

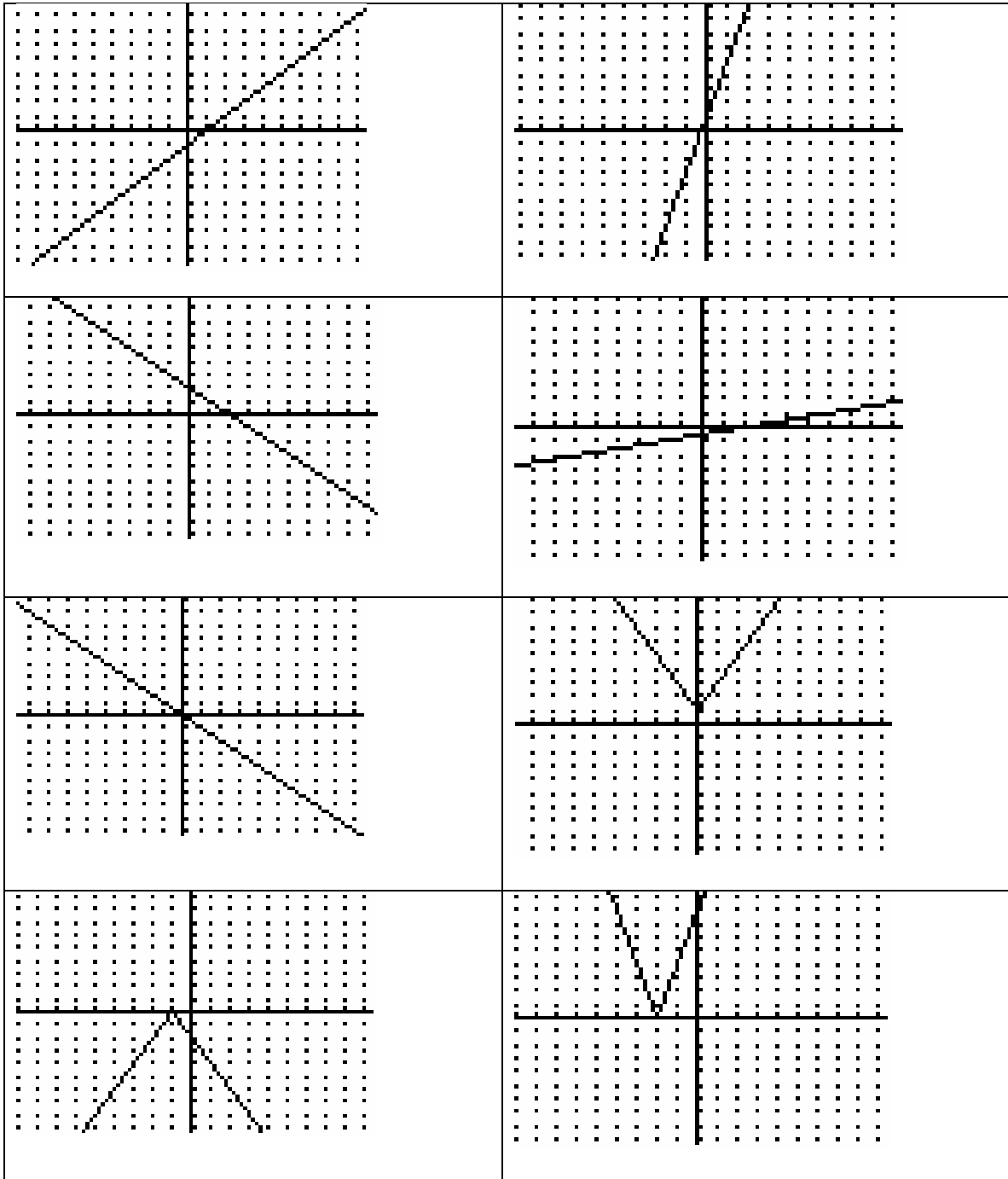
Transformation Graph Matching Game

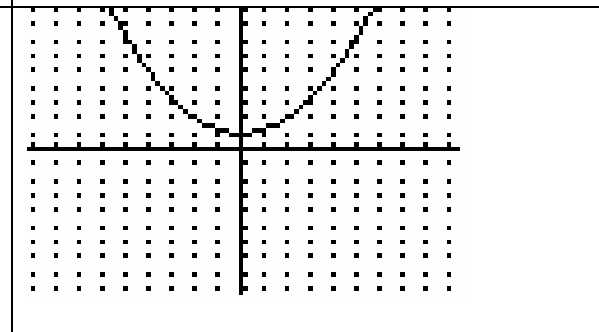
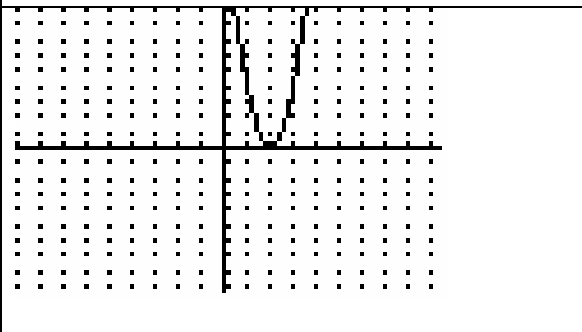
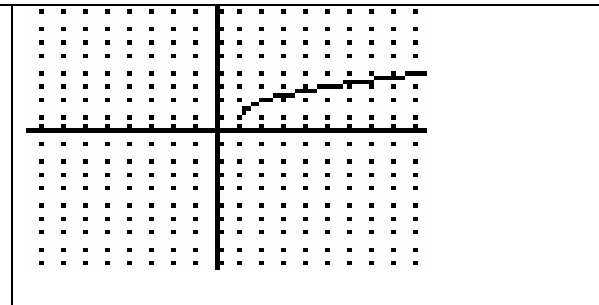
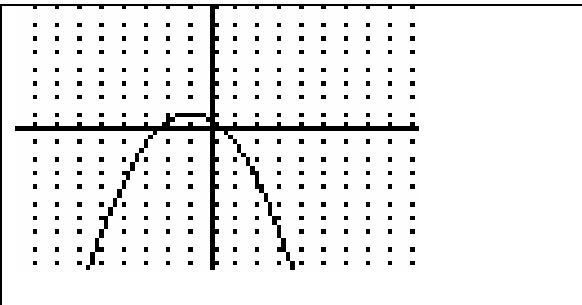
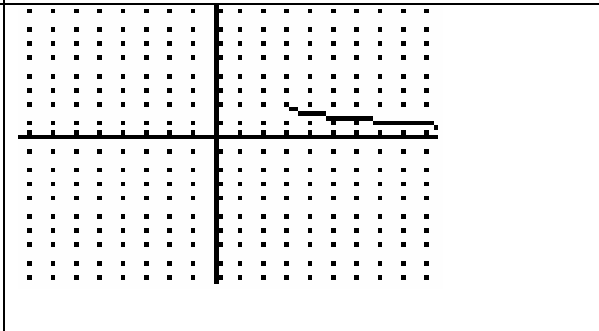
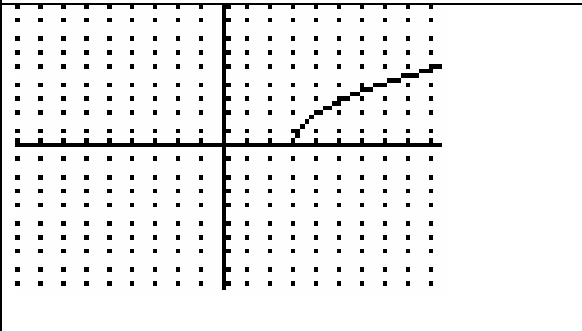
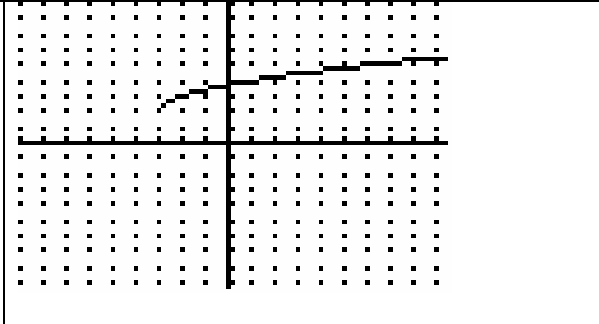
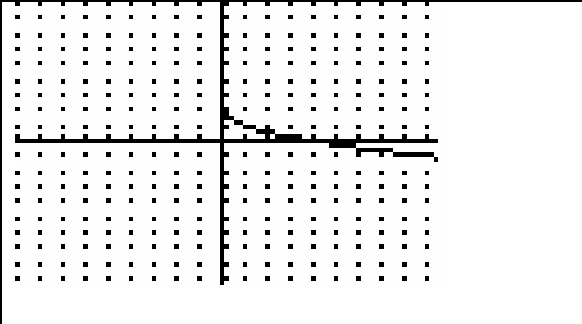
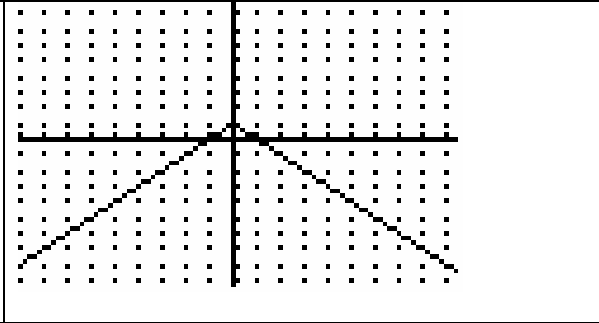
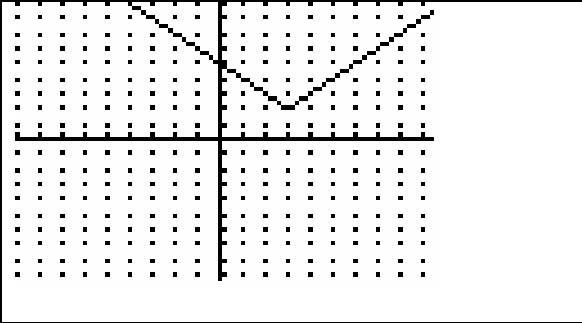
Summary	
In this lesson, students explore matching tables, graphs, equations and words. They use their knowledge of plotting points and transformations to make connections. As a summary, students could write about their knowledge of functions and transformations.	
Utah State Core Standard	
<p>Standard 3, Objective 3.2 Specify locations and describe spatial relationships using coordinate geometry.</p> <ul style="list-style-type: none"> • Sketch the graph of a function. • Perform the transformations of stretching, shifting, and reflecting the graphs of linear, absolute value, quadratic, and radical functions. <p>Standard 2, Objective 2.3 Represent quantitative relationships using mathematical models and symbols.</p> <ul style="list-style-type: none"> • Find the vertex, maximum or minimum values, intercepts, and axis of symmetry of a quadratic or absolute value function, algebraically, graphically, and numerically. 	
Desired Results	
Benchmark/Enduring Understanding	
<p>Students will know the graph of Algebra II functions. Student will understand that graphing functions can be simplified by using transformations that are consistent among functions. Students will make connections to tables, graphs, and transformations.</p>	
Essential Questions	Skills
	Matching Functions: Numerically, Algebraically, Graphically and with Words.
Assessment Evidence	
Students will complete the game. This may be used as a review for an assessment or as an individual assessment by itself.	

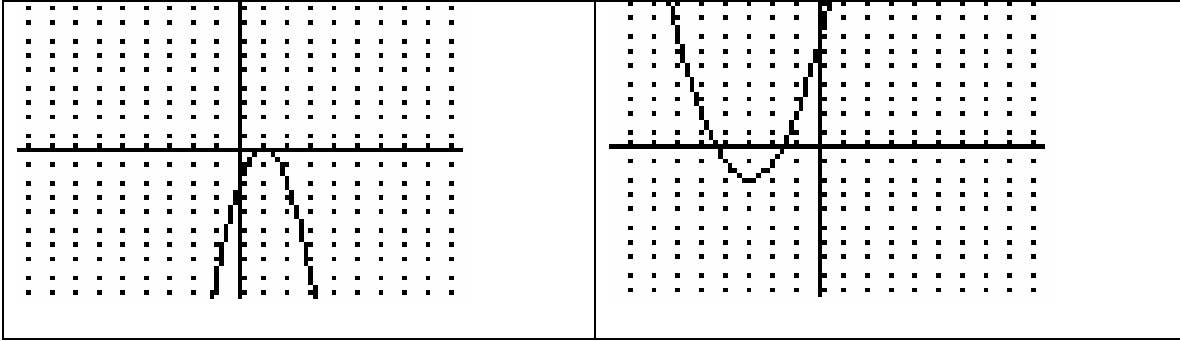
Instructional Activities
<p>Launch: Give students the sheet with the graphs on it (this helps them determine which way is up for the graphs) and the cards to complete the activity.</p> <p>Explore: Students work individually or in groups (recommended) to complete the game (activity). It is helpful to be sure that everyone has the graphs facing in the correct direction (an upside down graph paper creates confusion).</p> <p>Summarize: Have students create a foldable as a group discussing the connections among transformations of functions and how each function can be matched graphically, numerically, and algebraically. Have them write about what strategies they used to complete the game. As a class, discuss student conjectures and bring the class to consensus regarding functions and their representations.</p>
Materials Needed
<p>Make copies of worksheet and cut out everything except the graphs (you may want to use different colors for each group so the pieces do not get mixed up).</p> <p>A stapler or glue may be used to attach pieces of game to graph paper.</p> <p>To 'quick check', you can put letters on the bottom corners of the cards and have students record the letters of each set (this is easier to scan than looking at each item individually. Something to think about: perhaps you do</p>

not have to check the game results, especially if they are following through with a write up that is being scored.

Graphs:







Equations:

$f(x) = (x - 3) + 2$	$f(x) = 2 x + 1$
$y = 4x + 1$	$y = -2 x + 1 $
$g(x) = \frac{1}{4}(x - 2)$	$g(x) = - x + 1$
$h(x) = -x$	$h(x) = 4 x + 2 $
$r(x) = -(x - 2)$	$r(x) = (x + 3)^2 - 2$
$t(x) = (x - 3) + 2$	$t(x) = \frac{1}{4}x^2 + 1$

$f(x) = 4(x - 2)^2$	$f(x) = -\sqrt{x} + 2$
$y = -2(x - 1)^2$	$y = -\frac{1}{2}\sqrt{x - 3} + 2$
$g(x) = -\frac{1}{2}(x + 1)^2 + 1$	$h(x) = \sqrt{x + 3} + 2$
$r(x) = \sqrt{x - 1} + 1$	$t(x) = 2\sqrt{x - 3}$

Tables:

X	3	-3	0	2	-5	X	4	0	-5	5	-1
X	10	2	-14	-2	-6	X	-3	0	4	-1	-8
y	2	0	-4	-1	-2	y	3	0	-4	1	8
X	2	-5	6	-12	0	X	0	-2	9	-10	5
y	5	11	13	25	1	y	5	7	8	15	4
X	-6	4	11	-1	0	x	0	-8	-1	8	1
y	-10	-10	-24	0	-2	y	1	-7	0	-7	0
X	7	-7	0	5	9	X	20	0	-6	-3	2
y	-5	9	2	-3	-7	y	88	8	16	4	16

X	-3	0	2	4	6
Y	-2	7	23	47	79

X	-3	1	6	13	22
Y	2	4	5	6	7

X	-4	-2	0	2	4
Y	5	2	1	2	5

X	1	2	5	10	17
Y	1	2	3	4	5

X	-3	-1	2	3	5
Y	100	36	0	4	36

X	3	4	7	12	19
Y	0	2	4	6	8

X	-7	-5	0	3	5
Y	-128	-72	-2	-8	-32

X	0	1	4	9	16
Y	2	1	0	-1	-2

<table border="1"> <tr> <td>X</td> <td>-5</td> <td>-1</td> <td>1</td> <td>3</td> <td>5</td> </tr> <tr> <td>y</td> <td>-7</td> <td>1</td> <td>-1</td> <td>-7</td> <td>-17</td> </tr> </table>	X	-5	-1	1	3	5	y	-7	1	-1	-7	-17	<table border="1"> <tr> <td>X</td> <td>3</td> <td>7</td> <td>19</td> <td>39</td> <td>67</td> </tr> <tr> <td>Y</td> <td>2</td> <td>1</td> <td>0</td> <td>-1</td> <td>-2</td> </tr> </table>	X	3	7	19	39	67	Y	2	1	0	-1	-2
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<p>Horizontal Shift: left 3 Vertical Shift: up 2</p>	<p>Horizontal Shift: right 1 Vertical Shift: up 1</p>																								
<p>Horizontal Shift: right 3 Stretch: 2</p>	<p>Vertical Shift: up 2 Reflection: x-axis (vertical)</p>																								
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Horizontal Shift: left 1 Stretch: 2 Reflection: x-axis (vertical)	Vertical Shift: up Reflection: x-axis (vertical)
Horizontal Shift: 2 left Stretch: 4	Horizontal Shift: left 3 Vertical Shift: down 2
Vertical Shift: up 1 Stretch: $\frac{1}{4}$	Horizontal Shift: right 2 Stretch: 4
Horizontal Shift: right 1 Stretch: 2 Reflection: x-axis (vertical)	Horizontal Shift: 1 left Vertical Shift: 1 up Stretch: $\frac{1}{2}$ Reflection: x-axis

