(A) Lesson Context

BIG PICTURE of this UNIT:	- mastery with algebraic skills to be used in our work with co-ordinate geometry (midpoint, length, slope) - understanding various geometric properties of quadrilaterals & triangles - how do you really prove that something is "true"?		
CONTEXT of this LESSON:	Where we've been You know how to find a midpoint, a length and how to work with Geogebra	Where we are Using length and midpoint in developing and working with equations of circles	Where we are heading How can I prove various geometric properties of quadrilaterals and triangles?

(B) Lesson Objectives:

a. Exploring the relationship between the midpoint, endpoints & circles (through geogebra)
b. Determine the equation of a circle centred at the origin
c. Explore and determine the equation of a circle NOT centred at the origin (through geogebra)

(C) Exploring Circles – through dynamic geometry software: geogebra

USING GEOGEBRA ➔ go to http://www.geogebratube.org/student/m52677 : Point A will be fixed as the MIDPOINT at (0,0). You will move slider "a" to get to the requested length ➔ Record 5 positions of B ➔ Q? how can you predict where Point B should be?

Point A	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)	(0,0)
Length	2	4	5	6	8	10	15
Point B							

(D) Working with the Formula

a. The formula to find the length of a line segment between two points on a graph is

$$l = \sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$$

    i. Where is Point A ?

    ii. Let Point B be the unknown $B(x, y)$

    iii. How would you determine the length of the line segment between A and B .

(E) Analysis of a Circle

a. Given the circle with the equation of $x^2 + y^2 = 25$. Using GEOGEBRA, determine:

  1. Use the INPUT bar to write the equation.

  2. Determine the radius ➔

  3. Determine the x- and y-intercepts of the circle. ➔

  4. If x = 3, determine the value(s) for y. ➔

  5. If y = -1.5, determine the value(s) for x. ➔

b. Given the circle with the equation of $x^2 + y^2 = 100$. Using ALGEBRA & your brains, determine:

  1. Determine the radius ➔

  2. Determine the x- and y-intercepts of the circle. ➔

  3. If x = 6, determine the value(s) for y. ➔

  4. If y = -3, determine the value(s) for x. ➔

c. Given a circle with its center at $(0,0)$ and a point at $(-5,12)$, determine its equation USING ALGEBRA & your brains.

d. Given a circle with the end points of its diameter being $(-8,15)$ and $(8,-15)$, determine its equation USING ALGEBRA & your brains.

(F) Analysis of Circles ➔ Moving the Center

    a. Given the circle with the equation of $x^2 + y^2 = 25$. Using GEOGEBRA, go to

        http://www.geogebratube.org/student/m52682 and determine:

           1. Move the sliders for "h" and "k" around to various positions

           2. Record the values of "h" and "k" as well as the new equation of the circle.

"h"	"k"	Equation

           3. Explain the relationship between the values of "h" and "k" and the equation of a circle.

(G) Homework/Resources

Nelson 10 Chap 2.3 – Equation of a Circle, p91-93, Q1,3,4,7

For advanced work & challenge, try http://www.kutasoftware.com/FreeWorksheets/GeoWorksheets/11-Equations%20of%20Circles.pdf