

## Exponential Growth

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9<sup>th</sup> Grade

Algebra 1B

20 – 30 students

# of IEPs None

Goals and Objectives: Students recognize mathematical relationships in different contexts through investigation. Students make connections by drawing on prior knowledge to form conclusions. Students use recognition to relate mathematical situations to real world situations.

### Connections:

Big Idea: Algebraic Thinking

High school students extend analysis and use of functions and focus on linear, quadratic, absolute value and exponential functions. They explore parametric changes on graphs of functions.

MA-HS-AT-S-PRF13 Students will graph linear, absolute value, quadratic and exponential functions and identify their key characteristics.

MA-HS-5.1.1 Students will identify multiple representations (tables, graphs, equations) of functions (linear, quadratic, absolute value, exponential) in real-world or mathematical problems. DOK 2

MA-HS-5.1.4

Students will recognize and solve problems that can be modeled using an exponential function, such as compound interest

MA-HS-5.1.8 Students will identify the changes and explain how changes in parameters affect graphs of functions (linear, quadratic, absolute value, exponential) (e.g., compare  $y = x^2$ ,  $y = 2x^2$ ,  $y = (x-4)^2$ , and  $y = x^2+3$ ). DOK 2

Context:

This lesson is designed to be an introduction to exponential functions. The class has background knowledge in linear functions, slope, and rate of change. They will investigate exponential functions with a comparison their background knowledge of linear functions.

**Essential Question:** What are the similarities and differences between a linear function and an exponential function?

**Resources:**

Poster board

Calculators

Graph Paper

Markers

Exponential Scenarios

**Procedure:**

As the class enters the room they are given salary options to choose from. They make their choice and document it on their paper. They are then placed into heterogeneous groups to discuss their choice and why they made it. As group they are to come to concensus on the best option and prepare a presentation justifying their choice. Supplies are available and they can pepare a table, a chart, a graph, or an equation to support their decision.

The groups present.

Discussion takes place making connections to the various methods presented. Similarities and differences in the two scenarios are discussed.

Students then go back to their groups. Each group is given a scenario to present to the class describing what type of function they were given and how they came to that conclusion.

Again the discussion is led around similarities and differences in the functions.

Homework is then assigned differentiating functions.

**Student Assessment:**

Formative assessment is done on the discussions as well as the presentations. Group work is closely monitored throughout the lesson. Summative assessment is done later in the unit with a quiz and at the end of the unit with a test.

