Thinking with Mathematical Models Glossary

Equation model – An equation that describes the relationship between two variables.

Fulcrum – The balance point of a teeter-totter or balance.

Graph Model – A line or curve that represents a mathematical relationship. If plotted data show a trend, a graph model can be drawn to fit the pattern of change in the data.

Inverse Relationship – A nonlinear relationship in which the product of two variables is constant. In an inverse relationship, the values of one variable decrease as the values of the other variable increase.

Linear Relationship – A relationship in which there is a constant rate of change between two variables. Y= mx+b

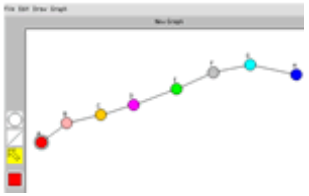
Mathematical Model – A mathematical representation, such as a graph or an equation, of the relationship in a set of data

Relationship – An association between two variables, a table, or with an equation.

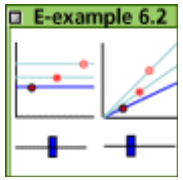
Web Resources

WWW.illuminations.nctm.org

Graph Creator



Learning About Rate of Change In Linear Functions



Everett Public Schools

Connected Mathematics Project

Everett Public Schools Mathematics Program

Thinking with Mathematical Models

Algebra

Unit Goals:

- **Building and analyzing mathematical models**
- **Fitting a line to experimental data**
- **Identifying the variables of interest in a situation**
- **Conducting experiments to gather data about how variables are related.**

Proposed Time Frame:
Approximately 6 weeks

Mathematics in Investigations

Investigation 1 Linear Models

* Collect data, record data in tables, and represent data in coordinate graph
* Fit a linear model to a graph
* Make predictions from data tables and graph models
* Write an equation given the line of a graph
* Review the meaning of slope and y-intercept in relation to a set of data
* Write an equation of a line given the slope and the y-intercept, the slope and the coordinates of a point on the line, or the coordinates of two points on the line

Investigation 2: Nonlinear Models

* Express data in tables and graphs
* Make predictions from tables and graph models
* Distinguish between linear and nonlinear relationships
* Identify inverse relationships and describe their characteristics

Investigation 3: More Nonlinear Models

* Use knowledge about percents and fractions to generate data
* Explore a new type of graph model and compare it to those explored previously
* Use a graph model to make predictions
* Continue to develop the idea of using a graph to model the trend in a data set

Investigation 4: A World of Patterns

* Use intuitive ideas about rates of change to sketch and match graphs to given situations
* Use intuitive ideas about rates of change to crate stories that fit given graphs
* Extend understanding of graph models to include new shapes

Tips for Helping at Home

Good questions and good listening will help children make sense of mathematics and build self-confidence. A good question opens up a problem and supports different ways of thinking about it. Here are some questions you might try, notice that none of them can be answered with a simple "yes" or "no".

Getting Started

* What do you need to find out?
* What do you need to know?
* What terms do you understand or not understand?

While Working

* How can you organize the information?
* Do you see any patterns or relationships that will help solve this?
* What would happen if…?

Reflecting about the Solution

* How do you know your answer is reasonable?
* Has the question been answered?
* Can you explain it another way?

At Home:

1 Talk with your child about what's going on in mathematics class.

2 Look for ways to link mathematical learning to daily activities. Encourage your child to figure out the amounts for halving a recipe, estimating gas mileage, or figuring a restaurant tip.

3 Encourage your child to schedule a regular time for homework and provide a comfortable place for their study, free from distractions.

4 Monitor your child's homework on a regular basis by looking at one problem or asking your child to briefly describe the focus of the homework. When your child asks for help, work with them instead of doing the problem for them.

At School

1 Attend Open House, Back to School Night, and after school events.

2 Join the parent-teacher organization

Connected Mathematics Project

Phone: 425-385-4062
Fax: 425-385-4092
Email: mstine@everett.wednet.edu