures, including spheres, rectangular prisms (including cubes), cylinders, and cones
- describe and identify two-dimensional geometric figures, including circles, triangles, rectangles, and squares (a special type of rectangle)
- describe, identify, and compare circles, triangles, rectangles, and squares (a special type of rectangle)
- recognize shapes in real-life three-dimensional geometric figures or models of three-dimensional geometric figures
- describe and compare the attributes of real-life objects such as balls, boxes, cans, and cones or models of three-dimensional geometric figures
- sort a variety of objects including two- and three-dimensional geometric figures according to their attributes and describe how the objects are sorted
- compare two objects based on their attributes
- describe and identify an object by its attributes using informal language

#### Geometry and spatial sense skills

- create shapes
- name common shapes

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**NOTE:** Under each heading the prerequisite skills are arranged from the highest grade level to the lowest grade level.
### STAAR Reporting Category 2 – Geometric Patterns and Representations: The student will demonstrate an understanding of geometric patterns and representations.

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<tr>
<td><strong>Geometry (4) Geometric structure.</strong> The student uses a variety of representations to describe geometric relationships and solve problems. The student is expected to (A) select an appropriate representation ([concrete,] pictorial, graphical, verbal, or symbolic) in order to solve problems. Supporting Standard</td>
<td>Uses different representations for geometric relationships and solves problems.</td>
</tr>
</tbody>
</table>

### Geometry 4

#### Prerequisite Skills/Links to TEKS Vertical Alignment

**Attributes of Geometric Figures**
- use critical attributes to define similarity
- use properties to classify three-dimensional figures, including pyramids, cones, prisms, and cylinders
- use properties to classify triangles and quadrilaterals
- use angle measurements to classify pairs of angles as complementary or supplementary
- describe the relationship between radius, diameter, and circumference of a circle
- identify relationships involving angles in triangles and quadrilaterals
- use angle measurements to classify angles as acute, obtuse, or right
- identify essential attributes including parallel, perpendicular, and congruent parts of two- and three-dimensional geometric figures
- use essential attributes to define two- and three-dimensional geometric figures
- identify and describe parallel and intersecting (including perpendicular) lines using concrete objects and pictorial models
- identify and describe right, acute, and obtuse angles
- compare two-dimensional figures, three-dimensional figures, or both by their attributes using formal geometry vocabulary
- identify, classify, and describe two- and three-dimensional geometric figures by their attributes
- cut two-dimensional geometric figures apart and identify the new geometric figures formed
- use attributes to describe how 2 two-dimensional figures or 2 three-dimensional geometric figures are alike or different
- describe attributes (the number of vertices, faces, edges, sides) of two- and three-dimensional geometric figures such as circles, polygons, spheres, cones, cylinders, prisms, and pyramids, etc.
- use concrete models to combine two-dimensional geometric figures to make new geometric figures
- describe and identify two- and three-dimensional geometric figures in order to sort them according to a given attribute using informal and formal language
### Geometry 4  
#### Prerequisite Skills/Links to TEKS Vertical Alignment

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<tr>
<td></td>
<td>• describe and identify three-dimensional geometric figures, including spheres, rectangular prisms (including cubes), cylinders, and cones</td>
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<td>• describe and identify two-dimensional geometric figures, including circles, triangles, rectangles, and squares (a special type of rectangle)</td>
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<td>• describe, identify, and compare circles, triangles, rectangles, and squares (a special type of rectangle)</td>
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<td>• recognize shapes in real-life three-dimensional geometric figures or models of three-dimensional geometric figures</td>
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<td>• describe and compare the attributes of real-life objects such as balls, boxes, cans, and cones or models of three-dimensional geometric figures</td>
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<td>• sort a variety of objects including two- and three-dimensional geometric figures according to their attributes and describe how the objects are sorted</td>
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**Geometry and spatial sense skills**

- create shapes
- name common shapes

**NOTE:** Under each heading the prerequisite skills are arranged from the highest grade level to the lowest grade level.
### STAAR Reporting Category 2 – Geometric Patterns and Representations: The student will demonstrate an understanding of geometric patterns and representations.

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<tr>
<td><strong>Geometry (5) Geometric patterns.</strong> The student uses a variety of representations to describe geometric relationships and solve problems. The student is expected to</td>
<td>Uses geometric relationships in a variety of ways.</td>
</tr>
<tr>
<td>(A) use numeric and geometric patterns to develop algebraic expressions representing geometric properties; <strong>Readiness Standard</strong></td>
<td></td>
</tr>
<tr>
<td>(B) use numeric and geometric patterns to make generalizations about geometric properties, including properties of polygons, ratios in similar figures and solids, and angle relationships in polygons and circles; <strong>Supporting Standard</strong></td>
<td></td>
</tr>
<tr>
<td>(C) use properties of transformations and their compositions to make connections between mathematics and the real world, such as tessellations; <strong>Supporting Standard</strong></td>
<td></td>
</tr>
<tr>
<td>(D) identify and apply patterns from right triangles to solve meaningful problems, including special right triangles (45-45-90 and 30-60-90) and triangles whose sides are Pythagorean triples. <strong>Readiness Standard</strong></td>
<td></td>
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### Geometry 5

#### Prerequisite Skills/Links to TEKS Vertical Alignment

*Geometric Properties and Relationships*
- use pictures or models to demonstrate the Pythagorean Theorem
- draw three-dimensional figures from different perspectives
- graph dilations, reflections, and translations on a coordinate plane
- generate similar figures using dilations including enlargements and reductions
- use geometric concepts and properties to solve problems in fields such as art and architecture
- make a net (two-dimensional model) of the surface area of a three-dimensional figure
- sketch three-dimensional figures when given the top, side, and front views

*Symmetry and Transformations*
- identify the transformation that generates one figure from the other when given two congruent figures on a Quadrant I coordinate grid

Continued
### Geometry 5 Prerequisite Skills/Links to TEKS Vertical Alignment

- sketch the results of translations, rotations, and reflections on a Quadrant I coordinate grid
- use reflections to verify that a shape has symmetry
- use translations, reflections, and rotations to verify that two shapes are congruent
- demonstrate translations, reflections, and rotations using concrete models
- identify lines of symmetry in two-dimensional geometric figures
- create two-dimensional figures with lines of symmetry using concrete models and technology
- identify congruent two-dimensional figures
- place an object in a specified position
- describe one object in relation to another using informal language such as over, under, above, and below

**Geometry and spatial sense skills**
- slide, flip, and turn shapes to demonstrate that the shapes remain the same
- demonstrate use of location words (such as “over,” “under,” “above,” “on,” “beside,” “next to,” “between,” “in front of,” “near,” “far,” etc.)

**NOTE:** Under each heading the prerequisite skills are arranged from the highest grade level to the lowest grade level.
### STAAR Reporting Category 3 – Dimensionality and the Geometry of Location: The student will demonstrate an understanding of dimensionality and the geometry of location.

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| **Geometry (6) Dimensionality and the geometry of location.** The student analyzes the relationship between three-dimensional geometric figures and related two-dimensional representations and uses these representations to solve problems. The student is expected to  
(A) describe and draw the intersection of a given plane with various three-dimensional geometric figures; Supporting Standard  
(B) use nets to represent and construct three-dimensional geometric figures; Supporting Standard  
(C) use orthographic and isometric views of three-dimensional geometric figures to represent and construct three-dimensional geometric figures and solve problems. Supporting Standard | Uses geometric representations to solve problems. |

### Geometry 6

**Prerequisite Skills/Links to TEKS Vertical Alignment**

- **Geometric Properties and Relationships**
  - use pictures or models to demonstrate the Pythagorean Theorem  
  - draw three-dimensional figures from different perspectives  
  - graph dilations, reflections, and translations on a coordinate plane  
  - generate similar figures using dilations including enlargements and reductions  
  - use geometric concepts and properties to solve problems in fields such as art and architecture  
  - make a net (two-dimensional model) of the surface area of a three-dimensional figure  
  - sketch three-dimensional figures when given the top, side, and front views

- **Attributes of Geometric Figures**
  - use critical attributes to define similarity  
  - use properties to classify three-dimensional figures, including pyramids, cones, prisms, and cylinders  
  - use properties to classify triangles and quadrilaterals  
  - use angle measurements to classify pairs of angles as complementary or supplementary  
  - describe the relationship between radius, diameter, and circumference of a circle  
  - identify relationships involving angles in triangles and quadrilaterals  
  - use angle measurements to classify angles as acute, obtuse, or right  
  - identify essential attributes including parallel, perpendicular, and congruent parts of two- and three-dimensional geometric figures
## Geometry 6

### Prerequisite Skills/Links to TEKS Vertical Alignment

- use essential attributes to define two- and three-dimensional geometric figures
- identify and describe parallel and intersecting (including perpendicular) lines using concrete objects and pictorial models
- identify and describe right, acute, and obtuse angles
- compare two-dimensional figures, three-dimensional figures, or both by their attributes using formal geometry vocabulary
- identify, classify, and describe two- and three-dimensional geometric figures by their attributes
- cut two-dimensional geometric figures apart and identify the new geometric figures formed
- use attributes to describe how 2 two-dimensional figures or 2 three-dimensional geometric figures are alike or different
- describe attributes (the number of vertices, faces, edges, sides) of two- and three-dimensional geometric figures such as circles, polygons, spheres, cones, cylinders, prisms, and pyramids, etc.
- use concrete models to combine two-dimensional geometric figures to make new geometric figures
- describe and identify two- and three-dimensional geometric figures in order to sort them according to a given attribute using informal and formal language
- describe and identify three-dimensional geometric figures, including spheres, rectangular prisms (including cubes), cylinders, and cones
- describe and identify two-dimensional geometric figures, including circles, triangles, rectangles, and squares (a special type of rectangle)
- describe, identify, and compare circles, triangles, rectangles, and squares (a special type of rectangle)
- recognize shapes in real-life three-dimensional geometric figures or models of three-dimensional geometric figures
- describe and compare the attributes of real-life objects such as balls, boxes, cans, and cones or models of three-dimensional geometric figures
- sort a variety of objects including two- and three-dimensional geometric figures according to their attributes and describe how the objects are sorted
- compare two objects based on their attributes
- describe and identify an object by its attributes using informal language

### Geometry and spatial sense skills

- create shapes
- name common shapes

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**NOTE:** Under each heading the prerequisite skills are arranged from the highest grade level to the lowest grade level.
### STAAR Reporting Category 3 – Dimensionality and the Geometry of Location: The student will demonstrate an understanding of dimensionality and the geometry of location.

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<tr>
<td>Geometry (7) Dimensionality and the geometry of location. The student understands that coordinate systems provide convenient and efficient ways of representing geometric figures and uses them accordingly. The student is expected to (A) use one- and two-dimensional coordinate systems to represent points, lines, rays, line segments, and figures; Supporting Standard (B) use slopes and equations of lines to investigate geometric relationships, including parallel lines, perpendicular lines, and special segments of triangles and other polygons; Readiness Standard (C) [derive and] use formulas involving length, slope, and midpoint. Readiness Standard</td>
<td>Represents geometric figures using the coordinate system.</td>
</tr>
</tbody>
</table>

### Geometry 7

#### Prerequisite Skills/Links to TEKS Vertical Alignment

**Working with Coordinate Planes**
- locate and name points on a coordinate plane using ordered pairs of rational numbers
- graph reflections across the horizontal or vertical axis and graph translations on a coordinate plane
- locate and name points on a coordinate plane using ordered pairs of integers
- locate and name points on a coordinate plane using ordered pairs of non-negative rational numbers
- locate and name points on a coordinate grid using ordered pairs of whole numbers
- locate and name points on a number line using whole numbers, fractions such as halves and fourths, and decimals such as tenths
- locate and name points on a number line using whole numbers and fractions, including halves and fourths
- use whole numbers to locate and name points on a number line

**Symmetry and Transformations**
- identify the transformation that generates one figure from the other when given two congruent figures on a Quadrant I coordinate grid
- sketch the results of translations, rotations, and reflections on a Quadrant I coordinate grid
- use reflections to verify that a shape has symmetry
- use translations, reflections, and rotations to verify that two shapes are congruent
- demonstrate translations, reflections, and rotations using concrete models

Continued
### Geometry 7

#### Prerequisite Skills/Links to TEKS Vertical Alignment

- Identify lines of symmetry in two-dimensional geometric figures
- Create two-dimensional figures with lines of symmetry using concrete models and technology
- Identify congruent two-dimensional figures
- Place an object in a specified position
- Describe one object in relation to another using informal language such as over, under, above, and below

**Geometry and spatial sense skills**
- Slide, flip, and turn shapes to demonstrate that the shapes remain the same
- Demonstrate use of location words (such as “over,” “under,” “above,” “on,” “beside,” “next to,” “between,” “in front of,” “near,” “far,” etc.)

**NOTE:** Under each heading the prerequisite skills are arranged from the highest grade level to the lowest grade level.
STAAR Reporting Category 4 – Congruence and the Geometry of Size: The student will demonstrate an understanding of congruence and the geometry of size.

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<td><strong>Geometry (8) Congruence and the geometry of size.</strong> The student uses tools to determine measurements of geometric figures and extends measurement concepts to find perimeter, area, and volume in problem situations. The student is expected to (A) find areas of regular polygons, circles, and composite figures; Readiness Standard (B) find areas of sectors and arc lengths of circles using proportional reasoning; Supporting Standard (C) [derive,] extend, and use the Pythagorean Theorem; Readiness Standard (D) find surface areas and volumes of prisms, pyramids, spheres, cones, cylinders, and composites of these figures in problem situations; Readiness Standard (E) use area models to connect geometry to probability and statistics; Supporting Standard (F) use conversions between measurement systems to solve problems in real-world situations. Supporting Standard</td>
<td>Uses tools to solve measurement problems.</td>
</tr>
</tbody>
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**Geometry 8 Prerequisite Skills/Links to TEKS Vertical Alignment**

*Geometric Properties and Relationships*
- use pictures or models to demonstrate the Pythagorean Theorem
- draw three-dimensional figures from different perspectives
- graph dilations, reflections, and translations on a coordinate plane
- generate similar figures using dilations including enlargements and reductions
- use geometric concepts and properties to solve problems in fields such as art and architecture
- make a net (two-dimensional model) of the surface area of a three-dimensional figure
- sketch three-dimensional figures when given the top, side, and front views

*Measurement Comparisons*
- convert measures within the same measurement system (customary and metric) based on relationships between units

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<th>Prerequisite Skills/Links to TEKS Vertical Alignment</th>
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<tbody>
<tr>
<td></td>
<td>• perform simple conversions within the same measurement system (SI (metric) or customary)</td>
</tr>
<tr>
<td></td>
<td>• explain the difference between weight and mass</td>
</tr>
<tr>
<td></td>
<td>• compare and order two or more objects according to weight/ mass (from heaviest to lightest)</td>
</tr>
<tr>
<td></td>
<td>• compare and order two or more containers according to capacity (from holds the most to holds the least)</td>
</tr>
<tr>
<td></td>
<td>• compare and order the area of two or more two-dimensional surfaces (from covers the most to covers the least)</td>
</tr>
<tr>
<td></td>
<td>• describe the relationship between the size of the unit and the number of units needed to measure the length of an object</td>
</tr>
<tr>
<td></td>
<td>• compare and order two or more concrete objects according to length (from longest to shortest)</td>
</tr>
<tr>
<td></td>
<td>• compare two objects according to weight/ mass (heavier than, lighter than or equal to)</td>
</tr>
<tr>
<td></td>
<td>• compare two containers according to capacity (holds more, holds less, or holds the same)</td>
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<tr>
<td></td>
<td>• compare the areas of two flat surfaces of two-dimensional figures (covers more, covers less, or covers the same)</td>
</tr>
<tr>
<td></td>
<td>• compare and order two or three concrete objects according to length (longer/ shorter than, or the same)</td>
</tr>
<tr>
<td></td>
<td><strong>Using Models</strong></td>
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<tr>
<td></td>
<td>• describe the resulting effect on volume when dimensions of a solid are changed proportionally</td>
</tr>
<tr>
<td></td>
<td>• describe the resulting effects on perimeter and area when dimensions of a shape are changed proportionally</td>
</tr>
<tr>
<td></td>
<td>• use proportional relationships in similar two-dimensional figures or similar three-dimensional figures to find missing measurements</td>
</tr>
<tr>
<td></td>
<td>• use the Pythagorean Theorem to solve real-life problems</td>
</tr>
<tr>
<td></td>
<td>• estimate measurements and use formulas to solve application problems involving lateral and total surface area and volume</td>
</tr>
<tr>
<td></td>
<td>• connect models of prisms, cylinders, pyramids, spheres, and cones to formulas for volume of these objects</td>
</tr>
<tr>
<td></td>
<td>• find lateral and total surface area of prisms, pyramids, and cylinders using concrete models and nets (two-dimensional models)</td>
</tr>
<tr>
<td></td>
<td>• estimate measurements and solve application problems involving volume of prisms (rectangular and triangular) and cylinders</td>
</tr>
<tr>
<td></td>
<td>• connect models for volume of prisms (triangular and rectangular) and cylinders to formulas of prisms (triangular and rectangular) and cylinders</td>
</tr>
<tr>
<td></td>
<td>• estimate measurements and solve application problems involving length (including perimeter and circumference) and area of polygons and other shapes</td>
</tr>
<tr>
<td></td>
<td>• measure angles</td>
</tr>
<tr>
<td></td>
<td>• select and use appropriate units, tools, or formulas to measure and to solve problems involving length (including perimeter), area, time, temperature, volume, and weight</td>
</tr>
<tr>
<td></td>
<td>• estimate measurements (including circumference) and evaluate reasonableness of results</td>
</tr>
<tr>
<td></td>
<td>• select and use appropriate units and formulas to measure length, perimeter, area, and volume</td>
</tr>
<tr>
<td></td>
<td>• connect models for perimeter, area, and volume with their respective formulas</td>
</tr>
<tr>
<td></td>
<td>• estimate volume in cubic units</td>
</tr>
<tr>
<td></td>
<td>• use concrete models of standard cubic units to measure volume</td>
</tr>
<tr>
<td></td>
<td>• perform simple conversions between different units of length, between different units of capacity, and between different units of weight within the customary measurement system</td>
</tr>
</tbody>
</table>

Continued...
### Geometry 8

#### Prerequisite Skills/Links to TEKS Vertical Alignment

- estimate and use measurement tools to determine length (including perimeter), area, capacity, and weight/mass using standard units SI (metric) and customary
- use concrete models that approximate cubic units to determine the volume of a given container or other three-dimensional geometric figure
- identify concrete models that approximate standard units for capacity and use them to measure capacity
- identify concrete models that approximate standard units of weight/mass and use them to measure weight/mass
- use concrete and pictorial models of square units to determine the area of two-dimensional surfaces
- use standard units to find the perimeter of a shape
- use linear measurement tools to estimate and measure lengths using standard units
- select a non-standard unit of measure such as beans or marbles to determine the weight/mass of a given object
- select a non-standard unit of measure such as a bathroom cup or a jar to determine the capacity of a given container
- select a non-standard unit of measure such as square tiles to determine the area of a two-dimensional surface
- identify concrete models that approximate standard units of length and use them to measure length
- estimate and measure length using nonstandard units such as paper clips or sides of color tiles

#### Measurement skills

- informally recognize and compare weights of objects or people
- recognize how much can be placed within an object
- recognize and compare heights or lengths of people or objects

**NOTE:** Under each heading the prerequisite skills are arranged from the highest grade level to the lowest grade level.
### STAAR Reporting Category 4 – Congruence and the Geometry of Size: The student will demonstrate an understanding of congruence and the geometry of size.

<table>
<thead>
<tr>
<th>TEKS Knowledge and Skills Statement/STAAR-Tested Student Expectations</th>
<th>Essence of TEKS Knowledge and Skills Statement/STAAR-Tested Student Expectations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Geometry (9) Congruence and the geometry of size.</strong> The student analyzes properties and describes relationships in geometric figures. The student is expected to (A) formulate and test conjectures about the properties of parallel and perpendicular lines based on explorations and [concrete] models; Supporting Standard (B) formulate and test conjectures about the properties and attributes of polygons and their component parts based on explorations and [concrete] models; Supporting Standard (C) formulate and test conjectures about the properties and attributes of circles and the lines that intersect them based on explorations and [concrete] models; Supporting Standard (D) analyze the characteristics of polyhedra and other three-dimensional figures and their component parts based on explorations and [concrete] models. Supporting Standard</td>
<td>Analyzes geometric relationships in figures.</td>
</tr>
</tbody>
</table>

### Geometry 9

#### Prerequisite Skills/Links to TEKS Vertical Alignment

- **Attributes of Geometric Figures**
  - use critical attributes to define similarity
  - use properties to classify three-dimensional figures, including pyramids, cones, prisms, and cylinders
  - use properties to classify triangles and quadrilaterals
  - use angle measurements to classify pairs of angles as complementary or supplementary
  - describe the relationship between radius, diameter, and circumference of a circle
  - identify relationships involving angles in triangles and quadrilaterals
  - use angle measurements to classify angles as acute, obtuse, or right
  - identify essential attributes including parallel, perpendicular, and congruent parts of two- and three-dimensional geometric figures
  - use essential attributes to define two- and three-dimensional geometric figures
  - identify and describe parallel and intersecting (including perpendicular) lines using concrete objects and pictorial models
  - identify and describe right, acute, and obtuse angles
  - compare two-dimensional figures, three-dimensional figures, or both by their attributes using formal geometry vocabulary

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*Continued*
## Geometry 9

### Prerequisite Skills/Links to TEKS Vertical Alignment

- identify, classify, and describe two- and three-dimensional geometric figures by their attributes
- cut two-dimensional geometric figures apart and identify the new geometric figures formed
- use attributes to describe how two-dimensional figures or three-dimensional geometric figures are alike or different
- describe attributes (the number of vertices, faces, edges, sides) of two- and three-dimensional geometric figures such as circles, polygons, spheres, cones, cylinders, prisms, and pyramids, etc.
- use concrete models to combine two-dimensional geometric figures to make new geometric figures
- describe and identify two- and three-dimensional geometric figures in order to sort them according to a given attribute using informal and formal language
- describe and identify three-dimensional geometric figures, including spheres, rectangular prisms (including cubes), cylinders, and cones
- describe and identify two-dimensional geometric figures, including circles, triangles, rectangles, and squares (a special type of rectangle)
- describe, identify, and compare circles, triangles, rectangles, and squares (a special type of rectangle)
- recognize shapes in real-life three-dimensional geometric figures or models of three-dimensional geometric figures
- describe and compare the attributes of real-life objects such as balls, boxes, cans, and cones or models of three-dimensional geometric figures
- sort a variety of objects including two- and three-dimensional geometric figures according to their attributes and describe how the objects are sorted
- compare two objects based on their attributes
- describe and identify an object by its attributes using informal language

### Geometry and spatial sense skills

- create shapes
- name common shapes

**NOTE:** Under each heading the prerequisite skills are arranged from the highest grade level to the lowest grade level.
STAAR Reporting Category 4 – Congruence and the Geometry of Size: The student will demonstrate an understanding of congruence and the geometry of size.

<table>
<thead>
<tr>
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</tr>
</thead>
</table>
| **Geometry (10) Congruence and the geometry of size.** The student applies the concept of congruence to justify properties of figures and solve problems. The student is expected to  
(A) use congruence transformations to make conjectures and justify properties of geometric figures including figures represented on a coordinate plane; Supporting Standard  
(B) justify and apply triangle congruence relationships. | Uses the concept of congruence in geometric figures. |

**Geometry 10**

**Prerequisite Skills/Links to TEKS Vertical Alignment**

*Symmetry and Transformations*  
- identify the transformation that generates one figure from the other when given two congruent figures on a Quadrant I coordinate grid  
- sketch the results of translations, rotations, and reflections on a Quadrant I coordinate grid  
- use reflections to verify that a shape has symmetry  
- use translations, reflections, and rotations to verify that two shapes are congruent  
- demonstrate translations, reflections, and rotations using concrete models  
- identify lines of symmetry in two-dimensional geometric figures  
- create two-dimensional figures with lines of symmetry using concrete models and technology  
- identify congruent two-dimensional figures  
- place an object in a specified position  
- describe one object in relation to another using informal language such as over, under, above, and below

*Geometry and spatial sense skills*  
- slide, flip, and turn shapes to demonstrate that the shapes remain the same  
- demonstrate use of location words (such as “over,” “under,” “above,” “on,” “beside,” “next to,” “between,” “in front of,” “near,” “far,” etc.)

*Working with Coordinate Planes*  
- locate and name points on a coordinate plane using ordered pairs of rational numbers  
- graph reflections across the horizontal or vertical axis and graph translations on a coordinate plane  
- locate and name points on a coordinate plane using ordered pairs of integers

Continued
### Geometry 10

<table>
<thead>
<tr>
<th>Prerequisite Skills/Links to TEKS Vertical Alignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• locate and name points on a coordinate plane using ordered pairs of non-negative rational numbers</td>
</tr>
<tr>
<td>• locate and name points on a coordinate grid using ordered pairs of whole numbers</td>
</tr>
<tr>
<td>• locate and name points on a number line using whole numbers, fractions such as halves and fourths, and decimals such as tenths</td>
</tr>
<tr>
<td>• locate and name points on a number line using whole numbers and fractions, including halves and fourths</td>
</tr>
<tr>
<td>• use whole numbers to locate and name points on a number line</td>
</tr>
</tbody>
</table>

**NOTE:** Under each heading the prerequisite skills are arranged from the highest grade level to the lowest grade level.
### STAAR Reporting Category 5 – Similarity and the Geometry of Shape: The student will demonstrate an understanding of similarity and the geometry of shape.

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td><strong>Geometry (11) Similarity and the geometry of shape.</strong> The student applies the concepts of similarity to justify properties of figures and solve problems. The student is expected to (A) use and extend similarity properties and transformations to explore and justify conjectures about geometric figures; Supporting Standard (B) use ratios to solve problems involving similar figures; Supporting Standard (C) develop, apply, and justify triangle similarity relationships, such as right triangle ratios, trigonometric ratios, and Pythagorean triples using a variety of methods; Readiness Standard (D) describe the effect on perimeter, area, and volume when one or more dimensions of a figure are changed and apply this idea in solving problems. Readiness Standard</td>
<td>Uses the concept of similarity in geometric figures.</td>
</tr>
</tbody>
</table>

### Geometry 11

#### Prerequisite Skills/Links to TEKS Vertical Alignment

**Geometric Properties and Relationships**
- use pictures or models to demonstrate the Pythagorean Theorem
- draw three-dimensional figures from different perspectives
- graph dilations, reflections, and translations on a coordinate plane
- generate similar figures using dilations including enlargements and reductions
- use geometric concepts and properties to solve problems in fields such as art and architecture
- make a net (two-dimensional model) of the surface area of a three-dimensional figure
- sketch three-dimensional figures when given the top, side, and front views

**Attributes of Geometric Figures**
- use critical attributes to define similarity
- use properties to classify three-dimensional figures, including pyramids, cones, prisms, and cylinders
- use properties to classify triangles and quadrilaterals
- use angle measurements to classify pairs of angles as complementary or supplementary
- describe the relationship between radius, diameter, and circumference of a circle
<table>
<thead>
<tr>
<th>Geometry 11</th>
<th>Prerequisite Skills/Links to TEKS Vertical Alignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• identify relationships involving angles in triangles and quadrilaterals</td>
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<tr>
<td>• use angle measurements to classify angles as acute, obtuse, or right</td>
<td></td>
</tr>
<tr>
<td>• identify essential attributes including parallel, perpendicular, and congruent parts of two- and three-dimensional geometric figures</td>
<td></td>
</tr>
<tr>
<td>• use essential attributes to define two- and three-dimensional geometric figures</td>
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</tr>
<tr>
<td>• identify and describe parallel and intersecting (including perpendicular) lines using concrete objects and pictorial models</td>
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<tr>
<td>• identify and describe right, acute, and obtuse angles</td>
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<tr>
<td>• compare two-dimensional figures, three-dimensional figures, or both by their attributes using formal geometry vocabulary</td>
<td></td>
</tr>
<tr>
<td>• identify, classify, and describe two- and three-dimensional geometric figures by their attributes</td>
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<tr>
<td>• cut two-dimensional geometric figures apart and identify the new geometric figures formed</td>
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<tr>
<td>• use attributes to describe how 2 two-dimensional figures or 2 three-dimensional geometric figures are alike or different</td>
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<td>• describe attributes (the number of vertices, faces, edges, sides) of two- and three-dimensional geometric figures such as circles, polygons, spheres, cones, cylinders, prisms, and pyramids, etc.</td>
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<td>• describe and compare the attributes of real-life objects such as balls, boxes, cans, and cones or models of three-dimensional geometric figures</td>
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<td>• sort a variety of objects including two- and three-dimensional geometric figures according to their attributes and describe how the objects are sorted</td>
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<td>• compare two objects based on their attributes</td>
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<td>• describe and identify an object by its attributes using informal language</td>
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</tr>
</tbody>
</table>

**Geometry and spatial sense skills**

- create shapes
- name common shapes

**NOTE:** Under each heading the prerequisite skills are arranged from the highest grade level to the lowest grade level.