

Unit 6 pt 2 Measurement, Data, & Geometry

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Title Section

Department of Curriculum and Instruction



Belleville Public Schools

Curriculum Guide

Math, Fourth Grade

Unit 6: Measurement, Data, & Geometry

Belleville Board of Education

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Unit Overview

Lessons within the units, “Measurement, Data, and Geometry” have been sequenced to assure students’ exposure to selected topics prior to the PARCC Exam. The following is recommended for Unit 6 “Measurement, Data, and Geometry”, Part 2.

- Use line plots to solve problems (T.11-3)
- Critique reasoning (T.11-4)
- Equivalence with metric units of length (T.13-4)
- Equivalence with metric units of capacity and mass (T.13-5)
- Solve perimeter and area problems (T.13-6)
- Measure and draw angles (T.15-4)
- Add and subtract angle measures (T.15-5)
- Use appropriate tools (T.15-6)
- Line symmetry (T.16-4)
- Draw shapes with line symmetry (T.16-5)
- Critique reasoning (T.16-6)
- **Use extra week to build in Assessment for each Topic and or Unit, as well as Re-teaching and Enrichment.**

MA.4.NF.B.3d	Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.
MA.4.NF.B.4c	Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem.
MA.4.MD.A.1	Know relative sizes of measurement units within one system of units including km, m, cm, mm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two column table.
MA.4.MD.A.2	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
MA.4.MD.A.3	Apply the area and perimeter formulas for rectangles in real world and mathematical problems.
MA.4.MD.B.4	Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots.
MA.4.MD.C.5	Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:
MA.4.MD.C.6	Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.
MA.4.MD.C.7	Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.
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.

Exit Skills

By the end of Grade 4 Mathematics, students in the Belleville Public Schools will be able to:

- **Develop an understanding and fluency with multi-digit multiplication and develop an understanding of dividing to find quotients involving multi-digit dividends. Students will also work toward fluency in addition and subtraction within 1,000,000 using the standard algorithm:** Students generalize their understanding of place value to 1,000,000, understanding the relative sizes of numbers in each place. They apply their understanding of models for multiplication (equal-sized groups, arrays, and area models), place value, and properties of operations, in particular the distributive property, as they develop, discuss, and use efficient, accurate, and generalizable methods to compute products of

multi-digit whole numbers. Depending on the numbers and the context, they select and accurately apply appropriate methods to estimate or mentally calculate products. They develop fluency with efficient procedures for multiplying whole numbers; understand and explain why the procedures work based on place value and properties of operations; and use them to solve problems. Students apply their understanding of models for division, place value, properties of operations, and the relationship of division to multiplication as they develop, discuss, and use efficient, accurate, and generalizable procedures to find quotients involving multi-digit dividends. They select and accurately apply appropriate methods to estimate and mentally calculate quotients, and interpret remainders based upon the context.

- **Develop an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers:**

Students develop understanding of fraction equivalence and operations with fractions. They recognize that two different fractions can be equal (e.g., $15/9 = 5/3$), and they develop methods for generating and recognizing equivalent fractions. Students extend previous understandings about how fractions are built from unit fractions, composing fractions from unit fractions, decomposing fractions into unit fractions, and using the meaning of fractions and the meaning of multiplication to multiply a fraction by a whole number.

- **Understand that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry:**

Students describe, analyze, compare, and classify two-dimensional shapes. Through building, drawing, and analyzing two-dimensional shapes, students deepen their understanding of properties of two-dimensional objects and the use of them to solve problems involving symmetry.

Enduring Understanding

- Data from line plots can be used to solve problems.
- Critique the reasoning of others using understanding of line plots.
- 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 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.
- Some problems can be solved by applying the formula for the perimeter of a rectangle or the formula for the area of a rectangle.
- The unit for measuring angles is 1 degree, 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.
- A shape that can fold along a line into matching parts are 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

- How can you read data on a line plot?

- How can you make a line plot?
- How can you convert from one unit to another?
- How can you be precise when solving math problems?
- What are some common geometric terms?
- How can you measure angles?
- How can you classify triangles and quadrilaterals?
- What is line symmetry?

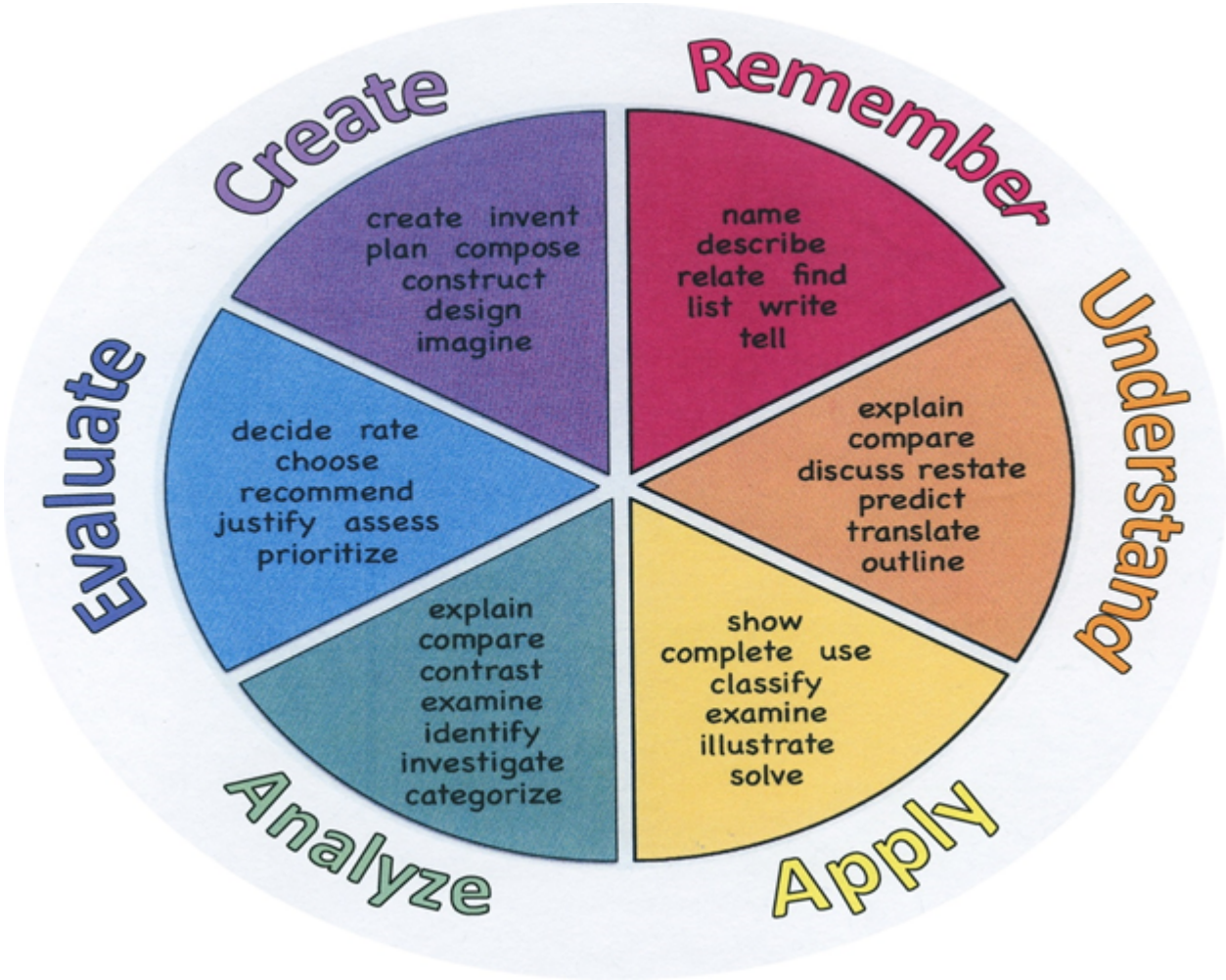
Learning Objectives

After learning how to recognize the relative size of units, students will be able to:

- **Recognize** the relative size of a unit, **indicate** the the length and **explain** the process.
- Once the conversion is complete, **illustrate** the larger unit against the smaller unit, and **determine** if the answered **generated** is correct.

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				
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Interdisciplinary Connections

LA.K-12.NJLSA.R	Reading
LA.K-12.NJLSA.W	Writing
SOC.6.1.4.B.CS1	Spatial thinking and geographic tools can be used to describe and analyze the spatial patterns and organization of people, places, and environments on Earth.
TECH.8.1.5.A.CS1	Understand and use technology systems
TECH.8.1.5.A.CS2	Select and use applications effectively and productively.

Alignment to 21st Century Skills & Technology

- English, reading or language arts
- World languages

- Arts
- Mathematics
- Economics
- Science
- Geography
- History
- Government and Civics

21st Century/Interdisciplinary Themes

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

21st Century Skills

- 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

Technology Infusion

- Smart Board
- Student Lap-top

Differentiation

Utilize **Quick Check** in order to determine differentiation of instruction. **Assess and differentiate** page will prescribe the differentiated instruction activity.

- Intervention activity.
- Reteach.
- Technology center.
- On-level and advanced activity center.
- Leveled Assignment.

Resources:

- NJDOE: Instructional Supports and Scaffolds for Success in Implementing the Common Core State Standards <http://www.state.nj.us/education/modelcurriculum/success/math/k2/>

Special Education

- 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
- multi-sensory presentation
- multiple test sessions
- preferential seating
- preview of content, concepts, and vocabulary
- 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

ELL

- teaching key aspects of a topic. Eliminate nonessential information
- using videos, illustrations, pictures, and drawings to explain or clarify
- 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 work presented 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

Intervention Strategies

- 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 work presented 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

Evidence of Student Learning-CFU's

- Admit Tickets
- Anticipation Guide
- Choral response
- Common benchmarks
- Compare & Contrast
- Create a Multimedia Poster
- Define
- Describe
- Evaluate
- Evaluation rubrics
- Exit Tickets
- Explaining
- Fist- to-Five or Thumb-Ometer
- Illustration
- Journals
- KWL Chart
- Newspaper Headline
- Outline
- Question Stems
- Quickwrite
- Quizzes
- Red Light, Green Light
- Self- assessments
- Socratic Seminar
- Study Guide
- Teacher Observation Checklist
- Think, Pair, Share
- Think, Write, Pair, Share
- Thumbs up
- Top 10 List
- Unit tests

Primary Resources

- envision-Vision 2.0
- envision-Vision 2.0 Digital Resources

Ancillary Resources

New Jersey Center for Teaching and Learning: www.njctl.org

PARCC site: www.parcconline.org

Khan Academy:
www.khanacademy.org

<http://www.mathworksheets4kids.com/activities/4th-grade.html>

<http://www.education.com/worksheets/fourth-grade/math/>

<http://www.math-drills.com/privacy.php>

http://www.internet4classrooms.com/printables/common_core/math_mathematics_4th_fourth_grade/

<http://imathworksheets.com/geometry-worksheets-2complementary-angles-worksheets/volume-worksheets/volume-of-a-rectangular-prism/>

<http://illuminations.nctm.org/Search.aspx?view=search&type=ls&gr=3-5>

<http://www.k6-geometric-shapes.com/4th-grade-math-Worksheets.html>

<http://www.math-aids.com/>

<http://www.mathworksheetsland.com/>

<http://www.mathsisfun.com/worksheets/multiplication.php>

<http://www.softschools.com/mathg.jsp>

<http://interactivesites.weebly.com/addition.html>

<http://www.worksheetworks.com/math/geometry/measuring-figures/volume.html>

<http://www.math-salamanders.com/equivalent-fractions-worksheet.html>

<http://www.printable-math-worksheets.com/multiplication-array.html>