Unit 6: Measurement, Data, and Geometry - Part 2

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Unit 6: Measurement, Data, and Geometry - Part 2

Department of Curriculum and Instruction

Belleville Public Schools

Curriculum Guide

Mathematics: Grade 4

Unit 6: Measurement, Data, and Geometry - Part 2

Belleville Board of Education

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Unit Overview

Unit 6 will cover four topics including (T11-3) Use Line Plots to Solve Problems, (T11-4) Critique Reasoning, (T13-4) Equivalence with Metric Units of Length, (T13-5) Equivalence with Metric Units of Capacity and Mass, (T13-6) Solve Perimeter and Area Problems, (T15-4) Measure and Draw Angles, (T15-5) Add and Subtract Angle Measures, (T15-6) Use Appropriate Tools, (T16-4) Line Symmetry (T16-5) Draw Shapes with Line Symmetry, and (T16-6) Critique Reasoning.

Enduring Understandings

Topic 11 focuses on:

- A line plot organizes data on a number line and is useful for showing how data are distributed.
- Data from line plots can be used to solve problems.
- Good math thinkers use math to explain why they are right. They can talk about the math that others do, too.

Topic 13 focuses on:

- To convert from a larger unit of length to a smaller unit of length, multiply the number of larger units by the conversion factor, that is, the number of smaller units in each larger unit.
- To convert from a larger unit of capacity to a smaller unit of capacity, multiply the number of larger units by the conversion factor, that is, the number of smaller units in each larger unit.
- To convert from a larger unit of weight to a smaller unit of weight, multiply the number of larger units by the conversion factor, that is, the number of smaller units in each larger unit.
- To convert from a larger unit of capacity or mass to a smaller unit, multiply the number of larger units by the conversion factor, that is, the number of smaller units in each larger unit.
- Same problems can be solved by applying the formula for the perimeter of a rectangle or the formula

for the are of a rectangle.
- Good math thinkers are careful about what they write and say, so their ideas about math are clear.

Topic 15 focuses on:

- Line segments and rays are sets of points that describe parts of line and angles. Angles are classified by their measure.
- The measure of an angle depends upon the fraction of a circle that the angle turns through.
- The unit for measuring angles is 1", the unit angle.
- The unit for measuring angles is 1', the unit angle. A protractor can be used to measure angles.
- Angle measures can be added and subtracted.
- Good math thinkers know how to pick the right tools to solve math problems.

Topic 16 focuses on:

- Lines can be classified as parallel, intersecting, or perpendicular.
- Triangles are classified by their sides and by their angles.
- Quadrilaterals are classified by their sides and by their angles.
- A shape that can fold along a line into matching parts is line symmetric.
- Good math thinkers use math to explain why they are right. They can talk about the math that others do, too.

Essential Questions

(T11): Represent and Interpret Data on Line Plots

- How can you read data on a line plot?
- How can you make a line plot?

(T13): Measurement: Find Equivalence

- How can you convert from one unit to another?
- How can you be precise when solving math problems?

(T15): Geometric Measurement

- What are some common geometric terms?
- How can you measure angles?

(T16): Lines, Angles, and Shapes

- How can you classify triangles and quadrilaterals?
- What is line symmetry?

Exit Skills

Topics 11, 13, 15, 16 Cluster:

- Represent and interpret data
- Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit
- Geometric measurement: Understand concepts of angles and measure angles
- Draw and identify lines and angles, and classify shapes by properties of their lines and angles

New Jersey Student Learning Standards (NJSLS)

The Math Practices, as put forth by the National Council of Teachers of Mathematics (NCTM), are connected within all lessons:

MP.1 - Make sense of problems and persevere in solving them.

MP.2 - Reason abstractly and quantitatively.

MP.3 - Construct viable arguments and critique the reasoning of others.

MP.4 - Model with mathematics.

MP.5 - Use appropriate tools strategically.

MP.6 - Attend to precision.

MP.7 - Look for and make use of structure.

MP.8 - Look for and express regularity in repeated reasoning.

MA.4.G	Geometry
MA.4.G.A	Draw and identify lines and angles, and classify shapes by properties of their lines and angles.
MA.4.G.A.1	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
MA.4.G.A.2	Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize

	right triangles as a category, and identify right triangles.
MA.4.G.A.3	Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

Interdisciplinary Connections

LA.RL.4.7	Make connections between specific descriptions and directions in a text and a visual or oral representation of the text.
LA.RI.4.1	Refer to details and examples in a text and make relevant connections when explaining what the text says explicitly and when drawing inferences from the text.
LA.RI.4.3	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
LA.RI.4.4	Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.

Learning Objectives

After completing Unit 6, students will be able to:

Topic 11:

- Read and interpret data using line plots.
- Represent data using line plots and interpret data in line plots to solve problems.
- Solve problems involving line plots and fractions.
- Critique the reasoning of others using an understanding of line plots.

Topic 13:

- Recognize the relative size of customary units of weight and convert from a larger unit to a smaller unit.
- Recognize the relative size of metric units of length and convert from a larger unit to a smaller unit.
- Recognize the relative size of metric units of capacity and mass, and convert from a larger unit to a smaller unit.
- Find the unknown length or width of a rectangle using the known area or perimeter.
- Be precise when solving measurement problems.

Topic 15:

- Recognize and draw line, rays, and angles with different measures.
- Find the measure of an angle that turns through a fraction of a circle.
- Use known angle measures to measure unknown angles.
- Use a protractor to measure and draw angles.

- Use addition and subtraction to solve problems with unknown angle measures.
- Use appropriate tools, such as a protractor and ruler, to solve problems.

Topic 16:

- Draw and identify perpendicular, parallel, and intersecting lines.
- Classify triangles by line segments and angles.
- Classify quadrilaterals by lines and angles.
- Recognize and draw lines of symmetry. identify line symmetric figures.
- Draw figures that have line symmetry.
- Use understanding of two-dimensional shapes to critique the reasoning of others.

Suggested Activities & Best Practices

- Consider Extension Activity e.g. Topic 11-1, pg. 587

- Further suggested activities embedded within each Topic

Assessment Evidence - Checking for Understanding (CFU)

- Common Formative Assessments (Formative)
- Common Summative Assessments (Summative)
- District Benchmark (Benchmark)
- Do Now
- Exit Tickets
- Higher-order Questioning / Rich Discussion
- Journals
- KWL Chart
- Learning Center Activities
- Performance Task (Alternative)
- Quick Check (enVisionmath)
- Quick Write
- Quizzes (Formative)
- Rubrics
- Surveys
- Teacher Observation Checklist
- Think-Pair-Share

- Think, Write, Pair, Share
- Turn-and-Talk / Share-out
- Unit Assessments (Summative)
- WIK / WINK

Primary Resources & Materials

EnVision Math Teacher Edition

PearsonRealize.com

Ancillary Resources

New Jersey Student Learning Standards for Mathematics

NJSLS Mathematics Crosswalk

IXL Learning

NCTM Illuminations

Technology Infusion



Alignment to 21st Century Skills & Technology

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.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP4.1	Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.
CRP.K-12.CRP6.1	Career-ready individuals regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.
CRP.K-12.CRP8.1	Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.
CRP.K-12.CRP11.1	Career-ready individuals find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.
CAEP.9.2.4.A.4	Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.
TECH.8.1.5.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.5.A.1	Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.
TECH.8.1.5.A.CS1	Understand and use technology systems
TECH.8.1.5.A.CS2	Select and use applications effectively and productively.

21st Century Skills/Interdisciplinary Themes

- 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

- Use the "Quick Check" feature on Pearson Realize (embedded in each Unit) to help determine the strategy for differentiating instruction; the "Assess and Differentiate" page will prescribe the differentiated instructional activity

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 aloud
- 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

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)

- Consider Intervention Activity and/or Reteach e.g. Topic 11-1, pg. 595A

- Use suggestions under Technology Center section in Pearson Realize to target students with disabilities

- Use the Pacer Center Action Information Sheet for research-based ideas on accommodations and modifications

- Allow for open-note/open-book assessments
- Check classwork frequently for understanding
- Conduct preview of content, concepts, and vocabulary
- Consider behavior management plan
- Implement accommodations/modifications as dictated in the student's IEP/504 plan
- Modified test content/format
- Modified written assignments
- Multi-sensory presentation
- Pre-annotate text
- Preferential seating
- Promote pair work
- Provide extended time on various assignments
- Provide printed/online copies of lesson notes
- Secure attention before providing instruction/directions
- Use assistive technology

English Language Learning (ELL)

- Use Teaching Tool 48 as a graphic organizer to help students connect a visual to the vocabulary term

- Use Teaching Tool 49 to connect students' understanding of vocabulary terms with actual meanings

- Use suggestions under English Language Learners section in Pearson Realize to target beginning, intermediate, and advanced learners e.g. Topic 11-1, pg. 591A

- Use suggestions under Technology Center section in Pearson Realize to target ELLs

- Allow for multiple student revisions
- Allow for open-note / open-book assessments
- Allow multiple forms of student products (projects, models, slide-shows, etc.) to demonstrate student learning
- Ask and give information using key words
- Demonstrate listening comprehension by responding to questions
- Develop basic sight vocabulary
- Differentiate assessments to reflect selected objectives
- Express ideas in single words

- Leverage computer spell checker
- Modify reading assignments to correlate with lexile level
- Peer tutoring / Peer note-taking
- Speak using content area vocabulary in context
- Teacher-created Study Guide
- Use prior experiences to understanding meanings
- Use videos, illustrations, pictures, and drawings to explain or clarify

At Risk

- Decrease the amount of work represented or required by assigning the "Do You Understand?" and the "Do You Know How?" sections of each lesson

- Use suggestions under Technology Center section in Pearson Realize to target at-risk students

- Use suggestions under Intervention Activity e.g. Topic 11-1, Error Intervention, pg. 593-594

- Allow for multiple student revisions
- Allow for open-note / open-book assessments
- Allow multiple forms of student products (projects, models, slide-shows, etc.) to demonstrate student learning
- Allow students to select from given assignment choices
- Differentiate assessments to reflect selected objectives
- Mark students' correct and acceptable work, not the mistakes
- Peer tutoring / Peer note-taking
- Promote student collaboration on in-class / outside class assignments
- Reduce lengthy outside reading assignments
- Teach key aspects of a topic - eliminate non-essential information
- Teacher-created Study Guide
- Use authentic assessments with real-life problem-solving
- Use videos, illustrations, pictures, and drawings to explain or clarify

Talented and Gifted Learning (T&G)

- Use suggestions under Extension for Early Finishers section in Pearson Realize to target advanced learners
- Use suggestions under Advanced Activity Centers to target advanced learners e.g. Topic 11-1, pg. 595A

- Administer Unit Assessment to determine level of proficiency
- Allow gifted children to create and publish a class newspaper to distribute
- Allow students to work at a faster pace
- Complete activities aligned with above grade-level text using Benchmark results
- Consider parental input about the education of their gifted children

- Create a blog or social media page about a topic of interest
- Create a plan to solve an issue presented in the class or in a text
- Debate issues with research to support arguments
- Involve students in academic contests
- Promote advanced problem-solving
- Remember that gifted children may not excel in all areas
- Set individual goals
- Utilize exploratory connections to higher-grade concepts
- Utilize project-based learning for greater depth of knowledge