

TCSS Unit 2 Information

Georgia Milestones Domain & Weight: Circles 15%

Curriculum Map: [Circles and Volume](#)

Content Descriptors:

Concept 1: Understand and apply theorems about circles.

Concept 2: Find arc lengths and areas of sectors of circles.

Concept 3: Explain volume formulas and use them to solve problems.

Content from Frameworks: [Circles and Volume](#)

Unit Length: Approximately 20 days

[Georgia Milestones Study Guide for TCSS Unit 2](#)

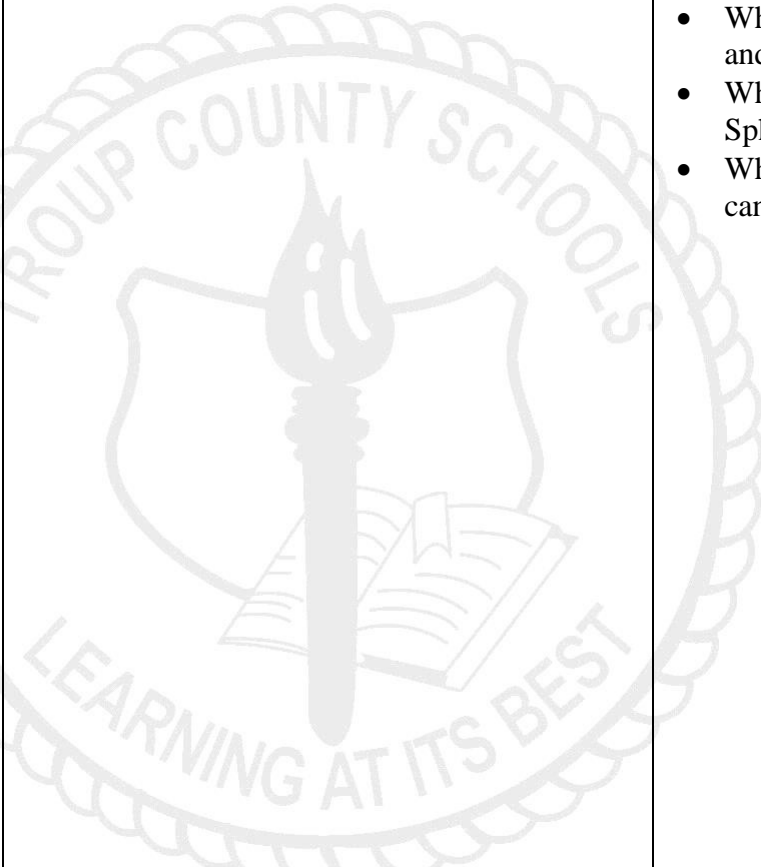
TCSS – Accelerated GSE Geometry B Unit 2

Curriculum Map

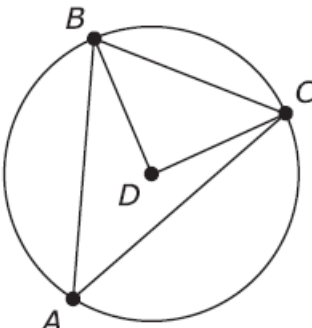
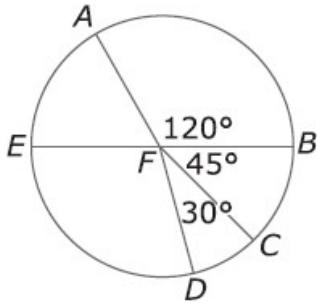
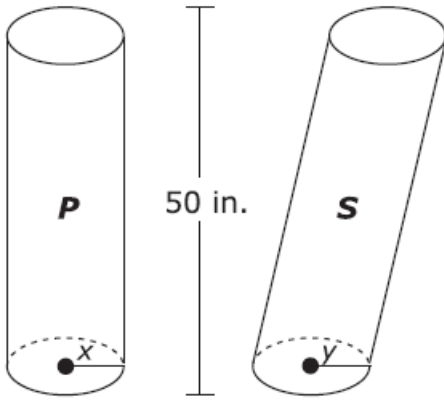
<p><u>Unit Rational:</u> Students will understand and apply theorems about circles, find arc lengths of circles, and find areas of sectors of circles. Students will develop and explain formulas related to circles and the volume of solid figures and use the formulas to solve problems. Building on standards from middle school, students will extend the study of identifying cross-sections of three-dimensional shapes to identifying three-dimensional objects generated by rotations of two-dimensional objects.</p>		
<p>Prerequisites: As identified by the GSE Frameworks</p> <ul style="list-style-type: none"> ✓ Solve multi-step equations. ✓ Understand angle sum and exterior angle of triangles. ✓ Know facts about supplementary, complementary, vertical, and adjacent angles. ✓ Solve problems involving scale drawings of geometric figures. ✓ Draw geometric shapes with given conditions. ✓ Draw polygons in the coordinate plane given coordinates for the vertices. 		<p>Length of Unit</p> <p>20 Days</p>
Concept 1	Concept 2	Concept 3
Understand and apply theorems about circles.	Find arc lengths and areas of sectors of circles.	Explain volume formulas and use them to solve problems.
GSE Standards	GSE Standards	GSE Standards
<p>MGSE9-12.G.C.1 Understand that all circles are similar.</p> <p>MGSE9-12.G.C.2 Identify and describe relationships among inscribed angles, radii, and chords, tangents, and secants. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.</p> <p>MGSE9-12.G.C.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.</p> <p>MGSE9-12.G.C.4 Construct a tangent line from a point outside a given circle to the circle.</p>	<p>MGSE9-12.G.C.5 Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.</p>	<p>MGSE9-12.G.GMD.1 Give informal arguments for geometric formulas.</p> <p>a. Give informal arguments for the formulas of the circumference of a circle and area of a circle using dissection arguments and informal limit arguments.</p> <p>b. Give informal arguments for the formula of the volume of a cylinder, pyramid, and cone using Cavalieri's principle.</p> <p>MGSE9-12.G.GMD.2 Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.</p> <p>MGSE9-12.G.GMD.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.</p>

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<i>Lesson Essential Question</i>	<i>Lesson Essential Question</i>	<i>Lesson Essential Question</i>
<ul style="list-style-type: none"> • Why are all circles similar? • What is the symbolic notation for the parts of a circle? • How is the measure of an Inscribed Angle related to the measure of its Intercepted Arc? • How are the Opposite Angles of an Inscribed Quadrilateral related to each other? • How does the location of the vertex of an angle effect the formula for finding the angle measure? • How many ways can a line intersect a circle? • When two lines intersect they create an angle. How does the location of the vertex of that angle effect the formula that I will use to find the lengths of those line segments that get created? • How are Congruent Chords related? • What are some real life examples of lines intersecting circles and will I be able to solve them? • How did ancient mathematicians construct perfect tangents to a circle, without the software or measuring tools that we have today? • Which concurrent lines of a triangle will create the Inscribed Circle? 	<ul style="list-style-type: none"> • How do I find the Arc Length of a circle? • How do I find the area of a sector of a circle? • How are the formulas for Arc Length and Area of a Sector related? 	<ul style="list-style-type: none"> • How does Cavalieri’s Principle apply to finding the Volume of a cylinder, even if it is oblique or not standing straight up? • How can I use volume formulas for cylinders, pyramids, cones and spheres to solve problems? • Why does the formula for the volume of a cone and pyramid have a $\frac{1}{3}$ in it? • Why do you need the $\frac{4}{3}$ in the Volume of a Sphere formula? • What are some real life situations in which I can use these formulas?
<i>Vocabulary</i>	<i>Vocabulary</i>	<i>Vocabulary</i>
Arc Center Central Angle Circle Circumscribed Diameter Intercepted Arc Inscribed Angle Inscribed Circle Inscribed Polygon	Area of a sector Sector Arc Length	Cavalieri’s Principle Circumference Cone Pyramid Slant Height

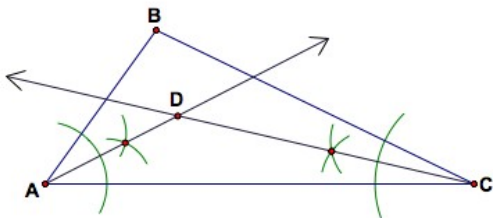


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Chord Point of Tangency Quadrilateral Radius Secant Line	Major and minor arcs Secant Segment Similarity Tangent Line	Sphere Volume
Sample Assessment Items Concept 1	Sample Assessment Items Concept 2	Sample Assessment Items Concepts 3
<p>MGSE9-12.G.C.1 Circle A is dilated to form circle A'. Which statement is ALWAYS true?</p> <p>a. The radius of circle A is equal to the radius of circle A'.</p> <p>b. The diameter of circle A is greater than the diameter of circle A'.</p> <p>c. The ratio of the diameter to the circumference is the same for both circle A and A'.</p> <p>d. The length of any chord in circle A is greater than any chord in circle A'.</p> <p>MGSE9-12.G.C.2 The figure below shows $\triangle ABC$ inscribed in circle D.</p>  <p>If $m\angle CBD = 44^\circ$, find $m\angle BAC$.</p> <p>45°</p>	<p>MGSE9-12.G.C.5 The circle with center F is divided into sectors. In circle F, EB is a diameter. The length of FB is 3 units. Select the correct expression that represents the arc length of arc AED.</p>  <p>a. π</p> <p>b. $\frac{7\pi}{4}$</p> <p>c. $\frac{11\pi}{4}$</p> <p>d. $\frac{13\pi}{4}$</p>	<p>MGSE9-12.G.GMD.1 Two cylinders each with a height of 50 inches are shown below.</p>  <p>Which statements about cylinders P and S are true?</p> <p>Select all that apply</p> <p>a. If $x = y$, the volume of cylinder P is greater than the volume of cylinder S, because cylinder P is a right cylinder.</p> <p>b. If $x = y$, the volume of cylinder P is equal to the volume of cylinder S, because the cylinders are the same height.</p> <p>c. If $x = y$, the volume of cylinder P is less than the volume of cylinder S, because cylinder S is slanted.</p> <p>d. If $x < y$, the area of a horizontal cross section of cylinder P is greater than the area of a horizontal cross section of cylinder S.</p>

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MGSE9-12.G.C.3

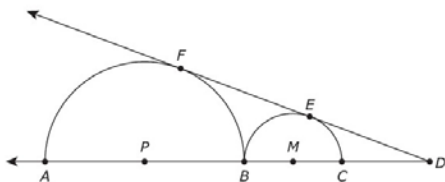


Paige has completed the first few steps for constructing the inscribed circle for triangle ABC. She started by constructing the angle bisectors for angles A and C. This gives her the incenter (point D). What is the next step?

- Construct the angle bisector for angle B.
- Construct a circle with center D that passes through point B.
- Construct the perpendicular bisector of one side of the triangle.
- Construct the altitude from the incenter to a side of the triangle and label the intersection point.

MGSE9-12.G.C.4

The figure shows two semicircles with centers P and M. The semicircles are tangent to each other at point B, and DE is tangent to both semicircles at F and E.



If $PB = BC = 6$, what is ED ?

- 6
- $\sqrt{48}$
- 8
- $\sqrt{72}$

e. If $x < y$, the area of a horizontal cross section of cylinder P is equal to the area of a horizontal cross section of cylinder S.

f. If $x < y$, the area of a horizontal cross section of cylinder P is less than the area of a horizontal cross section of cylinder S.

MGSE9-12.G.GMD.2

A cylinder has a base area of 28.2 m^2 and a height of 3.1 m . Estimate the volume of the cylinder.

- 31 m^3
- 31 m^2
- 84 m^2
- 84 m^3

MGSE9-12.G.GMD.3

Volume of a Sphere = $\frac{4}{3}\pi r^3$

The radius of the earth is approximately 3950 miles. The radius of Jupiter is approximately 44,400 miles. Since the radius of Jupiter is more than 11 times that of the earth, which comes closest to the volume of Jupiter?

- About 11 times that of the earth
- About 121 times that of the earth
- About 600 times that of the earth
- About 1300 times that of the earth

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Resources – Concept 1	Resources – Concept 2	Resources – Concept 5
<ul style="list-style-type: none"> ❖ Instructional Strategies and Common Misconceptions ❖ Circle Vocabulary Activity (G.C.2) ❖ Acquisition Lesson – Parts of a circle (G.C.2) ❖ Circle Theorems (notes and online practice) – technology needed (G.C.2&3) ❖ Acquisition Lesson – Angles of a Circle (G.C.2) ❖ Acquisition Lesson – Segments of Circles (G.C.2) ❖ Graphic Organizer (G.C.2) Angle/Arc Relationship Foldable Line Segments in a Circle Foldable ❖ Practice – Inscribed Angles (G.C.2) ❖ Practice – Line Segments (G.C.2) ❖ Relationship between tangent, Secant Side Lengths (G.C.2) <p style="text-align: center;"><i>These tasks were taken from the <u>GSE Frameworks.</u></i></p> <ul style="list-style-type: none"> ➤ Circles and their Relationships – can be broken into parts, used as guided notes or for accelerated students (G.C.1-3) Teacher Student ➤ Investigating Angle Relationships in Circles – guided notes with graphic organizer (G.C.2&3) Teacher Student ➤ Chords, Secants and Tangents – guided notes with graphic organizer (G.C.2&3) Teacher Student 	<ul style="list-style-type: none"> ❖ Instructional Strategies and Common Misconceptions ❖ Activator/summarizer – Revolving Door Question (G.C.5) ❖ Acquisition Lesson – Arc Length and Area of a Sector (G.C.5) ❖ Area of a Sector notes and practice (G.C.5) ❖ Practice Review (G.C.5) <p style="text-align: center;"><i>Textbook Resources</i></p> <ul style="list-style-type: none"> ✓ Holt McDougal – Explorations in Core Math p (G.C.5) 	<ul style="list-style-type: none"> ❖ Instructional Strategies and Common Misconceptions ❖ Cavalieri’s principle lesson and practice – can be differentiated (G.GMD.1-3) KEY ❖ Graphic Organizer for finding SA and Volume of solid figures (G.GMD.1-3) Teacher Student ❖ Graphic Organizer with practice problems (G.GMD.3) <ul style="list-style-type: none"> ➤ Volume of a pyramid and cone ➤ Volume of a prism and cylinder ❖ Study guide for spheres (G.GMD.1&2) ❖ Acquisition Lesson - Volume and Surface Area of a Sphere (G.GMD.1-3) <p style="text-align: center;"><i>These tasks were taken from the <u>GSE Frameworks.</u></i></p> <ul style="list-style-type: none"> ➤ Volumes – Guided notes/application practice (G.GMD.1-3) Teacher Student ➤ Constructed Response Problem (G.GMD.1-3) Grading Rubric ➤ A Golden Crown – extension (G.GMD.1-3) Grading Rubric ➤ Constructed Response Problem (G.GMD.1-3) Grading Rubric <p style="text-align: center;"><i>Textbook Resources</i></p> <ul style="list-style-type: none"> ✓ Holt McDougal – Explorations in Core Math p229-254, 269- (G.GMD.1) ✓ Holt McDougal – Explorations in Core Math p255-260 (G.GMD.2)

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<ul style="list-style-type: none"> ➤ Constructing (G.C.3&4) Teacher Student ➤ Circles and Triangles – Extension Activity (G.C.1-4) ➤ Constructed Response Problem (G.C.3) Grading Rubric <p style="text-align: center;"><u>Textbook Resources</u></p> <ul style="list-style-type: none"> ❖ Holt McDougal – Explorations in Core Math p265-268, 279-284 (G.C.2) ❖ Holt McDougal – Explorations in Core Math p281-284 (G.C.3) ❖ Holt McDougal – Explorations in Core Math p261-264 (G.C.4) 		<ul style="list-style-type: none"> ✓ Holt McDougal – Explorations in Core Math p265-260(G.GMD.3)
Differentiated Activities Concept 1	Differentiated Activities Concept 2	Differentiated Activities Concept 5
<ul style="list-style-type: none"> ➤ Inscribing and Circumscribing Right Triangles (FAL) – Error Analysis (G.1-4) 	<ul style="list-style-type: none"> ➤ Circle Cube Activity (G.C.5) Cubes Student Answer Document and Key 	<ul style="list-style-type: none"> ➤ Evaluating Statements about Enlargements (FAL) – (G.GMD.1-3) ➤ Calculating Volume of Compound Objects – great discussion activity (G.GMD.1-3)
Resources recommended for Math Support	Resources recommended for Math Support	Resources recommended for Math Support
<ul style="list-style-type: none"> ✓ Circle Vocabulary Game (G.C.2) ✓ Interactive Vocabulary Site (differentiate how vocabulary is presented) ✓ G.C.2 GADOE Notes ✓ Summary activity (G.C.2) <p style="text-align: center;"><i>These tasks were taken from the <u>GSE Frameworks.</u></i></p> <ul style="list-style-type: none"> ✓ Grain Storage (G.C.2) 	<p style="text-align: center;"><i>These tasks were taken from the <u>GSE Frameworks.</u></i></p> <ul style="list-style-type: none"> ✓ Arc Length and Area of a Sector Activity – involves food (G.C.5) Teacher Student 	<ul style="list-style-type: none"> ➤ G.MD.3 GADOE Notes <i>These tasks were taken from the <u>GSE Frameworks</u></i> ➤ Math Lab (G.GMD.1-3) ➤ Constructed Response Problem (G.GMD.1-3) Grading Rubric

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At the end of Unit 2 student's should be able to say “I can...” Take Away

- Select an appropriate theorem or formula to use to solve a variety of situations involving circles, their segments, and the angles created, as well as volumes of such solids as the cylinder, cone, pyramid, and sphere.
- Construct Inscribed and Circumscribed Circles of triangles
- Complete a Formal Proof of the opposite angles of an Inscribed Quadrilateral being supplementary.
- Find the Arc Length and Area of any sector of a circle
- Use Cavalieri's Principle to show that the Volume of an Oblique Solid can be found using Right Solids.

