Unit 4: Title of Unit : Measurement

Content Area: **Mathematics**
Course(s): **Mathematics - Grade 4**
Time Period: **Generic Time Period**
Length: **6 Weeks**
Status: **Published**

Unit Overview

Students will develop an understanding of measurement and its applications in the real world. This will enable students to solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit as well as Area and Perimeter. Students must be able to represent and interpret data using number line diagrams.

Benchmark 11 - 13 will be assessed Early June

Transfer

Students will be able to independently use their learning to...

Students will be able to independently use their learning of measurement to record and convert measurements. Students will be able to apply their understanding by using the four operations to solve word problems involving time, volume, mass, money, fractions, and decimals.

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For more information, read the following article by Grant Wiggins.

http://www.authenticeducation.org/ae_bigideas/article.lasso?artid=60

Meaning

Understandings

Students will understand that...

Chapter 11

- how to convert customary units of length
- how to convert customary units of capacity
- how to convert customary units of weight
- how to convert customary units of time
- how to use a line plot to represent measurement data involving fractions of units

Chapter 12

- how to estimate measures of lenght in the metric system
- how to estimate metric units of capacity
- how to estimate metric units of mass
- how to convert metric units of measurement
- how to solve word problems involving metric measurements

Chapter 13

- how to find the perimeter of a rectangle
- how to find the perimeter of a rectangle by using a formula
- how to find the area of a rectangle
- how to find the area of using square
- how to relate perimeter and area of rectangles

Essential Questions

Students will keep considering...

- Why do we convert measurements?
- How can conversions of measurements help me solve real-world problems?
- Why is it important to measure perimeter and area?

Application of Knowledge and Skill

Students will know...

Students will know...

Chapter 11

- inch, foot, and yard are units of lenght in the customary system
- to convert larger units in the customary system to smaller units, multiply
- capacity is the amount of liquid that a container can hold
- cups, pints, quarts, and gallons are units of capacity in the customary system
- ounces, pounds, and tons are units of weight in the customary system
- the method that was used to convert units of length, capacity, and weight can be used to convert units of time
- measurements can be recorded in two-column tables
- line plots resemble rulers
- use the line plots to solve problems involving addition and subtraction

Chapter 12

- millimeter, centimeter, meter, and kilometer are units of length in the metric system
- before measuring the length of an object, first estimate the length to decide which unit of measurement is best to use
- capacity is the amount of liquid that a container can hold
- liter and milliliter are units of capacity in the metric system
- mass is the amount of matter that an object has
- mass is different than weight
- the method that was used to convert customary units can be used to convert metric units
- to convert larger units to smaller units, multiply; to convert smaller units to larger units, divide
- if necessary, convert so that all measurements in a problem have the same units
- use the four operations to solve measurement problems

Chapter 13

- add side lengths to find the perimeter
- the perimeter of a rectangle is $P=(2x\ l) + (2\ x\ w)$, *where l is the lenght and w is the width*
- the perimeter of a square is $P=4s$; *where s is the side length*
- count unit squares to find area
- use the formula $A=s\ x\ s$ *to find area*
- two rectangles can have the same perimeters, the same areas, or both

Students will be skilled at...

Students will be skilled at how to ...

Chapter 11

- find measurement equivalents for customary units of length
- find meaurement equivalents for customary units of capacity
- find meaurement equivalents for customary units of weight
- create a conversion table to show the relationship between two units of time, like seconds and minutes
- use line plots to represent measurement values that are fractions

Chapter 12

- meaure the length of objects to the nearest centimeter
- determine reasonable estimates for the capacity of containers, such as a sports drink bottle
- determine reasonable estimates for the mass of objects, such a a cat
- convert metric units of length, capacity, and mass
- solve measurement problems like the one show below

Kylie walks three steps, with each step 0.4 meter long. How far did Kylie walk?
0.4 + 0.4 + 0.4 = 1.2; So, Kylie walked 1.2 meters

Chapter 13

- find the perimeter of a rectangle
- use a formula to find the perimeter of a rectangle
- find the area of a rectangle
- find the area of a square
- describe possible dimensions and perimeters of rectangles for given areas

Academic Vocabulary

Customary system

Metric system

convert

Kilometer (km)

Meter (m)

Centimeter (cm)

Millimeter (mm)

Inch (in)

Foot (ft)

Yard (yd)

Mile (mi)

Kilogram (kg)

Gram (g)

Pound (lb)

Ton (t)

Ounce (oz)

Millileter (ml)

Liter (l)

Teaspoon (tsp)

Tablespoon (tbsp)

Cup (c)

Pint (p)

Gallon (gal)

Quart (qt)

Hour (hr)

Minute (min)

Second (sec)

Scale

Intervals

Volume

Mass

Weight

Capacity

Decimal

Fraction

Distance

Express

Liquid

Measurement

Line plot

unit square

square unit

operation

time

word problem

Area

Perimeter

Unknown

Learning Goal Chapter 11 Customary Measurement

Students will be able to solve problems involving measurement and the conversion of measurements from a larger unit to a smaller unit.

Daily Targets Chapter 11

SWBAT:

- Estimate and measure length using customary units (Lesson 1/DOK 2)
- Convert customary units of length (Lesson 2/DOK 3)
- Estimate and measure customary capacities (Lesson 3/DOK 2)
- Convert customary units of capacity (Lesson 4/DOK 3)
- Estimate and measure customary units of weight (Lesson 5/DOK 2)
- Convert customary units of weight (Lesson 6/DOK 3)
- Convert units of time (Lesson 7/DOK 3)
- Display measurement data on a line plot (Lesson 8/DOK 4)

- Solve problems involving measurement (Lesson 9/DOK 4)
- Solving problems using the guess, check and revise strategy (Lesson 10, DOK 4)

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
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.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.
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.B.4	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots.

Learning Goal Chapter 12- Metric Measurement

Students will solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit

Daily Targets Chapter 12

- Estimate and measure lengths within the metric system (Lesson 1/DOK 2)
- Estimate and mesure metric capacities (Lesson 2/DOK 2)
- Estimate and measure mass and learn the difference between weight and mass (Lesson 3/DOK 3)
- Make an organized list to solve problems (Lesson 4/DOK 4)
- Convert metric units (Lesson 5/DOK 3)
- Solve problems involving measurement (Lesson 5/DOK 4)

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Learning Goal Chapter 13-Perimeter and Area

Students will solve problems inolving measurement by applying the area and perimeter formulas for rectangles in real world and mathematical problems.

Daily Targets Chapter 13

- Find the perimeter of a figure (Lesson 1/DOK 2)
- Solve a simpler problem to solve problems (Lesson 2/DOK 4)
- Explore the area of a figure (Lesson 3/DOK 2)
- Find the area of rectangles and squares (Lesson 4/DOK 3)
- Relate area to perimeter (Lesson 5/ DOK 4)

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
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.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.
MA.4.MD.A.3	Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

Formative Assessment and Performance Opportunities

- academic games
- benchmark assessments
- centers
- challenge tasks/problems
- Chapter 11 Project- Healthful Snacks (pg.686)
- Chapter 12 Project-Metric Units of Capacity (pg.766)
- Chapter 13 Project- It's Your Area (pg.818)
- exit tickets
- Kahoot
- Performance Task Chapter 11 Darrel Delivers! Convert units of measure for capacity, weight, length, and time within the setting of a delivery truck driver (DOK2, DOK3) Rubric TM764PT2
- Performance Task Chapter 12- Let's Take the Ferry- Convert units of measure, select the most reasonable estimates, and solve measurement problems using the setting of an auto ferry (DOK2, DOK3) Rubric TM816PT2
- Performance Task Chapter 13-Home Makeover- Use the setting of a home renovation to find the perimeter and area of rectangles and squares (DOK2, DOK3) Rubric TM660PT1
- Power Up for State Assessment
- projects
- quizzes
- teacher made assessments
- teacher observations

Summative Assessment

- Centers
- Classwork
- Quizzes
- Tests

21st Century Life and Careers and Technology

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP1.1	Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.

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	Communicate clearly and effectively and with reason.
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.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP7.1	Career-ready individuals are discerning in accepting and using new information to make decisions, change practices or inform strategies. They use reliable research process to search for new information. They evaluate the validity of sources when considering the use and adoption of external information or practices in their workplace situation.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
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.
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.D	Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
TECH.8.1.5.D.4	Understand digital citizenship and demonstrate an understanding of the personal consequences of inappropriate use of technology and social media.
TECH.8.1.5.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.5.D.CS2	Demonstrate personal responsibility for lifelong learning
TECH.8.1.5.E	Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
TECH.8.1.5.E.CS1	Plan strategies to guide inquiry.
TECH.8.1.5.E.CS3	Evaluate and select information sources and digital tools based on the appropriateness for specific tasks.

Accommodations and Modifications

- 504 Accommodations
- BSI Support
- English Learner Support Interactive Guide (T98-121)
- ELL Support Strategy - Use the activity in the Vocabulary Check to assess students' ability to extend their understaning
- IEP Modifications
- Interactive Guide: Scaffolded differentiatied activities (emerging, expanding and bridging levels)
- Performance Tasks

- ST Math
- Service Rich Environment
- RTI in My Math (Chapter Specific)
- TAG Manipulative Kits
- Clickers
- Learning Centers
- Manipulatives/Concrete Models
- Small Group Instruction
- Reference sheets of conversion rules
- Real world examples of mesurements (milk jug, soda bottle, etc.)
- Various forms of assessments
- Math Fact Charts
- Divisibiltiy Rules Chart

Unit Resources

- AAAmath: Measurement: http://www.aaamath.com/mea.html
- Brainpop http://www.brainpop.com/
- Cool math 4 kids http://www.coolmath4kids.com/
- Funbrain http://www.funbrain.com/
- illustrative mathematics: http://www.illustrativemathematics.org/
- Linkit
- Math playground http://www.mathplayground.com/
- McGraw-Hill My Math
- NCTM illuminations Measurement: http://illuminations.nctm.org/WebResourceList.aspx?Ref=2&Std=3&Grd=0
- ST Math

Interdisciplinary Connections

Solving the Pyramid Puzzle describes the precision and geometric knowledge ancient Egyptians used to build pyramids. It focuses in particular on the Great Pyramid. Students will apply the area and perimeter formulas for rectangles in real world and mathematical problems. (4.MD.3)

What is Recycling? focuses on reducing, reusing, and recycling trash. Students will interpret charts and graphs and use multiplication skills to answer questions and draw conclusions. Students will 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 to terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. (4.MD.2)

SOC.6.1.4.C.16	Explain how creativity and innovation resulted in scientific achievement and inventions in many cultures during different historical periods.
SOC.6.1.4.D.20	Describe why it is important to understand the perspectives of other cultures in an interconnected world.
4-ESS3-2.6	Constructing Explanations and Designing Solutions