

Population Growth Lesson 3

Modeling Population Growth

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DATE LESSON TO BE TAUGHT:

GRADE LEVEL: Algebra

SOURCE OF THE LESSON:

<http://www.k12science.org/curriculum/popgrowthproj/index.html>

TEKS:

CONCEPT(S)

OBJECTIVES (LEARNER OUTCOMES): The student will be able to

1. Find linear, exponential and quadratic models of U.S. population data
2. Predict future populations based on each model
3. Compare predicted populations to given estimates
4. Determine which function best represents data
5. Write an equation to determine U.S. population based on constant growth rate model and continuous change model
6. Compare predicted population to given estimates
7. Determine limitations of model
8. Compare predicted population to given estimates
9. Determine limitations of model

MATERIALS LIST and ADVANCED PREPARATIONS:

A computer for every group of 2-3 students

SAFETY:

No foreseen safety issues

SUPPLEMENTARY MATERIALS:

All supplementary materials are online at

<http://www.k12science.org/curriculum/popgrowthproj/activities.html>

or the mirror site

<http://www.k12science2.org/curriculum/popgrowthproj/activities.html>

Engagement (5 min)

What the Teacher Will Do	Eliciting Questions	Student Responses
Will review the concepts of population rate of change and growth rate		

Exploration ()

What the Teacher Will Do	Eliciting Questions	Student Responses
Will instruct Students to complete Activities #6, #7, and #8		Students will work on Activities #6, #7, and #8. Posting a Blog entry for each Activity.
	<p>How do we know when we have a good fit?</p> <p>Which equation do you think will have the best fit? (without looking at r^2)</p> <p>Why wouldn't a Constant growth rate model be a good model for 100's of years?</p> <p>Which is a better model, the continuous change model or the constant growth rate model?</p>	<p>The closer r^2 is to 1 the better the fit.</p> <p>Students should see that population grows exponentially.</p> <p>The growth rate is affected by many factors. In the course of 100 years the birth rate can change drastically.</p> <p>Students will use what they have discovered about the two different models and justify why the continuous change model is a better model.</p>

Elaboration (15-30 min) (can be optional if not enough time)

What the Teacher Will Do	Eliciting Questions	Student Responses
Instruct students to choose one or two activities from the additional activities list.		Will choose one or two of the additional Explorations to research and create a blog entry about.

Explanation/Evaluation (30-45 min for blog and 10 min for presentation per group)

What the Teacher Will Do	Eliciting Questions	Student Responses
<p>Student blog entries can be used to evaluate their work. Especially look for the Linear, Exponential, and 2nd degree polynomial trend lines, the residuals, exponential functions (constant growth rate, and continuous change model).</p>		<p>Students Post a blog entry about each completed activity. Posting any further questions they may have or any opinions they may have about world population change.</p> <p>Students will present their results. Each group has Ten minutes to present their model for population growth? The causes, problems with population growth, and possible solutions. This will be more interesting if groups choose different activities from the additional activities list.</p>