Unit 3 Analyzing Linear Equations

Content Area: **Math**
Course(s): **Algebra 1H**
Time Period:
Length: **27 days**
Status: **Published**

Algebra 1 Honors

Department of Curriculum and Instruction

Belleville Public Schools

Curriculum Guide

Algebra 1 H, Grade 8

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=mx+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.
- Explore a more formal means of assessing how a model fits data.
- 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. With linear models, they look at residuals to analyze the goodness of fit.

- Determine whether lines are parallel, perpendicular, or neither.
- Write equations of parallel and perpendicular lines.
- Model contextual problems by using linear equations.

New Jersey Student Learning Standards (NJSLS)

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.F-IF.A.2	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.S-ID.B.6a	Fit a function to the data (including with the use of technology); use functions fitted to data to solve problems in the context of the data.
MA.K-12.6	Attend to precision.
MA.F-IF.B.6	Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.
MA.K-12.7	Look for and make use of structure.
MA.S-ID.B.6c	Fit a linear function for a scatter plot that suggests a linear association.
MA.F-IF.C.7a	Graph linear and quadratic functions and show intercepts, maxima, and minima.
MA.F-BF.A.1	Write a function that describes a relationship between two quantities.
MA.F-LE.A.1a	Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.
MA.F-LE.A.2	Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

Interdisciplinary Connections

Economics, Business, Financing, Literacy, Science

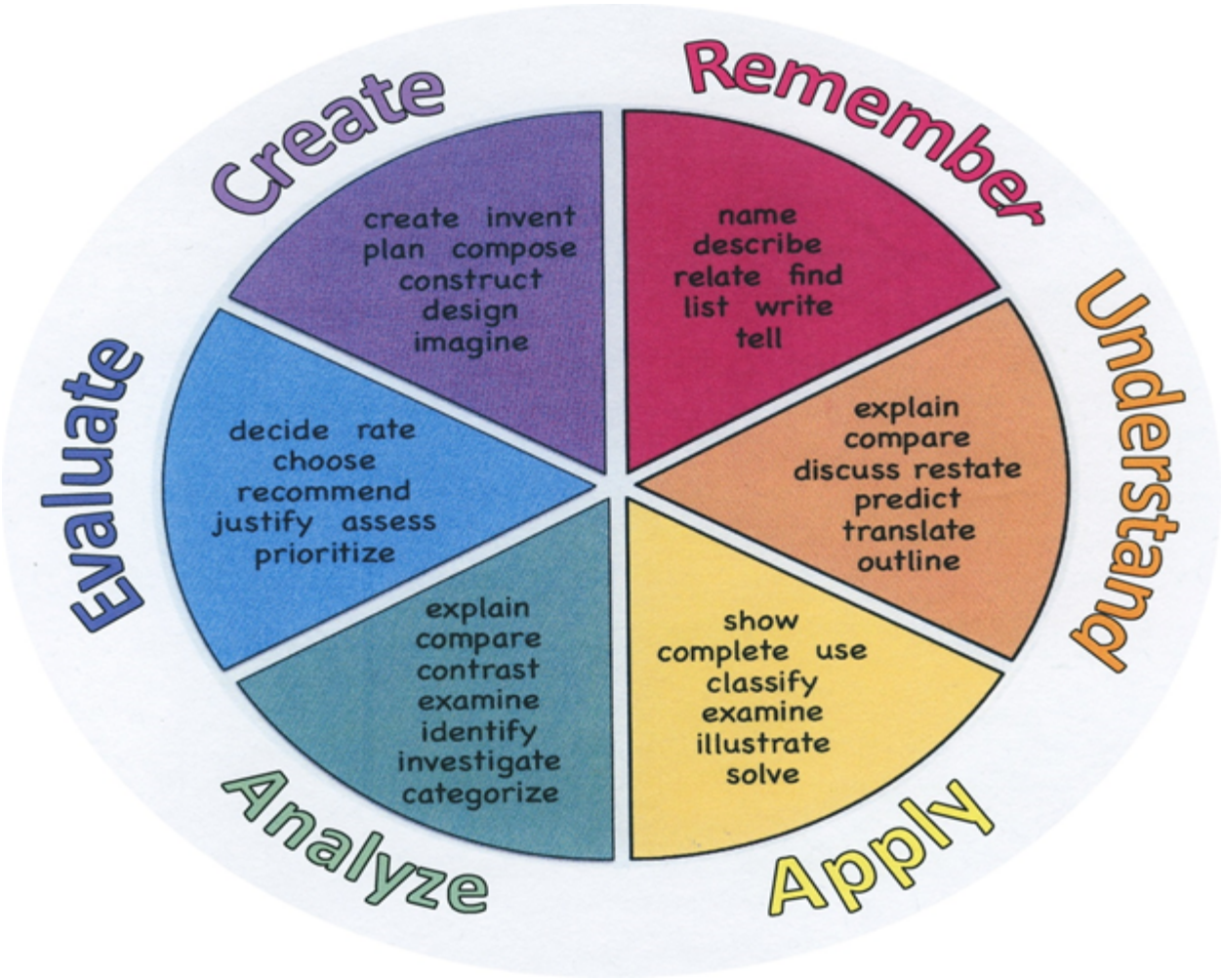
LA.SL.8.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.
LA.SL.8.1.B	Follow rules for collegial discussions and decision-making, track progress toward specific goals and deadlines, and define individual roles as needed.
LA.SL.8.1.C	Pose questions that connect the ideas of several speakers and respond to others' questions and comments with relevant evidence, observations, and ideas.
LA.SL.8.1.D	Acknowledge new information expressed by others, and, when warranted, qualify or justify their own views in light of the evidence presented.

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.

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				
	Predict				



Suggested Activities & Best Practices

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/cccs/math/NJISTAlgebra.pdf

Misc Mathematics materials:

http://www.mathnstuff.com/

Graphing Calculator, Math Resources

https://mathbits.com/

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:

http://algebrasfriend.blogspot.com/2012/10/slope-as-rate-of-change.html

Meaning of slope and y intercept

http://untilnextstop.blogspot.com/2010/10/activities-to-help-kids-understand.html

Parallel and perpendicular lines

https://teacher.desmos.com/activitybuilder/custom/5664e067eb08d9501576caa0

Graph Paper:

https://www.mathworksheets4kids.com/grid/30by30-all-noscale1.pdf

http://www.printfreegraphpaper.com/

Related Documents:

Choice.board.slope.docx

0x

Curricular.Framework.Algebra1.docx

Ref's

Document

0x

Choice.board.slope.docx

0x

Curricular.Framework.Algebra1.docx

Assessment Evidence - Checking for Understanding (CFU)

- kahoot Slope Intercept Form https://create.kahoot.it/details/bb9d0a93-8033-4262-bf34-aae8d0eca35e (formative assessment)
- Benchmark #2 (summative assessment)
- Entrance/exit tickets (formative assessment)
- Weekly quizzes (summative assessment)
- Group project (alternative assessment)

- Admit Tickets
- Common Benchmarks
- Compare & Contrast
- Define
- Describe
- Evaluate
- Evaluation rubrics
- Exit Tickets
- Explaining
- Fist- to-Five or Thumb-Ometer
- Illustration
- Journals
- KWL Chart
- Learning Center Activities
- Quizzes
- Red Light, Green Light
- Study Guide
- Teacher Observation Checklist
- Think, Pair, Share
- Unit review/Test prep
- Unit tests

Primary Resources & Materials

Glencoe McGraw-Hill Algebra1 2014

Glencoe McGraw-Hill Algebra1 2010

Practice Glencoe Algebra1

Study Guide Glencoe Algebra1

Ancillary Resources

Glencoe Algebra 1 Tutor: Personal Tutor and Spanish Tutor

Glencore Algebra 1 Geometer's Sketchpad

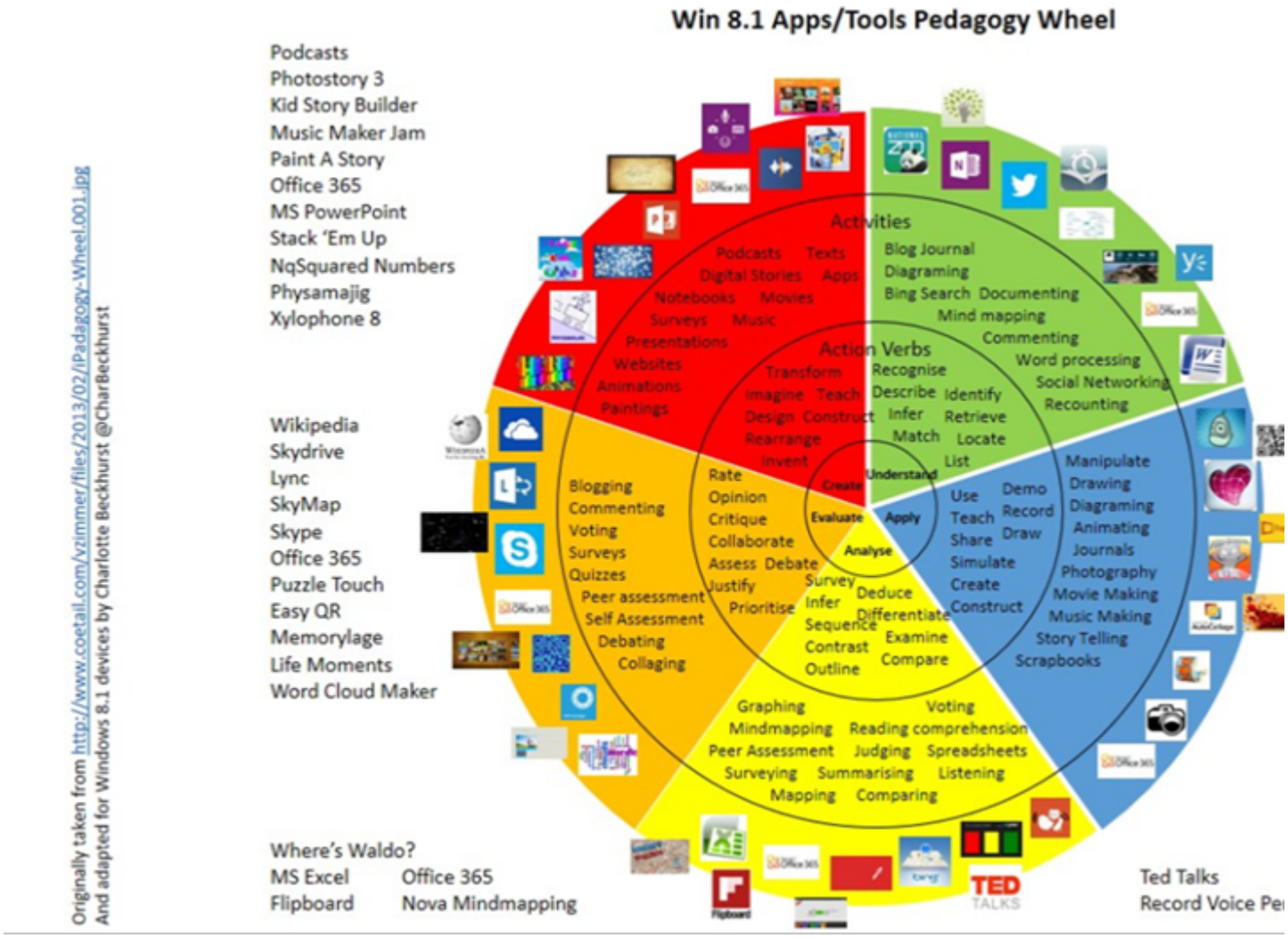
Glencoe Algebra 1 Glencoe Mathematics Secondary Series

ALEKS

Technology Infusion

- Betterlesson.com Scatterplots and Patterns https://betterlesson.com/lesson/594109/fast-hands?from=cc
- lessonYoutube
- n academy
- Edulastic
- Google Sheets
- Google Classroom
- Office 365
- Google Docs
- PodCasts
- Google Slides
- Wikipedia
- Skype
- Twitter
- Ted Talks
- QR Barcode Generator

- Calculator/Graphing calculate



Alignment to 21st Century Skills & Technology

- English Language Arts;
- Science and Scientific Inquiry (Next Generation);
- Economics;
- Technology;

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.9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.
TECH.8.1.12.A.3	Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.
TECH.8.1.12.B	Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
TECH.8.2.12.D.CS2	Use and maintain technological products and systems.

21st Century Skills/Interdisciplinary Themes

- Communication and Collaboration
- Creativity and Innovation
- Critical thinking and Problem Solving
- ICT (Information, Communications and Technology) Literacy

21st Century Skills

- Civic Literacy
- Environmental Literacy
- Financial, Economic, Business and Entrepreneurial Literacy

Differentiation

Use of Larger version of coordinate plane
Color coding Equations based on their slope
Use of piece of spaghetti to show the line of best fit and determine the correlation

- Small group instruction
- Small group assignments
- Extra time to complete assignments
- Pairing oral instruction with visuals
- Repeat directions
- Use manipulatives
- Study guides
- Scheduled breaks
- Rephrase written directions
- Multisensory approaches
- Additional time
- Preview vocabulary

- Preview content & concepts
- Highlight text
- Student(s) work with assigned partner
- Visual presentation
- Assistive technology
- Auditory presentations
- Large print edition
- Small group setting

- Alternative formative and summative assessments

- Choice boards
- Group investigations
- Independent research and projects
- Leveled rubrics
- Project-based learning
- Problem-based learning
- Stations/centers
- Think-Tac-Toes
- Tiered activities/assignments
- Tiered products
- Varying organizers for instruction

- Flexible grouping

- Open-ended activities
- Think-Pair-Share
- Varied supplemental materials

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

- Use of Larger version of coordinate plane
- Color coding Equations based on their slope
- Use of piece of spaghetti to show the line of best fit and determine the correlation

- printed copy of board work/notes provided
- additional time for skill mastery

- assistive technology
- 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
- preferential seating
- preview of content, concepts, and vocabulary
- Provide modifications as dictated in the student's IEP/504 plan
- Reduced/shortened written assignments
- secure attention before giving instruction/directions
- shortened assignments
- student working with an assigned partner
- Use open book, study guides, test prototypes

English Language Learning (ELL)

- Use of Larger version of coordinate plane
- Color coding Equations based on their slope
- Use of piece of spaghetti to show the line of best fit and determine the correlation

- 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 the number of answer choices on a multiple choice test

- tutoring by peers

At Risk

- Use of Larger version of coordinate plane
- Color coding Equations based on their slope
- Use of piece of spaghetti to show the line of best fit and determine the correlation

- allowing students to correct errors (looking for understanding)
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning
- 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 the number of answer choices on a multiple choice test
- tutoring by peers
- using authentic assessments with real-life problem-solving
- using videos, illustrations, pictures, and drawings to explain or clarify

Talented and Gifted Learning (T&G)

- Investigating Slope-Intercept Form graphing technology lab(McGraw Hill Algebra 1 textbook page 215)

- Advanced problem-solving
- Allow students to work at a faster pace
- Complete activities aligned with above grade level text using Benchmark results
- Create a blog or social media page about their unit
- 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: