"Save the Zogs" Activity Handout

Answer Key and Grading Rubric (Total Points: 18)

1. Give an example of a non-linear equation by drawing some Duplicators on a graph.
   Answers will vary. The graph should include 3 points (i.e. Duplicators) that cannot connect to form a straight line.

   Total Points: 2 (all or nothing)

2. What about the situation that you drew makes the line through the Duplicators non-linear?
   Students should mention that the relationship between the Duplicators on the graph is not constant.

   Total Points: 3
   -1 if the only justification includes that a straight line cannot be drawn through the graph

3. Move as few Duplicators as possible on your graph to create a linear equation. What is the linear equation? What did you do to determine the appropriate linear equation?
   Answers will vary.
   Example: Duplicators at (0,0), (2,2), and (3,4) means that the student could move the Duplicator at (3,4) to (3,3). Another possibility is for the Duplicator at (2,2) to move to (7,7). In the first case, the linear equation is y=x and in the second the equation is y=4/3x. In order to determine the appropriate equation, students needed to see how the Duplicators were related to each other.

   Total Points: 3
   -1 moving Duplicator does not produce a linear relationship
   -1 incorrect linear equation
   -1 no mention of relationship between points when describing how to determine equation

4. Consider two Zogs on the graph and consider the relationship between the two Zogs. How can you use this information alone to determine the slope of the linear equation that goes through them?
   You need to consider the relationship between the two points by noticing the vertical and horizontal components of each (i.e. rise over run). If students have learned m=(y2-y1)/(x2-x1), they can mention that here as well.

   Total Points: 2
   -2 incorrect description
   -1 only mentions rise over run

5. Do two points on a graph always have a linear equation going through them? Do three? Why or why not?

   Yes, no. A unique relationship of a linear equation is defined with two points. A third point must follow the same relationship in order to be linear. If it does not, the three points do not have a linear equation and do not produce a straight line on the Cartesian Coordinate system.

   Total Points: 4
   -1 per incorrect yes/no answer
   -1 justification only mentions that a straight line cannot be formed

6. Suppose that the Zogs were able to send you a message that the slope of the equation of the line they were forming is going to be -3 and that you knew that one of the Zogs was located at (3, 4). Where are two other possible points that you could possibly find another Zog? Why are those points good places to look? Write an equation to describe this situation.

   Answers will vary. Example points: (2,1), (1,-2) because those lie along the linear equation with a slope of 3 that passes through the point (3,4).
   y= 3x-5

   Total Points: 4
   -1 per incorrect point
   -1 incorrect justification
   -1 incorrect equation