Measurements
Customary (U.S) and Metric

4th Grade
Student Teaching
13 Days

Autumn Mundy
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Description of the Unit

This unit is designed to help students understand how to use a 12-inch ruler to measure to the closest quarter and eighth inch and how to use a centimeter ruler to measure to the closest centimeter and millimeter. Students will also learn how to convert units in the customary (U.S.) measurement system and in the metric system. Students will be able to demonstrate how to measure items using non-standard measuring units like paperclips.

Academic Standards and Indicators and Objectives

Content Objective: Students will be able to use a 12 inch ruler to measure to the nearest quarter and eighth-inch and a centimeter ruler to measure to the nearest centimeter and millimeter.

Students understand perimeter and area, as well as measuring volume, capacity, time, and money.

4.5.1 Measure length to the nearest quarter-inch, eighth-inch, and millimeter.

Interdisciplinary and Curricular Connection: Science and Mathematics

Assessment of Objective: This objective will be assessed through worksheets and activities that the students complete during class with their peers.

Content Objective: Students will convert between units of length within one system (U.S. customary or Metric) with 85% accuracy.

Students understand perimeter and area, as well as measuring volume, capacity, time, and money.

4.5.2 Subtract units of length that may require renaming of feet to inches or meters to centimeters.

Interdisciplinary and Curricular Connection: Science and Mathematics

Assessment of Objective: This objective will be assessed with practice book pages that go along with the chapter in the book.

Content Objective: Students will convert between units of capacity within one system (U.S. customary or Metric) with 85% accuracy.

Students understand perimeter and area, as well as measuring volume, capacity, time, and money.

4.5.8 Use volume and capacity as different ways of measuring the space inside a shape.

Interdisciplinary and Curricular Connection: Science and Mathematics

Assessment of Objective: This objective will be assessed with practice book pages that go along with the chapter in the book.

Content Objective: Students will measure the length of objects using paperclips and candy with 85% accuracy.

State Standard: Science: Standard 5: The Mathematical World
Students apply mathematics in scientific contexts. Their geometric descriptions of objects are comprehensive. They realize that graphing demonstrates specific connections between data. They identify questions that can be answered by data distribution.

**Shapes and Symbolic Relationships**

4.5.3 Illustrate how length can be thought of as unit lengths joined together, area as a collection of unit squares, and volume as a set of unit cubes.

**Interdisciplinary and Curricular Connection:** Science and Mathematics

**Assessment of Objective:** This objective will be assessed by observation and a chart that is to be completed

## Vocabulary

- **Inch (in)** - a unit of measurement equal to 1/12 of a foot
- **Half-inch** - a unit of measurement equal to 1/24 of a foot
- **Quarter inch** - a unit of measurement equal to 1/48 of a foot
- **Eighth inch** - a unit of measurement equal to 1/96 of a foot
- **Foot (ft)** - a unit of measurement equal to 12 inches
- **Yard (yd)** - a unit of measurement equal to 3 feet
- **Mile (mi)** - a unit of measurement equal to 5,280 feet or 1,760 yards
- **Gallons (gal)** - a unit of volume to measure liquids, equal to 4 quarts
- **Quarts (qt)** - a unit of volume to measure liquids, equal to 2 pints or 1/4 of a gallon
- **Pints (pt)** - a unit of volume to measure liquids, equal to 2 cups, 1/2 of a quart and 1/8 of a gallon
- **Cups (c)** - a unit of capacity equal to 1/2 a pint, 1/4 of a quart, 1/16 of a gallon and 8 ounces
- **Capacity** - the amount a container can hold
- **Ounces (oz)** - a unit of weight that equals 1/16 of a pound, a unit of capacity that equals 1/8 of a cup
- **Pounds (lb)** - a unit of weight that equals 16 ounces
- **Tons (T)** - a unit of weight that equals 2,000 pounds
- **Weight** - the measure of how heavy something is
- **Centimeter (cm)** - a metric unit of length that equals 1/100 of a meter
- **Millimeter (mm)** - a metric unit of length that equals 1/1,000 of a meter
- **Decimeter (dm)** - a metric unit of length that equals 1/10 of a meter
- **Meter (m)** - a metric unit of length that equals 10 decimeters, 100 centimeters and 1,000 millimeters
- **Kilometer (km)** - a metric unit of length that equals 1,000 meters
- **Liter (L)** - a metric unit of capacity
- **Milliliter (mL)** - a metric unit of capacity equal to 1/1,000 of a liter
- **Gram (g)** - a metric unit of weight equal to 1/1,000 of a kilogram
- **Kilogram (kg)** - a metric unit of weight equal to 1,000 grams
Outline of Day-to-day Lesson Plans

Lesson 1
Science: Exploratory with nonstandard units.
   Students are using paper clips to measure objects from around the classroom.

Lesson 2
Math: Measuring to the Nearest Quarter- and Eighth-Inch
   Students will be using the same objects from lesson 1 using a 12-inch ruler. The students will be measuring to the nearest quarter-inch and eighth-inch in small groups.

Lesson 3
Math: Inch, Foot, Yard, and Mile and their Conversions
   Students will be experimenting with their height and converting the customary units of length.

Lesson 4
Math: Gallon, Quart, Pint, and Cup and their Conversions
   Students will be experimenting with customary units of capacity. They will be working on the conversions of the units.

Lesson 5
Math: Ounce, Pound, and Ton and their Conversions
   Students will be experimenting with their weight if they choose and converting customary units of weight.

Lesson 6
Social Studies: Web Quest Weights and Measurements
   Students will be using the Internet to discover some of the history pertaining to weights and measurements. There will be a worksheet with fill in the blank questions straight from the web site. The site was created by the Federal Government.

Lesson 7
Science: Exploratory metric
   Students will be exploring measuring by using candy, Reese’s Pieces, Skittles, or M&M’s. They will be measuring objects found in their desks.
Lesson 8
Math: Measuring to the Nearest Millimeter and Centimeter
Students will be measuring the same objects from Lesson 7 using a metric ruler. The measurements will be to the nearest millimeter or centimeter.

Lesson 9
Math: Millimeter, Centimeter, Decameter, Meter, and Kilometer and their Conversions
Students will be experimenting with and converting metric units of length using the objects from the two previous lessons.

Lesson 10
Math: Liter and Milliliter and their Conversions
Students will be experimenting with units of capacity in the metric system. They will be reviewing the metric conversions.

Lesson 11
Math: Gram and Kilogram and their Conversions
Students will be experimenting with their mass and converting units of mass in the metric system.

Lesson 12
Student Project Work and Support
Students will have the opportunity to design their own bedrooms using specified guidelines provided by the teacher.

Lesson 13
Wrap up: Web Quest Measurement Games and Trivia
Students will be using the Internet to play many games where customary and metric systems are used. They will have to document their scores and times to get credit for the activities.
Teacher Resources:


Internet Sites:


Student Resources:

Internet Sites:
AAAMath *Metric Prefixes I*. Retrieved February 1, 2007 from Web site: http://www.321know.com/mea212x2.htm#section2

AAAMath *U.S. Length II*. Retrieved February 1, 2007 from Web site: http://www.321know.com/g412_ux2.htm#section2


Measuring Methods. Retrieved February 3, 2007 from Web site: http://www.mce.k12tn.net/measurement/measurement_chart.htm


Technology

Students are going to use the laptops for 2 WebQuests. The first quest will be in the Weights and Measures museum with objects from the National Institute of Standards and Technology. The second quest will be games and trivia about measurements that the students will have to play and they will record scores and answers.

I will be using the overhead projector to help the students understand the lessons. We will be graphing things, drawing diagrams and other things that will aide the students in understanding the material.
Letter to Parents
Dear Families,

We are starting a unit on Measurements in our class. This unit will be taught in place of chapter 12 in the Math book. Students will still be required to do pages from their practice books but they will not need their hardback books for this chapter.

This unit is designed to help your student understand how to use a 12-inch ruler to measure to the closest quarter and eighth inch and how to use a centimeter ruler to measure to the closest centimeter and millimeter. Students will also learn how to convert units in the customary (U.S.) measurement system and in the metric system. By the end of this unit, your student should be able to tell you how many feet are in a mile and how many meters are in a kilometer. These are just a couple examples of the conversions we will be learning.

I enjoy using technology in the classroom and I will be using the laptops with your student. They will be using the laptops to find historical facts about the measuring systems we will be studying and they will have a chance to play a few educational games that I have found online.

This unit is designed to span approximately 12 days. We have started this week and should finish during the week before Spring Break. By doing this, your student will not have to retain information over the long break for a test.

During that final week of the unit, your student will be asked to design their own bedroom. Specifications will be sent home at a later date, closer to the project. They will have to put a bed, dresser, nightstand, closet doors, windows, and a hallway door in the room. I will give them two “rooms” to utilize. One will be for planning purposes and the other will be the final draft that they turn in to me.

I hope that you can help your student with this unit as we complete homework and the project. If you have any questions or would like more information please feel free to contact me through the school.
Display Area

My display will be on the closet doors in the classroom where all the students can see it. In the beginning of the unit, there will not be many items displayed because I am going to put things up as we talk about them. The headers for the set will be displayed telling the students what we are going to be learning about. The headers are How heavy is it? (Weight/Mass), How much does it hold? (Capacity/Volume), and How long is it? (Length).

Under the length header there are rulers for the metric system and customary system. The rulers are joined so the students can see the equivalency between the systems. There are also pieces that contain conversions within each measurement system. One has inches to feet, feet to yard, feet and yards to mile while the other has millimeters to centimeters, centimeters to meter and meters to kilometers.

The weight/mass header has conversions within each measurement system also. There are ounces to pounds, pounds to tons, grams to kilograms and kilograms to tonne (we will not be using the last one). There are also pieces that show the equivalency between pounds and kilograms.

With the capacity/volume header there is a pitcher that shows the equivalency between the metric system and the customary system. A few pieces show the conversions from cups to pint, pints to quart, quarts to gallon, milliliters to deciliter, deciliters to liter and liters to kiloliters. We will not be discussing all of the metric units but I think that it is good for the students to see them.
**Student Project**

Students are going to design their own bedroom using specific measurements. They will have to go by measurements given to them and they will be given a room and furniture specifications in scale. The day before they start on the room, the students will draw on a piece of paper the shapes of the objects that are to be placed in the room. The day they start designing they will have to label the objects and place them in the room. Time will be given to them during class to get started on this project. If they do not finish, they may take it home to finish or leave it at school to finish the next day.

Given the following measurements, design a bedroom for yourself. I must be able to measure the furniture, doors and windows without having to ask where one ends and the other begins. Please label the items so I know that you have included everything.

In the given room, 8 in. x 10 in., you must have a bed, dresser, nightstand, closet doors (sliding doors), a window, and a door leading out of the room. The items must measure:

- **Bed**: 76 mm. x 127 mm.
- **Dresser**: 1 cm. x 6 cm
- **Nightstand**: 3/4 in. x 1 5/8 in.
- **Closet doors**: 4 1/4 in.
- **Window**: 2 7/8 in.
- **Doorway**: 6 cm.

These are the things you must have. You need to leave a pathway next to some of the furniture so you can move around without bumping into things. Around the bed, there should be a space of 1/4 in. In front of the dresser there should be 3/8 in., in front of the closet there should be 5 cm. and in front of the door there should be 2 in. of space. If you choose to add any furniture, tell me the measurements of the furniture.
Autumn Mundy 4th Grade
Math Unit- Science Day 1

Standard 4.5.3 Illustrate how length can be thought of as unit lengths joined together, area as a collection of unit squares, and volume as a set of unit cubes.

**Materials:**
- Paper with objects listed
- Paperclips
- Objects from around the room
- *Weights and Measures* by Jerry Pallotta with questions on sticky notes

**Objective:**
Students will be able to correctly measure the length of objects around the room with paper clips.

**Goal for Learner:**
The learner will demonstrate how to measure objects using paper clips.

**Motivation:**
Ask the students to guess how wide their desk is, how wide the top of one of the computers is, how long their pencil is. Ask how they decided the measurement for that object. Read the book *Weights and Measures* by Jerry Pallotta. Ask students questions about the book as it’s being read.

**Content and Procedure:**
1. Explain the activity to the students.
   a. All students will receive a paper that has random objects from around the room listed.
   b. Students will be divided into groups of 3, there will be one group of 2.
   c. Each member of the group should measure at least four (4) things off the list.
   d. There are numbers on different objects around the room. At each of those objects is a baggie with paper clips. Estimate how many paper clips you think it will take to measure the object. Estimations may be individual.
e. Take the paper clips out of the bag and measure the object that is marked. All group members need to record the results.
f. When the group has finished measuring all the objects, they can sit and work together to answer the first set of questions on the back of the sheet.

2. Model the process using something that the students will not measure.
3. Give the students the paper with the list of objects.
4. Divide them into groups, count off by 8.
5. Have each group start at a different place.
6. When students finish, they can sit in a group and answer the questions on the back of the paper.

**Practice/Application:**
Students will go from station to station measuring the object at the station and recording it on their paper.

**Evaluation:**
Go over the measurements that the groups have recorded. Collect all the papers to be kept for lesson 2.

**Closure:**
Ask students what they thought about the activity. Talk about other units of non-standard measurements they could have used.
Customary Measure Scavenger Hunt

Directions: Day 1 - Measure the objects listed below with the paperclips at each station.

Day 2 - Measure the objects listed below to the nearest quarter inch or eighth inch. Look at each station to see which one.

<table>
<thead>
<tr>
<th>Object</th>
<th>Estimate paperclips</th>
<th>Paperclip measurement</th>
<th>Estimate inches</th>
<th>Measure and Label quarter or eighth inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 Width of Computer</td>
<td></td>
<td></td>
<td></td>
<td>in</td>
</tr>
<tr>
<td>#2 Length of stapler</td>
<td></td>
<td></td>
<td></td>
<td>in</td>
</tr>
<tr>
<td>#3 Length of English assignments</td>
<td></td>
<td></td>
<td></td>
<td>in</td>
</tr>
<tr>
<td>#4 Height tissue box</td>
<td></td>
<td></td>
<td></td>
<td>in</td>
</tr>
<tr>
<td>#5 Closet door handle height</td>
<td></td>
<td></td>
<td></td>
<td>in</td>
</tr>
<tr>
<td>#6 Height of length poster on closet</td>
<td></td>
<td></td>
<td></td>
<td>in</td>
</tr>
<tr>
<td>#7 Width of two mailboxes</td>
<td></td>
<td></td>
<td></td>
<td>in</td>
</tr>
<tr>
<td>#8 Width of book</td>
<td></td>
<td></td>
<td></td>
<td>in</td>
</tr>
<tr>
<td>#9 Width of keyboard</td>
<td></td>
<td></td>
<td></td>
<td>in</td>
</tr>
<tr>
<td>#10 Length of pencil sharpener</td>
<td></td>
<td></td>
<td></td>
<td>in</td>
</tr>
<tr>
<td>#11 Poster on bulletin board</td>
<td></td>
<td></td>
<td></td>
<td>in</td>
</tr>
<tr>
<td>#12 Width of your Math book</td>
<td></td>
<td></td>
<td></td>
<td>in</td>
</tr>
</tbody>
</table>
Math Unit - Math Day 2

Standard 4.5.1 Measure length to the nearest quarter-inch, eighth-inch, and millimeter.

Materials:
- 12 inch rulers
- Same objects from 1st lesson
- Papers with objects listed from 1st lesson
- Math books

Objective:
Students will be able to measure to the nearest quarter-inch or eighth-inch with 85% accuracy.

Goal for Learner:
To know how to measure to the nearest quarter or eighth inch.

Motivation:
Look at the objects that we measured with paper clips. Measure one of the paper clips and estimate the measurements of the objects around the room.

Content and Procedure:
1. Explain the activity to the students.
   a. All students will receive their paper from the 1st lesson.
   b. Students will be divided into pairs, there will be one group of 3.
   c. Each member of the group should measure at least 6 things off the list. The group of three should measure 4 each.
   d. There are numbers on different objects around the room. At each of those objects is a card telling how to measure- to the nearest quarter or eighth inch.
   e. All group members need to record the results.
   f. When the group has finished measuring all the objects, they can sit and work together to answer the second set of questions on the back of the sheet.
2. Model the process using the object from the 1st lesson that students will not measure. 3. Measure the paper clip, estimate how long the object is to the nearest inch.
4. Explain the difference between the quarter inch and eighth inch on the rulers.
5. Have students get out their Math book. Measure to the nearest quarter and eighth inch as a class.
6. Give the students back their papers from the 1st lesson.
7. Let students get into pairs counting up to 11 this time, starting at a different point in the room. There will be one group of three.
8. Then, have them write down the estimations that they have come up with their partner based on the measurement of the paper clip.

**Practice/Application:**
Let students get into the pairs and start around the room. Give them enough time to measure the object and check themselves, then signal for them to move on to the next station.

**Evaluation:**
Go over the measurements that the students have and collect the sheets for a grade. Measure the objects where students are not in agreement.

**Closure:**
Ask students if they have any questions about measuring to the quarter or eighth inch. Review how many quarter and eighth inches are in one inch.
Autumn Mundy 4<sup>th</sup> Grade
Math Unit- Math Day 3

Standard 4.5.2 Subtract units of length that may require renaming of feet to inches or meters to centimeters.

**Materials:**
- 12 inch ruler
- Yardstick
- M&M height chart
- Index Cards
- Math Practice Book

**Objective:**
Students will be able to convert inches to feet, feet to yards, inches to yards, feet and yards to miles and vice-versa with 85% accuracy.

**Goal for Learner:**
To be able to convert units of customary measurements of length among themselves.

**Motivation:**
Measure the height of all the students. Have them form a line and quickly measure them to the nearest inch. Give the students an index card with their height on it.

**Content and Procedure:**
1. Ask the students how many inches tall they are. Then ask how tall they are using feet. Have volunteers tell how they figured out how to convert inches to feet.
2. Have the students come to the board and show how they converted inches to feet.
3. Have everyone flip over their index card and write that 1 foot =12 inches.
4. Move on to feet to yards by measuring the doorway in feet first then converging to inches.
5. Ask the students how many yards tall they are using the original measurement of inches.
6. Put that 1 yard = 3 feet and 1 yard = 36 inches on their index card.

7. Talk about the differences between feet and yards in the measurement of miles.
   Discuss how long a mile really is. Show students how to convert from miles to
   feet and yards to miles.

8. Put the conversion of 5,820 feet = 1 mile and 1 mile = 1,760 yards.

**Practice/Application:**
Have students get out their Math practice books and turn to page 75, 12.2. Have
students use their index cards that have the conversions on it to aid them in
completing the page.

**Evaluation:**
Students need to finish the practice book page for homework to be turned in
tomorrow.

**Closure:**
Ask students if they have any questions about converting customary measurements.
Review the conversions for inches, feet, yards, and mile.
Autumn Mundy 4th Grade
Math Unit- Math Day 4
Standard 4.5.8 Use volume and capacity as different ways of measuring the space inside a shape.

Materials:
Overhead/rag/markers
Index card
Measuring cup
Pint jar/ Quart jar
Gallon bucket
Container to hold water
Fruity Favorite worksheet

Objective:
Students will be able to convert cups to pints, quarts and gallons, pints to quarts and gallons, and quarts to gallons and vice-versa with 85% accuracy.

Goal for Learner:
To be able to convert units of customary measurements of liquids among themselves.

Motivation:
Ask the students how many cups of ice cream they think they can eat. Draw a graph on the overhead. Tell about how the class is going to talk about capacity of different things.

Content and Procedure:
1. Ask the students how many pints of ice cream they think they can eat. See if any of the numbers match up.
2. Show the cup and pint jar. Ask the students to guess how many cups of water could fit in the pint jar. Have a student who guesses 2 cups put two cups of water into the pint jar. Write on the index card index card, 1 pint = 2 cups.
3. Ask the students how many quarts of soft drink they could drink. Graph the results.
4. Show the pint jar and quart jar. Ask the students to guess how many pints of water could fit in the quart jar. Have a student who guesses 2 pints put two pints of water into the quart jar.

5. Ask the students to guess how many cups would fit into the quart jar. Have a student who guesses closest to 4 cups dump the water out of the quart jar and tell how many times the cup was filled.

6. Write on the index card, 1 quart = 2 pints, 1 quart = 4 cups.

7. Show the quart jar and gallon bucket. Ask the students to guess how many cups of water could fit in the pint jar. Have a student who guesses closest to 4 quarts put 4 quarts of water into the gallon bucket.

8. Ask the students to guess how many pints of water could fit in the gallon bucket. Have a student who guesses closest to 8 pints put eight pints of water into the gallon bucket.

9. Ask the students to guess how many cups of water could fit in the gallon bucket. Have a student who guesses closest to 16 cups put 16 cups of water into the gallon bucket.

10. Write on the index card, 1 gallon = 4 quarts, 1 gallon = 8 pints, and 1 gallon = 16 cups.

Practice/Application:
Pass out the Fruity Favorite worksheet. Have students use their index cards that have the conversions on it to aid them in completing the page.

Evaluation:
Students need to finish the worksheet for homework to be turned in tomorrow.

Closure:
Ask students if they have any questions about converting customary measurements. Review the conversions for gallons, quarts, pints, and cups.
Standard 4.5.2 Subtract units of length that may require renaming of feet to inches or meters to centimeters.

Materials:
Overhead/rag/markers
Index card
Standard Scale
Balance Scale and Weights
Math Practice Book

Objective:
Students will be able to convert ounces to pounds and tons, pounds to tons and vice-versa with 85% accuracy.

Goal for Learner:
To be able to convert units of customary measurements of weight among themselves.

Motivation:
Ask the students how much they weigh. If they want to weigh themselves on the scale they can. Have them write it down on the index card.

Content and Procedure:
1. Ask the students to guess how many ounces they think are in a pound. On what basis are they making the estimation?
2. Have a student level out the balance scale with ounces and pounds.
3. Discuss the number of ounces in a pound, write 1 pound = 16 ounces on the index card.
4. Talk about how much a ton is, about an elephant. About how many pounds are in a ton? Write on the index card 1 ton = 2,000 pounds.
Practice/Application:

Have students get out their Math practice books and turn to page 77, 12.4. Students may use their index cards that have the conversions on it to aid them in completing the page.

Evaluation:

Students need to finish the practice book page for homework to be turned in tomorrow.

Closure:

Ask students if they have any questions about converting customary measurements. Review the conversions for ounces, pounds and tons.
Autumn Mundy 4th Grade
Math Unit - Social Studies Day 6
Standard 4.1.14 Distinguish fact from opinion and fact from fiction in historical
documents and other information resources.

Materials:
- Computer/Projector
- Laptops
- Worksheet

Objective:
Students will be able to distinguish fact from opinion after answering questions from
the given web site.

Goal for Learner:
To be able to tell fact or opinion after answering questions.

Motivation:
Tell them about the site they are going to go see. Show them how to get there.

Content and Procedure:
1. Take the students to the teachers' lounge to get computers.
2. Have address on the board where they can see it.
3. Pass out the worksheet. Let them explore the museum of *Weight and Measures*.

Practice/Application:
Students will answer the questions then mark fact or opinion next to the number.

Evaluation:
Go over the worksheet and have them turn it in.

Closure:
Ask students what they thought about the activity. Talk about any questions they
may have. Take the computers back.
NAME ____________________
The History of Weights and Measurements

Directions: Type in this web address:
http://museum.nist.gov/exhibits/ex1/index.html and answer the following questions. They are taken directly from the pages of this museum.

Room 1- One Question from Each Object and one from the front page.
1. The __________ system --a decimal system with a standardized nomenclature-- was considered a democratic development because it was thought to be accessible to people on all levels of society.
2. The kilogram/liter was a hollow gold-plated __________ sphere having a mass of approximately 1 kg and a volume of approximately 1 cubic decimeter (1 liter).
3. Congress responded by appointing a committee to study the matter but was reluctant to take conclusive action as long as the fate of the metric system was still undetermined in _________.
4. After just _____ months, Jefferson presented two alternative plans.
5. ________ favored the metric as the most rational of the two systems but feared that established usage would render it unworkable.

Room 2- Make sure to visit the “Star” Avoirdupois Pound and Committee Meter Objects.
6. The mass of a ________ pound is 0.82286 of an avoirdupois pound’s mass.
7. In _________, Congress legalized use of the metric system in the United States.
Room 3- Look at the Mass Standards, Bronze Yard, and Photograph of Balances objects.
8. Each standard was marked with a ________ so that the results of comparisons between it and the prototype standard at OWM could be ascertained if the label accompanying the standard was lost.
9. In 1834, the British Imperial Troy Pound and Yard were destroyed by ________ when the Houses of Parliament burned.
10. These balances with capacities of 50 lb, _____ lb, and 1 lb were received by the states from the Office of Weights and Measures (OWM).

Room 4- Visit the Photo of the International Bureau, National Prototype Meter, and Prototype Kilogram 20 objects.
11. The Treaty of the Meter (1875) mandated the establishment of a permanent International Bureau of Weights and Measures, to be located at Sevres, ________.
12. The United States received National Prototype Meters No. 27 and No. 21 in ________.
13. After The Mendenhall Order in 1893, Kilogram No. 20 became the primary national standard for all ________ measurements.

Room 7- Look at the Photograph of Architectural Model and Photo of Mass Standards objects.
14. In the 1960s, the National Bureau of Standards (NBS) decided to make another distribution of standard weights and measures and standard ________ devices to the states using federal monies.
15. In the disbursement made to the states in the 1960s and 1970s, the standards of length, mass, and volume were constructed of stainless ________ rather than brass as they had been in the past.
The History of Weights and Measurements

Directions: Type in this web address:
http://museum.nist.gov/exhibits/ex1/index.html and answer the following questions. They are taken directly from the pages of this museum.

Room 1- One Question from Each Object.
1. The metric system --a decimal system with a standardized nomenclature-- was considered a democratic development because it was thought to be accessible to people on all levels of society.
2. The kilogram/liter was a hollow gold-plated brass sphere having a mass of approximately 1 kg and a volume of approximately 1 cubic decimeter (1 liter).
3. Congress responded by appointing a committee to study the matter but was reluctant to take conclusive action as long as the fate of the metric system was still undetermined in Europe.
4. After just 4 months, Jefferson presented two alternative plans.
5. Adams favored the metric as the most rational of the two systems but feared that established usage would render it unworkable.

Room 2- Make sure to visit the “Star” Avoirdupois Pound and Committee Meter Objects.
6. The mass of a troy pound is 0.82286 of an avoirdupois pound's mass.
7. In 1866, Congress legalized use of the metric system in the United States.

Room 3- Look at the Mass Standards, Bronze Yard, and Photograph of Balances objects.
8. Each standard was marked with a **number** so that the results of comparisons between it and the prototype standard at OWM could be ascertained if the label accompanying the standard was lost.

9. In 1834, the British Imperial Troy Pound and Yard were destroyed by **fire** when the Houses of Parliament burned.

10. These balances with capacities of 50 lb, **10** lb, and 1 lb were received by the states from the Office of Weights and Measures (OWM).

**Room 4**- Visit the Photo of the International Bureau, National Prototype Meter, and Prototype Kilogram 20 objects.

11. The Treaty of the Meter (1875) mandated the establishment of a permanent International Bureau of Weights and Measures, to be located at Sevres, **France**.

12. The United States received National Prototype Meters No. 27 and No. 21 in **1890**.

13. After The Mendenhall Order in 1893, Kilogram No. 20 became the primary national standard for all **mass** measurements.

**Room 7**- Look at the Photograph of Architectural Model and Photo of Mass Standards objects.

14. In the 1960s, the National Bureau of Standards (NBS) decided to make another distribution of standard weights and measures and standard **measuring** devices to the states using federal monies.

15. In the disbursement made to the states in the 1960s and 1970s, the standards of length, mass, and volume were constructed of stainless **steel** rather than brass as they had been in the past.
Standard 4.5.3 Illustrate how length can be thought of as unit lengths joined together, area as a collection of unit squares, and volume as a set of unit cubes.

Materials:
- Overhead/rag/markers
- Candy (Reese's, Skittles or M&M's)
- Math Book
- Pencils
- Crayon or colored pencil
- Napkins/paper towels
- Fingers and hands
- Paper with list of objects to be measured

Objective:
Students will be able to measure objects using candy as the non-standard unit.

Goal for Learner:
To be able to measure accurately using candy.

Motivation:
Ask the students how many pieces of candy they think could go from end to end of their Math books. Graph the guesses on the overhead.

Content and Procedure:
1. Ask the students to get out their Math book, a pencil, and a crayon or colored pencil.
2. Give them the candy of their choice after you have explained the rules!
   a. You can eat the candy only when you are told that the activity is finished.
   b. Candy stays on the napkin at all times.
3. Have them measure their Math books. Compare to the graphed results.
4. Measure their pencils, crayon or colored pencil, index finger and width of their hand from the base of their pinky finger to the base of their index finger. They may need to draw a line on either side of their hand to accomplish this.
5. Compare measurements. Decide which ones should be the same and which measurements could be different. See who has the widest hand and the longest index finger.

**Practice/Application:**
Students will measure the objects at their desk and record them on their paper.

**Evaluation:**
Go over the measurements that the students have recorded. Collect all the papers to be kept for lesson 7.

**Closure:**
Ask students what they thought about the activity. Talk about other units of non-standard measurements they could have used.
Name ____________________

Metric Measure Scavenger Hunt

Directions: Day 1 - Measure the objects listed below with the candy.

Day 2 - Measure the objects listed below to the nearest centimeter or millimeter.

<table>
<thead>
<tr>
<th>Object</th>
<th>Estimate candy</th>
<th>Candy measurement</th>
<th>Estimate cm or mm</th>
<th>Measure to nearest cm or mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 Thickness of Math book</td>
<td></td>
<td></td>
<td></td>
<td>mm</td>
</tr>
<tr>
<td>#2 Length your index finger</td>
<td></td>
<td></td>
<td></td>
<td>cm</td>
</tr>
<tr>
<td>#3 Length your pencil</td>
<td></td>
<td></td>
<td></td>
<td>mm</td>
</tr>
<tr>
<td>#4 Length of a crayon/colored pencilmarker</td>
<td></td>
<td></td>
<td></td>
<td>mm</td>
</tr>
<tr>
<td>#5 Width of paper towel</td>
<td></td>
<td></td>
<td></td>
<td>cm</td>
</tr>
<tr>
<td>#6 Width of your hand, knuckle of index to knuckle of pinky fingers</td>
<td></td>
<td></td>
<td></td>
<td>mm</td>
</tr>
<tr>
<td>#7 Length of your pinky finger</td>
<td></td>
<td></td>
<td></td>
<td>cm</td>
</tr>
<tr>
<td>#8 One object from your desk</td>
<td></td>
<td></td>
<td></td>
<td>cm</td>
</tr>
</tbody>
</table>
Standard 4.5.1 Measure length to the nearest quarter-inch, eighth-inch, and millimeter.

Materials:
- Overhead/rag/markers
- Math Book
- Pencils
- Crayon or colored pencil
- Fingers and hands
- Paper with list of objects to be measured
- Metric ruler

Objective:
Students will be able to measure objects to the nearest millimeter or centimeter with 85% accuracy.

Goal for Learner:
To be able to measure accurately using a metric ruler.

Motivation:
Let the students estimate how many centimeters objects are based on the candy measurements from the day before.

Content and Procedure:
1. Pass back the paper from lesson 6. Have the students estimate how many centimeters each object is.
2. Explain how to measure using a metric ruler. Measure your index finger and show students the markings on the ruler.
3. Let them measure the objects from lesson 6. They will record the measurements on the paper from the lesson before.
**Practice/Application:**

Let students measure the objects at their seat. Give them enough time to measure the objects and check themselves.

**Evaluation:**

Go over the measurements that the students have and collect the sheets for a grade. Measure the objects where students are not in agreement.

**Closure:**

Ask students if they have any questions about measuring to the nearest centimeter and millimeter. Review how many centimeters are in a meter and how many millimeters are in a centimeter and meter.
Standard 4.5.2 Subtract units of length that may require renaming of feet to inches or meters to centimeters.

Materials:
- Overhead/rag/markers
- Index cards
- Matching cards
- Math Practice Book

Objective:
Students will be able to convert millimeters to centimeters, decameters, meters and kilometers, and centimeters to decameters, meters and kilometers, meters to decameters and kilometers, decameters to kilometers and vice-versa with 85% accuracy.

Goal for Learner:
To be able to convert metric units of length.

Motivation:
Measure the students' heights in centimeters and have them write it on an index card. Tell them that later on in the lesson they will find out how many millimeters, meters, decameters, and kilometers tall they are.

Content and Procedure:
1. Have the students guess how many meters tall they are. See how students derived they estimation.
2. Talk about the conversion of millimeters to centimeters to meters to decameters and to kilometers. Show the steps on the overhead.
3. Ask the students questions, using the base number of 1, about converting. Ask how many millimeters are in 1 meter and so on.
4. Write the conversions on the index card for students to use on the PB page.
Practice/Application:
Write the prefixes on the board with the number underneath it, milli- .001, centi- .01, deca- 10, kilo- 1,000. Give the students index cards that have the metric units on them and also cards that have the unit in a different unit on them. An example being 1 meter and the matching card would be 100 centimeters. They will have to match the units by the correct conversion.

Evaluation:
Have students complete PB 12.7, pg 80 to be checked the next day. Students may use their index card.

Closure:
Ask students if they have any questions about converting metric units of length.
Autumn Mundy 4th Grade
Math Unit- Math Day 10

Standard 4.5.2 Subtract units of length that may require renaming of feet to inches or meters to centimeters.

Materials:
- Overhead/marker/rag
- Liter cups
- Graduated cylinder
- Index cards
- Liter bottle
- 2 Liter bottle
- Mixed-Up Measurements worksheet

Objective:
Students will be able to convert milliliters to liters and vice-versa with 85% accuracy.

Goal for Learner:
To be able to convert metric units of capacity.

Motivation:
Ask the students how many of them could drink a liter of soda. How many could drink 2,000 milliliters of soda. How many liters is 2,000 mL? Let’s find out.

Content and Procedure:
1. Have a student fill the L cup up with water. Then have the class count how many mL are in the L as the student pours the water into the graduated cylinder.
2. Write the conversion on the index card, 1 liter = 1,000 milliliters.
3. Talk about how converting liters to milliliters is the same as converting meters to millimeters.
4. Let the students experiment with the graduated cylinders and liter cups in small, supervised groups while the others work on the PB page.
**Practice/Application:**
Let students use their index cards to complete the Mixed-Up Measurements worksheet

**Evaluation:**
Students will turn in Mixed-Up Measurements the next day in class.

**Closure:**
Ask students if they have any questions about converting milliliters to liters. Review the conversions for metric units.
Standard 4.5.2 Subtract units of length that may require renaming of feet to inches or meters to centimeters.

Materials:
- Overhead/marker/rag
- Index Cards
- Metric Scale
- Standard Scale
- Math Practice Book

Objective:
Students will be able to convert grams to kilograms and vice-versa with 85% accuracy.

Goal for Learner:
To be able to measure convert metric units of mass.

Motivation:
Let the students weigh themselves on the metric scale. Have them write down their weight on the index card.

Content and Procedure:
1. When all students who want to be weighed, have written down their numbers, ask them to guess how many grams they think they will weigh.
2. Ask them what they used to figure out the conversion. Remind them of the metric system being the same no matter what the basic unit is.
3. Write on the index card, 1 kilogram = 1,000 grams.
4. Let the students weigh things from around the room. They can compare kilograms and pounds with the different scales. Those not experimenting should be working on the Practice Book page.
Practice/Application:
The students can use the index card with metric conversions to complete PB 12.9, page 82

Evaluation:
Grade the PB page 82 the next day in class.

Closure:
Ask students if they have any questions about converting metric units. Explain the final project and web quest. Have the students draw the objects for the final project.

   Bed- 76 mm. x 127 mm.
   Dresser- 1 cm. x 6 cm
   Nightstand- 3/4 in. x 1 5/8 in.
Materials:
- Folders
- Room diagram
- Room specifications
- Rulers
- Markers/crayons/colored pencils

Objective:
Students will be able to design a room based on given measurements of furniture and room specifications.

Goal for Learner:
To be able to design their own bedroom with given specifications.

Motivation:
Ask the students how many of them were able to help set up their bedroom just the way they wanted it. Tell a little about the assignment before going into a lot of detail.

Content and Procedure:
1. Explain the project before passing out any materials.
   a. Each student is going to get a folder. In that folder is all the papers you will need to finish the project.
   b. When you get your folder open it to the first page, the specifications of the room. The next page will be the room outlined in black. You will have two copies of this, one for drafting or practicing and one for the final copy.
   c. You will each want different things in your rooms, so you will work on your own.
   d. Make sure that you do not lose any of the papers in the folder because you will have to turn in all your work.
2. Hand out the folders to the students.
3. Explain the specifications when they have that paper in front of them so they can make marks on the paper for clarification.
4. Let the students work individually with minimal talking. If noise gets too loud the students can work in silence.

Practice/Application:
Let students work on the room during the assigned subject time. Be available to answer questions and keep students on track. If students finish early, let them pick a color palette for their room, have them describe it on a separate piece of paper.

Evaluation:
Students will turn in their rooms the next day if they do not finish the day of the lesson.

Closure:
Ask students if they have any questions about the project or what is suppose to be done by the next day. Do a quick review for the post-test.
## Making A Poster: Room Design

**Teacher Name:** Miss Mundy

**Student Name:**

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>5</th>
<th>3</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Elements</td>
<td>The room includes all required items.</td>
<td>Two of the required items are missing in the room.</td>
<td>Four of the required items are missing in the room.</td>
<td>All required items were missing.</td>
</tr>
<tr>
<td>Labels</td>
<td>All items in the room are clearly labeled with labels that can be read.</td>
<td>Almost all items in the room are clearly labeled with labels that can be read.</td>
<td>Several items in the room are clearly labeled with labels that can be read.</td>
<td>Labels are too small or messy to read.</td>
</tr>
<tr>
<td>Measurements</td>
<td>All items are measured to the correct length.</td>
<td>Most items are measured correctly.</td>
<td>Few items are measured correctly.</td>
<td>Measurements are not correct.</td>
</tr>
<tr>
<td>Attractiveness</td>
<td>The room is exceptionally attractive in terms of design, layout, and neatness.</td>
<td>The room is attractively in terms of design, layout and neatness.</td>
<td>The room is acceptably attractive though it may be a bit messy.</td>
<td>The room is distractingly messy or very poorly designed. It is not attractive.</td>
</tr>
<tr>
<td>Originality</td>
<td>Several of the items used on the poster reflect a exceptional degree of student creativity in their creation and/or display.</td>
<td>One or two of the items used on the poster reflect student creativity in their creation and/or display.</td>
<td>The items are made by the student, but the room is minimum in design.</td>
<td>No items made by the student are included.</td>
</tr>
</tbody>
</table>
Autumn Mundy 4th Grade
Math Unit- Math Day 13

Standard 4.5.1 Measure length to the nearest quarter-inch, eighth-inch, and millimeter.
Standard 4.5.2 Subtract units of length that may require renaming of feet to inches or meters to centimeters.
4.5.8 Use volume and capacity as different ways of measuring the space inside a shape.

Materials:
  Computer/Projector
  Laptops
  Worksheet

Objective:
  Students will be able to play games using customary and metric measurements.

Goal for Learner:
  To be able to play games using the U.S. measurement system and the metric system.

Motivation:
  Tell them about the site they are going to go see. Show them how to get there.

Content and Procedure:
  1. Take the students to the teachers' lounge to get computers.
  2. Have address on the board where they can see it.
  3. Pass out the work sheet. Let them explore the different games listed on the site

Practice/Application:
  Students will mark their scores and times for the games played.

Evaluation:
  Go over the scores and times of the students and have them turn it in.

Closure:
  Ask students what they thought about the activity. Talk about any questions they may have. Take the computers back.
Name __________________

Measuring Fun

Record your scores from the web pages you visit!

1. How many did you get correct in 1 min.? ______

2. Did you get 10 out of 10? _____
   If not how many did you get correct? ______

3. What was your matching score? _____ Did you beat me? _____

4. Did you measure correctly? 1____ 2____ 3____ 4____ 5____

5. How many did you answer correctly on the quiz? _____

6. What weighs about 1 gram? __________
   What can you use to measure about 1 inch? __________
   What holds about 1 pint? ________________

7. How many did you answer correctly? _____

8. How long is 1 furlong? __________
   How many square rods are in 1 acre? ______
   How many pints are in 4 gills? ______
   How many pounds are in 1 gross? ______
   What is a peck? ________________
   What is considered 1 chain? __________
Measurements

1. How many blocks long is the stack of books? _______
   Science 4.5.3

2. How many cubes would fit into the box? _______
   Science 4.5.3

3. How many squares would it take to cover the blanket? _______
   Science 4.5.3

Measure the pencil and orange to the nearest quarter-inch.

4. _______ 5. _______
   Math 4.5.1 Math 4.5.1

Measure the girl’s legs to the nearest the eighth inch.
Measure the blocks from end to end to nearest eighth inch.

6. _______ 7. _______
   Math 4.5.1 Math 4.5.1
Measure the tomato and crayon to the nearest millimeter

8. ________

9. ________

10. The amount of water in a swimming pool would be measured in customary units of ______________.

11. The metric unit for the amount of water in a sink is ________________.


13. The amount of water in a rain gauge would be measured in metric units of ________________.

14. _______ centimeters = 3 meters.

15. _______ cups = 1 gallon

16. 2 yards = ________ feet.

17. 1000 milliliters = ______ liters
Name _________________________

Measurements

1. The notepad is 3 units wide and 3 units long. What is the area? _______ square units

Science 4.5.3
2. Explain how you measured the area of the front cover of the book with the given information? Science 4.5.3

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

3. There are 12 ___________ in a can of Pepsi.

Math 4.5.8
Name _______ Pre-Test _______ Measurements

1. How many blocks long is the stack of books? __3__

2. How many cubes would fit into the box? __18__

3. How many squares would it take to cover the blanket? __18__

Measure the pencil and orange to the nearest quarter-inch.

4. 2 1/4 or 2 1/2 in. 5. __1 in.__

Measure the girl’s legs to the nearest the eighth inch. Measure the blocks from end to end to the nearest eighth inch.

6. 1 3/4 or 1 6/8 in. 7. 2 5/8 or 2 3/4 in.
Measure the tomato and crayon to the nearest millimeter

8. 24 mm.  9. 48 mm.

10. The amount of water in a swimming pool would be measured in customary units of __gallons__.

11. The metric unit for the amount of water in a sink is __liters__.

12. A glass of milk contains a __cup__ of liquid.

13. The amount of water in a rain gauge would be measured in metric units of __milliliters__.

14. __300__ centimeters = 3 meters.  15. __16__ cups = 1 gallon

16. 2 yards = __6__ feet  17. 1000 milliliters = __1__ liters
Name __________________________

Measurements

1. The notepad is 3 units wide and 3 units long.
   What is the area?  __9__ square units

2. Explain how you measured the area of the front cover of the book with the given information?
   _____ Answers may vary

   ______________________________________
   ______________________________________
   ______________________________________
   ______________________________________
   ______________________________________
   ______________________________________
   ______________________________________
   ______________________________________

3. There are 12 ___ounces___ in a can of Pepsi.
Name Post-Test

Measurements

1. How many blocks long is the pencil? ________
Science 4.5.3

2. How many cubes would fit into the box? ________
Science 4.5.3

3. How many squares would it take to cover the front of the desk? _______
Science 4.5.3

Measure the pencil and the top of the blackboard to the nearest quarter-inch.

4. ________
Math 4.5.1

5. ________
Math 4.5.1

Measure the square to the nearest the

sixth inch.

Measure the bus from end to end to the nearest eighth inch.

6. ________
Math 4.5.1

7. ________
Math 4.5.1
Measure the pumpkin and bottom of the triangle to the nearest millimeter.

8.  
Math 4.5.1

9.  
Math 4.5.1

10. The amount of water in a swimming pool would be measured in customary units of ______________.
Math 4.5.8

11. The metric unit for the amount of water in a sink is ________________.
Math 4.5.8

Math 4.5.8

13. The amount of water in a rain gauge would be measured in metric units of ________________.
Math 4.5.8

14. There are 12 __________ in a can of Pepsi.
Math 4.5.8

15. _______ centimeters = 3 meters.  
Math 4.5.2

16. _______ cups = 1 gallon  
Math 4.5.2

17. 2 yards = __________ feet.  
Math 4.5.2

18. 1000 milliliters = _____ liters  
Math 4.5.2
19. The rectangle is 3 units wide and 6 units long.

   What is the area? _______ square units

Science 4.5.3

20. Explain how you measured the area of the rectangle with the given information? Science 4.5.3

__________________________________________________________________________________________

__________________________________________________________________________________________

__________________________________________________________________________________________

__________________________________________________________________________________________

__________________________________________________________________________________________

__________________________________________________________________________________________
Name ______ Post-test ______

Measurements

1. How many blocks long is the pencil? __4__

2. How many cubes would fit into the box? ___18___

3. How many squares would it take to cover the front of the desk? ___12___

Measure the pencil and the top of the blackboard to the nearest quarter-inch.

4. __2 3/4 in__

5. __1 1/4 in__

Measure the square to the nearest eighth inch.

6. __7/8 in__

Measure the bus from end to end to nearest eighth inch.

7. __2 1/4 or 2 3/8 in__
Measure the pumpkin and bottom of the triangle to the nearest millimeter

8. 38 mm  
9. 35 mm

10. The amount of water in a swimming pool would be measured in customary units of _gallons_.

11. The metric unit for the amount of water in a sink is _liter_.


13. The amount of water in a test tube would be measured in metric units of _milliliters_.

14. There are 12 _ounces_ in a can of Pepsi.

15. _300_ centimeters = 3 meters  
16. _16_ cups = 1 gallon

17. 2 yards = _6_ feet  
18. 1000 milliliters = _1_ liters
19. The rectangle is 3 units wide and 6 units long.
   What is the area? \( \underline{18} \) square units

20. Explain how you measured the area of the rectangle with the given information?
   \( \underline{\text{Answers may vary}} \)
## Pre-test Results

<table>
<thead>
<tr>
<th>Students</th>
<th>Math 5.1</th>
<th>Math 5.2</th>
<th>Math 5.8</th>
<th>Science 5.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alexis</td>
<td>#1</td>
<td>0</td>
<td>0</td>
<td>40</td>
</tr>
<tr>
<td>Sam C.</td>
<td>#2</td>
<td>0</td>
<td>50</td>
<td>20</td>
</tr>
<tr>
<td>Christian</td>
<td>#3</td>
<td>67</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>Austin C.</td>
<td>#4</td>
<td>17</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>Kilie C.</td>
<td>#5</td>
<td>17</td>
<td>0</td>
<td>40</td>
</tr>
<tr>
<td>Alivia</td>
<td>#6</td>
<td>0</td>
<td>100</td>
<td>60</td>
</tr>
<tr>
<td>Allison</td>
<td>#7</td>
<td>33</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rachel</td>
<td>#8</td>
<td>0</td>
<td>0</td>
<td>60</td>
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<tr>
<td>Yamileth</td>
<td>#9</td>
<td>17</td>
<td>0</td>
<td>20</td>
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<td>Andrew</td>
<td>#10</td>
<td>33</td>
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<td>Alex</td>
<td>#11</td>
<td>33</td>
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<td>Luke</td>
<td>#13</td>
<td>33</td>
<td>50</td>
<td>40</td>
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<tr>
<td>Austin M.</td>
<td>#15</td>
<td>0</td>
<td>25</td>
<td>60</td>
</tr>
<tr>
<td>Kiley M.</td>
<td>#16</td>
<td>0</td>
<td>25</td>
<td>60</td>
</tr>
<tr>
<td>James</td>
<td>#17</td>
<td>0</td>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td>Teri</td>
<td>#18</td>
<td>0</td>
<td>50</td>
<td>80</td>
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<td>Kailor</td>
<td>#19</td>
<td>17</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>Jordan</td>
<td>#20</td>
<td>17</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Joe</td>
<td>#21</td>
<td>17</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Matt</td>
<td>#22</td>
<td>17</td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>Olivia</td>
<td>#23</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sam M.</td>
<td>#24</td>
<td>17</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>Natasha</td>
<td>#25</td>
<td>33</td>
<td>0</td>
<td>20</td>
</tr>
</tbody>
</table>
Autumn Mundy  Mitchell Elementary  4th Grade  Overall Average- 27%
<table>
<thead>
<tr>
<th>Students</th>
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Pre-test Reflections

1. Based on the graph information, how did the students perform collectively on the Pre-test?

   Collectively, the students scored low on the pre-test. Almost all of the students scored at or below 33% on measuring to the closest eighth- and quarter-inch and millimeter. In the section where students convert from one unit of measurement to another, the scores are mostly at or below 50%. Scores at 60% or below also reflect the section where students had to decide what unit of capacity would be the best. The section where students measured by general units and not by specific units, like inch, centimeter or mile, is the best section of the pretest. Many students obtained a score above 40%.

2. Did any individual performances stand out? How will that impact your planning? Be specific.

   There was not one student that did outstanding overall on the pre-test. A few students stood out above the rest in a couple standard areas. I do not think that this will change the plans I was thinking of. There are many more students who did not understand the information presented. They need to learn the basic procedures first before they can acquire a higher level of thinking.

3. Based on the results, which indicators will require the most direct teaching?

   I believe that the Math indicator on converting between units in the same measuring system will require the most direct teaching. Over half of the students did not answer any of the questions on the pre-test correct.

4. Set a goal for mastery for your students. Indicate the percentage correct you expect your students to achieve on the post-test.

   Throughout the unit, I expect the students to be at an 85% mastery level. On the post-test, I expect students to answer 85% of the questions correct.
Unit Reflections

To what degree did your students master the standards you taught? Did you meet the goal you set? Are you satisfied with that level of mastery?

The students did not meet the mastery goal of 85% that I had previously set. For the standards in math, the students ranged from 43% to 53% mastery on average. In science, the mastery was around 31%. Looking at the scores from the pre-test to the post-test, I am satisfied with the level of mastery that the students achieved in the math standards. The level of mastery in the science standard was not raised much from the pre-test to the post-test.

Did some students show greater gains than others? If so, reflect on possible causes for these differences.

Many students showed a great gain from the pre-test to the post-test. A few did do much better on the post-test. I believe that many of the students had not been exposed to this information before. By just hearing the information and being shown how to figure the problems, many of the students were able to grasp the concept and retain it.

How did your instructional strategies, amount of review, type of projects, etc. impact student learning?

I tried to incorporate demonstrations so the students could see how the measurements worked together. I had the students work in small groups to use the discovery method while working with using a ruler. Students were able to work with a teacher for small group instruction and there was individual support given also. We reviewed more with the metric system than we did with the customary system. I think this helped the students grasp that the metric system was not as hard as they thought. All of this may have impacted the students’ learning because of the amount of time we spent on the topics. By offering different types of instruction, students could choose how they wanted to learn.

Reflect on the strengths and weaknesses of you assessments of student learning.
My assessments were somewhat weak during the unit. Mostly the assessment method was paper and pencil activities. I think if I could have incorporated more hands-on activities where the students could have applied what they were learning, the assessments would have been more accurate.

*Evaluate your student project and rubric. How well did this project process illustrate student application of their learning?*

I believe that the project evaluated only a portion of what was taught during the unit. To me that was the more important part, measuring with a ruler. Looking at the pre-test, students were not able to measure with a ruler. This is why I choose to do the project based on that. I started looking at the projects with the rubric that I originally created and realized that the components I wanted to be looking at were not being assessed with that rubric. I created another rubric that encompassed the aspects that I was looking at a little better. Many students did well on the project except on the measuring portion. I do not think that the project showed that the students grasped the concept of measuring with a ruler.

*What would you do differently in planning and teaching this unit again?*

I believe that I tried to find activities that the students would enjoy. When I introduced a few of the activities, many of the students complained and balked at completing them. Knowing this now, I think I would survey the students to see what they would like to do. I would have a list of activities and let them check two or three that they think would be fun. I would also like to include more discovery learning and possibly another project.

*Throughout the reflection process, what did you learn about yourself as a teacher? How will you apply this to your teaching in the future?*

I learned that I am the type of teacher who thinks they needs a paper trail. I noticed that anything the students did required a piece of paper and them documenting something. I would like to be able to change this in the future by using observation notes and projects where the students demonstrate what they know.