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Exponential and Logistic Growth Curves Model

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Name: Juan Betancourt
Grade Level: population growth comparison
Objective: Students will compare logistic and exponential growth and contrast on their similarities and differences.

Science concept:

Population

Key Idea 6:

Plants and animals depend on each other and their physical environment.

The fundamental concept of ecology is that living organisms interact with and are dependent on their environment and each other. These interactions result in a flow of energy and a cycling of materials that are essential for life.

Competition can occur between members of different species for an ecological niche. Competition can also occur within species. Competition may be for abiotic resources, such as space, water, air, and shelter, and for biotic resources such as food and mates. Students should be familiar with the concept of food chains and webs.

PERFORMANCE INDICATOR 6.1

Explain factors that limit growth of individuals and populations.

Major Understandings

6.1a Energy flows through ecosystems in one direction, typically from the Sun, through photosynthetic organisms including green plants and algae, to herbivores to carnivores and decomposers.

6.1b The atoms and molecules on the Earth cycle among the living and nonliving components of the biosphere. For example, carbon dioxide and water molecules used in photosynthesis to form energy-rich organic compounds are returned to the environment when the energy in these compounds is eventually released by cells. Continual input of energy from sunlight keeps the process going. This concept may be illustrated with an energy pyramid.

6.1c The chemical elements, such as carbon, hydrogen, nitrogen, and oxygen, that make up the molecules of living things pass through food webs and are combined and recombined in different ways. At each link in a food web, some energy is stored in newly made structures but much is dissipated into the environment as heat.

6.1d The number of organisms any habitat can support (carrying capacity) is limited by the available energy, water, oxygen, and minerals, and by the ability of ecosystems to recycle the residue of dead organisms through the activities of bacteria and fungi.

6.1e In any particular environment, the growth and survival of organisms depend on the physical conditions including light intensity, temperature range, mineral availability, soil/rock type, and relative acidity (pH).

Please provide a rich **one-page, single-spaced**, description or a *vision* of your best thinking on a way or ways you might teach the planned lesson. (approximately ½ page for the teacher role, ½ page for the student role). Also, construct a tentative rubric that you might use with your students

Teachers and student role:

In this activity students will explore things that will make a population increase and decrease as well as comparing two different types of growth and compare their similarities and differences . The class will be started by writing in the board the word population and ask the students for things that can affect the population. The discussion will be geared towards trying to develop an idea on how the population will grow (exponentially or logistically). We will use handout 2 on population to discuss both types of population growth.

Once students understand both types of growth handout #1 will be given to them. Students at this point will have to take the handout and work individually to take a set of data and entered it into the TI calculator and then graph it. Once the data I son graph mode and everyone has completed this part of the activity, the teacher will lead a discussion on regression and how equations can model a set of data and predict behavior. After the discussion is completed the students will have to explore the different types of regressions available in the TI calculator and come up with the2 that best fit the set of data given to them . Students will have to realize that the two regressions needed are the exponential and logistic regression.

This will complete the activity for the day. For homework students will have to think on how the plots they created could be affected in order to cause the population to increase or decrease. For this they will have to recall the discussion at the beginning of class where they discussed the factors affecting population. This will lead to the next day discussions on population.

Assesment:

	5pt	***4pt***	***3pt***	***2pt***	***1pt***
Questions	All answered	1 missing	One missing and others incomplete	More than 2 incomplete	Pooly answered/completed/ missing
Tables in TI	populated	Entered but labeled incorrectly	Partially entered	Some missing	Table is not entered correctly but entered
Graphing	Accurately created	One graph done other with some errors	One graph missing	Errors on both graph	Graph created with incorrect type, data missing, not all graph can be seen on display
regression	Accurately done	Done, but parameters not included	One regression done, one missing, no chart on one	Wrong regressions, type done, no charts	Both regressions incorrectly created, no graph showing regression
Analysis	In depth analysis performed	Almost correct analysis	Some depth , some superficial analysis	Mostly superficial analysis	Answers make no sense , do not answer the question.Imcomplete