# Algebra 1A , Unit 3 , Analyzing Linear Equations Copied from: Algebra 1, Copied on: 02/21/22 <br> Content Area: Course(s): Time Period: Length: Status: <br> Math <br> Algebra 1 <br> JanFeb <br> 25-30 Days <br> Published 

Title Section

## Department of Curriculum and Instruction



Belleville Public Schools
Curriculum Guide

Algebra 1A

# Unit 3 Analyzing Linear Equations 

Belleville Board of Education

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## Unit Overview

- This unit is about graphing linear equations and writing equations of line.
- The students will identify linear equations, intercepts, and zeros, write and graph equations of line.


## Enduring Understanding

- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and express regularity in repeated reasoning.


## Essential Questions

- What does the slope of a line indicate about the line?
- How do the values of $m$ and $b$ affect the graph $y=m x+b$ ?
- What are different ways of finding the slope of a line?
- What information does the equation of a line give you?
- How can you make predictions based on a scatter plot?
- What are characteristics of real-life situations that can be modeled using linear relationships?
- How can you use a graphing calculator to perform linear regression on a set of a paired numerical data?


## Exit Skills

By the end of Unit 3 Students Should be able to:

- Find rates of change from tables.
- Find the slope of a line
- Find the y-intercept of a line.
- Graph equations in slope-intercept form.
- Write equations in slope-intercept form and standard form.
- Graph linear equations using intercepts.
- Analyze scatter plots and lines of best fit.
- Use a trend line and a line of best fit to make predictions.
- Use regression techniques to describe approximately linear relationships between quantities.
- Use graphical representations and knowledge of context to make judgments about the appropriateness of linear models.
- Model contextual problems by using linear equations.


## New Jersey Student Learning Standards (NJSLS)

| MA.F-BF.A | Build a function that models a relationship between two quantities |
| :--- | :--- |
| MA.F-BF.A. 1 | Write a function that describes a relationship between two quantities. |
| MA.F-IF.A. 2 | Use function notation, evaluate functions for inputs in their domains, and interpret <br> statements that use function notation in terms of a context. |
| MA.F-IF.B.6 | Calculate and interpret the average rate of change of a function (presented symbolically or <br> as a table) over a specified interval. Estimate the rate of change from a graph. |
| MA.F-IF.C | Analyze functions using different representations |
| MA.F-IF.C.7 | Graph functions expressed symbolically and show key features of the graph, by hand in <br> simple cases and using technology for more complicated cases. |
| MA.F-IF.C.7a | Graph polynomial functions, identifying zeros when suitable factorizations are available, <br> MA.F-IF.C.7c |
| MA.F-LE.A | Construct and compare linear and exponential models and solve problems |
| MA.F-LE.A.1 | Distinguish between situations that can be modeled with linear functions and with <br> exponential functions. |
| MA.F-LE.A. 2 | Construct linear and exponential functions, including arithmetic and geometric sequences, |
| given a graph, a description of relationship, or two input-output pairs (include reading |  |
| these from a table). |  |

## Interdisciplinary Connections

9.3.12.FN. 1

LA.L.9-10.1

LA.W.9-10.1

9-12.HS-PS1-4.2.1

9-12.HS-PS1-3.3
9-12.HS-PS2-4.5

Utilize mathematical concepts, skills and problem solving to obtain necessary information for decision making in the finance industry.

Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
Develop a model based on evidence to illustrate the relationships between systems or between components of a system.

Planning and Carrying Out Investigations
Mathematical and computational thinking at the 9-12 level builds on $K-8$ and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

## Learning Objectives

Students will be able to:

- Find and use rates of change to solve problems.
- Differentiate between correlations of a scatter plot by using the lines of best fit.
- Find the slope of a line algebraically and graphically
- Find the y-intercept of a line by using a graph or formula
- Graph equations of a line by using $x / y$ intercepts and slope/intercept.
- Write equations of a line in slope-intercept form and standard form
- Analyze scatter plots and lines of best fit by using correlation and line of regression
- Use a trend line and a line of best fit to make predictions
- Determine whether lines are parallel, perpendicular, or neither by analyzing the slope
- Write equations of parallel and perpendicular lines by finding the slope and they-intercept
- Model and create contextual problems by using linear equations.
- Manipulate with a graphing calculator to perform analysis on a set of paired numerical data.

Action Verbs: Below are examples of action verbs associated with each level of the Revised Bloom's Taxonomy.

| Remember | Understand | Apply | Analyze | Evaluate | Create |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Choose | Classify | Choose | Categorize | Appraise | Combine |
| Describe | Defend | Dramatize | Classify | Judge | Compose |
| Define | Demonstrate | Explain | Compare | Criticize | Construct |
| Label | Distinguish | Generalize | Differentiate | Defend | Design |
| List | Explain | Judge | Distinguish | Compare | Develop |
| Locate | Express | Organize | Identify | Assess | Formulate |


| Match | Extend | Paint | Infer | Conclude | Hypothesize |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Memorize | Give Examples | Prepare | Point out | Contrast | Invent |
| Name | Illustrate | Produce | Select | Critique | Make |
| Omit | Indicate | Select | Subdivide | Determine | Originate |
| Recite | Interrelate | Show | Survey | Grade | Organize |
| Select | Interpret | Sketch | Arrange | Justify | Plan |
| State | Infer | Solve | Breakdown | Measure | Produce |
| Count | Match | Use | Combine | Rank | Role Play |
| Draw | Paraphrase | Add | Detect | Rate | Drive |
| Outline | Represent | Calculate | Diagram | Support | Devise |
| Point | Restate | Change | Discriminate | Test | Generate |
| Quote | Rewrite | Classify | Illustrate |  | Integrate |
| Recall | Select | Complete | Outline |  | Prescribe |
| Recognize | Show | Compute | Point out |  | Propose |
| Repeat | Summarize | Discover | Separate |  | Reconstruct |
| Reproduce | Tell | Divide |  |  | Revise |
|  | Translate | Examine |  |  | Rewrite |
|  | Associate | Graph |  |  | Transform |
|  | Compute | Interpolate |  |  |  |
|  | Convert | Manipulate |  |  |  |
|  | Discuss | Modify |  |  |  |
|  | Estimate | Operate |  |  |  |
|  | Extrapolate | Subtract |  |  |  |
|  | Generalize <br> Predict |  |  |  |  |



## Suggested Activities \& Best Practices

Explore Steepness:
https://teacher.desmos.com/activitybuilder/custom/56b8d8ec6fb01b1648653477

Slope Intercept Game:
https://www.scribd.com/presentation/110006988/Slope-Intercept-Gameboard

Equations of lines/slope int form:
https://teacher.desmos.com/activitybuilder/custom/582b81f4bf3030840aacf265

Linear Models
https://teacher.desmos.com/activitybuilder/custom/563a59893f80f2fd0b7c77f0

Graph real-world problems:
http://www.graphingstories.com/

Slope:
https://www.youtube.com/watch?v=u3spOO-m_Gg

Rate of Change:
$\underline{\text { http://algebrasfriend.blogspot.com/2012/10/slope-as-rate-of-change.html }}$

Meaning of slope and y intercept
$\underline{\text { http://untilnextstop.blogspot.com/2010/10/activities-to-help-kids-understand.html }}$

## Scatterplot:

https://www.mathsisfun.com/data/scatter-xy-plots.html

Textbook, eAssessment, supplemental materials:
https://my.mheducation.com/login

AI Assessment and Learning System:
https://www.aleks.com/

Algebra Tools - Functions:
https://www.state.nj.us/education/aps/cccs/math/NJISTFunctions.pdf

Algebra Tools - Algebra:
https://www.state.nj.us/education/aps/cces/math/NJISTAlgebra.pdf

Misc Mathematics materials:
http://www.mathnstuff.com/

Graph Paper:
https://www.mathworksheets4kids.com/grid/30by30-all-noscale1.pdf
http://www.printfreegraphpaper.com/

## Assessment Evidence - Checking for Understanding (CFU)

McGraw Hill : EAssessment test generator (Summative)
Edulastic Formative assessments (Formative)
Kahoot: Slope Intercept Form: https://create.kahoot.it/details/bb9d0a93-8033-4262-bf34-aae8d0eca35e (Formative)
Benchmark 2 (Benchmark)
"Do Now/Exit Ticket" Activity (Formative)

- Admit Tickets
- Anticipation Guide
- Common Benchmarks
- Compare \& Contrast
- Create a Multimedia Poster
- DBQ's
- Define
- Describe
- Evaluate
- Evaluation rubrics
- Exit Tickets
- Explaining
- Fist- to-Five or Thumb-Ometer
- Illustration
- Journals
- KWL Chart
- Learning Center Activities
- Multimedia Reports
- Newspaper Headline
- Outline
- Question Stems
- Quickwrite
- Quizzes
- Red Light, Green Light
- Self- assessments
- Socratic Seminar
- Study Guide
- Surveys
- Teacher Observation Checklist
- Think, Pair, Share
- Think, Write, Pair, Share
- Top 10 List
- Unit review/Test prep
- Unit tests
- Web-Based Assessments
- Written Reports


## Ancillary Resources

## ALEKS

The Glencoe Personal Tutor Plus
The Glencoe Personal Tutor Plus(Spanish)

## Technology Infusion

Create and assign exit tickets using Edulastic
\{ https://app.edulastic.com/\#renderResource/close/Mjk0MjE2ODUwOA\%3D\%3D \} or Goolgle forms

Use graphing calculator to model problems

Technology that may be infused into this unit to enhance learning

- Youtube
- Khan academy
- Google Classroom
- GSuite
- Kutasoftware
- PodCasts
- Twitter
- Ted Talks
- ALEKS
- Calculator/Graphing calculator
- Flipgrid
- Peardeck
- Edulastic
- McGraw-Hill Education
- Desmos.com
- Geogebra.org

Win 8.1 Apps/Tools Pedagogy Wheel
Podcasts


## Alignment to 21st Century Skills \& Technology

Develop mathematical thinking using real world problems in the Glencoe Interactive Student Guide Workbook https://catalog.mcgraw-hill.com/repository/private_data/DOC/50001167/94/30.pdf

Mastery and infusion of 21st Century Skills \& Technology and their Alignment to the core content areas is essential to student learning. The core content areas include:

- English Language Arts;
- Mathematics;
- Science and Scientific Inquiry (Next Generation);
- Social Studies, including American History, World History, Geography, Government and Civics, and Economics;
- World languages;
- Technology;
- Visual and Performing Arts

| CRP.K-12.CRP2 | Apply appropriate academic and technical skills. |
| :--- | :--- |
| CRP.K-12.CRP4 | Communicate clearly and effectively and with reason. |
| CRP.K-12.CRP7 | Employ valid and reliable research strategies. |
| CRP.K-12.CRP8 | Utilize critical thinking to make sense of problems and persevere in solving them. |
| CRP.K-12.CRP11 | Use technology to enhance productivity. |
| CAEP.9.2.12.C.2 | Modify Personalized Student Learning Plans to support declared career goals. |
| TECH.8.1.12.A.3 | Collaborate in online courses, learning communities, social networks or virtual worlds to <br> discuss a resolution to a problem or issue. |
| TECH.8.1.12.C.CS2 | Communicate information and ideas to multiple audiences using a variety of media and <br> formats. |
| TECH.8.1.12.F.CS1 | Identify and define authentic problems and significant questions for investigation. |

## 21st Century Skills/Interdisciplinary Themes

- English Language Arts;
- Mathematics;
- Science and Scientific Inquiry (Next Generation);
- Social Studies/Economics;
- Technology
- Communication and Collaboration
- Creativity and Innovation
- Critical thinking and Problem Solving
- ICT (Information, Communications and Technology) Literacy
- Information Literacy
- Life and Career Skills
- Media Literacy


## 21st Century Skills

- Civic Literacy
- Environmental Literacy
- Financial, Economic, Business and Entrepreneurial Literacy
- Global Awareness
- Health Literacy


## Differentiation

Glencoe -McGrawHill Resources:

# Teaching with Manipulatives: Algebra Tiles, Algebra Labs 

Math Triumphs

Algebra 1 Study Notebook

TI-84 Calculator Activities

Differentiations:

- Small group instruction
- Small group assignments
- Extra time to complete assignments
- Pairing oral instruction with visuals
- Repeat directions
- Use manipulatives
- Center-based instruction
- Token economy
- Study guides
- Teacher reads assessments allowed
- Scheduled breaks
- Rephrase written directions
- Multisensory approaches
- Additional time
- Preview vocabulary
- Preview content \& concepts
- Story guides
- Behavior management plan
- Highlight text
- Student(s) work with assigned partner
- Visual presentation
- Assistive technology
- Auditory presentations
- Large print edition
- Dictation to scribe
- Small group setting


## Hi-Prep Differentiations:

- Alternative formative and summative assessments
- Choice boards
- Games and tournaments
- Group investigations
- Guided Reading
- Independent research and projects
- Interest groups
- Learning contracts
- Leveled rubrics
- Literature circles
- Multiple intelligence options
- Multiple texts
- Personal agendas
- Project-based learning
- Problem-based learning
- Stations/centers
- Think-Tac-Toes
- Tiered activities/assignments
- Tiered products
- Varying organizers for instructions

Lo-Prep Differentiations

- Choice of books or activities
- Cubing activities
- Exploration by interest
- Flexible grouping
- Goal setting with students
- Jigsaw
- Mini workshops to re-teach or extend skills
- Open-ended activities
- Think-Pair-Share
- Reading buddies
- Varied journal prompts
- Varied supplemental materials


## Special Education Learning (IEP's \& 504's)

Graphing calculator(TI-84)
The Glencoe Personal Tutor
Glencoe -McGrawHill Resources:

Teaching with Manipulatives: Algebra Tiles, Algebra Labs
Math Triumphs

Algebra 1 Study Notebook

- printed copy of board work/notes provided
- additional time for skill mastery
- assistive technology
- behavior management plan
- Center-Based Instruction
- check work frequently for understanding
- computer or electronic device utilizes
- extended time on tests/ quizzes
- have student repeat directions to check for understanding
- highlighted text visual presentation
- modified assignment format
- modified test content
- modified test format
- modified test length
- multiple test sessions
- multi-sensory presentation
- preferential seating
- preview of content, concepts, and vocabulary
- Provide modifications as dictated in the student's IEP/504 plan
- reduced/shortened reading assignments
- Reduced/shortened written assignments
- secure attention before giving instruction/directions
- shortened assignments
- student working with an assigned partner
- teacher initiated weekly assignment sheet
- Use open book, study guides, test prototypes


## English Language Learning (ELL)

The Glencoe Personal Tutor(Spanish)

Teaching Algebra with Manipulatives

- teaching key aspects of a topic. Eliminate nonessential information
- using videos, illustrations, pictures, and drawings to explain or clarif
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning;
- allowing students to correct errors (looking for understanding)
- allowing the use of note cards or open-book during testing
- decreasing the amount of workpresented or required
- having peers take notes or providing a copy of the teacher's notes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using computer word processing spell check and grammar check features
- using true/false, matching, or fill in the blank tests in lieu of essay tests


## At Risk

Graphing calculator(TI-84)

## The Glencoe Personal Tutor

## Glencoe -McGrawHill Resour

## Teaching Algebra with Manipulatives

## Math Triumphs

## Algebra 1 Study Notebook

- allowing students to correct errors (looking for understanding)
- teaching key aspects of a topic. Eliminate nonessential information
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning
- allowing students to select from given choices
- allowing the use of note cards or open-book during testing
- collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test.
- decreasing the amount of workpresented or required
- having peers take notes or providing a copy of the teacher's notes
- marking students' correct and acceptable work, not the mistakes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using authentic assessments with real-life problem-solving
- using true/false, matching, or fill in the blank tests in lieu of essay tests
- using videos, illustrations, pictures, and drawings to explain or clarify


## Talented and Gifted Learning (T\&G)

## Glencoe Enrichment Activities

## Glencoe Chapter Projects

Math Forum: Problems of the Week, Sample Lesson( Min,Max), Resoning and Making Sense Task Library

- Above grade level placement option for qualified students
- Advanced problem-solving
- Allow students to work at a faster pace
- Cluster grouping
- Complete activities aligned with above grade level text using Benchmark results
- Create a blog or social media page about their unit
- Create a plan to solve an issue presented in the class or in a text
- Debate issues with research to support arguments
- Flexible skill grouping within a class or across grade level for rigor
- Higher order, critical \& creative thinking skills, and discovery
- Multi-disciplinary unit and/or project
- Teacher-selected instructional strategies that are focused to provide challenge, engagement, and growth opportunities
- Utilize exploratory connections to higher-grade concepts
- Utilize project-based learning for greater depth of knowledge


## Sample Lesson

Using the template below, please develop a Sample Lesson for the first unit only.

Unit Name:

NJSLS:
Interdisciplinary Connection:
Statement of Objective:
Anticipatory Set/Do Now:

Learning Activity:
Student Assessment/CFU's:

Materials:
21st Century Themes and Skills:
Differentiation/Modifications:
Integration of Technology:

