POWER BASICS®

Algebra

Teacher's Guide

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Table of Contents

Unit 3: Graphing Linear Equations

This unit introduces students to graphing linear equations on the coordinate plane. Lesson 7 presents graphing points and lines on the coordinate plane. Lesson 8 introduces linear equations and presents two approaches to graphing them on the coordinate plane: the table method and the intercept method. Lesson 9 introduces the students to linear slope, including the formula for finding slope, positive and negative slope, and how to graph a line using slope and one point.

Lesson 7—The Coordinate Plane

Goal: To graph ordered pairs on the coordinate plane

WORDS TO KNOW

axes	the horizontal number line (*x*-axis) and vertical number line (*y*-axis) on a coordinate plane; the singular is "axis."
axis	either of the number lines (horizontal and vertical) used to form a coordinate plane; the plural is "axes."
coordinates	a pair of numbers used to locate a point on a coordinate plane
coordinate plane	a flat surface divided into four parts by a horizontal line (*x*-axis) and a vertical line (*y*-axis) that meet in the center of the plane
horizontal	going from side to side
intersect	to cross at exactly one point
line	a straight path that goes on forever in two different directions
ordered pair	a pair of numbers used to locate a point on a coordinate plane, usually written inside parentheses; the first number tells how far to move horizontally and the second number tells how far to move vertically.
origin	the point at which the *x*-axis and the *y*-axis in the coordinate plane intersect
vertical	going up and down
***x*-axis**	the horizontal number line on a coordinate plane
***x*-coordinate**	the first number in an ordered pair that tells how far to move left or right from the origin
***y*-axis**	the vertical (up-and-down) number line on a coordinate plane
***y*-coordinate**	the second number in an ordered pair that tells how far to move up or down from the origin

Lesson 8—Graphing Linear Equations

Goal: To graph linear equations using the table method and the intercept method

WORDS TO KNOW

intercept method	graphing a linear equation by connecting the two points where the line meets the axes of the coordinate plane
linear equations	equations that have to do with lines

Lesson 9—Slope

Goal: To learn to find the slope of a line and to use a slope to graph lines

WORDS TO KNOW

ratio	the relationship between two numbers showing how they compare to each other
slope	the steepness of the slant of a line

Notes on Application Activity in Student Text

Activity	Skills Applied	Product
Coordinates and Maps	solving problems reading a map	list of coordinates optional activity: map and list of coordinates

Additional Activity Suggestions

- Have learners build a number line in the form of a time line. Ask them to research a historical figure of their choice, or, if they prefer, interview a living person, and plot the major events of that person's life on a time line. The time line should have standard increments with events interspersed. You might have students include world events in order to give their subject's actions some context.

- With a large globe or an atlas handy, give learners the latitude and longitude of several locations and have them identify those locations. For example, ask learners "What city is located at latitude 38° 0' north and longitude 23° 44' east?" The answer is "Athens, Greece." In this activity learners could take turns posing questions to one another.

Differentiation

- Give students practice using coordinates to name points with this game, played in pairs. Each student marks one point in each quadrant of a coordinate grid, labeling the point in quadrant I A, in quadrant II B, in quadrant III C, and in quadrant IV D. Students should write the coordinates for each point below the grid. Holding their grids so that their opponents cannot see them, players take turns using coordinates to name one point in each quadrant. The first player to correctly guess the coordinates of all four of the other player's points wins.
- Ask students (working in small groups or as a whole class) to brainstorm a list of situations in which slope is found. If students have difficulty getting started, suggest roads, hills, ski resorts, and so forth. Have them say whether the slope is positive or negative in relation to sea level. Once the lists are completed, ask students to suggest ways that changing the slope would affect the situation. For example, how would reducing the slope of a ski run affect the difficulty of the run?

Graphic Organizers

Graphic Organizers

Graphic organizers are a versatile teaching and learning tool. They can help students clarify their thinking, integrate new knowledge, reinforce their understanding of a topic, and review material for quizzes and tests. Using graphic organizers, learners can understand content more clearly and can take clear, concise notes. Graphic organizers can also act as a visual aid to make abstract concepts more concrete.

The graphic organizers provided here can be used in many ways. You can use transparencies of the organizers to introduce or review a topic with the entire class. You can photocopy the organizers and allow students to use them as they work through the student text. Here is a brief description of the organizers in this section, and their uses.

Structured Notes

This organizer is one way of organizing notes as students read through the text. Students should write the main topic in the box at the top. In the boxes underneath they can write details about the topic, specific information, examples, and so forth.

Concept and Definition Chart

This chart is used to keep track of new vocabulary and concepts as they are introduced in the text. Students should write the word or concept in the box at the top of the chart. They should then fill in the information in the rest of the boxes.

Steps in a Process Chart

This graphic organizer is used to show information in order. Students will find this organizer particularly useful when taking notes of mathematical processes, showing the steps in order. They should write the process in the box at the top of the chart, then break the process down into steps and write one step in one box, adding or deleting boxes as needed.

Table

This graphic organizer has many uses. Students should label each column, then write relevant information in each cell of the chart.

Steps in a Process Chart