

06. Measurement & Data

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **4 weeks**
Status: **Published**

General Overview, Course Description or Course Philosophy

In this unit, students will focus on the following skills and concepts:

- length measurement units and tools (feet, inches, centimeters, yards, & meters)
- representing data (picture graphs and bar graphs)
- data displays (line plots)
- telling time

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Enduring Understandings:

- Measurement describes the attributes of objects and events.
- Describing and analyzing objects develop a foundation for understanding our physical environment.
- The length of some objects is measurable.
- The length of any object can be used as a measurement unit for length, but a standard unit, such as an inch or centimeter, is always the same length.
- The length of any object can be used as a measurement unit for length, but a standard unit is always the same length.
- Measurement is a process of comparing a unit to the object being measured.
- The length of any object can be used as a measurement unit for length.
- Measurements in the same unit like inches can be added or subtracted in the same way as adding and subtracting whole numbers.
- The measurement unit needs to be written with the sum or difference.
- The length of two objects can be compared by subtracting to find the difference.
- Representing and interpreting data helps analyze information and develop critical thinking skills.
- Data can be organized in different ways. The lengths of objects can be organized in different ways.
- A line plot can be used as a visual representation of the relative lengths of objects.
- Each type of graph is most appropriate for certain kinds of data. Pictographs and bar graphs make it easy to compare data.
- Time can be given to the nearest five minutes.
- Time can be expressed using different units that are related to each other. A.M. and P.M. are used to designate certain time periods.

Essential Questions:

- How can you measure the length of an object using nonstandard units?
- How can you use addition and subtraction to solve measurement problems?

- How do you compare the lengths of three objects?
- How can you use inch models to measure length?
- How do you use an inch ruler to measure lengths?
- Why is using a ruler similar to using a row of color tiles to measure length?
- How can you estimate the lengths of objects in inches?
- Why is measuring in feet different from measuring in inches?
- Why is measuring in yards different from measuring in feet?
- How can you use a centimeter model to measure length?
- How do you use a centimeter ruler to measure length?
- How can you use known lengths to estimate unknown lengths?
- Why is standard measurement important?
- How do you decide which unit of measurement to use?
- How do I choose the appropriate tool and unit when measuring?
- How can clocks, bar graphs, and pictographs be used to show data and answer questions?
- How can you collect, organize, and display data?
- How do you interpret the data you have collected?
- How does the type of data influence the choice of graph?
- What kinds of questions can be answered using different data displays?
- Why are graphs helpful?
- Why is telling time important?
- How do you show time to the hour or half hour on an analog clock?
- How do you show time to the nearest five minutes on an analog clock?
- How do the different units of time (minutes, day, weeks) relate to each other?

CONTENT AREA STANDARDS

2.M

A. Measure and estimate lengths in standard units

B. Relate addition and subtraction to length

C. Work with time and money

2.DL

A. Understand concepts of data

B. Represent and interpret data

2.G

A. Reason with shapes and their attributes

MA.K-12.6	Attend to precision.
MA.2.MD.A.1	Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
MA.2.MD.A.2	Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.
MA.2.MD.A.3	Estimate lengths using units of inches, feet, centimeters, and meters.
MA.2.MD.A.4	Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.
MA.2.MD.B.5	Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.
MA.2.MD.C.7	Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
MA.2.MD.D.9	Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.
MA.2.MD.D.10	Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put together, take-apart, and compare problems using information presented in a bar graph.

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

LA.RI.2.10	Read and comprehend informational texts, including history/social studies, science, and technical texts, at grade level text complexity proficiently with scaffolding as needed.
LA.SL.2.1	Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
TECH.9.4.2.CI.1	Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).
TECH.9.4.2.IML.2	Represent data in a visual format to tell a story about the data (e.g., 2.MD.D.10).

STUDENT LEARNING TARGETS

- I can identify tools that can be used to measure length such as:
 - Rulers
 - Yardsticks
 - Meter sticks
 - Measuring tapes
- I can identify the unit of length for the tool used (e.g., inches, feet, yards, centimeters, meters)
- I can determine which tool to use to measure length of an object.
- I can measure the length of objects using the appropriate tool.
- I can explain how to measure the length of an object using standards tools.
- I can explain how one object can have two different measurements for the same attribute.
- I can describe the relationship between the size of the measurement unit and the number of units needed to measure an object.
- I can determine the length of an object using two different units of measure (e.g., the desk is 36 inches)

or 3 feet long)

- I can estimate (calculate approximately) the length of objects using:
 - Inches
 - Feet
 - Centimeters
 - Meters
- I can measure the length of objects to determine if estimates are reasonable
- I can explain why it is important to use the same unit of measure when comparing the length of two objects
- I can compare the lengths of two objects and determine the difference between the two
- I can describe how much longer one object is than another in terms of a standard length unit
- I can solve word problems involving lengths given in the same units using:
 - Representations (e.g., drawings, rulers, cubes, pictures, etc.)
 - Equations with a symbol for the unknown number
- I can explain how to solve word problems that call for the addition or subtraction involving lengths of the same unit
- I can describe where the hour and minute hand must be on an analog clock when telling time to the nearest five minutes (e.g., when it is 11:40 the hour hand is between the 11 and the 12 and the minute hand is on the 8)
- I can identify and label the time cycles using a.m. and p.m.
- I can orally tell the time to the nearest five minutes using analog and digital clocks
- I can write the time to the nearest five minutes using analog and digital clocks
- I can use common time phrases to communicate time (e.g., quarter till, quarter after, ten till, 10 after, half past, etc.)
- I can create a single-unit scale bar graph to represent data that can be sorted with up to four categories
- I can identify and label the components of a bar graph (e.g., title, scale, scale label, categories, category label, data)
- I can use the information presented in a horizontal or vertical bar graph to interpret and solve:
 - Addition problems (put-together)
 - Subtraction problems (take-apart)
 - Compare problems (more than, fewer than etc.)
- I can represent measurement data on a line plot with a whole-number horizontal scale

Declarative Knowledge

Students will understand that:

- selecting and using appropriate tools is essential when measuring the length of objects and distances.
- two different measurements of the same object relate to the size of the unit chosen.
- measurements are used to determine how much longer one object is than another.
- estimation is used to check the reasonableness of one's measurements and to select a unit of measurement.
- addition and subtraction within 100 can be used to solve word problems involving lengths that are given in the same units.
- graphs are used to organize and represent data.

- line plots are used to display measurement data.
- information presented on graphs and line plots should be shared and discussed.

Procedural Knowledge

Students will be able to:

- Measure the length of an object by selecting and using appropriate tools.
- Describe how two different measurements of the same object relate to the size of the unit chosen.
- Measure the length of an object twice using different length units for the two measurements.
- Measure to determine how much longer one object is than another.
- Estimate lengths using units of inches, feet, centimeters, and meters.
- Solve word problems involving lengths that are given in the same units using addition and subtraction within 100.
- Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
- Draw a bar graph (with single unit scale) to represent a data set with up to four categories.
- Draw a picture graph (with single unit scale) to represent a data set with up to four categories.
- Generate measurement data by measuring lengths of several objects to the nearest whole unit or by making repeated measurements of the same object.
- Show the measurements by making a line plot where the horizontal scale is marked off in whole-number units.

EVIDENCE OF LEARNING

Refer to the 'Formative, Summative, and Benchmark Assessments' sections.

Alternate Assessments

- Portfolios
- Verbal Assessment (instead of written)
- Multiple choice

Summative Assessments

- End of Unit Assessment
- Fact Fluency Assessments

- End of Unit Self Assessment

Formative Assessments

- Journal Pages
- Self-Assessments/Student Friendly Scales
- White board responses
- Exit/Entrance Tickets
- Math Talks
- Measurement City Project

Benchmark Assessments

- EDM BOY Assessment
- IXL Screener / Diagnostic Snapshot BOY
- IXL Diagnostic Snapshot MOY
- IXL Diagnostic Snapshot EOY

RESOURCES (Instructional, Supplemental, Intervention Materials)

Core Instructional Materials:

- Everyday Math Grade 2 Unit 4 & 7 Resources
 - Math Masters
 - Student Journal Volume 1
 - [ConnectED](#)

Supplemental Materials:

- [IXL](#)
- Illustrative Math Tasks
 - Growing Bean Plants <https://tasks.illustrativemathematics.org/content-standards/2/MD/D/9/tasks/493>
 - Determining Length: <http://tasks.illustrativemathematics.org/content-standards/2/MD/A/1/tasks/2069>
- EM Games
- Calendar Math
- [Bar Graphs](#)
- [Line plots](#)
- <http://sciencenetlinks.com/lessons/estimation-and-measurement/>

Lessons:

- 4-8
- 4-9
- 4-10
- [\(Independent\) Problem Solving 4b](#)
- 4-11 (only measuring a crooked path activity)
- 6-1
- 7-4
- 7-5
- 7-6
- 7-7
- [\(Independent\) Problem Solving 7b](#)
- 7-8
- 4-1
- 4-2
- 4-3

INTERDISCIPLINARY CONNECTIONS

ELA:

Reading- *How Big is a Foot?* by Rolf Myller (Lesson 4-1)

- Career Readiness: Utilize Critical Thinking to Make Sense of Problems and Persevere in Solving Them
- Technology/Multimedia: Educational Tech Application
- Social Studies: Current Events
- Science & Health: Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

LA.RL.2.10

Read and comprehend literature, including stories and poetry, at grade level text complexity or above with scaffolding as needed.

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

- simplify written directions
- visuals
- manipulatives
- graphic organizers

- sentence starters
- wait time
- additional time for tasks
- verbal responses
- illustrations
- colored clock

See link to Accommodations & Modifications document in course folder.