

## Template for Using Functions in an Intro Geology Class

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**Purpose of this Template:** We envision this template as an outline for teachers of introductory geology classes (physical, historical, environmental, etc.) who want to develop the graphical literacy of their students. They will be able to adapt this template for any graph or function of interest. Similarly, it can be adapted to illustrate functions in a pre-calculus course.

### Learning Goals:

- use data to plot a curve
- read information off of a curve
- recognize different functions, in numerical, graphical, and algebraic forms
- calculate slopes of functions
- interpolation and extrapolation
- (optional) learning to use appropriate technology (e.g., Excel)

CONTEXT – paragraph introducing the problem and its relevance

DATA – present data in a tabular format

DATA EXPLORATION – variable as to how in depth this portion is. Will vary depending on whether used in lecture or lab format or whether this is the first time they see a type of function (i.e., linear, exponential, power, etc.).

*Possible questions/activities:*

- Are values increasing or decreasing?
- Have them determine the amount of change between two or more pairs of data
- Have them make an initial prediction (beyond the limit of the data) and then explain how they did it

GRAPH –variable depending on how often they've seen the function.

*Set-up*

Early in the term – give them graph paper with labeled axes  
Discuss how to scale an axis  
Later in the term -- Let them determine axes and scales

*Plot data*

*Fit a smooth curve to the data points.*

*Describe/Explore Curve*

- What's the shape of the curve?
- Where is the curve steep?
- Revisit the same pairs of data they looked at earlier and ask them additional questions (maybe slope of the line between the pairs)

EQUATION – introduce equation & possibly use

- Discuss what each term in the equation means
- Provide brief discussion of the properties of the function (perhaps contrast or compare with other functions they have seen)

ANALYSIS W/ GRAPH & EQUATION

- Ask them questions about the graph (in words). These questions might require one or more of the following:
  - Interpolation between plotted data points
  - Prediction of values beyond the plotted data (compare with previous prediction and/or prediction based on calculation)

DEEPER THOUGHT QUESTIONS

These will vary depending on context. The goal of these should be to get students to think more deeply about the geology or about the math.