Unit 2 Linear Inequalities

Content Area: **Math**
Course(s): **Algebra 1**
Time Period:
Length: **21 days**
Status: **Published**

Algebra 1

Department of Curriculum and Instruction

Belleville Public Schools

Curriculum Guide

Algebra 1, Grade 8

Unit 2: Linear Inequalities

Belleville Board of Education

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Board Approved:September 23, 2019

Unit Overview

- This unit is about solving and graphing inequalities and compound inequalities.
- The students should learn how to solve inequalities using different methods, graph their solution sets on number line, identify and solve compound inequalities.

Enduring Understanding

- Create inequalities to use to solve problems
- Create inequalities to apply to real-life situations
- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Model with mathematics.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Essential Questions

- How do you represent relationships between quantities that are not equal?
- How do you justify the solution to a linear inequality?
- Can inequalities that appear to be different be equivalent?
- How can you solve inequalities?
- How to distinguish between to types of inequalities: unions and intersection?
- What are real-life applications of inequalities?

Exit Skills

By the end of Unit 2 Students Should be able to:

- Write, graph, and identify solutions of inequalities.
- Solve inequalities using addition or subtraction.
- Solve inequalities using multiplication or division.
- Solve multi-step inequalities involving the distributive property.
- To solve inequalities with coefficients represented by letters.
- Graph linear inequalities on the coordinate plane.
- Identify compound statements connected by the word and/or.
- Solve compound inequalities containing the word and/or and graph their solution set.
- Model real world problems using inequalities.

New Jersey Student Learning Standards (NJSLS)

MA.K-12.1 Make sense of problems and persevere in solving them.

MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.6	Attend to precision.
MA.A-CED.A.1	Create equations and inequalities in one variable and use them to solve problems.
MA.A-REI.B.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

Interdisciplinary Connections

Ecomomics, business, financing, geometry, literacy, science.

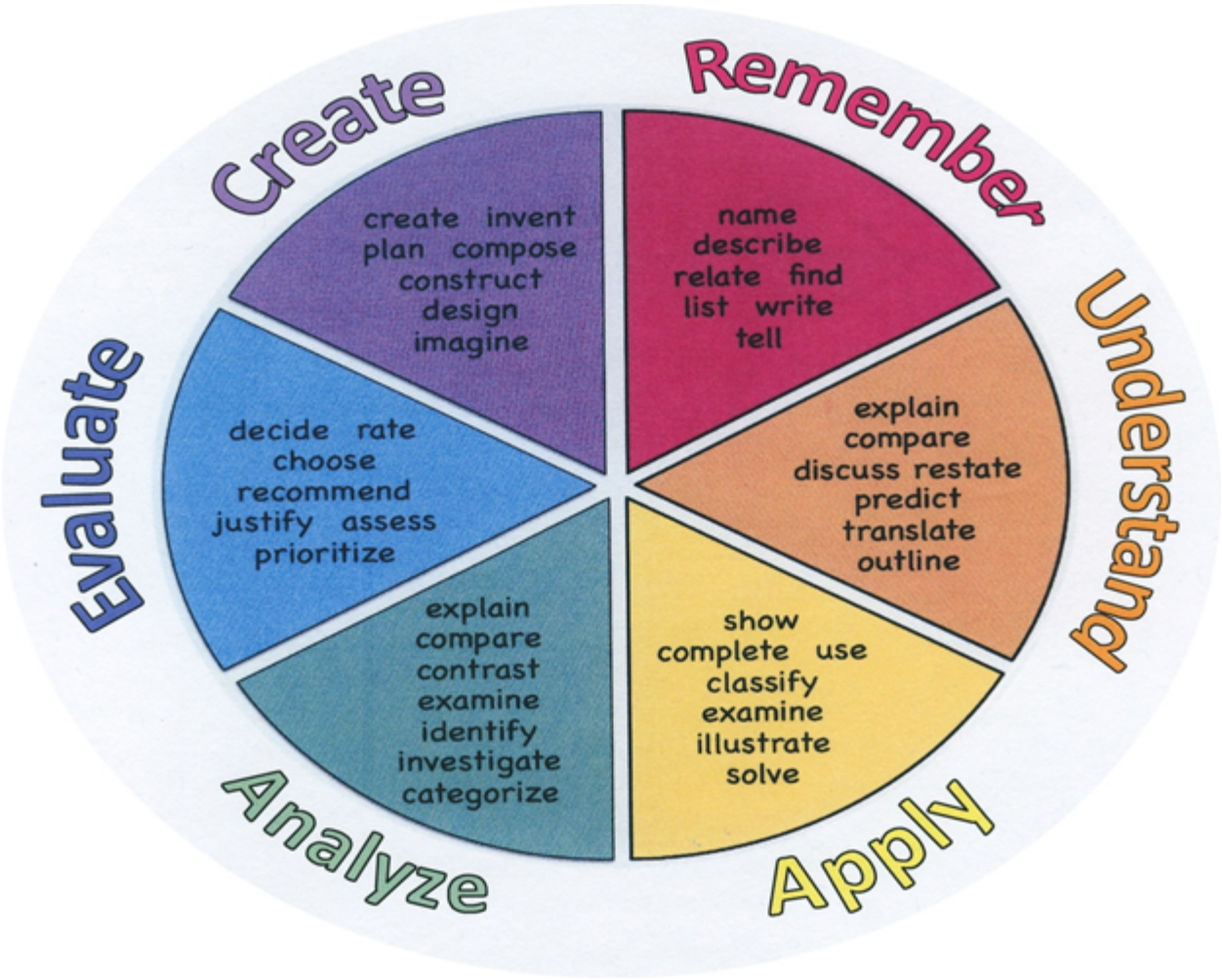
LA.SL.8.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.
LA.SL.8.1.B	Follow rules for collegial discussions and decision-making, 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:

- Represent relationship algebraically and evaluate them using properties.
- Interpret real-word examples into linear inequalities .
- Solve one-step inequalities in one variable using different operations.
- Solve multi-step inequalities and justify each step using properties.
- Solve inequalities with the variables on both sides by using like terms and the distributive property.
- Identify inequalities that are unions and intersections by analyzing the signs of inequalities.
- Graph solution sets on the number line using number theory .
- Solve inequalities by graphing.
- Investigate the graphs of inequalities by using a graphing calculator.
- Analyze the difference between the words phrases "at least" and " the most" and be able to use their symbols in inequalities.
- Model real-world situations using inequalities.
- Investigate and extend classroom activities into self research and long term projects.

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

Videos on Solving Inequalities:

https://mathtv.com/topic/algebra/35

Quizlet:

https://quizlet.com/ca/371889397/solving-equations-flash-cards/

https://quizlet.com/388264433/inequalities-flash-cards/

https://quizlet.com/307164262/flashcards

Solving Linear Inequalities:

https://whenmathhappens.com/2013/11/22/solveineqintro-50min/

https://betterlesson.com/browse/common_core/standard/604/ccss-math-content-hsa-rei-b-3-solve-linear-equations-and-inequalities-in-one-variable-including-equations-with-coefficients-repr?from=standard_level1

Equations and Inequalities , Basketball problem:

https://www.illustrativemathematics.org/content-standards/HSA/CED/A/1/tasks/702

Find Errors in Solutions to Inequalities

https://www.illustrativemathematics.org/content-standards/HSA/REI/A/1/tasks/807

Explore Linear Inequalities:

https://teacher.desmos.com/activitybuilder/custom/57d9fdc6ebf48f73093807b2

Graphing Inequatlies

http://mathbitsnotebook.com/Algebra1/Inequalities/IQgraphinglinear2.html

Simple and Compound Inequalities:

https://teacher.desmos.com/activitybuilder/custom/57ed6233b22885ee08944fce

Textbook, eAssessment, supplemental materials:

https://my.mheducation.com/login

AI Assessment and Learning System:

https://www.aleks.com/

Mindset:

https://www.youtube.com/watch?v=3icoSeGqQtY

http://www.youcubed.org/wp-content/uploads/Positive-Classroom-Norms2.pdf

Teaching Strategies for Improving Algebra Knowledge in Middle and High School Students:

https://ies.ed.gov/ncee/wwc/PracticeGuide/20

Coaching Corner:

https://sites.google.com/belleville.k12.nj.us/thecoachingcorner/home

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/

Algebra Kahoots:

https://kahoot.com/explore/collections/math-kahoot-algebra/

Assessment Evidence - Checking for Understanding (CFU)

- Exit Ticket Solve and Graph the following inequality -12x - 7 + 6x > 5 (formative assessment)
- Benchmark #1 (summative assessment)
- Class discussions and working in pairs (formative assessment =)
- Entrance tickets (formative assessment)
- Teaching a peer/whole class (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
- Question Stems
- Quizzes
- Self- assessments
- Study Guide
- Teacher Observation Checklist
- Think, Pair, Share
- Think, Write, Pair, Share
- Unit review/Test prep
- Unit tests
- Web-Based Assessments

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

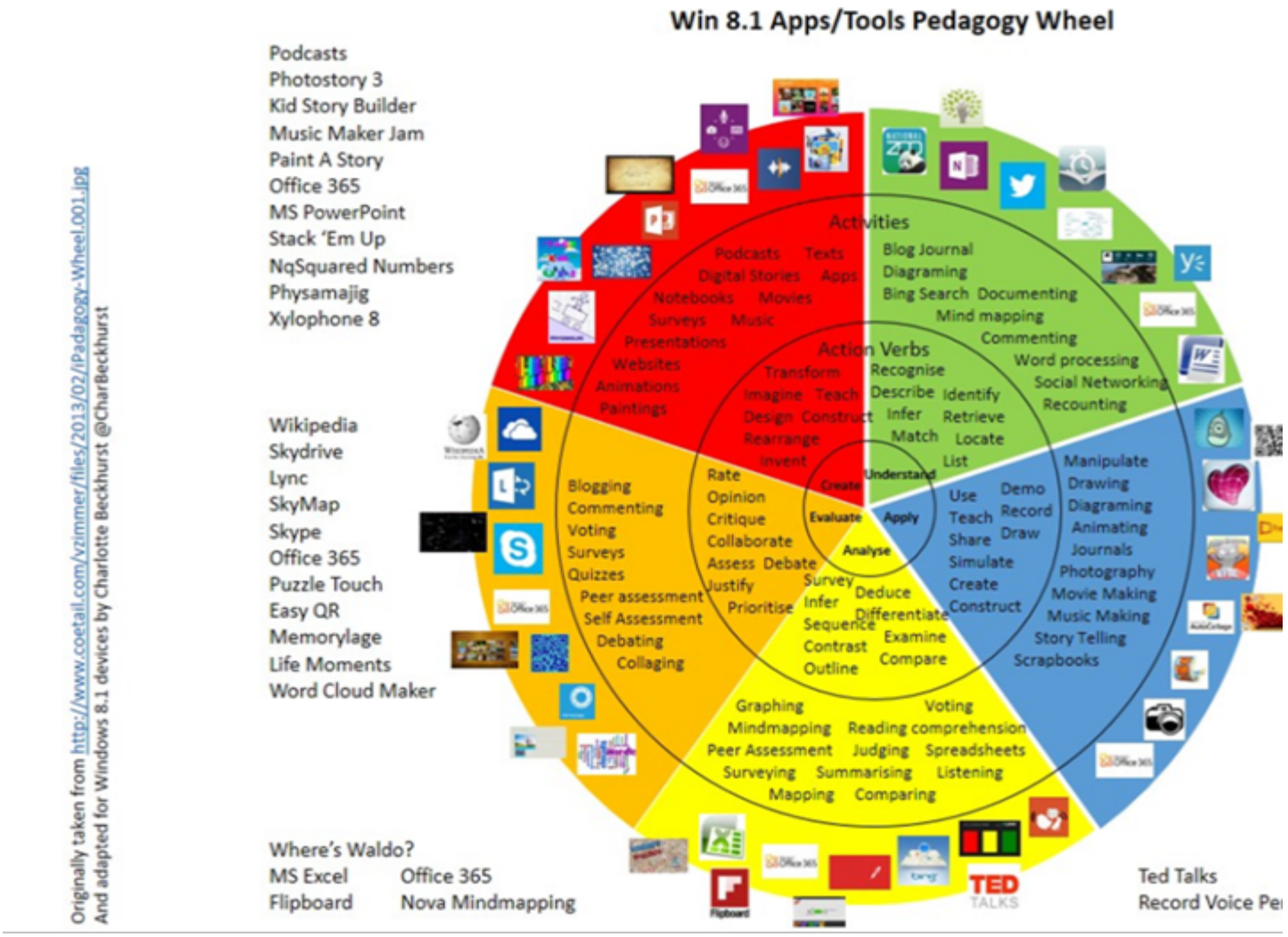
Glencore Algebra 1 Geometer's Sketchpad

Glencoe Algebra 1 Glencoe Mathematics Secondary Series

ALEKS

Technology Infusion

- You tube Solving and graphing inequalities https://www.youtube.com/watch?v=EE2qWIyjKD0
- Youtube
- Khan academy
- Edulastic
- Google Classroom
- Google Docs
- Office 365
- Google Slides
- PodCasts
- Google Sheets
- Wikipedia
- Skype
- Twitter
- Ted Talks
- QR Barcode Generator
- Calculator/Graphing calculator
- Desmos.com
- Geogebra.org



Alignment to 21st Century Skills & Technology

- English, reading or language arts
- Economics
- Science

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.2	Develop a Personalized Student Learning Plan with the assistance of an adult mentor that includes information about career areas of interest, goals and an educational plan.
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.F.1	Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.

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

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

Differentiation

- Use of Algebra tiles to model solving inequalites(Mcgraw Hill Algebra 1 Textbook page 299)
- Compare compound inequalities to real life compound statements(Mcgraw Hill Algebra 1 Textbook page 305)
- Peer Partner
- One-on-One Instruction as needed
- Cooperative groups
- Instruction given orally and written
- Break material down into smaller parts
- Assignments Shortened
- Study guide
- Tests/quizzes reviews
- Algebra tiles
- Equation Mats
- Graphic Organizer
- Calculator/graphing calculator
- Anchor Charts display
- Extra time

- Assistive Technology
- repeat directions as needed
- Rephrase written directions

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

Graphing calculator(Ti-84)

The Glencoe-McGrawHill Personal Tutor

Glencoe -McGrawHill Resources:

Teaching Algebra with Manipulatives:https://catalog.mcgraw-hill.com/repository/private_data/DOC/50000008/74/21.pdf

Algebra Lab

Math Triumphs

Algebra 1 Study Notebook

- printed copy of board work/notes provided
- additional time for skill mastery
- assistive technology
- 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
- 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
- Use open book, study guides, test prototypes

English Language Learning (ELL)

The Glencoe Personal Tutor(Spanish):

Solve and graph an Intersection

Solve and graph a Union

Teaching Algebra with Manipulatives

- 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
- 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

Graphing calculator(TI-84)

Graphing Inequalities p.323 textbook

Glencoe -McGrawHill Resources:

Teaching Algebra with Manipulatives, McGrawHill Resource - (digital version accessible)

- Compound inequalities
- Reading Compound sentences

Math Triumphs

Algebra 1 Study Notebook

- 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
- 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
- using authentic assessments with real-life problem-solving
- using videos, illustrations, pictures, and drawings to explain or clarify

Talented and Gifted Learning (T&G)

- Use of graphing calculator to investigate the graphs of inequalites (Mcgraw Hill Algebra 1 textbook) page 323 Graphing Technology Lab-Graphing Inequalities

- Above grade level placement option for qualified students
- Advanced problem-solving
- Allow students to work at a faster pace
- Complete activities aligned with above grade level text using Benchmark results
- 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