LessonTitle: Detective Work in Linear Equation Forms	**Alg 6.2**
Utah State Core Standard and Indicators Algebra Content Standard 2.1 Process Standards 1-5	
Summary In this activity, students use what they know (points, slopes, x and y intercepts, equation forms etc.) to find out what they don't know (points, slopes, x and y intercepts, equation forms etc.).	
Enduring Understanding Doing Algebra is sometimes like doing detective work. You can use what you know about points, slopes, x and y intercepts, and equation forms to derive information about linear equations.	**Essential Questions** What linear equation story details can you derive from different equation forms? When would you use the different linear equation forms?
Skill Focus • Manipulating linear equations to find missing information.	**Vocabulary Focus**
Assessment • See partner test below.	
Materials: graph paper	
Launch	
Explore	
Summarize	
Apply	

Directions:
There are varying opinions on the need to teach three forms of an equation. Perhaps it is valuable for students to be able to recognize the standard form of a linear equation and be able to translate equations into different forms. What is important is that they can

- graph using slope intercept,
- graph using point slope,
- graph by finding and plotting the x and y intercepts,

As part of Alg 6.2, we suggest incorporating activities from Discovering Algebra with Geometer's Sketchpad, pages 50-56.

Using clues from the titles of the three forms of a linear, students will solve for missing information. They will also use what they know about solving equations to rewrite equations into different forms.

Use Alg 6.0, Quick Draw McGraw, to have students practice quickly sketching graphs from different equation forms. These can be used as class starters or quizzes.

Alg 6.2 Detective Work in Linear Equation Forms
(Using what you know to find out what you don't)

Name _____

CLUES: Three forms of a linear equation.

I. Slope Intercept Form: $y = mx + b$

Why is this called the slope intercept form? _____

What are two ways for thinking about or finding slope?

II. Point Slope Form: $y - y_1 = m(x-x_1)$ or $y = m(x-h) + k$

Why do you think this form of the equation is called point slope? _____

_____

What is the "point" and the "slope" found in these equations?

$y = 2(x -3) + 4$ Point (___,___) Slope _____

$y = 3(x + 4) - 2$ Point (___,___) Slope _____

How do you know whether the coordinates for the point found in this equation form are positive or negative?

III. Standard Form: $ax + by = c$ When graphing this form of the equation, solve for the x intercept by setting y at 0. Then solve for the y intercept by setting x at 0.

1) If you know that a point on a line is (-3,4) and the slope of the line is -1/2, write an equation for that line._____

2) What clues about the lines can you take from the following equations?

   $y + 6 = ¾(x – 4)$ _____

   $y = 1/3\ x + 2$ _____

   $y – 4 = 5(x +2)$ _____

   $y = -3x -5$ _____

3) Find an equation of the line parallel to $y = 2/5\ x$ that passes through (-5,-1).

4) Find an equation of the line that passes through the points (1,1) and (3,5).
5) Find the equation of the line with slope of -1/4 that passes through (-8,-2)

   Rewrite the equation into slope intercept form.

6) Write 2 forms for the equation of the line parallel to $y = 6x + 10$ that passes through (.5,0)

7) Write two forms of the equation of the line through (5,4) and (8,7)

8) Describe 2 ways you could go about graphing this equation. $y = 3x - 2$

9) Describe the easiest way to graph this equation. $y - 3 = 1/2(x + 2)$

10) What would you do to this equation in order to find the easiest way to graph it?
$4x + 2y = 10$

11) What would you do to this equation in order to find the easiest way to graph it?
$2(x - 3) = 3(y - 6)$

Alg 6.2 assessment Partner Test

On graph paper, graph # 1-4 below on the same coordinate graph.

1) One point on line Y_1 is the point (9,3) and another point is (-6,-2). Graph these points on a piece of graph paper. Label this line Y_1 on the graph paper. Count out the slope. What is the slope? _____
In the space below, use the slope formula to find the slope.

Find the equation of the line. Y_1 =_____ Show your work below.

2) Move this line up 10 and graph it. What is the equation of this line?
Y_2 = _____ Label the line on the graph paper.

Fill in the blanks for the line Y_2. (9, ___) (___, -6) (0, ___)

3) What is the slope of a line that is equally as steep as Y_1 but is going the opposite direction? m = _____

Graph the line with this slope that passes through the point (0,6).

What is the equation of this line? Y_3 = _____ Label the line on the graph paper.

How are lines Y_1 and Y_3 related?

4) Graph the line parallel to Y_3 that goes through the point (-6,-2).

What is the equation of this line? Y_4 = _____ Label the line on the graph paper.

5) Given the points (4,2 (-2,1) write an equation in point slope form. Show all steps

6) Rewrite the equation into standard form. Show all steps.

7) Rewrite the equation into slope intercept form.