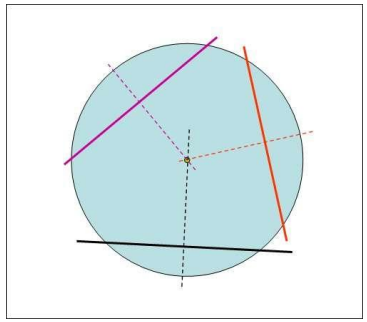
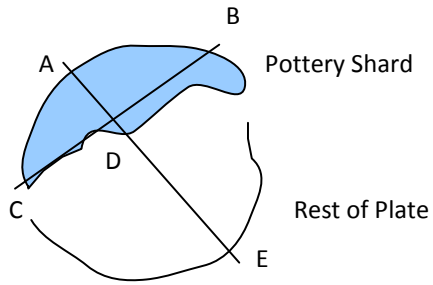
Curriculum Sample Template
Max. 8 Pages

Grade Level	10	**Content Area**	Mathematics (Geometry)
Course Title (grades 9-12 Only)	Geometry		
Length of Unit	4 days	**Time of Year**	Block 8 of 10
Expected Prior Knowledge *The knowledge/skills mastered earlier in the year foundational to the mastery of the required Standard in the current sample.*	Students will know Pythagorean theory, how to make a bisecting line using a straight edge and a compass, students will know diameter and radius of a circle.		
Alignment to Program of Instruction *Briefly outline methods of instruction found in this sequence of lessons that align to the Program of Instruction described in A.3.*	Students will be solving a real-world problem, applying concepts learned in class. This lesson fits the rigor/ relevance framework outlined in the Program of Instruction.		
Standard Number and Description *List the Number* and full description for the required Standard.*	HS.G-C.2. Identify and describe relationships among inscribed angles, radii, and chords. *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.*		
Summative Assessment *Describe a cumulative and comprehensive activity, clearly separate from instruction and guided or independent practice, which allows each student to individually demonstrate mastery of the required Standard. A copy of the summative assessment must be attached to the curriculum sample.*	Students will be using relationships among inscribed angles, radii, and chords, to solve a variety of problems. Problems will include two problems where students will determine the diameter of a circle using a chord and its bisector, two problems will involve students using a tangent perpendicular to the radius to determine distance to the horizon, and one problem will involve finding the diameter of a circle using an inscribed right angle.		
Scoring Scale and Mastery Level *Explain how the assessment is scored, to include points per question, how points are awarded, total points possible, criteria necessary to demonstrate mastery, and grading scale. A copy of the answer key and scoring rubric (whichever applicable) must be attached to the curriculum sample.*	The test will have 5 questions each worth 2 points for a total of 10 points. For 2 problems students will determine the radius using a chord and its bisector (1 point for labeling the length of the chord and finding it bisector, and another point for determining the diameter of the circle using the chord-chord product theorem). For 2 questions students will have to determine the distance to the horizon using a tangent perpendicular to the radius (1 point for setting up the problem, 1 point for the correct solution using Pythagorean theorem). For one problem students will have to determine the diameter of a table knowing the length of 2 chords that form an interior right angle (1 point for setting up the problem, 1 point for correct solution using Pythagorean Theorem). The grading scale will be: 0-6 = No grade (required retake), 7 = C, 8 = B, 9-10 = A. Students will demonstrate mastery with a score of 8 (80%) or better.		

Materials/Resources Needed	Ruler, compass, fake pottery shards, document camera and projector

* ***Standard Number****: For English Language Arts (Reading and Writing), use Grade, Strand, Standard (e.g., 3.RI.2). For K-8 Math, use Grade, Domain, Standard (e.g., 6.EE.7). For HS Math, use Conceptual Category-Domain, Standard (e.g., A-REI.6). For Science, use Grade, Strand, Concept, PO (e.g., 4.1.3.1).*

Lesson (add as needed)	**Instruction**	**Student Activities**
1	For bell work students will be given a review of drawing bisectors of segments using a compass and a straight edge. After students have finished they will be shown some pictures of pottery shards (broken pieces of pottery found at archaeological sites). Students will be told that archaeologists use geometry to determine how large the whole plate would have been. Students will be told that they are going to be the archaeologists after they have learned how to use a chord to find diameter. Students will be introduced into what a chord is. Students will draw their own circles and create their own chords. Next students will be shown that by using 2 chords they can find the center of any circle by drawing lines that bisect the chords. Students will find the center of several circles by drawing chords and their bisectors. Teacher will circulate at this time to give individual help where needed. Students will finish class with a vocabulary exercise about chords, and be given homework in which they must find the centers of circles using chords.	Students will draw bisecting lines of segments Students will take notes on chords Students will find the centers of circles using chords Students will complete vocabulary cards example 
2	For bell work students will be given problems where they find the bisector of chords. Next students will be shown the chord-chord product theorem. Students will be shown how using this theorem can help them find the diameter of plates from broken pottery shards. Students in groups will then find the diameters of plates using broken shards and the chord-chord product theorem. Groups will present their solutions to the class using the document camera. Students will be given individual homework in which they find the diameters of circles using the chord-chord product theorem.	Students will bisect chords as review in bell work Students will take notes on the chord-chord product theorem, and how to use it to find the diameter Students, in teams, will find the diameters of circles using chords and their bisectors. Students will demonstrate their solutions Students will complete homework in which they find the diameters of circles using chords and their bisectors.

		Example using chord-chord product theorem  AE would be the diameter of the plate. Chord-chord product theorem: CD * DB = AD * DE If the distances measured are CD = 5in and AD = 3in, and CD = DB because AE is a perpendicular bisector then: (5)(5) = 3(DE) DE = 8.3 so DE + AD = 11.3 The diameter of the plate is 11.3 inches
3	Students will be given a bell work involving Pythagorean theory and told they will use it today to solve two other types of problems involving circles. Students will be introduced to the radius being perpendicular to a tangent line at the point of tangency, and also that inscribed angles on the diameter are right angles. Students will then work in groups to solve problems involving distance to the horizon, and problems finding the lengths of diameters using inscribed right angles. Students will present their solutions to the class. Students will be assigned individual homework for practice on both of these concepts	Students will complete bell work on Pythagorean theory Students will take notes on radius being perpendicular to a tangent line at point of tangency, and on inscribed angles on the diameter being right angles Students will determine, in groups, the distance to the horizon using the radius perpendicular to a tangent. Students will determine in groups the length of the diameter of a circle using two chords that form an inscribed angle of 90 degrees Students will present solutions to group problems using document camera and projector. Students will, for homework, determine the distance to the horizon

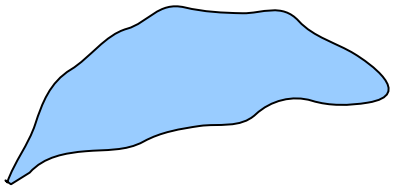
		using the radius perpendicular to a tangent. Students will determine the length of the diameter of a circle using two chords that form an inscribed angle of 90 degrees
4	Students will be given bell work to review the previous days material. Students will be given the summative assessment.	Students will complete review bell work Students will complete the summative assessment.

Paste Summative Assessment Here:

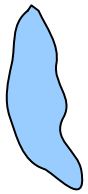
Chords, Radius, and Inscribed Angles of Circles

For Questions 1 and 2 you will need to use a ruler and a compass to demonstrate that you can find the diameter of a circle using a chord and its bisector

1. Find the diameter of the broken plate using chord and bisector



2. Find the diameter of the broken plate using a chord and bisector



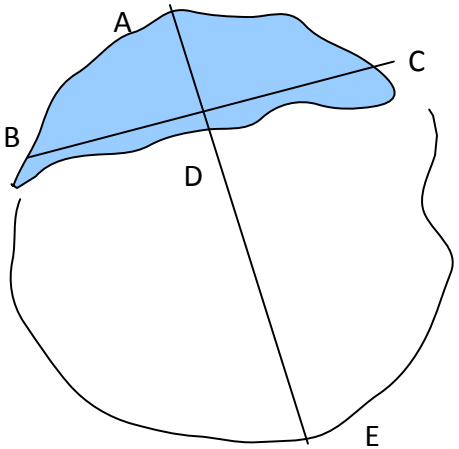
3. The international space station orbits Earth at an altitude of 240 miles. What is the distance from the space station to the Earth's horizon? Assume the radius of the Earth is 4000 miles.
4. The crow's nest on a ship is used for observation. The crow's nest on Christopher Columbus's ship the *Santa Maria* was about 60 ft above the water line. How far to the horizon would an observer on the crow's nest be able to see? Assume a radius of the Earth is 4000 miles. 5,280 ft = 1 mile.
5. The tape measure I have is not long enough to measure across a large round table. I was able to measure the legs of an inscribed 90 degree angle. If the legs of the inscribed angle are 8 ft and 6 ft, what is the diameter of the table?

Paste Answer Key/Scoring Rubric Here:

The test will have 5 questions each worth 2 points for a total of 10 points. For 2 problems students will determine the radius using a chord and its bisector (1 point for labeling the length of the chord and finding it bisector, and another point for determining the diameter of the circle using the chord-chord product theorem). For 2 questions students will have to determine the distance to the horizon using a tangent perpendicular to the radius (1 point for setting up the problem, 1 point for the correct solution using Pythagorean theorem). For one problem students will have to determine the diameter of a table knowing the length of 2 chords that form an interior right angle (1 point for setting up the problem, 1 point for correct solution using Pythagorean Theorem). The grading scale will be: 0-6 = No grade (required retake), 7 = C, 8 = B, 9-10 = A. Students will demonstrate mastery with a score of 7 (70%) or better.

Chords, Radius, and Interior Angles of Circles Key

1.



chord-chord product theorem: (BD)(DC) = (AD)(DE)

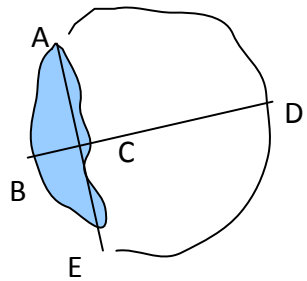
(4.3)(4.3) = (2.6)(DE)

measurements would be in cm. Not accurate to drawing only shown here as an example

$\frac{18.49}{2.6} = \frac{(2.6)DE}{2.6}$ divide each side by 2.6

DE = 7.1 Length of diameter = DE + AD = 7.1 + 2.6 = 9.7 cm

2.



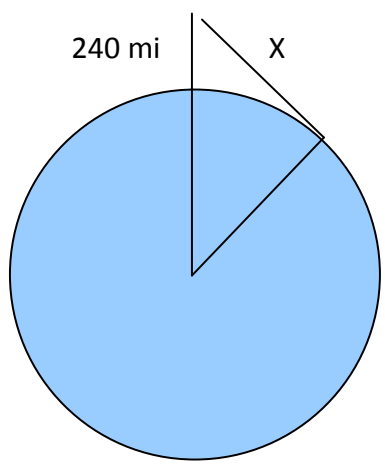
Chord-chord product Theorem: (AC)(CE) = (BC)(CD)

(2.4)(2.4) = (0.8)(CD)

$\frac{5.76}{0.8} = \frac{(0.8)(CD)}{0.8}$ divide by 0.8

CD = 7.2 diameter of plate = CD + BC = 7.2 + 0.8 = 8 cm

3.



The radius is perpendicular to the tangent line (X).
If the radius is 4000 mi then the hypotenuse of the right triangle is 4000 + 240. Using Pythagorean Theorem

$a^2 + b^2 = c^2$

$4000^2 + X^2 = 4240^2$

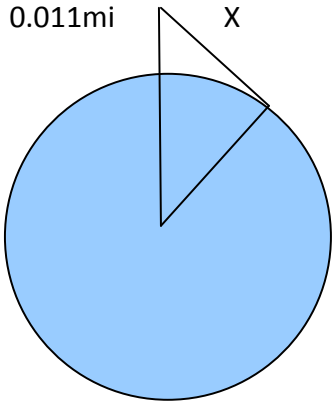
$16000000 + X^2 = 17977600$ subtract 16000000 from each

$X^2 = 1977600$ square root of each

x = 1,406 miles

4.

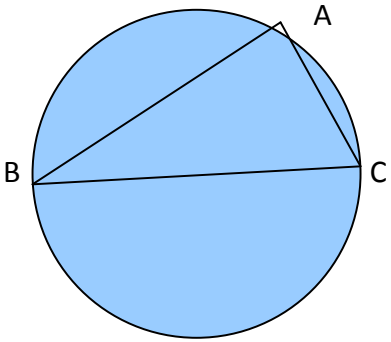
60 ft is converted to 0.011 mi by:
60 / 5280



The radius is perpendicular to the tangent line (X).
If the radius is 4000 mi then the hypotenuse of the right triangle is 4000 + 0.011. Using Pythagorean Theorem

$a^2 + b^2 = c^2$
$4000^2 + X^2 = 4000.011^2$
$16000000 + X^2 = 16000088$ subtract 16000000 from each
$X^2 = 88$ square root of each
$x = 9.4$ miles

5.

The inscribed angle is 90 degrees so by theorem of inscribed right angle on diameter, BC is the length of the diameter and the Hypotenuse of triangle ABC. Using Pythagorean Theorem:

$(AB)^2 + (AC)^2 = (BC)^2$
$8^2 + 6^2 = BC^2$
$64 + 36 = BC^2$
$100 = BC^2$ square root of each
$BC = 10$ feet