

Thoughts for Teachers – Analyzing the Data

The families of functions exploration is intended to be an opportunity to re-examine functions previously studied and to produce a solution for students who aren't yet ready for the more symbolic solution using recurrence equations or semi-log graphs. For many students, this portion of the investigation can be skipped or done outside of class.

The discrete analysis using recurrence equations is a primary component of this investigation. This method should be explored by all students. The development using recurrence equations can happen quite naturally once students have observed that the amount of change in light intensity will depend on the amount of light intensity. This observation is best done at the time of the launch.

The discrete analysis presented here is done explicitly so that as instructors you can quickly see the mathematics within the investigation. This development can flow from the class discussion and from students' ideas.

A limited background in logarithms is assumed for the section on semi-log graphs. The question of other methods for linearizing data can be used as a springboard for studying semi-log graphs. While the investigation here is written assuming some experience with the properties of logarithms, an alternative method is to first introduce the concept of an inverse function for exponentials if students haven't already encountered logarithms. Using a graphics calculator or other graphing tool, have students plot (depth, $\log(\text{intensity})$). Then once students have observed the linear relationship between the depth and the log of the light intensity, the goal of rewriting this relationship can be used to introduce the properties of logarithms.