



Name: _____

Date: _____

Student Exploration: Zap It! Game

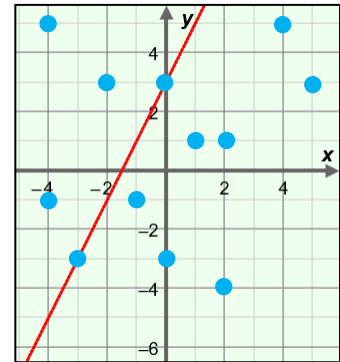
Vocabulary: parabola, quadratic function

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

The equation of the line shown is $y = 2x + 3$.

1. If you wanted the line to intersect more points, how would you change the slope of the line? _____

2. How would you change the y-intercept? _____



Gizmo Warm-up

In the *Zap It!* Gizmo, you will see how many points you can hit (or “zap”) with a **parabola** by changing the values in a **quadratic function**. You can choose polynomial form, $y = ax^2 + bx + c$, or vertex form, $y = a(x - h)^2 + k$.

With **Polynomial form** selected, be sure that the sliders are set to the default values: **a** to 1, **b** to 0, and **c** to 0. (To quickly set a slider to a value, type the value in the box to the right of the slider and press **Enter**.)

1. Click **Reset – random points**. Then click **Graph it!** to graph $y = x^2$. The “zapped” points are in red.

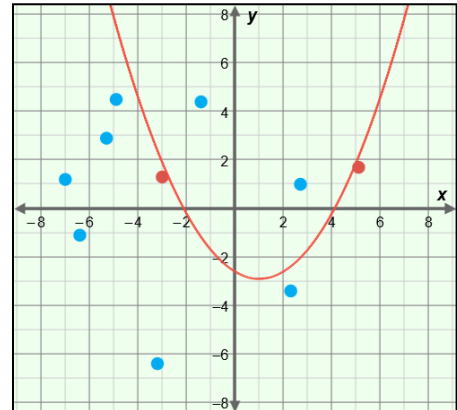
A. How many points did this curve “zap”? _____

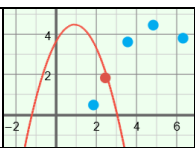
B. How do you need to change the parabola to zap more points? _____

2. Click **Keep trying**. Drag the sliders, and click **Graph it!** How many did you zap now? _____

Keep trying! The goal is to zap as many points as you can, in as few attempts as possible.

To start a new game, click either **Reset – random points** or **Reset – perfect fit**.



Activity A: Polynomial form	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> • Be sure Polynomial form is selected. • Click Reset – random points. 	
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1. Play the “Random points” game several times. Record how many points you zap each time.

Game	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	Most zapped
1						
2						
3						
4						

2. Click **Reset – perfect fit**. In this game, you can actually zap all 10 points. The challenge is, how many tries will it take you to zap all 10? (Note: The points in the Gizmo are “fat” so there are several different graphs that will zap all 10 points.)

Game 1: It took _____ attempts to zap all 10 points.

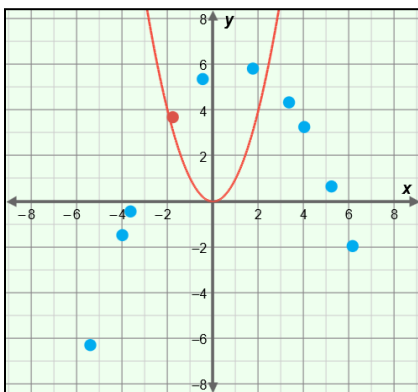
Game 2: It took _____ attempts to zap all 10 points.

Game 3: It took _____ attempts to zap all 10 points.

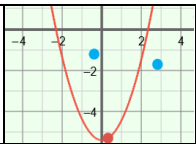
Game 4: It took _____ attempts to zap all 10 points.

Play the “perfect fit” game several more times, in **Polynomial form** mode. What’s your best score (fewest attempts to zap all 10 points)? _____

3. The parabola graphed here is $y = x^2$ ($a = 1$, $b = 0$, and $c = 0$). How would you change the values in $y = ax^2 + bx + c$ to zap more points? Explain why.





Activity B: Vertex form	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> • Select Vertex form. • Click Reset – random points. 	
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1. Play the “Random points” game several times. Record how many points you zap each time.

Game	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Attempt 5	Most zapped
1						
2						
3						
4						

4. Click **Reset – perfect fit**. In this game, you can actually zap all 10 points. The challenge is, how many tries will it take you to zap all 10? (Note: The points in the Gizmo are “fat” so there are several different graphs that will zap all 10 points.)

Game 1: It took _____ attempts to zap all 10 points.

Game 2: It took _____ attempts to zap all 10 points.

Game 3: It took _____ attempts to zap all 10 points.

Game 4: It took _____ attempts to zap all 10 points.

Play the “perfect fit” game several more times, in **Vertex form** mode. What’s your best score (fewest attempts to zap all 10 points)? _____

2. The parabola graphed here is $y = x^2$ ($a = 1$, $h = 0$, and $k = 0$). How would you change the values in $y = a(x - h)^2 + k$ to zap more points? Explain why.

