Converting Customary and Metric Measurements

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Spring Semester: Student Teaching

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Section One: *Unit Planning*

Converting Customary and Metric Measurements

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Unit Objective:

When given a summative test, students will convert measurements within a given measurement system by answering fill-in-the-blank questions and solving real-world problems with an accuracy of 80 percent.

5th Grade Math Standard:

18.) Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multistep, real-world problems. [5-MD1]

Skills	Concepts	Vocabulary	Facts
● Multiplication ● Division ● Addition ● Subtraction ● Ability to read a chart ● The ability to add to and complete a graphic organizer ● Use of a measurement tool (ruler, yard stick, metric stick, etc.)	Unit of measure Conversion	**Customary measurement:** system of measurement used in the United States ● Inch, foot, yard, and **mile** ● Cup, pint, quart, and **gallon** ● Ounce, **pound**, and **ton** **Metric measurement:** system of measurement using decimals; used throughout the world ● **Meter**, **liter**, and **gram** ● Kilo-, hecto-, deka-, deci-, centi-, and milli- **Length:** measurement of something end to end **Mass:** amount of matter in an object **Weight:** how heavy an object is **Capacity:** the maximum amount something can hold	**Customary measurement:** ● 1 foot=12 inches ● 1 yard=3 feet or 36 inches ● 1 mile=1,760 yards or 5,280 feet ● 1 cup=8 fluid ounces ● 1 pint=2 cups ● 1 quart= 2 pints or 4 cups ● 1 gallon= 4 quarts ● 1 pound=16 ounces ● 1 ton=2,000 pounds **Metric measurement:** ● 1 centimeter=10 millimeters ● 1 meter=1,000 millimeters ● 1 meter=100 centimeters ● 1 meter= 10 decimeters ● 1 kilometer= 1,000 meters ● 1 liter=1,000 milliliters ● 1 metric cup=250 milliliters ● 1 liter= 4 metric cups ● 1 kiloliter=1,000 liters ● 1 gram=1,000 milligrams ● 1 gram=100 centigrams ● 1 kilogram=1,000 grams

Lesson One: Introduction

- Read book on history of measurement
- Frontload vocabulary through Venn diagram sorting exercise
- Graphic organizer notes on conversion steps
- Mini poster creation for measurement conversion
- Assessment: exit slip

Use the conversion steps learned in lesson 1 to convert customary length

Lesson Two: Converting Customary Length

- Vote on longer length and convert
- Graphic organizer notes on converting customary length
- Measure board and convert
- Solve real-world problem as class
- Customary length conversion stations
- Assessment: solve problem and walk to answer on the wall

Problem of the Day—convert 15 ft. to inches

Lesson Three: Converting Customary Capacity

- Vote on cup with more water; then measure both cups
- Graphic organizer notes on converting customary capacity
- Model capacity conversion with previous cup capacities
- Solve real-world problem as class
- Gallonbot scavenger hunt and song creation
- Assessment: Sticky notes- one thing learned and one thing unsure about

Problem of the Day—convert 2 gallons to pints

Lesson Four: Converting Customary Weight

- KWL chart—Fill in "K" and "L" about converting customary weight
- Graphic organizer notes on converting customary weight
- Convert real examples of objects
- Solve real-world problem as class
- Table scoot activity practicing converting customary weight
- Assessment: Fill in "L" on KWL chart

Problems of the Day—one conversion problem from customary length, capacity, and weight

Lesson Five: Converting Metric Units

- Watch Bill Nye video introducing the metric system
- Graphic organizer notes on metric system (prefixes, names of units)
- Model conversion problems
- Solve real-world problem as class
- Metric conversion team competition
- Assessment: Sticky note walk (post answers to conversion problems around room)

Problem of the Day—Convert metric units; review all of measure-ment conversion

Lesson Six: Review and Test

- Open word sort using measurement terms and units learned throughout unit
- Each table explains the way they sorted their words and the categories created
- Review measurements and conversions for each system
- Two-round Jeopardy review game (team competition)
- Summative test
- Culminating activity—"Measure Me!"

Section Two: *Instruction*

Instruction Summary

The lessons for this unit are set up in a traditional sequence, in which there is an engagement, followed by explicit instruction, then an opportunity for students to practice, and finally brought back together with an assessment and a short closing. Throughout the lessons the content is taught in a similar fashion with the exception of lesson six, which is the review lesson. The students always have a chance to first fill in their graphic organizers using their prior knowledge about the lesson's information relating to measurement conversions. Then the teacher goes over the graphic organizer information to assure that students have the correct notes. Following the notes, the teacher presents a few conversion problems, in which she explicitly models and later has the students guide her through the steps. At the end of each lesson instruction the teacher will go over a word problem with the students involving conversions for the relevant measurement system in order to relate back to real-world situations.

Students have opportunities to make connections throughout the unit. The students can make connections to other subjects, such as Language Arts when they sort vocabulary words using a Venn diagram and when there is discussion about prefixes and base words within the metric system. Students also can make connections to prior knowledge, such as when they fill in a KWL chart on customary weight.

There is a wide range of vocabulary words when focusing on both customary and metric measurements. The new vocabulary is first introduced during a front loading vocabulary sort, in which the students each receive one word and have to place the word in the correct spot on the Venn diagram. Vocabulary is later addressed

throughout the unit during the correlating measurement system lesson, such as “quart” during the lesson on customary capacity.

There are times throughout the unit where students can have misconceptions about measurement sizes. However, I have included times to show students measurement tools, such as rulers and yard sticks. I also lead them to think about gallons of milk and liters of soda for capacity. In the lesson on customary weight, students convert the weights of different familiar objects seen in pictures, such as a desk and a school bus. In the culminating activity students measure themselves and convert their measurements. I feel that I have provided many opportunities to share examples so that student confusion is lessened.

I have included questions in this lesson to periodically check student understanding. This is done by accessing prior knowledge and comparing it to similar questions later on in the lesson. “Why” questions are continually asked to assure that students understand the measurement conversion concept. There are also repetitious questions about conversion steps to check that students know how to convert and to continually practice conversion steps.

Active learning is implemented throughout instruction and practice. During instruction students will have a graphic organizer to fill out that relates to the lesson. They will get to collaborate with their table to fill in spaces and the information will be gone over following table discussion. Students are continually asked questions throughout instruction, and sometimes they are asked to come to the front to help work some problems. There are also helpful graphics included during instruction and when those are presented students have opportunities to think-pair-share, which supports

active learning. During practice time students are engaged in active learning through stations, movement activities, song creations, and a measurement poster project. I have done my best to create active learning practice opportunities that are appropriate for my current students and classroom.

I have briefly mentioned strategies that I will use to teach the content and skills in this unit, such as active learning and graphic organizers. All of the lessons involve measurement conversions so one of my major strategies is repetition. A poster will be created for both customary and metric conversions, and that can also be referred to as the lessons move forward. Another major strategy is explicit instruction. Each lesson involves the teacher modeling conversion problems prior to student practice. Teaching strategies are very important, and the strategies I value most for this particular class of students is repetition and explicit instruction because they respond best to these strategies.

The concept of measurement conversion is developed in the first introductory lesson. A book will be read about the history of measurement conversion, students will use prior knowledge to sort vocabulary words, a graphic organizer will be filled in, and students will collaborate with a partner to create a mini poster about measurement conversion. Measurement conversion develops further as the unit moves forward because it connects to measurement units from different measurement systems.

Each lesson is connected by a “Problem of the Day,” which is completed in the morning and relates to information from the prior lesson. Lessons are also connected by the concept of conversion and the steps that are used are the same.

Practice is an important component of this unit. Every practice opportunity follows explicit instruction and involves some type of active learning. In-class practice includes poster creations, stations, a table scoot activity, a scavenger hunt and song creation, and competitions. I have also included further practice through homework assignments. The students have opportunities to dig deeper in the content through creation opportunities and real-world connections. The students get to create posters about certain conversions and relate measurements to themselves, and they always have opportunities to solve problems with a real-world connection.

As mentioned earlier, the unit is introduced by developing the concept of measurement conversion through discussion and creation. The unit is closed through a culminating activity in which students measure themselves and create a poster displaying their measurements and a paragraph about themselves. Prior to the final assessment, students also get an opportunity to review the material through a team competition involving a Jeopardy-like game. The end of the unit allows students to show what they learned in various and engaging ways.

Measurement Unit: Lesson One

Grade/Subject: 5th Grade Math **Date:** March 2, 2015
Lesson Title: "Measurements and Conversions" **Estimated time:** 90 min.

Standard:

18.) Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multistep, real-world problems. [5-MD1]

Objectives:

When given an exit slip, students will be able to sort ten measurement units into the correct measurement system and they will be able to decide whether to multiply or divide when converting measurements with an accuracy of 9/12 correct answers.

Engagement:

The teacher will begin to introduce measurement by reading the book *Millions to Measure*. The book discusses the history of measurement and how and why the metric system was created. Throughout the reading of the book the teacher will point out some important points and ask the students questions. After reading the book to the class, the teacher will state the objective for the unit and the objective for this lesson.

Good morning everyone! As you may know, the next couple of weeks we will be talking about converting measurement. You all should already know how to measure various things and you have had a little practice converting, but raise your hand if you have ever learned about the history of measurement. Well as we get started today, we are going to read a book about how measurement has changed throughout history. So listen really close and pay attention to the different kinds of measurements that have been used and are still being used. The book we are reading today is called Millions to Measure *by David M. Schwartz…*(The teacher will then begin reading. Throughout the book she will address and ask the following questions...*What is volume?; What were some of the ways prehistoric people measured? Do you think the prehistoric measurement worked well? Why or why not?; Do you agree with this boy about this type of measurement being too complicated?...*finish the book...*How do you feel about the metric system?)...So now that you know about the history of measurement we can talk about what we are going to be learning about during this unit. The next two weeks we will be learning about the customary measurement system and the metric system, and we will learn how to convert or switch measurements within those systems. So as we begin today, we are going to be learning the basics about converting measurements so that tomorrow we can start practicing converting more measurements.*

Instruction:

The teacher will begin instruction by frontloading the vocabulary that will be used throughout the unit. She will have a large Venn diagram drawn on chart paper comparing and contrasting the customary system and metric system. She will ask the students what the purpose of a Venn diagram is (reviewing language arts). She will briefly explain the difference between the customary and metric systems. She will explain the instructions for the vocabulary sorting activity by saying that each student will receive a sticky note with a vocabulary word and that they will have to decide where that word belongs on the diagram. Then the teacher will give each student a vocabulary word on a sticky note. Students will then be instructed by tables to place their word on the Venn diagram. The teacher will go over the words with the students and explain that they will be seeing these words throughout the unit. The teacher will leave the Venn diagram on the board as she transitions into an explanation about how the students will be taking notes throughout the unit. She will hold up the graphic organizer they will be using to take notes during the unit. She will explain that this is a good way to organize their notes on different measurements and have them all in one place as an easy reference. She will pass out the organizers and have the students write their names at the top. When the students have their organizer, the teacher will put up an anchor chart about converting measurements. She will ask the students what it means to convert something. After a few students have answered she will define the word “convert” by saying it means “to change.” Therefore, they are learning about how to change measurements. She will have the students fill in that definition on their organizer. She will explain that when you are converting measurements you are going to change the units but still have the same amount. She will give an example by holding up a ruler and explaining that 12 inches and 1 foot are the same amount but they are in different units. She will then discuss that in order to convert from one measurement to another and have the same amount you have to do some math. She will explain how to convert from a smaller unit to a larger unit and a larger unit to a smaller unit. She will have students fill in their organizer. She will go over some examples of converting. Next, she will go over the steps of conversion. She will use the example of the ruler to display both kinds of conversions (small to large and large to small). She will ask the students give thumbs up, in the middle, or down to check for current understanding.

An important part of measurement is knowing the words that you will be using. I have drawn a Venn diagram on this paper for customary measurement and metric measurement. Raise your hand if you can tell us what a Venn diagram is. (Choose students to answer) *Yes, a Venn diagram compares two things by telling us the differences and the similarities. So right now we will be going over the similarities and differences of the customary system and the metric system. The customary system is the measurement system we use in the U.S. and the metric system is used all around the world. Think back to the book we just read. Remember how the boy said some of the types of measurement were confusing. Well he was talking about the customary system we use in our country. Then the book explained the metric system. Each system has different*

measurement words and they also have some words that they both use. I am going to give each of you a sticky note with a vocabulary word on it. I want you to think about your word and decide where it belongs on the Venn diagram. Does it belong just under customary measurement, which is what we use in the U.S. to measure things? Does it belong just under metric measurement, which is what most of the world uses to measure things. Or does it belong to both measurement systems? You may not know the word you receive, but I want you to do your best to place it on the Venn diagram, and we will go over it after everyone places their word. Are there any questions about what you will be doing once you get your vocabulary word? Ok, once you get your word just think about where it belongs. I'll let you know when you can get up to put it on the board. (Pass out words) *Table one please go to the board to place your word. Table 2...Table 3...Table 4…Table 5…Good job everyone. Let's look over our Venn diagram.* (Read out each word and fix any word that's out of place and explain why) *Now that our Venn diagram and vocabulary words are in the right place, you can see the words that we will learn the next two weeks. I'm going to leave this on the board for the remainder of our lesson so you can view it if you wish. As you can see from our vocabulary words, we will be learning a lot about measurement. Therefore, it's important that you have very organized notes. I have made each of you a graphic organizer that you will be using to take notes each day as we learn about measurement. As I pass out your graphic organizers go ahead and write your name at the top.* (Pass out organizers) *As I stated earlier, we are going to be learning how to convert measurements. I have made an anchor chart about converting measurements that I will keep posted throughout this unit. What does the word "convert" mean? The word "convert" means "to change." Go ahead and fill that definition in on your graphic organizer. As we convert measurements the next two weeks we will be changing the units while keeping the same amount. Let me give you an example to better explain myself. What is this I'm holding? Yes, it's a ruler. What does a ruler represent? Yes, it represents a foot. How many inches are in a foot? Exactly, there are 12 inches. Therefore, a foot and 12 inches are the same, right? Although they are measured in different units, they represent the same amount of length. So as we convert one measurement to another and have the same amount, we will have to do some math. I need a volunteer to read this first part...Thank you. Now I need another volunteer to read this next part...Thank you. Remember back to when I showed you my ruler. Which unit is smaller, an inch or a foot? Yes, an inch is smaller. So if I'm going to convert from inches to feet I'll divide because when you are converting from a smaller unit to a larger unit, you divide. An easy way I remember how to convert is to think of a horse and a fly. A horse is large and a fly is small. So, horse to fly you multiply. Fly to horse, divide of course. Let's say that together. Horse to fly, multiply! Fly to horse, divide of course! Now let's look at the steps to convert measurements. Our example is to convert 2 feet to inches. I'm converting feet to inches so is that going from smaller to larger or larger to smaller? Yes, it's larger to smaller. So are first step is to decide whether or not to multiply or divide. What are we going to do? Yes,*

multiply. How many inches are in one foot? Yes, 12. So there are 12 smaller units in one larger unit. So now we multiply. We know that there are 12 inches in one foot, so we put the 12 on the top, and we know that we want to convert 2 feet to inches, so we are going to put 2 on the bottom. What's 12 times 2? Yes, 24. Therefore, there are 24 inches in one foot. Let's look at it this way. I have two rulers, or two feet. There are 12 inches in a foot, so since I have 2 feet, I'm going to multiply 12 times 2 to get 24 inches. So how is everyone doing? Give me a thumbs up if you really get this, a thumb in the middle if you get it but are still a little confused, or a thumbs down if you do not understand this. (Address any questions about measurement conversion)

Practice:

In order to practice the rules of measurement conversion, students will work in partner pairs to create a mini poster on measurement conversion. Each pair will receive a sheet of construction paper and will have to include the following parts: title, rules of conversion from small to large and large to small, examples of what to do when converting certain units, and three measurement words/units from each system. Students will be asked to be creative and to make their poster attractive. Students will get about twenty minutes to make their mini poster, and then they will turn them in. During this time, the teacher will be walking around the room to view the students' work and guiding them if the need arises.

Now that we have talked about how to convert measurements, it's time for you all to practice remembering this important information we will be using every day for the next two weeks. I will pair you up with a partner and each pair will receive one sheet of construction paper to make a mini poster about measurement conversion. On your poster you will need to write a title, such as Measurement Conversion or Converting Measurement, write out the rules of conversion from small to large and large to small, examples of what to do when converting certain units, such as multiplying when converting from feet to inches, and writing three words from each measurement system on random parts of the poster. I will write these things on the board, as well as the example units to include on your poster. Are there any questions? (Assign partner pairs) *Once you receive your construction paper you can begin. Be sure to make this poster attractive by using different colors and drawing pictures if you wish.*

Assessment:

Students will each receive an exit slip that will assess their knowledge on measurement vocabulary and measurement conversion rules. They will have to sort ten vocabulary words into the correct measurement system and decide the correct mathematical operation to use when converting small units to large units and large units to small units. Students will be considered proficient if they answer 9/12 parts correctly.

You all did such a great job on your posters. I have a little exit slip and I want you to be sure to read all of the directions and do the best you can. This is

individual work so I shouldn't hear any talking. When you get your slip be sure to write your name at the top and then start.

Closing:

To close out the lesson, the teacher will review with the students by asking a few questions about the lesson, such as conversion rules and what to do when converting certain units. Then she will give the students a sneak peak about what they will be learning during the next lesson.

Before we end let's review a few things we learned today. Be sure to raise your hand as I ask some questions. What do you do when converting from small units to large units? Yes, divide. What about converting large units to small units? Yes, multiply. If you are converting from inches to feet, what would you do? Yes, divide. Why? Exactly, you would divide because you are converting from small to large units. What about if you convert feet to inches? Yes, you'll multiply. What about feet to yards? Great, you'll divide. And yards to feet? Yes, multiply. You all did great today! We will be using what we learned today throughout this unit. Just a sneak peak for tomorrow, we will be learning about customary length and how to convert those units.

Materials/Resources:

- *Millions to Measure* by David M. Schwartz
- A type of board/wall for Venn diagram drawing
- Sticky notes with vocabulary words (words are attached)
- Graphic organizer for notes (attached- print front and back)
- Scaffolded graphic organizer (attached)
- "Converting Measures" anchor chart (picture attached)
- Chart paper
- Ruler
- Promethean board/white board
- Construction paper
- Markers/colored pencils/crayons
- Instructions for poster to be written on the board (Instructions are attached)
- Exit slip (attached)
- Reduced exit slip (attached)
- Extension packet (attached)
- Computer
- Reteaching step by step example of conversion (attached)

Differentiation:

- "Group 4" (4 students who need a little more scaffolding while learning):
    - They will receive a more scaffolded version of the graphic organizer.
    - They will each be paired with a partner who is a higher learner so that they can learn and be guided along the way.
    - They will receive a reduced version of the exit slip and be expected to answer 6/8 parts correctly to be considered proficient.

- Extension:
    - Students who quickly grasp the concept of converting measurements will get to research the customary system and the metric system. They will use a graphic organizer provided to take notes and write down important vocabulary and an example of a conversion. They will use their notes to create a measurement conversion research cube. Each side of the cube will have information from the notes for the following measurement areas: customary length, customary capacity, customary weight, the metric system, fun facts, and a title side. In the extension packet, student(s) will have a graphic organizer with the instructions for their research cube and an attached cube template.
- Reteaching:
    - Student(s) will meet with the teacher. They will review that sometimes measurements have to be converted to be understood. The teacher will give each student a visual step by step example of conversion. They will practice the steps of conversion according to the different process.

Reflection:

This lesson was very important for measurement conversion because it's the introductory lesson to the unit and there was a lot of new information to cover. There were vocabulary words that needed to be addressed, conversion rules and steps to be taught, and a practice activity for the students to better grasp the concept of measurement conversion. The students really enjoyed the book to introduce the lesson and we had a mini discussion about why measurement has changed throughout history.

The Venn diagram sorting activity turned out to be a great way to introduce vocabulary. The students showed that they have not learned many of the measurement words because they were placed wrong on the diagram. As we went over the proper places for the words, the students began to catch on to the similarities and differences of the measurement systems.

When we moved on to talking about conversion and the rules, the students looked very confused. I had to keep reminding them that the goal for this lesson was for them to know about conversion and the steps. They started to better understand once I gave an example of converting feet and inches. Since they have worked with those units before, they we better able to relate and understand conversion. They especially liked the rhyme about the horse and fly to remember conversion rules.

The downside to the lesson was that I ran out of time. I had to cut the practice time short due to the schedule. The students were able to discuss the mini poster with their partner and all students at least got to start on their actual poster. As I walked around I heard some good discussion about conversion and there didn't seem to be any misconceptions.

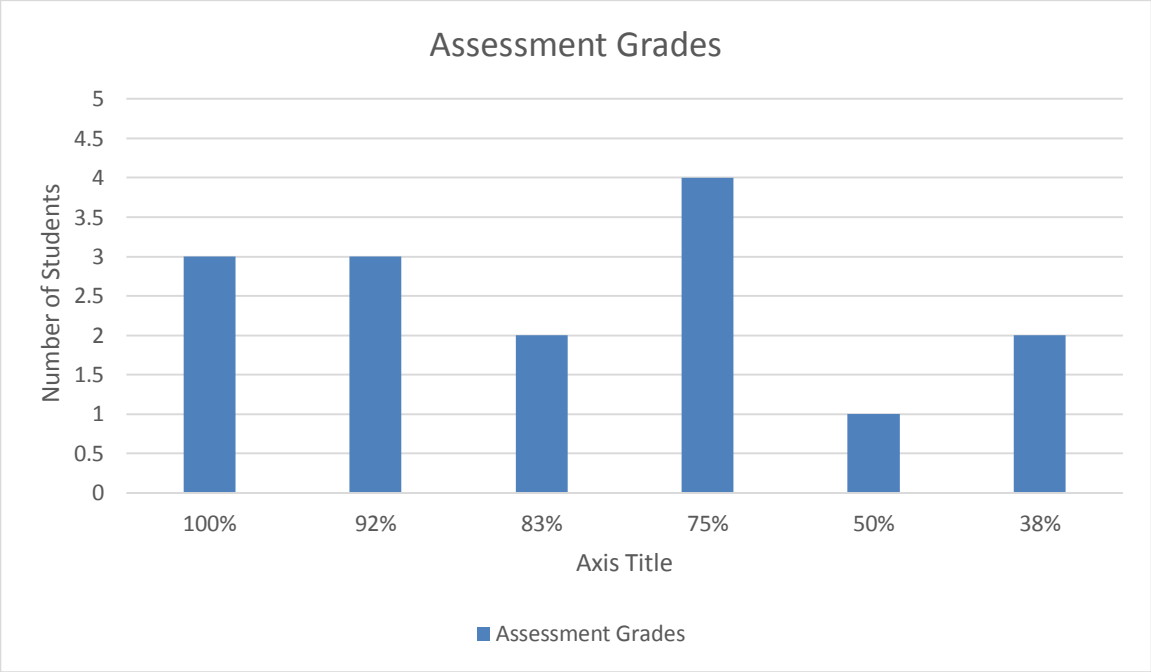
I ended up giving my students their exit slip assessment at the end of the day. I was very pleased with the results because 12 out of the 15 students (80 percent) met the objective of 9/12 correct answers. What made me even more pleased was that most of the students answered the last part correctly about

multiplying or dividing in certain conversion situations. The entire lesson was geared around conversion and it's very important to know those rules for the remainder of the unit. Therefore, I feel that this lesson was successful and that there will be a smooth transition into the next lessons.

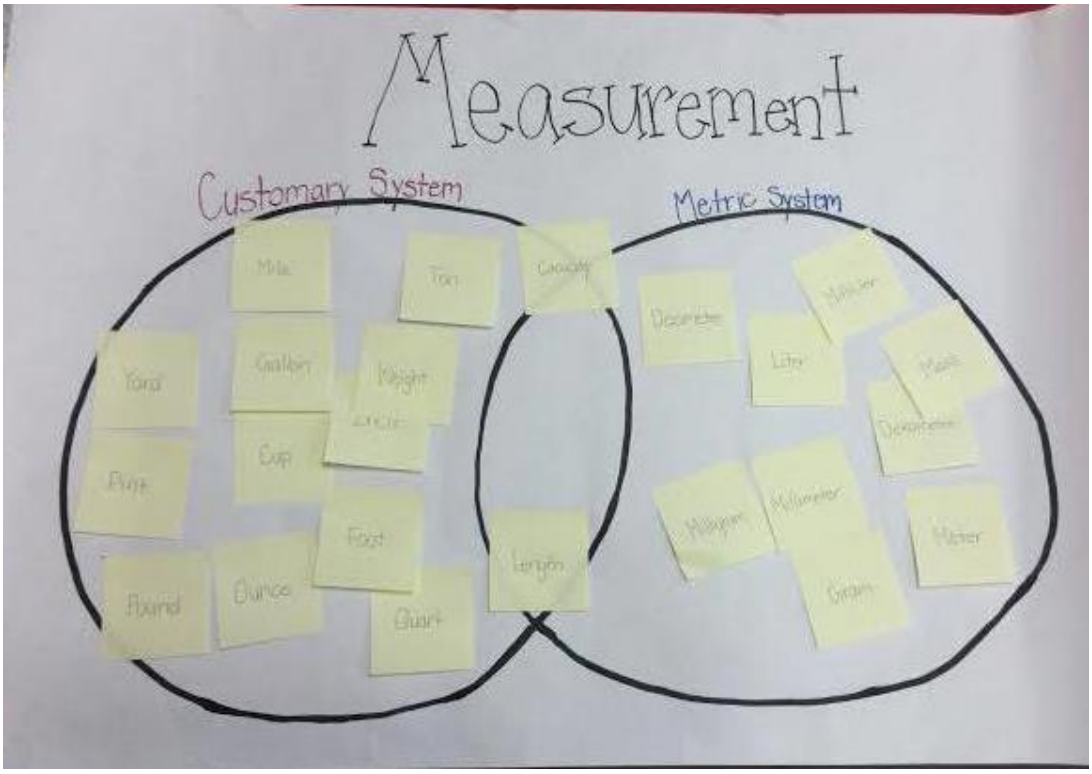
Data Analysis:

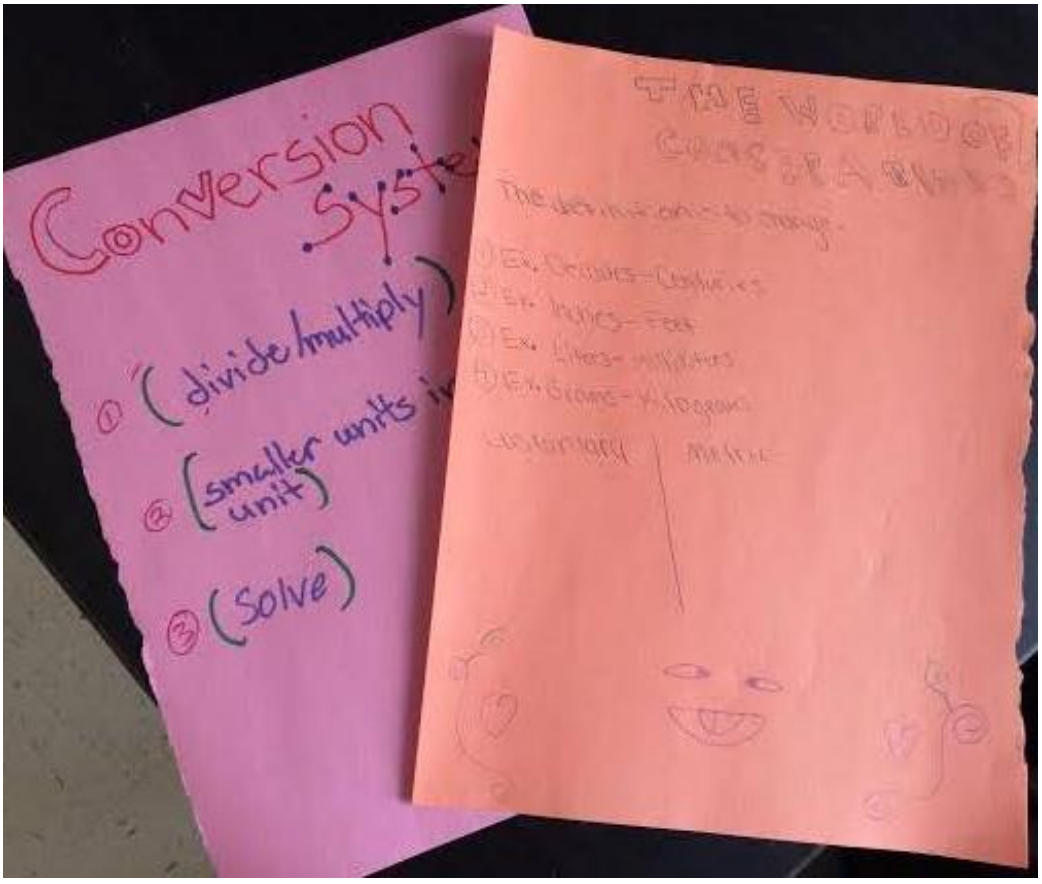
The data from the formative assessment, which was an exit slip, can be seen below. This data shows that 12 out of the 15 students met the lesson objective, which was to receive at least 9/12 or 75% on the assessment. As the chart exhibits, the majority grade for my students was exactly a 75%. However, eight students scored higher than the objective goal. There were three students who did not meet the lesson objective. Two of those students are ones who also received accommodations and a reduced assessment.

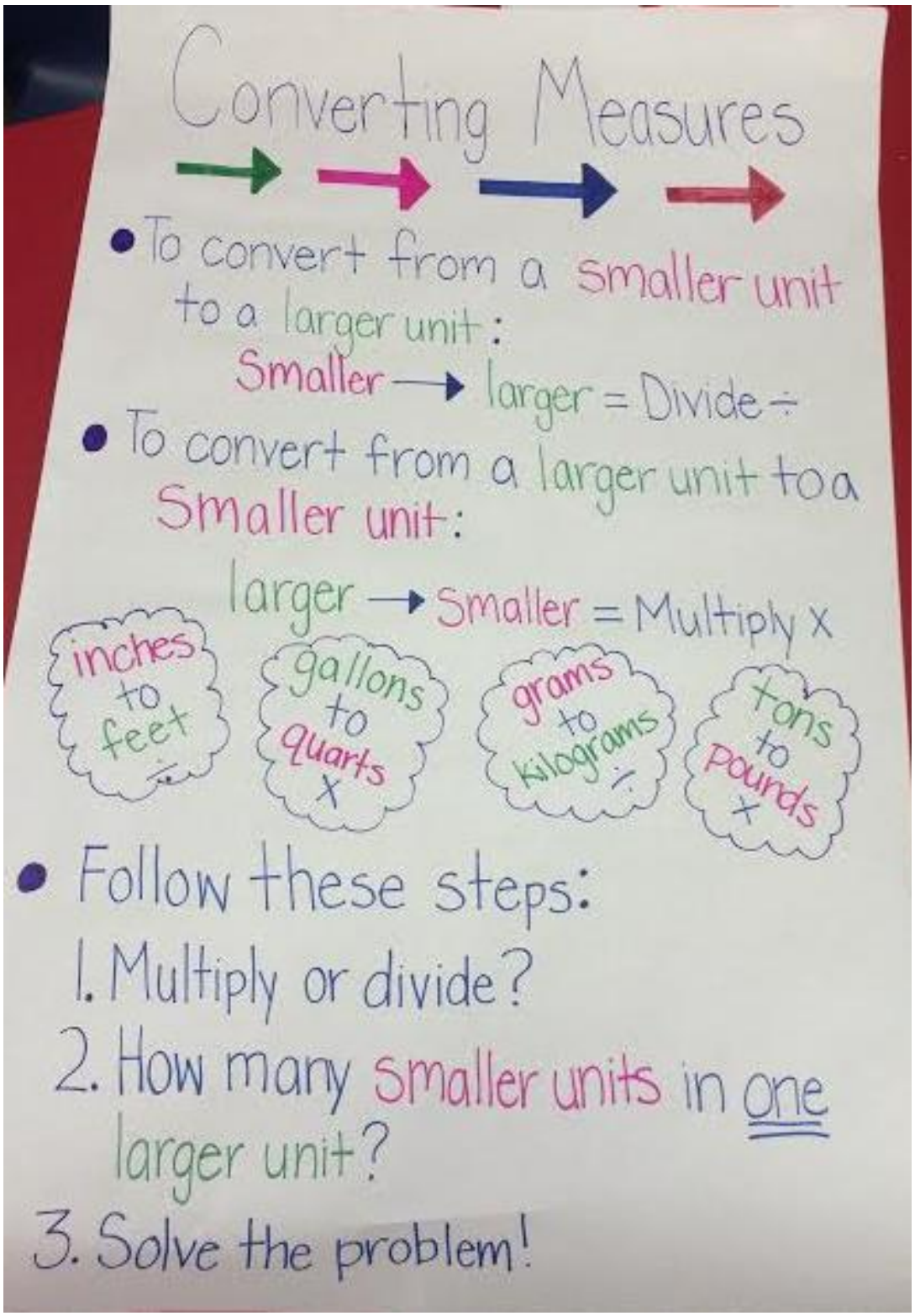
This data tells me that the majority of my students understand the basics of measurement and conversion. Therefore, I am planning on moving on with my teaching to apply the knowledge learned about how to convert. The three students who did not meet the objective will be closely monitored and given a little more support as we move forward.



Lesson Pictures






Converting Measures
• To convert from a smaller unit to a larger unit:
Smaller → larger = Divide ÷
• To convert from a larger unit to a Smaller unit:
larger → Smaller = Multiply x
inches to feet ÷
gallons to quarts x
grams to kilograms ÷
tons to pounds x
• Follow these steps:
1. Multiply or divide?
2. How many smaller units in one larger unit?
3. Solve the problem!

Vocabulary Words

1. Inch
2. Foot
3. Yard
4. Mile
5. Cup
6. Pint
7. Quart
8. Gallon
9. Ounce
10. Pound
11. Ton
12. Meter
13. Decimeter
14. Millimeter
15. Dekameter
16. Liter
17. Milliliter
18. Gram
19. Milligram
20. Length
21. Mass
22. Weight
23. Capacity

Converting Measurement

Convert: **LARGE** → small → _____ small → **LARGE** → _____
Conversion Steps:

	Customary
Length	1 foot (ft)= ____ inches 1 yard (yd)= ____ feet, ____ inches 1 mile (mi)= _____ yards, _____ feet
Capacity	1 cup (c)= ___ fluid ounces 1 pint (p)= ___ cups, ____ fluid ounces 1 quart (qt)= ___ pints, ___ cups 1 gallon (gal)= ___ quarts, ___ pints, ____ cups
Weight	1 pound (lb)= ____ ounces 1 ton (T)= _____ pounds

Metric Measurement

Prefix	Meaning	Length	Mass	Capacity
Kilo-				
Hecto-				
Deka-				
*Base unit				
Deci-				
Centi-				
Milli-				

Length	Basic unit:	Example:
Capacity	Basic unit:	Example:
Mass	Basic unit:	Example:

Converting Measurement

Convert:

LARGE → small → _____ small → **LARGE** → _____

Conversion Steps:	**Conversion example:**
1. X or ÷ ? 2. How many *smaller* units in **<u>one</u>** *larger* unit? 3. Solve the problem	2 ft. = ___ in. 1. ft. → in. = larger → smaller, so X 2. 12 in. = 1 ft. 3. 12 X 2 =24 2 ft. = 24 in.

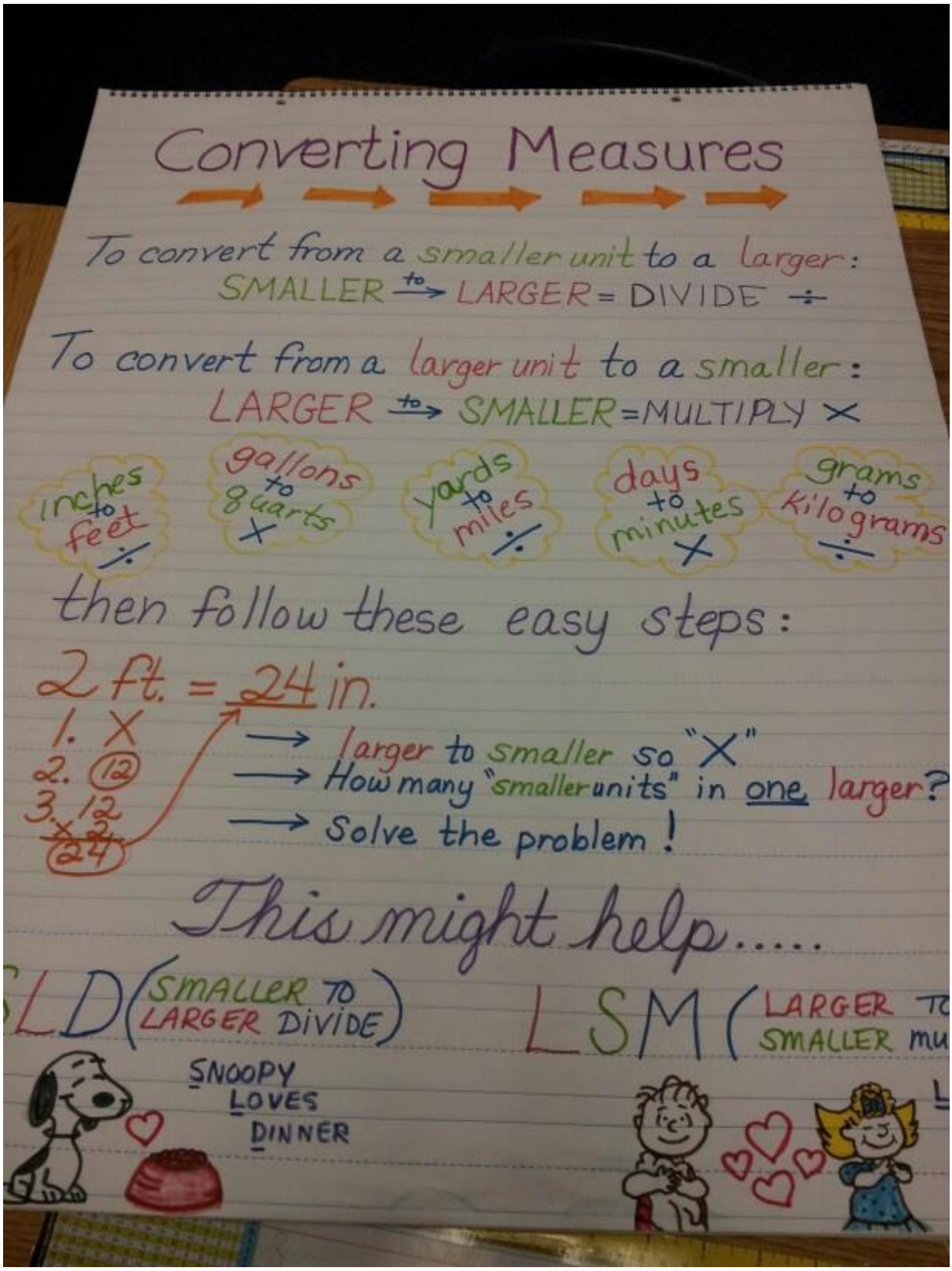
	Customary
<u>Length</u> How long?	1 foot (ft)= _____ inches 1 yard (yd)= _____ feet, _____ inches 1 mile (mi)= _____ yards, _____ feet
<u>Capacity</u> Amount something can hold	1 cup (c)= ___ fluid ounces 1 pint (p)= ___ cups, _____ fluid ounces 1 quart (qt)= ___ pints, ___ cups 1 gallon (gal)= ___ quarts, ___ pints, _____ cups
<u>Weight</u> How heavy?	1 pound (lb)= _____ ounces 1 ton (T)= _____ pounds

Metric Measurement

Prefix	Meaning	Length	Mass	Capacity
Kilo-		*kilo*	*kilo*	*kilo*
Hecto-		*hecto*	*hecto*	*hecto*
Deka-		*deka*	*deka*	*deka*
*Base unit		meter	gram	liter
Deci-		*deci*	*deci*	*deci*
Centi-		*centi*	*centi*	*centi*
Milli-		*milli*	*milli*	*milli*

Length	Basic unit: Meter (m)	Example:
Capacity	Basic unit: Liter (L)	Example:
Mass	Basic unit: Gram (g)	Example:

Converting Measures Anchor Chart Example



Mini Poster Instructions

Include the following on your poster

- Title
- Rules of conversion from small to large and large to small
- Examples of what to do when converting units (X or ÷ ?)
    - Inches to feet
    - Gallons to cups
    - Pounds to tons
- Write 3 measurement words/units from *each* system (customary and metric) somewhere on your poster

Be creative and colorful!

Exit Slip

Name: _____ **Date:** _____

Directions: Decide which measurement system each word belongs to, and write the word on the correct side.

mile	gram	pound	ton	meter	inch
liter	gallon	millimeter	dekameter		

Customary Measurement	Metric Measurement

Directions: Fill in the blank with the correct mathematical operation.

small → **LARGE** → _____ **LARGE** → small → _____

Exit Slip

Name: _____ **Date:** _____

Directions: Decide which measurement system each word belongs to, and write the word on the correct side.

mile	gram	pound	ton	meter	inch
liter	gallon	millimeter	dekameter		

Customary Measurement	Metric Measurement

Directions: Fill in the blank with the correct mathematical operation.

small → **LARGE** → _____ **LARGE** → small → _____

Exit Slip

Name: _____ **Date:** _____

Directions: Decide which measurement system each word belongs to, and write the word on the correct side.

mile	gram	pound	meter	inch	gallon

Customary Measurement	**Metric Measurement**

Directions: Fill in the blank with the correct mathematical operation.

small → **LARGE** → _____ **LARGE** → small → _____

Exit Slip

Name: _____ **Date:** _____

Directions: Decide which measurement system each word belongs to, and write the word on the correct side.

mile	gram	pound	meter	inch	gallon

Customary Measurement	**Metric Measurement**

Directions: Fill in the blank with the correct mathematical operation.

small → **LARGE** → _____ **LARGE** → small → _____

Converting Measurement Extension Project

Name: _____ **Date:** _____

Directions: Use a computer to learn more information about the customary measurement system and metric measurement system. Use the websites provided to complete your research, and use the graphic organizer below to record your information. Make sure to take notes on important words and ways to convert, as well as facts you think are interesting.

Customary Measurement www.myschoolhouse.com/courses/O/1/18.asp	**Metric Measurement** www.factmonster.com/ipka/A0769580.html

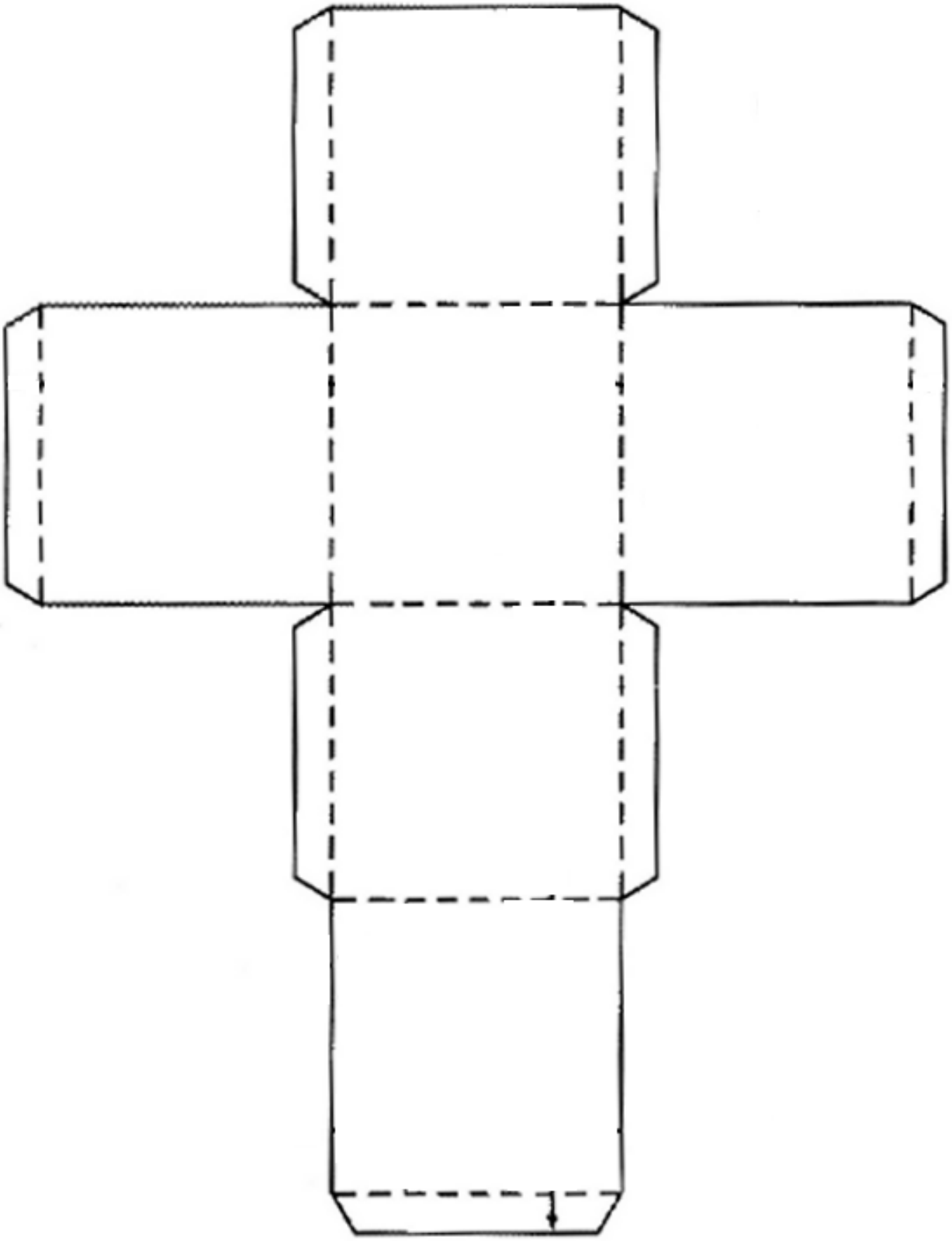
Research Cube

Directions: Use the notes you took to create a research cube on converting measurements. Each side of your cube will have notes on different aspects of measurement. Below are guidelines for each of the sides of your cube. Add color and pictures to make your cube more interesting.

Each of the following bullets represent a cube side:

- Information and examples about **customary length** units and conversions
- Information and examples about customary **capacity units** and conversions
- Information and examples about **customary weight** units and conversions
- Information and examples about **metric** units and conversions
- Any fun facts and pictures you would like to draw relating to measurement
- Title and your name

Your cube can be found on the next page. Write on it first, then cut it out, fold it, and tape it together.



Jacob had 648 inches of electrical wire. How many <u>feet</u> of electrical wire does he have?

Step 1: Write what you are looking for and what you have from the problem.

648 inches = ? feet

Step 2: Write "What You Know" about inches and feet equivalencies on top. (Make sure you match up the units.)

12 inches = 1 foot
648 inches = ? Feet

Inches are on top of inches and foot is on top of feet.

Step 3: Circle the unit you are trying to find. Then draw an arrow to that unit.

12 inches = (1 foot)
648 inches = (? feet)

Step 4: Determine how you get to the number circled on the "What You Know." Do you multiply or divide?

12 inches = (1 foot)
648 inches = (? feet)

To get from 12 to 1, I need to divide the 12 by 12.

Step 5: Go back to your original problem. Whatever you determined that you were supposed to do to convert from Step 4, complete on the given unit.

648 inches = ? Feet

648 ÷ 12 = 54 So, Jacob has 54 feet of electrical wire because 54 feet is equivalent to 648 inches.

Measurement Unit: Lesson 2

Grade/Subject: 5th grade math **Date Taught:** March 4, 2015
Lesson Title: "Converting Customary Length" **Estimated Time:** 90 min.

Standard:

18.) Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multistep, real-world problems. [5-MD1]

Objective:

Students will be able to solve a real-world customary length conversion problem with a 2/3 accuracy.

Engagement:

The teacher will have two customary length measurements written on the board (48 in. and 3 ft.) in the form of a T-chart with the measurements written on the top line. The teacher will ask the students to look at the two measurements and to think carefully (think time) about which measurement is larger. One table at a time, the students will come to the board and vote which is larger by marking a tally on the preferred side of the T-chart. After each student has voted, the teacher will count up the number of votes on each side. She will then ask the students what a better way would be to decide which measurement is larger other than guessing. She will relate what they learned the day before, guiding the students to discuss measurement conversions. She will then use the two measurements to convert feet to inches by using the information about conversion from the previous lesson. She will emphasize the importance of converting measurements. Then she will state the objective for the lesson.

Good morning everyone! As you can see I have written two measurements on the board. We have 48 inches and 3 feet. I want you all to look closely at these two measurements and take a minute to think about which measurement is larger. (Allow for a minute of think time) *Now that you have had time to think about the larger measurement, I want each of you to vote on your answer. When I call you up, just place a tally under the measurement you think is larger. Are there any questions? Ok, table one come up to vote...Table 2...Table 3...Table 4...Table 5...Ok, now that everyone has voted, let's count up the votes. 48 inches has...votes. 3 feet has...votes. Before I reveal which measurement is larger, what is a better way than guessing to figure this out? Think back to what we learned about yesterday with measurement.* (Have various students answer) *Yes, converting measurements to the same unit would help us to see exactly which is larger. So let's convert the 3 feet to inches. If we are converting from feet to inches should we multiply or divide? Yes, we should multiply because we are going from a larger unit to a smaller unit. Remember, horse to fly, multiply. So our next step is to determine how many inches are in foot, which is what? Yes, 12 inches. So now let's multiply. We will do 12 times 3. So 3 feet is equal to…? Yes, 36 inches. So which measurement is*

larger? Yes, the 48 inches is larger than 36 inches or 3 feet. So now do you see how important measurement conversion is? Well today we are going to be learning more about converting customary length.

Instruction:

The teacher will ask the students to take out their graphic organizers, and she will begin instruction by reviewing what customary measurement is. She will ask the students if they remember, and she will end up reminding them that customary measurement is the type of measurement we use in the U.S. like inches, feet, cups, and pounds. Then she will ask the students what the word "length" means. She will define length by saying how long something is, and she will have the students write that in on their graphic organizer. Then the students will collaborate as a table to review measurement equivalents by filling in the blanks on the graphic organizer. The teacher will then follow up making sure everyone filled in the measurements accurately. She will show them a helpful graphic on customary length that will be drawn on an anchor chart and have the students think, pair, and share about the meaning of the picture. She will have the students draw the graphic in the open space on their graphic organizer. After they finish talking about measurement units, they will transition into learning about customary length conversions. The teacher will ask for a student volunteer and have them help measure the board with a ruler. After a measurement is taken, the teacher will write it on the board and the student will sit down. The teacher will first model how to convert the board measurement in feet to inches. She will ask the students if they will need to multiply or divide, then ask how many inches are in foot, and then do the math. Next, the teacher will act as a scribe as the students guide her to convert the board measurement in inches to yards. To bring instruction to an end, the teacher will present and model solving a real-world problem involving converting miles to yards.

Everyone needs to now take out your graphic organizer that you received the other day...We talked about the customary system a little so far, but what did we say it was? Yes, it's the measurement system we use in the U.S. like inches, feet, cups, and pounds. As you can see on your organizer under customary measurement is that there are three major types of measurement-length, capacity, and weight. Today we are going to focus on customary length. What does the word "length" mean? Yes, it means how long something is. Go ahead and write that down under "length" on your graphic organizer. This organizer is going to be a helpful guide as you convert different measurements. But before you convert, you need to know different measurement unit values. As you can see in the box beside length, there are some blanks to fill in, so talk with your table and fill in the conversions together for length. (Give students a few minutes to fill in measurements) *How many inches are in one foot? Yes, 12 inches, so go ahead and write that in on your chart. How many feet are in a yard? Yes, 3, and what about inches? Yes, 36. And last but not least, we have the mile. Does anyone know how many yards are in one mile? There are 1,760 yards in a mile. What about feet? Yes, there are 5,280 feet in a mile. Now that we have equivalent measures, we can convert customary length easier. I have a picture*

that can also help you to better visualize and remember these measurements. Although this picture doesn't include miles, it's a great visual for inches, feet, and yards. Take a minute to study the picture. Think to yourself about what you notice. Now pair with a partner and discuss how you interpret this graphic. (Choose pairs to share) *Good, it shows one yard and how many feet and inches are in it. Go ahead and draw this in the length section of your organizer.* (Give students time to draw) Now, *I need a volunteer to help me measure the board. Ok, (student name) come on up. I have a ruler, and I want you to measure how wide the Promethean board is.* (Student measures board) *Alright, the board is...feet long. Let's write that on the board and let's practice converting it to inches and yards. Thank you (student name), you can sit down now. Let's go ahead and convert the board measurement to inches. Since we are converting from feet to inches am I going to multiply or divide? Yes, I'm going from large to small so I'm going to multiply. How many inches are in a foot? Good, 12, so I'm going to multiply 12 by...feet. So the Promethean board is...inches wide. Now I'm going to let you all guide me as we convert the inches measurement into yards. What do I need to decide first? Yes, I need to decide to multiply or divide. Alright, so you all say I'm going to divide, why? Yes, because I'm converting from small units to large units. What do I need to do next? Yes, determine how many inches are in a yard, which is? Yes, 36 inches. Now what? Good, I'm going to divide...inches by 36. So the Promethean board is...yards wide. Good job everyone. Now that we have worked with inches, feet, and yards, we need to practice converting miles. So let's look at this word problem I have.* (Write problem on the board) *Let's read it together, "Julie is training for a small triathlon where she will run 3 miles, bike 10 miles, and swim 150 yards. How many yards will Julie run?" So this is a little tougher because it has quite a few numbers trying to trip us up. What is this question asking us to do? Good, it's asking us to find how many yards Julie will run. So it's told us that Julie is running, biking, and swimming. Do I even need the numbers for biking and swimming? No, because we were asked just to find how many yards she will run. Just like when you finish reading a book, you need to know what the story was about. It's the same with word problems. Make sure you read carefully and decide what it's asking you to do. So all we need to worry about is converting 3 miles to yards. So will we be multiplying or dividing? Good, we'll be multiplying, why? Yes, because we are converting large units to small units. So our next step is to find out how many yards are in a mile, which is? Good, 1,760 yards. So now let's do our math. We will take the 1,760 yards and multiply that by the 3 miles. So Julie will be running 5,280 yards. Good job!*

Practice:

In order to practice converting customary length, the students will be participating in three stations for ten minutes each. There will also be a group that meets with the teacher to receive specialized instruction (see differentiation section). The teacher will first explain the directions for each station. There will be a computer station where students will be practicing converting length on an

interactive online game. There will be a measuring and converting station where students will measure objects and solve real-world problems. The third station will be a customary length worksheet that will help the students to better practice their converting skills with straight forward problems. Once the teacher explains each station, she will assign groups. A bell will be rung every ten minutes to signal a change in the stations.

Now it's time for some practice. We will be getting into stations like we do in reading to practice converting with different activities. Before I name the groups, please listen as I explain each station. There will be a computer station, and at that station I have written down the web address you need to go to. It's a pretty fun converting activity, and if you happen to finish early, try it again. The next station you will have a paper that has real-world problems on it. Each problem has a blank space, and in that blank space you will write the measurement of an item in the basket. I have supplied rulers so just read which unit you need to measure in, measure the object, and solve the problem. If you finish measuring, there is an extra real-world problem for you to solve. The last station will have a simple worksheet for you to do as you practice converting. You will be at each station for ten minutes, and I will ring the bell when it's time to change. Are there any questions about any of the stations? Ok, I'll read out the groups and then you can go to your stations…(Read groups)

- **Homework:** *Go Math!* book page 407

Assessment:

Each student will receive a real-world customary length conversion problem on a slip of paper, which will be one of four different problems in the room. The students will be instructed to solve their problem while showing their work. Then when everyone is finished, the teacher will show that there are four sides of the room, each with a different answer correlating to one of the four problems given out. Then the students will be instructed to move to the wall with their answer. This is a good visual of how the students' answer, but their work will also been taken up and considered. The students will be considered proficient if they can receive 2/3 points. They will receive two points if they can correctly set up the problem and one point for doing the math correctly.

Everyone has practiced converting customary length, so now it's time to solve one more problem to show what you know. I have a little slip for each of you with one real-world problem on it. It's asking you to convert, and I want each of you to show your work to convert. Are there any questions? Alright, once you receive your slip, you may begin. (Give students time to solve) *Is everyone finished? Alright, I have posted four answers in the room, one on each wall. If you answered your problem correctly, your answer will be on one of the four walls. Go ahead and stand up and move to your answer. Good job everyone, before you return to your seat place your paper on the table.*

Closing:

The teacher will close the lesson by reviewing customary length units and asking the students how they feel about customary length conversion by having a thumb check. Then she will give a sneak peak for what they will be learning the next day.

Before we end today let's quickly review customary length units. What are the four units we use for customary length? Good, inch, foot, yard, and mile. If you understood what you learned today give a thumbs up. If you are still a little confused give a thumbs in the middle, and if you are really confused about everything we learned today give a thumbs down. (Note students' feelings and confidence levels) *So tomorrow we are going to stay in the customary system, but we are going to learn about customary capacity or measuring how much something can hold. Good job today!*

Materials/Resources:

- Promethean board
- Graphic organizer (attached-printed front and back)
- Scaffolded graphic organizer (attached)
- Chart paper with customary length graphic (picture attached)
- Rulers
- Real-world conversion problem involving miles (attached)
- Computer station website page (attached)
- Computers
- Measure and convert interactive worksheet (attached)
- Measuring objects: pencil, printer paper, cup, sticky note (place in basket)
- Carrot Conversions sheet (attached)
- Assessment slip (attached)
- Modified assessment slip (attached)
- Assessment answers (attached- post one on each wall)
- Extension instruction sheet (attached)
- Extension webpage (www.buzzmath.com/Docs#F6KM17F&page=1)
- Reteaching graphic (attached)
- Yard stick
- Reteaching website (www.turtlediary.com/grade-3-games/math-games/customary-and-metric-unit-conversions.html)

Differentiation:

- "Group 4:"
  - They will receive a more scaffolded version of the graphic organizer.
  - The teacher will lead a station so the students can receive extra instruction. She will ask the students questions to test their knowledge of what they picked up during the lesson. Depending on knowledge, the teacher will either use the reteaching model below or just skip to extra practice with scaffolding.
  - They will receive a modified version of the assessment slip.

- Extension:
    - Student(s) who need an extended activity will receive an extension instruction sheet. Their instruction sheet will have them go through a customary length conversion practice game online. After they complete the practice activity, they will be instructed to create a real-world customary length conversion problem in which they will write on a sheet of construction paper and illustrate. They will attach their work used to solve the problem they created, which will show their work for each conversion step.
- Reteaching:
    - The teacher will have the students watch a video on customary length conversion. Then as a small group, they will discuss what they learned from the video. The teacher will also have three rulers and a yard stick. She will show them how three rulers fit in a yard stick and how they equal the same length. She will show them a customary length conversion graphic that shows what to do when converting different units. Then she will model a simple customary length conversion problem and use the ruler and yard stick as needed to help explain. Then she will have the students help her solve another problem. Finally, the students will work together to complete the practice problems from the video.

Reflection:

After teaching this lesson, the students seemed to know the material since they are familiar with inches, feet, and yards. However, this lesson served as more practice for conversion rules and built a stronger foundation for the students as the unit moves into more unfamiliar measurements.

The engagement portion of the lesson was interesting because I had the students vote on the larger measurement. The vote ended up being 7-9 in favor of the 3 feet measurement. After converting the 3 feet to inches, the students were amazed that 48 inches was a larger measurement than 3 feet. This exercise really helped to pull the students into the lesson.

The instruction went very smoothly. The students easily understood converting customary length. They enjoyed discussing the length graphic and they brought up really great points about the meaning of the drawing. We also did a few problems to practice together and they did well using the conversion steps to solve the problem.

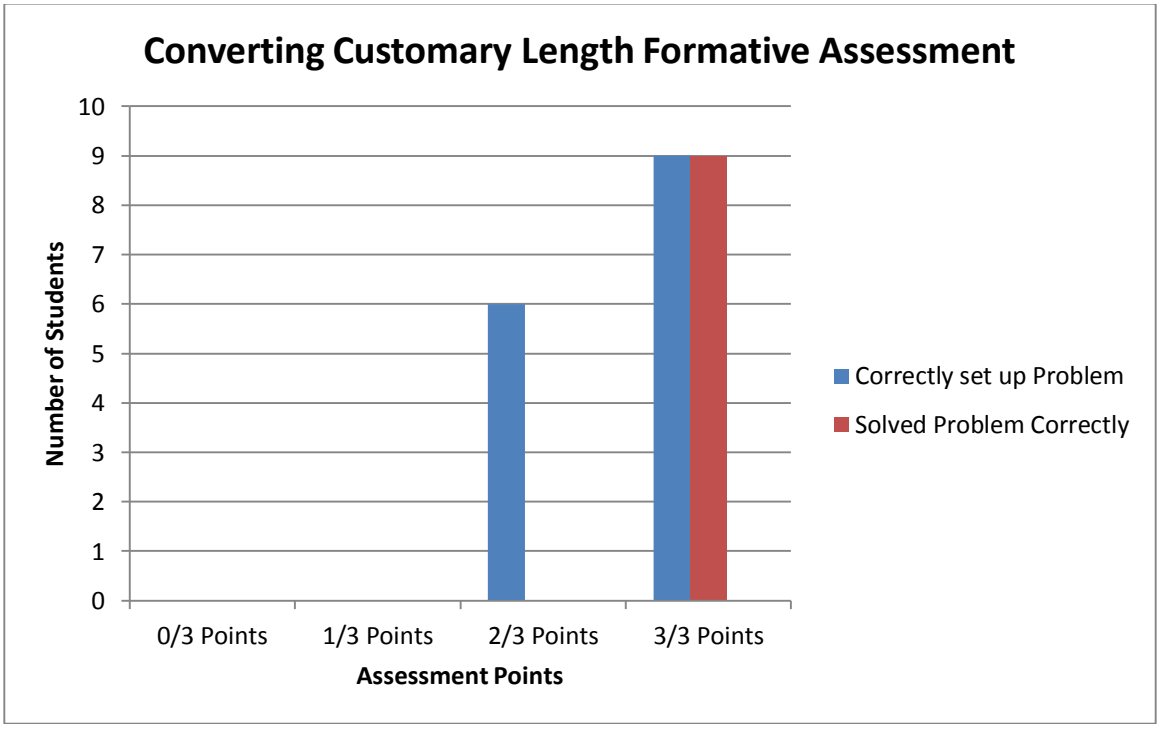
However, the lesson practice didn't go as smoothly as planned. I had stations set up, which also included a computer station. The computers ended up not working too well and the students were not on their best behavior. I decided that it was best to stop the stations and have the students go back to their seats to try something else. This seemed to work better and I gained back control of the classroom.

Due to a tight schedule, I gave the assessment at the end of the day. The students did fairly well. Although not all students received full credit, all of the students were able to set up the problem correctly. I also gave them homework to further practice converting customary length.

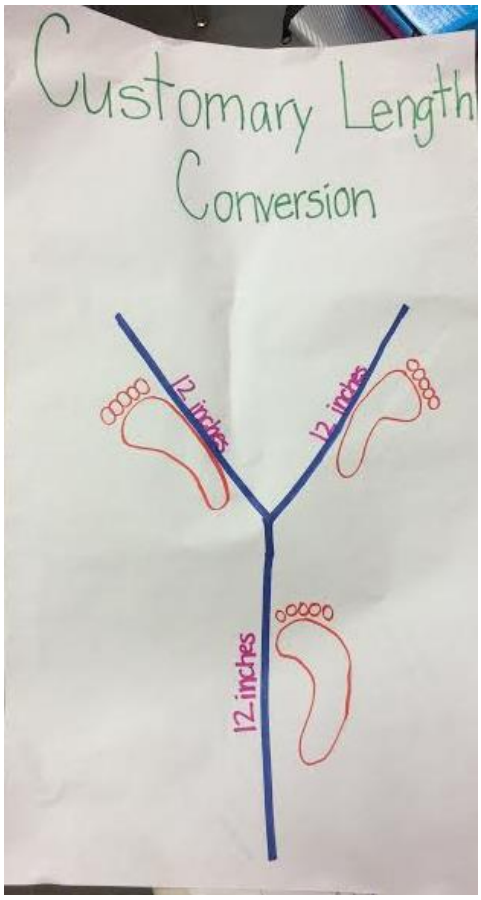
Data Analysis:

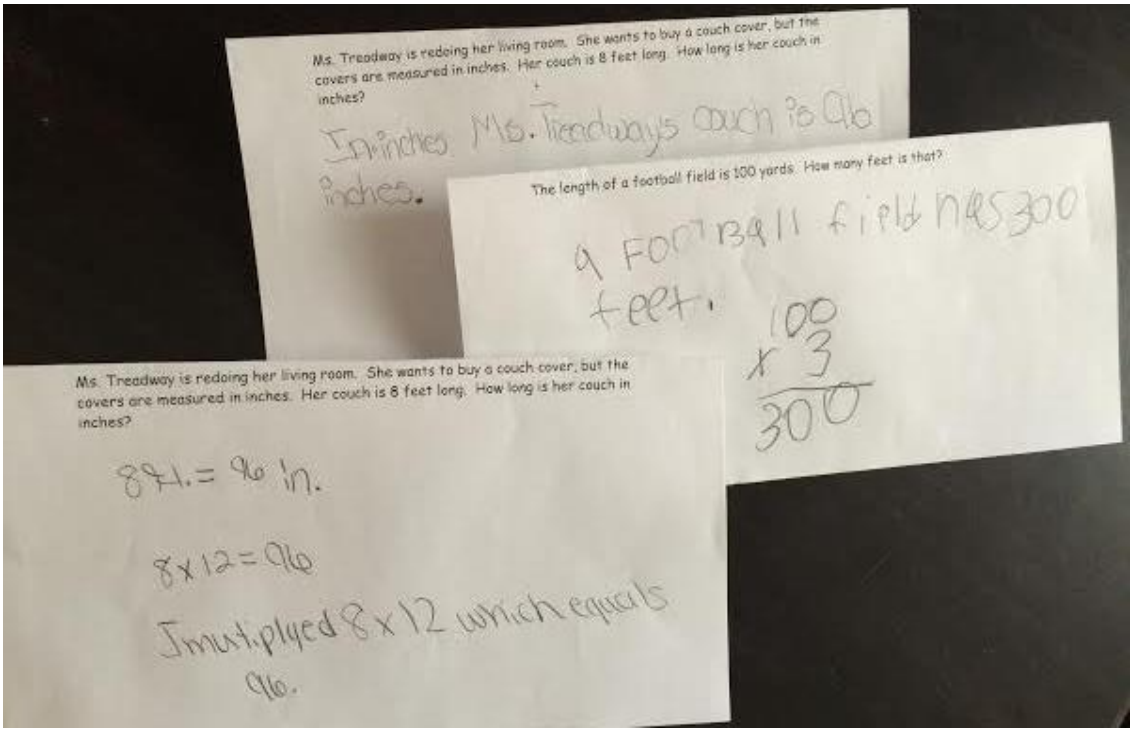
The students' formative assessment was in the form of one real-world problem. There were four separate questions and each had a different difficulty level. Each problem was given to a student of the same level. The assessments were scored out of three points. If a student set up the problem correctly (correct mathematical symbol and correct numbers) they received two points because it's important that they can successfully complete this step. The students received one point if they could correctly do the math to come to the correct answer. The data from the assessment can be seen below.

This data shows that all of my students can correctly set up a conversion problem. They know the conversion rule about multiplying or dividing and they know which numbers they should use. Six of the students were not able to do the math correctly to arrive at the correct answer. Therefore, six students (40 percent) understood how to convert length but did not correctly do the math to get the correct answer. Nine of my students could set up the problem and solve it to arrive at the correct answer. According to this data, all of my students understand customary length conversions and have met my objective for this lesson.



Lesson Pictures





Converting Measurement

Convert: **LARGE** → small → _____ small → **LARGE** → _____
Conversion Steps:

	Customary
Length	1 foot (ft)= ____ inches 1 yard (yd)= ____ feet, ____ inches 1 mile (mi)= _____ yards, _____ feet
Capacity	1 cup (c)= ___ fluid ounces 1 pint (p)= ___ cups, ____ fluid ounces 1 quart (qt)= ___ pints, ___ cups 1 gallon (gal)= ___ quarts, ___ pints, ____ cups
Weight	1 pound (lb)= ____ ounces 1 ton (T)= _____ pounds

Metric Measurement

Prefix	Meaning	Length	Mass	Capacity
Kilo-				
Hecto-				
Deka-				
*Base unit				
Deci-				
Centi-				
Milli-				

Length	Basic unit:	Example:
Capacity	Basic unit:	Example:
Mass	Basic unit:	Example:

Converting Measurement

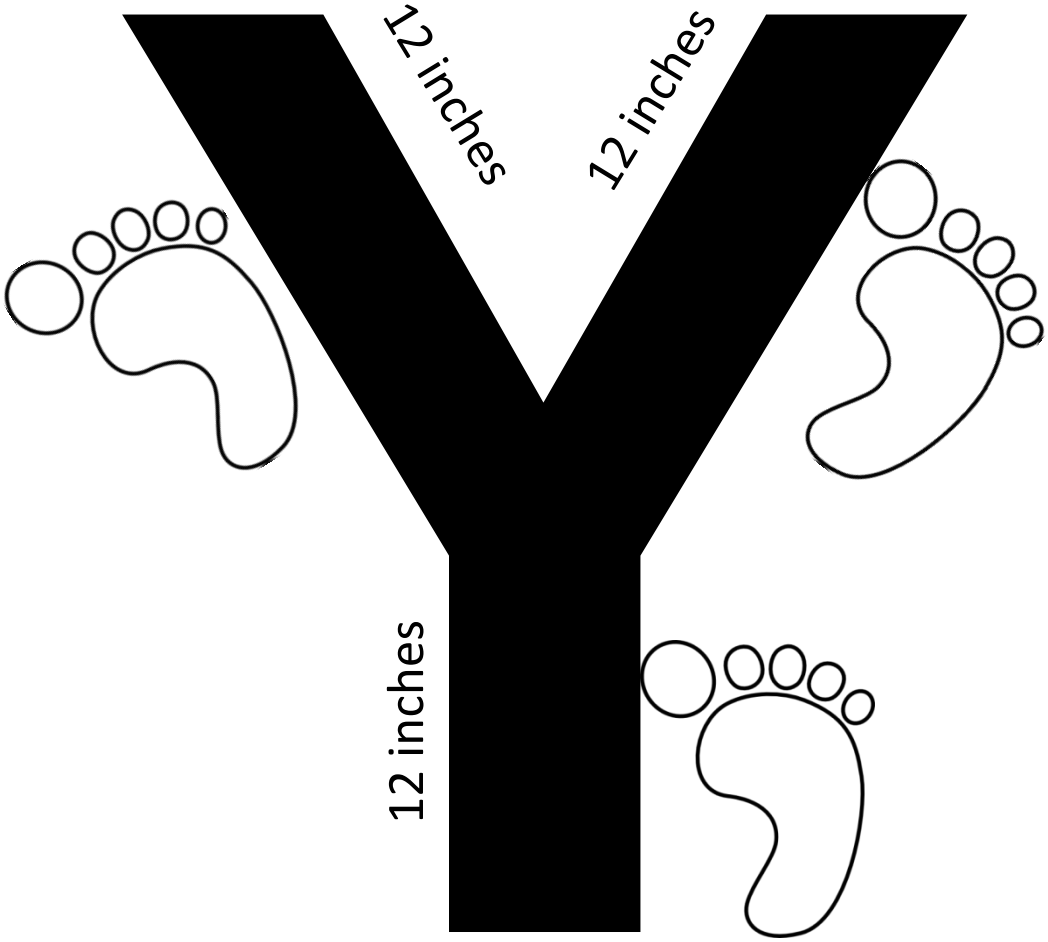
Convert:	
LARGE → small → _____	small → **LARGE** → _____
Conversion Steps: 4. X or ÷ ? 5. How many *smaller* units in **<u>one</u>** *larger* unit? 6. Solve the problem	**Conversion example:** 2 ft. = ___ in. 1. ft. → in. = larger → smaller, so X 2. 12 in. = 1 ft. 3. 12 X 2 =24 2 ft. = 24 in.

	Customary
<u>Length</u> How long?	1 foot (ft)= _____ inches 1 yard (yd)= _____ feet, _____ inches 1 mile (mi)= _____ yards, _____ feet
<u>Capacity</u> Amount something can hold	1 cup (c)= ___ fluid ounces 1 pint (p)= ___ cups, _____ fluid ounces 1 quart (qt)= ___ pints, ___ cups 1 gallon (gal)= ___ quarts, ___ pints, _____ cups
<u>Weight</u> How heavy?	1 pound (lb)= _____ ounces 1 ton (T)= _____ pounds

Metric Measurement

Prefix	Meaning	Length	Mass	Capacity
Kilo-		*kilo*	*kilo*	*kilo*
Hecto-		*hecto*	*hecto*	*hecto*
Deka-		*deka*	*deka*	*deka*
*Base unit		meter	gram	liter
Deci-		*deci*	*deci*	*deci*
Centi-		*centi*	*centi*	*centi*
Milli-		*milli*	*milli*	*milli*

Length	Basic unit: Meter (m)	Example:
Capacity	Basic unit: Liter (L)	Example:
Mass	Basic unit: Gram (g)	Example:


12 inches
12 inches
12 inches

Real-World Problem (with miles)

Julie is training for a small triathlon where she will run 3 miles, bike 10 miles, and swim 150 yards. How many yards will Julie run?

www.buzzmath.com/Docs#F6KM17F&page=1

Measure and Convert!

Name:_____ **Date:**_____

1	1. George has 15 pencils. Each pencil is _____ inches long. If he placed the pencils side by side, how long would the line of pencils be in feet?
2	2. Justin has 12 sheets of paper. Each sheet of paper is ____ inches wide. If he wants to make a line of paper on the wall, how long would the line of paper be in yards?
3	3. Ms. Brown has 7 cups. Each cup is ____ inches tall. If she makes a tower of the cups by stacking one on top of another, how tall would her tower of cups be in feet?
4	4. Sarah has 24 sticky notes. Each sticky note is ____ inches wide. If she places the sticky notes side by side, how long would the line of sticky notes be in feet?
Julie is training for a small triathlon where she will run 3 miles, bike 10 miles, and swim 150 yards. How many feet will Julie swim?	

Name_____ Date_____

Carrot Conversions

Candy Cottontail, a student at Cottontail Academy, loves to learn about measurement. Follow the directions to help Candy complete the measurement tasks below.

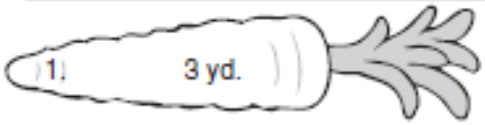
Directions: Each length is given in one unit. Change each length to the other two units.

Remember:

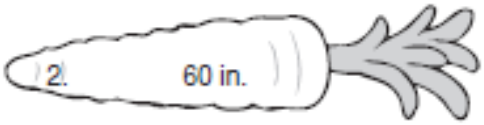
12 in. = 1 ft. 3 ft. = 1 yd. 36 in. = 1 yd.

To change a larger unit to a smaller unit, **multiply.**
4 ft. = ___?___ in.
1 ft. = 12 in.
4 x 12 = 48
4 ft. = **48** in.

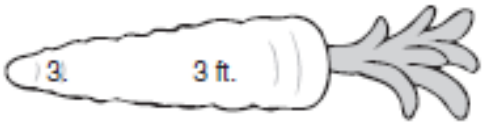
To change a smaller unit to a larger unit, **divide.**
(Remember that you may have a remainder.)
13 ft. = ___?___ yd.
3 ft. = 1 yd.
13 ÷ 3 = 4 R1
12 ft. = **4** yd. **1** ft.



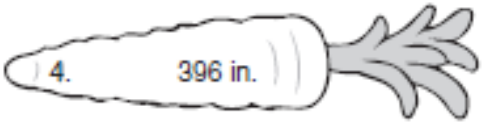
a. _____ in. b. _____ ft.



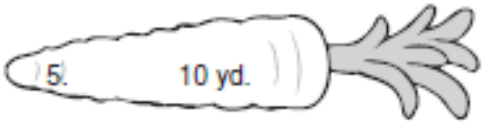
a. _____ ft. b. _____ yd. _____ ft.



a. _____ in. b. _____ yd.

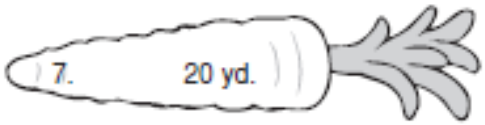


a. _____ ft. b. _____ yd.

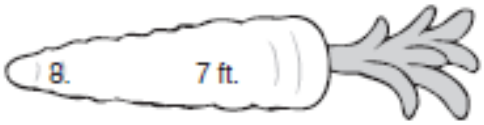


a. _____ in. b. _____ ft.

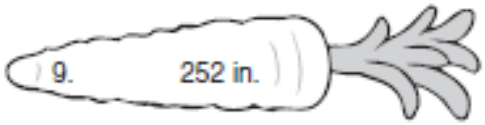
a. _____ in. b. _____ yd. _____ ft.



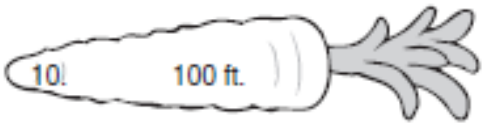
a. _____ in. b. _____ ft.



a. _____ in. b. _____ yd. _____ ft.



a. _____ ft. b. _____ yd.



a. _____ in. b. _____ yd. _____ ft.

Bonus Box: Order the ten carrots above from shortest to longest.

Customary Length Slip

Name: _____ **Date:** _____

Justin took a trip to New York City. The famous Woolworth building was built in 1913 and is 792 feet tall. How high is the building in yards?

Customary Length Slip

Name: _____ **Date:** _____

Ms. Treadway is redoing her living room. She wants to buy a couch cover, but the covers are measured in inches. Her couch is 8 feet long. How long is her couch in inches?

Customary Length Slip

Name: _____ **Date:** _____

Oliver's basketball court is 75 feet long. How long is the court in inches?

Customary Length Slip

Name: _____ **Date:** _____

The length of a football field is 100 yards. How many feet is that?

Assessment Answers

264 yards	96 inches
900 inches	300 feet

Extension Instructions

1. Using a computer, go to www.buzzmath.com/Docs#F6KM17F&page=1.

2. When you get to Buzz Math, complete all 10 pages of practice problems.

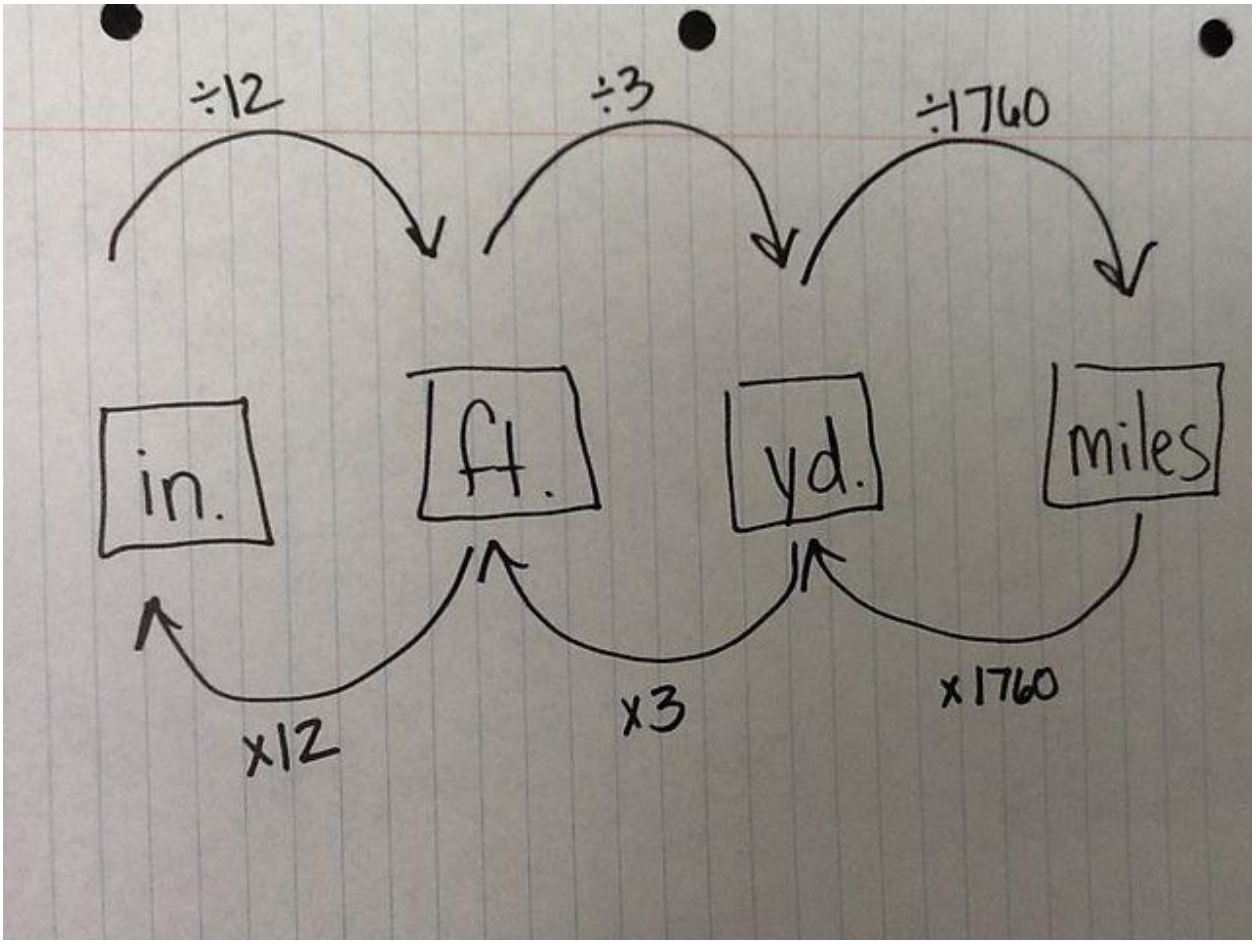
3. Once you have practiced converting customary length, create your own real-world customary length conversion problem.

4. When you finish writing your problem, give it to Miss Treadway to look over and approve.

5. On a sheet on construction paper, write your real-world problem and illustrate it. Make it creative and attractive.

6. Work out your problem on a separate sheet of paper and attach it to your word problem (Make sure you show your work for each conversion step).

Reteaching Graphic



Measurement Unit: Lesson 3

Grade/Subject: 5th grade Math
Date Taught: March 6, 2015
Lesson Title: "Converting Customary Capacity"
Estimated Time: 90 min.

Standard:

18.) Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multistep, real-world problems. [5-MD1]

Objective:

Students will be able to explain in complete sentences something they learned and something they are unsure about when converting customary capacity measurements according to the lesson.

Engagement:

The teacher will begin the lesson by going over the "problem of the day" (Convert 15 feet to inches), which will be a customary length conversion problem connecting the lessons together. Then the teacher will have a table set up with two clear cups of water of different measurements. The cups will also be different sizes. Like the previous lesson, the students will vote on the cup they think has more water. There will be a T-chart on the board with "Cup 1" (1.5 cups) and "Cup 2" (2 cups). A table at a time will come to the board to vote. Once everyone has voted, the teacher will have two volunteers come to the front and they will each pour one cup into a measuring cup to measure the amount of water. She will write each measurement on the board. Then she will state the objective for the lesson.

Good morning everyone! You should already have your problem of the day finished from earlier this morning. It was just a review problem on customary length. Let's go ahead and work it out together. Our first step in conversion is to always decide what? Yes, whether to multiply or divide. What do we do in this problem? Good, we multiply because we are going from larger units to smaller units. How many inches are in one foot? Yes, 12. So we do 15 times 12, and our answer is? Good, 180 inches. So now that we did a little review from yesterday, let's start thinking about what we will be working with today. As you can see, I have another chart on the board so you all can vote. Instead of measurements, however, I have two cups filled with different amounts of water. Take a minute to look and think about which cup is holding a larger amount of water. (Allow for a minute of think time) *Now I'm going to call you up one table at a time to come to the board and vote. Let's start with Table 5 today...Table 4...3...2...1. Now that everyone has made a vote, let's see which cup is holding more water. I brought a measuring cup with me to help with the decision. I need two volunteers to come up here and help me measure this water. Ok, (Student name) you'll measure cup 1 and (Student name) you'll measure cup 2.* (Measure cup 1, write measurement on the board, then measure cup 2 and write it on the board) Thank you volunteers. *Our*

measurements tell us that cup two was holding more water. Today we will be learning about customary capacity and learning how to convert within that system.

Instruction:

The teacher will have the students take out their graphic organizers. She will ask them what the word "capacity" means. She will define capacity as the amount a container can hold." She will ask the students how they can measure the maximum amount a container can hold. She will guide them to talking about volume and remind them of what they learned about a few weeks prior. She will explain that capacity uses specific units just like length did. The students will work with their table to fill in the customary capacity section of their organizer. After about 3-5 minutes, the teacher will bring the class back together and go over the measurements to make sure everyone wrote down the right numbers. She will then show a helpful capacity graphic on the anchor chart from the previous day. She will have the students think, pair, and share about what they see. The teacher will bring the class back together to discuss what they graphic means. Then the students will draw the picture on the graphic organizer. Next, the teacher will work with the students to convert using capacity units. She will have the students lead her in converting cup 2 to ounces. Next, she will write a real-world capacity conversion problem on the board and have the students solve it with her. Then she will ask the students if they have any questions about customary capacity.

Go ahead and take out your graphic organizer, and focus in on the capacity section. What does the word capacity mean? Yes, it means how much a container can hold. So go ahead and write that definition under capacity on your organizer. How can you measure the maximum or most capacity a container can hold? We learned about this a few weeks ago. Good, you can measure the maximum capacity by measuring the volume. So capacity is pretty similar because it's talking about the amount that something can hold. So remember that anytime you measure, you will be measuring using a certain type of units. So on your graphic organizer you can see that we will be talking about units, such as cups, pints, gallons, and more. Go ahead and talk with your table and work together to fill out the capacity section of your organizer with equivalent measurements. Some you may not know, but we will go over it in a couple of minutes. (Allow a few minutes to work together to fill in capacity measurements) *Ok, it looks like you filled in most of your measurements. Let's go over these so we can make sure we wrote down the right numbers so when we convert we will be accurate. How many ounces are in a cup? Good, there are eight fluid ounces in a cup. We are talking about capacity today, so we aren't going to say just ounces, we are going to say fluid ounces. So one cup equals…? Yes, 8 fluid ounces. How many cups does one pint equal? Good, 2 cups equal a pint. If there are two cups in a pint, how many fluid ounces will be in one pint? Very good, there will be 16 fluid ounces. How do you know that there will be 16 fluid ounces in 1 pint? Awesome thinking! Yes, because there are 8 fluid ounces in a cup and there are two cups in a pint, that means that 8*

times 2 is 16. Good job! Ok, let's go to our next measurement. Does anyone know how many pints are in one quart? Yes, there are 2 pints in a quart. So that would mean that one quart is equal to how many cups? Good, four cups. And now let's go to a gallon. What liquid can you think of that comes in a gallon container? Yes, there's a gallon of milk as well as other drinks. Ok, so how many quarts are in a gallon? Yes, four quarts. So that means that there are how many pints in a gallon? Good, there will be eight pints in a gallon. So finally, how many cups will be in a gallon? Yes, there will be sixteen cups in a gallon. How do you know that's true? Awesome! Yes, you already know that there are four cups in a quart and four quarts in a gallon, so four times four is sixteen. Good job! So now that we've written down our numbers and know the basic conversions, let's look at some helpful pictures that will help you to better remember customary capacity. I have the same anchor chart I used yesterday, except today I added a helpful graphic for capacity. As I reveal it, don't say anything. I just want you to study it and think about what it means. (Reveal graphic)...*Ok, raise your hand if you would like to share your thoughts on this graphic….Good, you noticed that the big G represents gallon and that there are four Q's for quarts, then two P's inside of the Q's for pints, and 2 C's inside the P's for cups. Go ahead and draw this graphic in your notes. This can be a really helpful tool as we practice more capacity and convert.* (Allow students a couple of minutes to draw graphic) *Ok, so now that we have our notes for capacity, let's put them to good use as we practicing some converting together. Like yesterday, we will still do the same conversion steps, but we are just using different units and numbers to convert. So let's practice using the water measurements from earlier. Let's use the 2 cups. Let's convert those two cups to fluid ounces. What would be my first step in conversion? Yes, to decide if I should multiply or divide. So what am I going to do? Good, we are going from large to small, so we will multiply. How many fluid ounces are in a cup? Good, 8. So we will multiply 8 by 2 and what will we get? Great, 16 fluid ounces. Now let's solve a real-world problem. What does your car need in order to run? Yes, it needs gas. So let me write this next problem about gas on the board...Let's read it together. "Ivan needs gas for his truck. He knows his truck holds 20 gallons of gas. His gas tank does not measure gallons, though. It measures pints. How many pints of gas will fill up his truck?" So what is this question asking us to do? Good, it's asking us to convert 20 gallons of gas to pints. So how will we do this? Right, we first have to decide to multiply or divide and since it's going from large to small we will multiply. Now what? Good, we determine the number of pints in gallons, which is what? Yes, eight. Now let's convert. What's 20 times 8? Good, 160. So Ivan's gas tank will hold 160 pints of gas. Good job! Are there any questions about converting capacity measurements? Ok, let's do some practice!*

Practice:

The students will practice converting customary capacity measurements by completing a scavenger hunt with a secret message, and turning the secret message into a mini song. The teacher will begin by presenting Gallonbot. She

will explain that Gallonbot is made up of customary capacity measurements and he serves as a good visual of how the different units make up a gallon. She will show that there is a scavenger hunt set up around the room with answers, and that each student will have a paper with questions. The scavenger hunt will be made up of five questions and answers. For each question that is answered, there is a secret word. The secret words will make up a message once the hunt is completed. Each table group will have a different message. The message will be one of the conversions building up to gallons, such as there are four quarts in gallon. After everyone is finished with the scavenger hunt, the tables will to put their message to a tune. Once everyone is finished, the tunes will be sung. The songs can be sung one or two times more to practice customary measurement units.

So I have a measurement friend here with me named Gallonbot. Let me walk around so you can see him closer. As you may have noticed, Gallonbot is another great visual for customary capacity measurements. For example, look at his arm. You can see that two cups are branching off of one pint, and two pints are branching off of one quart, and four quarts are connected to a gallon. So what we are about to do is to go on a scavenger hunt. As you can see, there are five answers around the room. You will receive a sheet with five questions that involve converting customary capacity measurements. Once you answer your questions, you can go ahead and go around the room to check your answers. When you find one of your answers you will see that there are words written on them. When the words from the five answers are put together, they will make up a secret message. Each table will have a different message, so make sure you write down the word that's next to your table number. You will record your message at the bottom of your question and answer sheet. Once your table has finished the hunt, you all will work together to put your message to a tune. Later on, each table will present their song to the rest of the class. So first, answer all the questions on your sheet, then go on your hunt to find our answers and your secret message, then when your table has the message you can put it to a tune, and then we will listen to all of the songs. Are there any questions? Ok, once you get your paper you can get started. (Pass out papers. Then walk around the room as the practice activity takes place and observe student understanding.) *Ok, it looks like everyone has practiced their tune. So let's hear what everyone came up with. Ok, let's do this. Table one, start us off...Great job everyone!*

- **Homework:** *Go Math!* book page 411

Assessment:

The students will be formatively assessed through a sticky note exercise. The students will receive one sticky note and write in a complete sentence one thing they learned from the lesson about converting customary capacity measurements and one thing they are still unsure about. Once they have written, they will go to the board and post it on the chart paper titled "Converting Customary Capacity." The teacher will be able to notice what

information stuck most with the students and if they wrote anything that communicates a misconception.

You all have done wonderful today. So I am now going to hand out one sticky note to each of you. I want you to write one complete sentence about what you learned from this lesson about converting customary capacity measurements and one thing you are still unsure about. Once you are finished you can walk to the board and post it on the chart paper. Are there any questions? Ok, you can get started.

Closing:

The lesson will be closed by having the students explain what they learned from Gallonbot. Then the teacher will give a sneak peak of the next lesson on converting customary weight.

As we end today, let's review really quick. What did we learn from Gallonbot? Good, that he represents capacity measurements. What else? Yes, that there are four quarts in a gallon. Good job. So tomorrow we will be learning about converting customary weight measurements. So be preparing your mind and get excited!.

Materials/Resources:

- 2 cups filled with different amounts of water- Cup 1 and Cup 2 (Cup 2 will have 2 cups of water and Cup 1 will have 1.5 cups of water)
- Measuring cup to measure water
- Promethean board
- Graphic organizer (attached)
- Scaffolded graphic organizer (attached)
- Anchor chart gallon graphic (picture attached)
- Real-world question for instruction (attached)
- Gallonbot (attached)
- Scavenger Hunt questions sheet (attached)
- Scavenger Hunt answer cards with secret codes (attached)
- Sticky notes
- Chart paper with title: "Converting Customary Capacity"
- Extension Gallonbot story instructions (attached)
- Re-teaching question and answer sheet (attached)

Differentiation:

- "Group 4:"
    - They will receive a more scaffolded version of the graphic organizer.
    - The teacher will help guide them as they practice converting (ex: guiding reading, prompting next step, etc.)
- Extension:
    - Student(s) will create their own Gallonbot and color coat him to better see the different units.
    - Student(s) will write a customary capacity conversion story about Gallonbot. The story will be five paragraphs, and it will begin by

introducing the story and scenario in the first paragraph, then it will present a problem (need of conversion) and solve it within the three body paragraphs, and finally it will all be tied together in the closing paragraph.
    - The Gallonbot and story will be posted together in the classroom.
- Reteaching:
    - Student(s) will receive their own copy of Gallonbot. They will be instructed to color coat each of the units to highlight how everything fits together to make a gallon.
    - Student(s) will then use their color coated Gallonbot to help them solve simple customary capacity conversion problems, as well as a real-world problem.
    - During this time, students will be guided by the teacher. She will ask questions that will help them think deeper and better understand the concept of capacity measurements.

Reflection:

This lesson has been the best lesson of the unit so far due to student engagement and learning. The students' conversion skills are increasing due to the repetition of the conversion steps each lesson.

We had a great discussion about the capacity graphic I presented after a think-pair-share. After studying the graphic, the students had great explanations about the drawing they shared with their partner and later with the class.

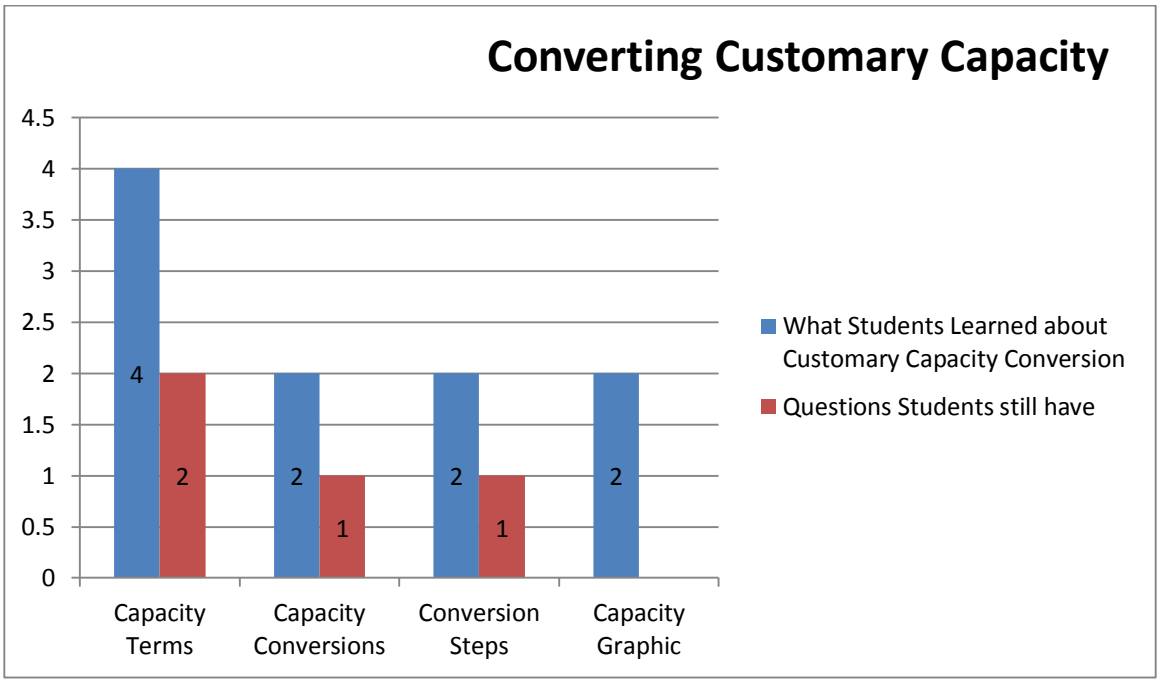
The most engaging part of the lesson was after the students completed their practice problems and went around the room to find their secret message. They especially enjoyed putting their message to a tune. Each group had unique beats and some groups went above and beyond and added more lyrics.

The formative assessment showed that the students all learned something about capacity. A few of the students mentioned the capacity graphic and even drew it on their sticky note. Overall, it was a good lesson with engaged students.

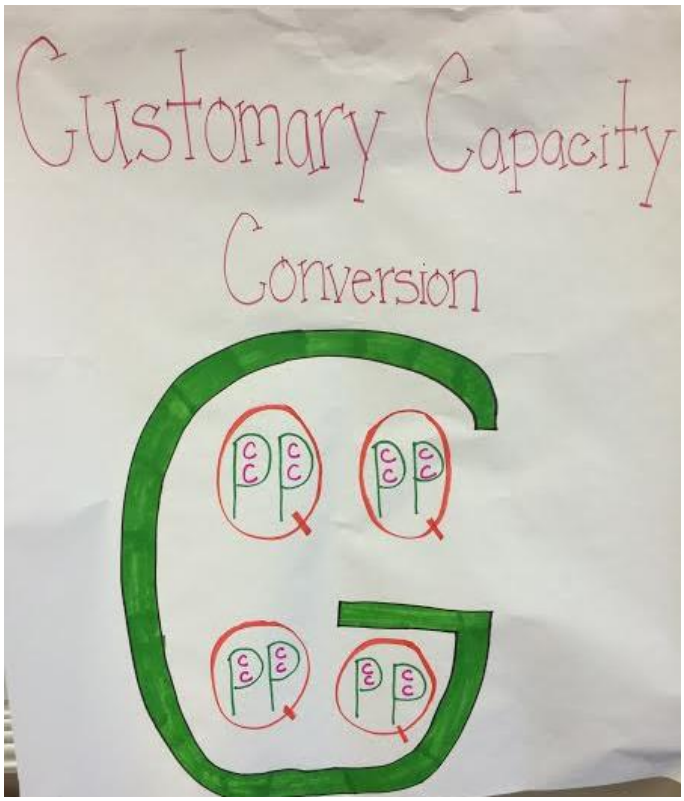
Data Analysis:

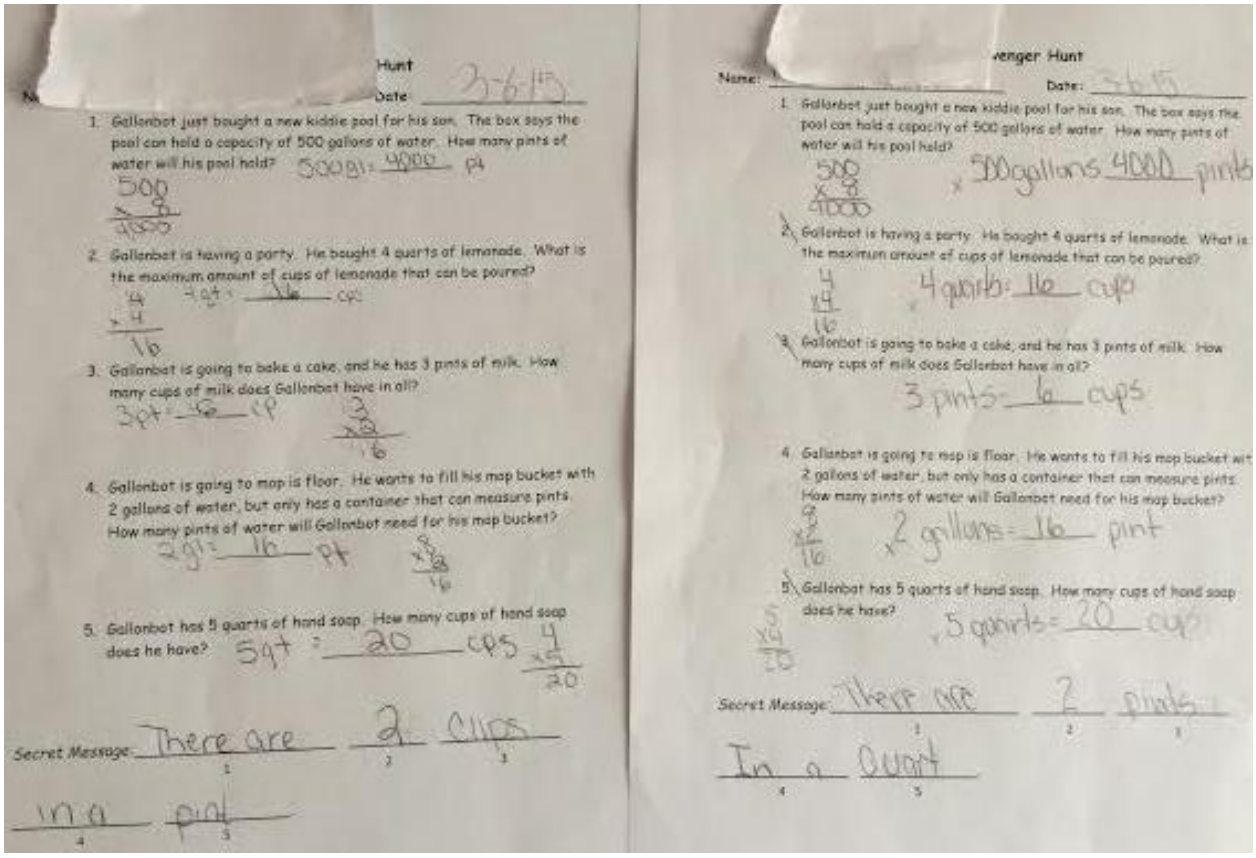
This lesson's formative assessment involved students writing down what they learned on a sticky note and a question they still had about the lesson. The pie chart below shows the categories of what the students learned according to their sticky note.

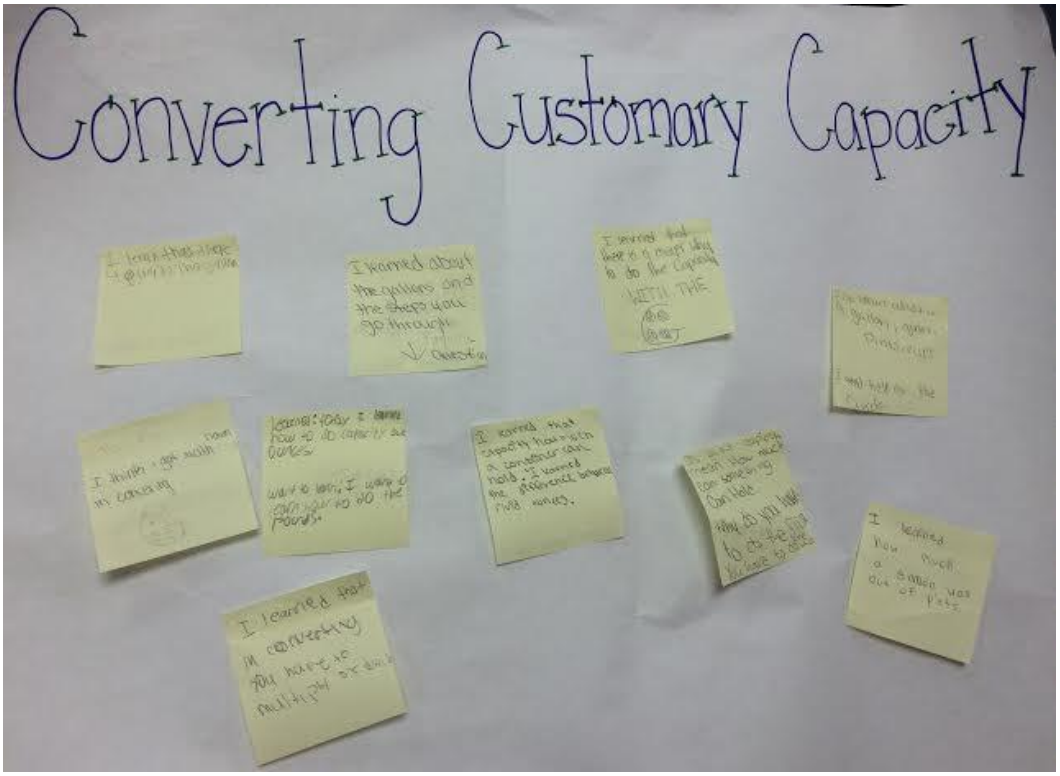
According to the data, capacity terms mostly stuck with the students. Capacity terms include information, such as capacity definition or the names of the capacity units. The other areas that stuck with students were basic capacity conversions, conversion steps, and the capacity graphic presented in the lesson. This data also shows the number of students that still had questions about the lesson. The question data is paired with the category that was learned by the students. Overall, the data shows capacity terms stuck with the students the most and that there are still a few questions students have about conversion.

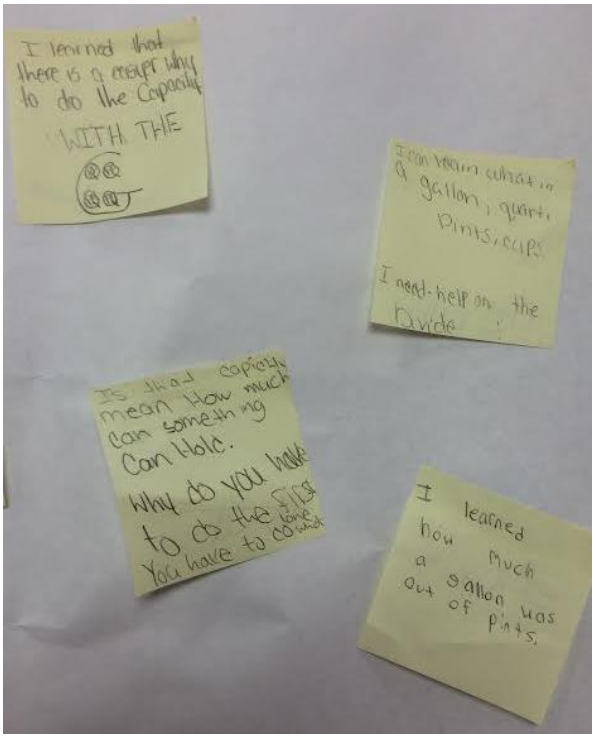


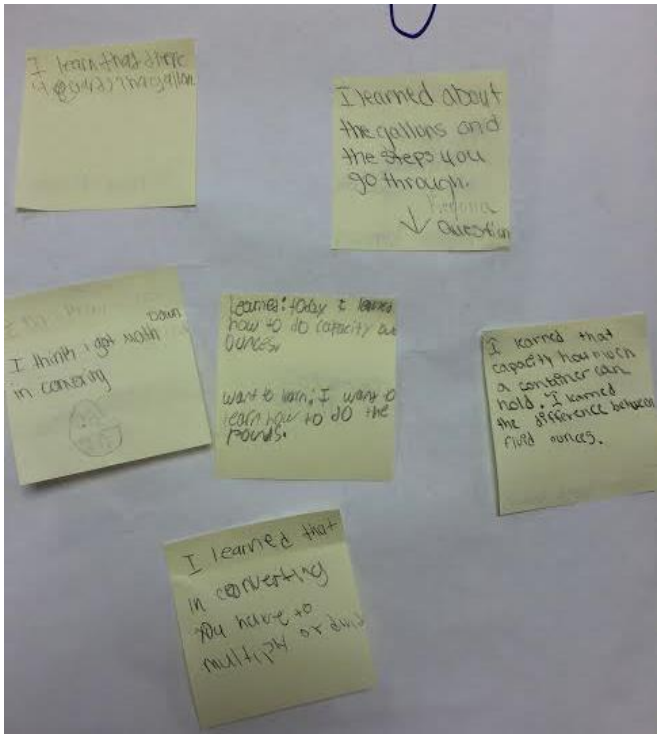
Lesson Pictures






Converting Customary Capacity
I learned about the gallons and the steps you go through.
I learned that capacity how much a container can hold. I learned the difference between fluid ounces.
I learned that in converting you have to multiply or divide
I learned how much a gallon was out of pints.


I learned that there is a easier way to do the Capacity WITH THE
I can learn what is a gallon, quart, pints, cups
I need help on the Divide
Is what capacity mean how much can something Can Hold.
Why do you have to do the You have to
I learned how much a gallon was out of pints.


I learned about the gallons and the steps you go through.
I learned that capacity how much a container can hold. I learned the difference between fluid ounces.
I learned that in converting you have to multiply or divide

Converting Measurement

Convert: **LARGE** → small → _____ small → **LARGE** → _____
Conversion Steps:

	Customary
Length	1 foot (ft)= ____ inches 1 yard (yd)= ____ feet, ____ inches 1 mile (mi)= _____ yards, _____ feet
Capacity	1 cup (c)= ___ fluid ounces 1 pint (p)= ___ cups, ____ fluid ounces 1 quart (qt)= ___ pints, ___ cups 1 gallon (gal)= ___ quarts, ___ pints, ____ cups
Weight	1 pound (lb)= ____ ounces 1 ton (T)= _____ pounds

Metric Measurement

Prefix	Meaning	Length	Mass	Capacity
Kilo-				
Hecto-				
Deka-				
*Base unit				
Deci-				
Centi-				
Milli-				

Length	Basic unit:	Example:
Capacity	Basic unit:	Example:
Mass	Basic unit:	Example:

Converting Measurement

Convert:	
LARGE → small → _____	small → **LARGE** → _____
Conversion Steps: 7. X or ÷ ? 8. How many *smaller* units in **<u>one</u>** *larger* unit? 9. Solve the problem	**Conversion example:** 2 ft. = ___ in. 1. ft. → in. = larger → smaller, so X 2. 12 in. = 1 ft. 3. 12 X 2 =24 2 ft. = 24 in.

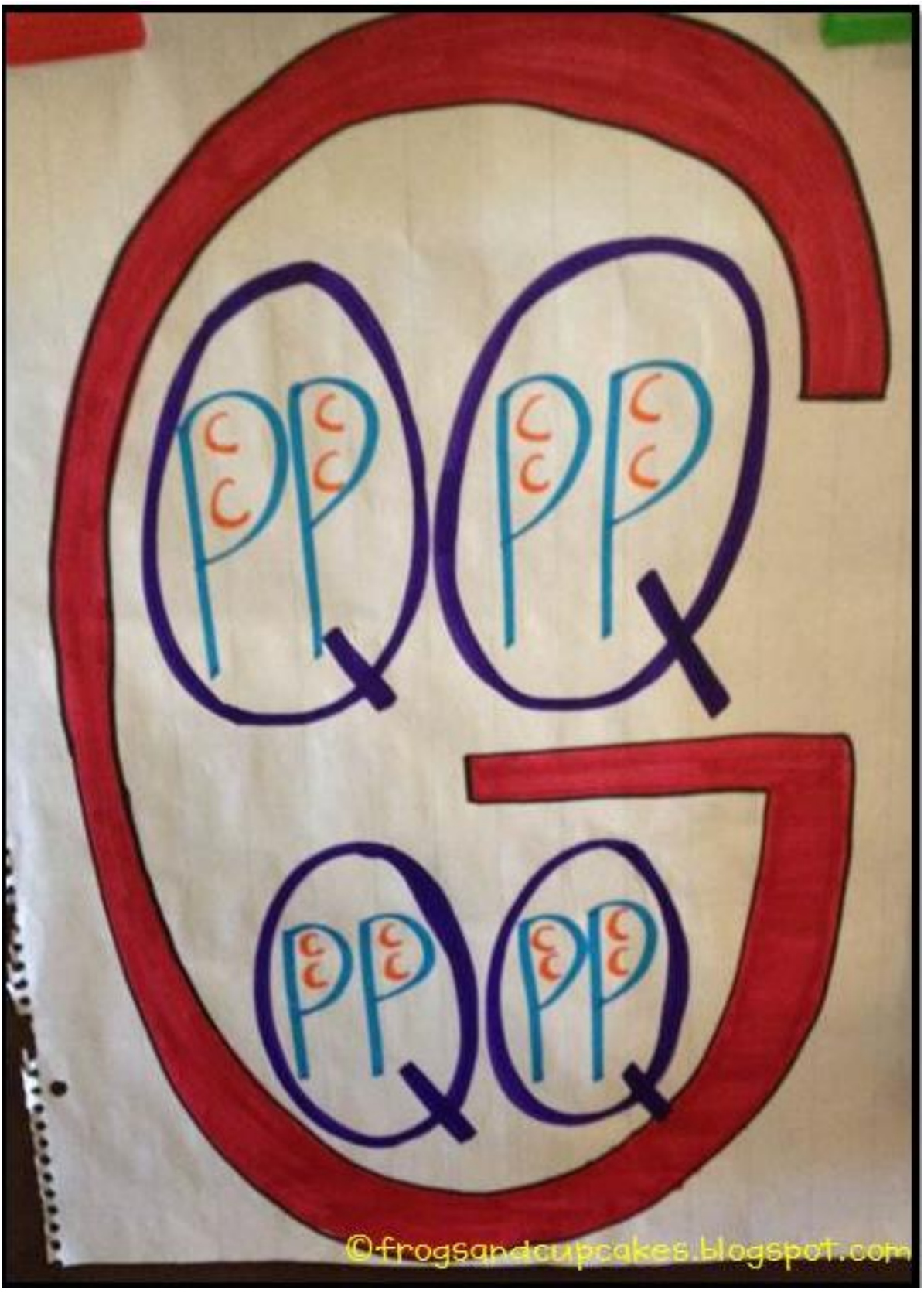
	Customary
<u>Length</u> How long?	1 foot (ft)= _____ inches 1 yard (yd)= _____ feet, _____ inches 1 mile (mi)= _____ yards, _____ feet
<u>Capacity</u> Amount something can hold	1 cup (c)= ___ fluid ounces 1 pint (p)= ___ cups, _____ fluid ounces 1 quart (qt)= ___ pints, ___ cups 1 gallon (gal)= ___ quarts, ___ pints, _____ cups
<u>Weight</u> How heavy?	1 pound (lb)= _____ ounces 1 ton (T)= _____ pounds

Metric Measurement

Prefix	Meaning	Length	Mass	Capacity
Kilo-		*kilo*	*kilo*	*kilo*
Hecto-		*hecto*	*hecto*	*hecto*
Deka-		*deka*	*deka*	*deka*
*Base unit		meter	gram	liter
Deci-		*deci*	*deci*	*deci*
Centi-		*centi*	*centi*	*centi*
Milli-		*milli*	*milli*	*milli*

Length	Basic unit: Meter (m)	Example:
Capacity	Basic unit: Liter (L)	Example:
Mass	Basic unit: Gram (g)	Example:

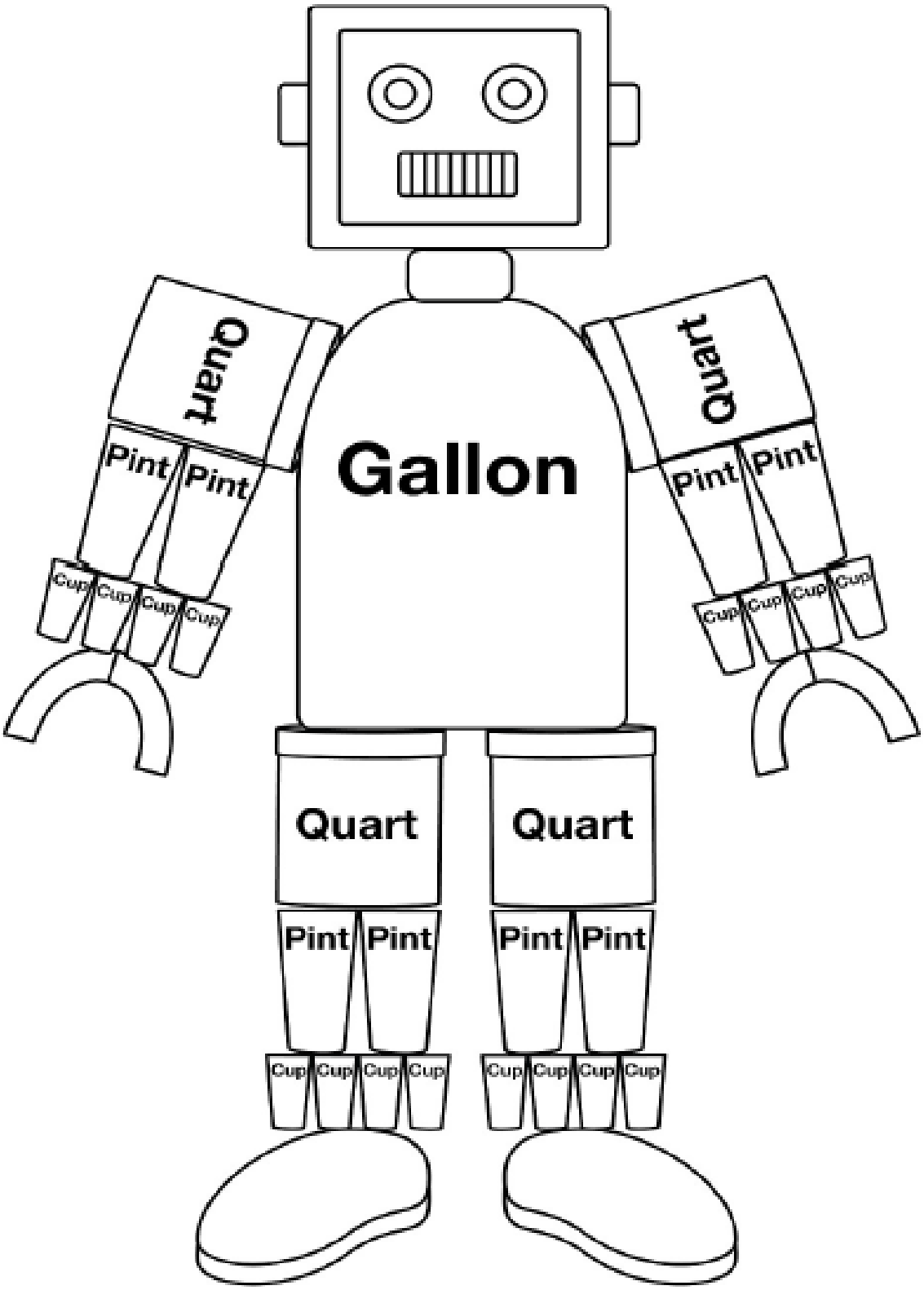
Gallon Graphic for Anchor Chart



Real-World Question for Instruction

"Ivan needs gas for his truck. He knows his truck holds 20 gallons of gas. His gas tank does not measure gallons, though. It measures pints. How many pints of gas will fill up his truck?"

GallonBot


Gallon
Quart
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Gallonbot Scavenger Hunt

Name: _____ **Date:** _____

1. Gallonbot just bought a new kiddie pool for his son. The box says the pool can hold a capacity of 500 gallons of water. How many pints of water will his pool hold?

2. Gallonbot is having a party. He bought 4 quarts of lemonade. What is the maximum amount of cups of lemonade that can be poured?

3. Gallonbot is going to bake a cake, and he has 3 pints of milk. How many cups of milk does Gallonbot have in all?

4. Gallonbot is going to mop is floor. He wants to fill his mop bucket with 2 gallons of water, but only has a container that can measure pints. How many pints of water will Gallonbot need for his mop bucket?

5. Gallonbot has 5 quarts of hand soap. How many cups of hand soap does he have?

Secret Message: _____ (1) _____ (2) _____ (3)

_____ (4) _____ (5).

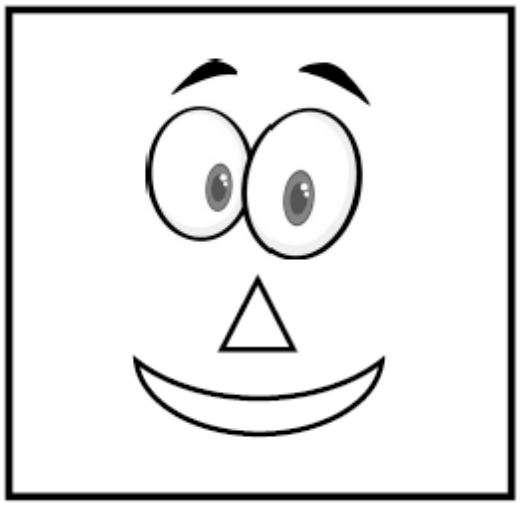
4,000 pints 1. There are 2. There are 3. There are 4. There are	**16 cups** 1. 8 2. 2 3. 2 4. 4
6 cups 1. Fluid ounces 2. Cups 3. Pints 4. Quarts	**16 pints** 1. In a 2. In a 3. In a 4. In a
20 cups 1. Cup 2. Pint 3. Quart 4. Gallon	

Gallonbot Story Instructions

- Before writing your story, use the attached sheets to make your own Gallonbot. Be sure to color coat the units so you can better see how each unit makes up a gallon; such as coloring all the cups red and all the pints blue. Glue your Gallonbot onto construction paper.

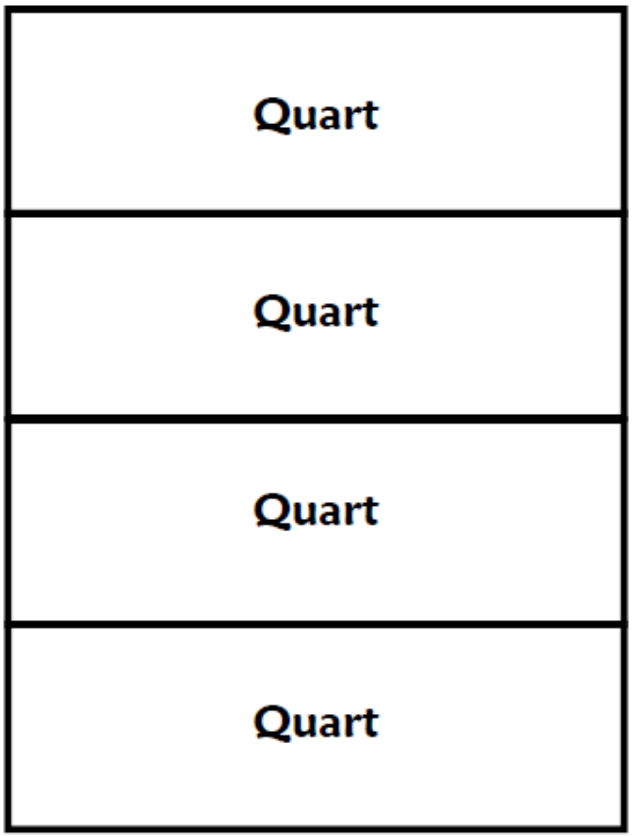
- After your Gallonbot is created, write a five paragraph story involving customary capacity conversion. Pretend you are writing a word problem about Gallonbot, except you are going to make a story about it instead.
    - Your story should include the following:
        - Introductory paragraph: Introduce Gallonbot and his problem.
        - Body paragraphs: Describe Gallonbot's problem and how it came to be. Then explain how he solves it. Remember he is trying to convert capacity in some way.
        - Closing paragraph: Bring the story together and end it by restating how the problem was solved.

Be creative and do your best!

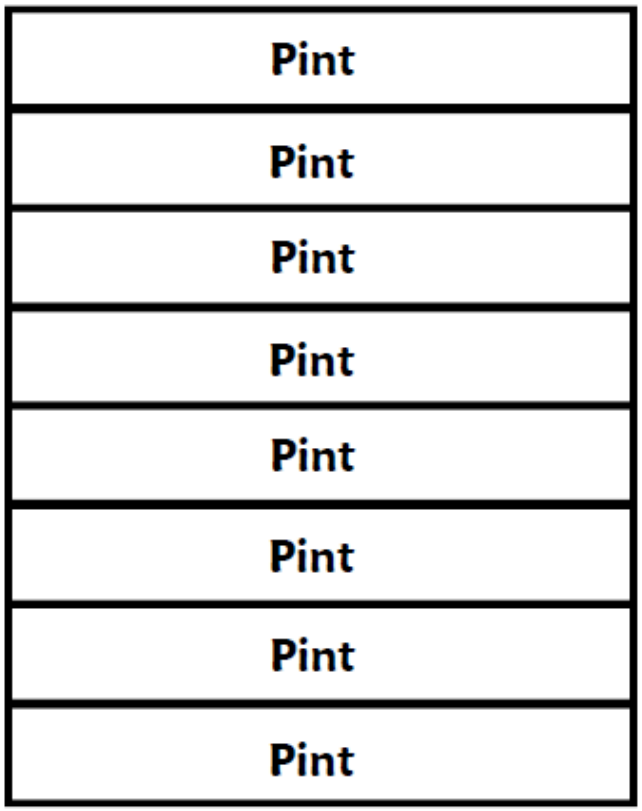


Gallonbot head

Gallonbot body



Upper arms and legs



Lower arms and legs

Cup	Cup
Cup	Cup
Cup	Cup
Cup	Cup

Cup	Cup
Cup	Cup
Cup	Cup
Cup	Cup

Fingers and toes

Converting Customary Capacity—Extra Practice

Name: _____ **Date:** _____

1 pint = _____ cups

1 gallon = _____ quarts

1 gallon = _____ cups

2 quarts = _____ pints

16 pints = _____ quarts

1 gallon = _____ pints

10 cups = _____ pints

4 quarts = _____ cups

Gallonbot needs 5 quarts of lemonade for a pool party. How many cups of lemonade will there be if he uses all of the lemonade?

Converting Customary Capacity—Extra Practice

Name: _____ **Date:** _____

1 pint = _____ cups

1 gallon = _____ quarts

1 gallon = _____ cups

2 quarts = _____ pints

16 pints = _____ quarts

1 gallon = _____ pints

10 cups = _____ pints

4 quarts = _____ cups

Gallonbot needs 5 quarts of lemonade for a pool party. How many cups of lemonade will there be if he uses all of the lemonade?

Measurement Unit: Lesson 4

Grade/Subject: 5th grade Math
Lesson Title: "Converting Customary Weight"
Date Taught: March 9, 2015
Estimated Time: 90 min.

Standard:

18.) Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multistep, real-world problems. [5-MD1]

Objective:

When given a KWL chart, students will be able to accurately explain three things they learned from the lesson about customary weight conversion.

Engagement:

The teacher will begin by going over the "Problem of the Day" which will be a customary capacity conversion problem (2 gallons to pints). The teacher will state the objective for the lesson. She will ask the students what they already know about customary weight and conversion, and she will have them write what they know and what they want to learn about the topic on a KWL chart she will pass out. Once everyone is finished writing, she will ask a few students to share what they already know and a few students to share what they want to learn.

Good morning everyone! As we begin today, let's go over the Problem of the Day. You should have already completed this problem from earlier this morning and it was just a review from yesterday. So our problem was to convert two gallons to pints. What's my first step when converting? Yes, decide if I'm going to multiply or divide. What will I do? Good, I will multiply because I am going from large to small. What do I have to do next? Yes, I have to determine how many pints are in one gallon. How many pints are in a gallon? Good, there are eight. So now let's do the math. Eight times two is sixteen. So there are sixteen pints in two gallons. Good job. So today we will be learning about customary weight and how to convert within that system. As you can see, I have passed out a KWL chart for each of you. Right now I want you to fill in the first two columns with everything you know about customary weight and conversion and what you would like to learn about it. Just leave the third column blank because we will fill that in after the lesson. Are there any questions? Alright, go ahead and get started. (During this time walk around and observe what students are writing) *Ok, raise your hand if you still need more time. Alright, raise your hand if you would like to share something you already know about customary weight and conversion. Good, you know about pounds and tons. Yes, you can convert within that system. Ok, raise your hand if you would like to share something you would like to learn about customary weight and conversion. Oh, you want to learn the equal measurements between units. Good. Well let's get started so we can learn more about weight and conversion.*

Instruction:

The teacher will have all of the students take out their graphic organizers so that they can take notes. Like the previous days, she will give them a couple of minutes to work as a table to fill in the customary weight measurements on their organizers. Then she will go over the correct measurements. She will then give them some examples of how much things in the world weigh, such as a school bus, a desk, and a large watermelon. She will use these weights to model and guide the students on conversion within the customary weight system. If the students seem to be quickly catching on, one or two can convert the last of the pictures. Then she will present a real-world problem to work through as a class.

Go ahead and take out graphic organizer so that we can take a few notes for the lesson. Like you have done the last couple of days, work with your table to fill in the missing measurements in the customary weight box. You only will have a minute or two to do so since there are only two measurements to fill...Alright, let's go over these measurements to make sure our conversions will be accurate. Did anyone know how many ounces are in a pound? There are 16 ounces in a pound. Where have we heard the unit of ounces before? Yes, we talked about it with capacity except we called it fluid ounces. When we talk about weight we can just say ounces. Ok, good. Now does anyone know how many pounds are in a ton? Yes, there are 2,000 pounds in a ton. Think of how much you weigh, which is in pounds. Then think of how many more pounds 2,000 pounds is. Would you say that one ton is pretty heavy? Yes, it sure is. So I brought in some pictures of common things in the world and I also have their weight. My first picture is a school bus. As I was doing my research I found that a school bus can weigh anywhere from 11-14 tons. So for this lesson we are going to say that this school bus weighs 12 tons. My next picture is a school desk that's about the same shape as the ones in here. The website said this desk weighs 32 pounds. My last picture I brought is a picture of a watermelon. Now this isn't any normal watermelon. This is the largest watermelon ever grown. Before I reveal the weight, does anyone have a guess of how much the largest watermelon weighs? (Allow students to make guesses) *Ok I'm not going to tell you how much it weighs in pounds because we will figure that out soon. But the largest watermelon weighs 4,304 ounces. So now that we have some real world examples of how much things weigh, let's practice converting the weights. Let's start with the school bus. I'm really curious of how many pounds a school bus weighs. So let's convert 12 tons to pounds. What is my first step when always converting? Good, I need to decide if I am going to multiply or divide. What should I do? Very good, I'll multiply because I'm going from a large unit to a small unit. Now how many pounds are in a ton? Yes, 2,000. So let's do our math. What will I multiply together? Good, I'll multiply 2,000 by 12. So what does a school bus weigh in pounds? Good, it weighs 24,000 pounds. So now when you see a school bus you know that it weighs quite a bit! Ok, you all seem to be doing really well. Is there anyone who would like to convert our school desk to ounces? Ok, (student name) come on up and explain your steps as you go...Good job. So we know that the school desk in this picture weighs 512 ounces. Now for our watermelon. Let's find out*

how much the largest watermelon weighs in pounds. Who would like to volunteer to show us? Ok, (student name) come up here and convert the ounces to pounds please, and explain what you are doing as you go...Wow, so the largest watermelon weighs 269 pounds! That's a lot of watermelon. So how are you all doing? Give me a thumbs up if you get this, thumbs in the middle if you're still a little confused, and a thumbs down if you are very confused. Ok, good. Let's move on then.

Practice:

The students will work in partner pairs during the practice time. They will be doing a table by table scoot activity. Each table will have one real-world problem and one simple problem about converting customary weight. The tables will have tent cards and there will be a problem on each side of the card. The students will get 2-4 minutes (depending on the first couple of tries) on each problem. They will start at their own table and do the problem facing them and their partner. After time is up the teacher will say "swap" and the tent card will be flipped, giving each partner pair a new problem. Once time is up for that problem, the teacher will say "scoot" and the table group will move to the next table and repeat the process. The students will end up completing eight problems with their partner. During this time the teacher will be timing and observing students as they work together and solve the problems. She will intervene if there are misunderstandings among the pairs.

We are going to be doing a "scoot" activity today. Let me tell you what that means. I have placed two problems on each table- one real-world problem and one simple conversion problem. You will work with a partner the entire time and record your work and answers on a recording sheet. You will first answer the problem facing you and your partner. After about three minutes I will say swap, and you will flip the card in the middle of the table so you receive another problem. After another three minutes of solving I will say "scoot and your entire table will stand up and move to the next table and do the same thing except have different problems. Does everyone understand? Ok, when you get your paper make sure you put your name and your partner's name at the top as well as the date...Ok, is everyone ready? Ok, go!...Swap...scoot!

***Homework:** *Go Math!* book page 415

Assessment:

Students will fill in the "L"-what they learned- on their KWL chart. They will be required to write down at least three things they learned about customary weight and conversion in complete sentences. Once they are finished they will turn their charts into the teacher. The teacher will review the charts to see how students grew throughout the lesson by comparing the columns.

You all have done wonderful today! Now that you have learned about customary weight conversion and practiced it, it's time to fill in the last part of your KWL chart. You need to write at least three things you learned from this lesson about customary weight and conversion. Each thing you write needs to

be in a complete sentence. Does anyone have any questions? Ok, you can get started.

Closing:

The teacher will ask the students what they learned about today. Then she will ask what they learned about the last couple of days and tie it into converting customary measurement. She will then ask the students to predict what they will be learning about next. After some predictions, the teacher will reveal that they will be learning about converting within the metric system.

As we end, what did we learn about today? Yes, we learned about how to convert customary weight. What have we learned about the last couple of days? Good, we've learned about how to convert customary length and customary capacity. What do these three days have in common? Good, it was all about the customary system. Raise your hand if you have a prediction about what we will be learning next. Converting measurement...measurement...metric system...Those are all good predictions. The next several days we will be talking about converting within in the metric system. So, get ready to learn some new things and participate in an exciting project!

Materials/Resources:

- KWL chart (attached)
- Reduced KWL chart (attached)
- Graphic organizer (attached)
- Scaffolded graphic organizer (attached)
- Pictures of the following: school bus, school desk, largest watermelon (attached- make into tent cards so they can stand up and write the weight on the picture)
- Promethean board
- Scoot recording sheet (attached)
- Scoot real-world problems (attached- to be attached to a tent card)
- Extension instruction sheet (attached)
- Reteaching practice website (www.thatquiz.org/tq-n/science/metric-system/)

Differentiation:

- Group 4:
  - They will receive a scaffolded version of the graphic organizer.
  - They will be paired with a higher level learner during the practice time to help guide them.
  - They will receive a reduced KWL chart (Write 2 things learned)
- Extension:
  - Student(s) will create a game involving customary weight conversion. They will receive an instruction sheet that will have the parameters of the activity. They can create any type of game as long as it involves at least 5 real-world problems and 5 regular weight conversion problems. They will be the ones to create the problems for the game. After the game is completed, it can be used for review activities and students who need more practice with customary weight.

- Reteaching:
    - The teacher will meet with student(s) in small group and break down weight conversion into simpler terms, such as using very simple numbers to model conversion.
    - The teacher will show the student an online practicing tool to practice conversion. They will work through a few problems together.
    - The student will practice converting on their own, while the teacher observes and notes any misconceptions. Misconceptions will be addressed immediately so the student can better understand.

Reflection:

Prior to this lesson my students have had a lot of opportunities to practice converting within the customary system. They quickly grasped converting customary weight because the only new information presented were the few weight units and their simple conversions to learn.

I had them fill out the first two columns for their KWL charts and it was very interesting to read what they had written. It was encouraging to see that many of the students wrote about conversion rules and that they knew weight was a way to measure something.

Instruction went well, but because of running behind during the morning, I had to cut practice time short. Most of the students knew how to do the conversions, but I still wanted to take some time to make sure all of my students knew what they were doing. Therefore, I took about thirty minutes the next day to practice converting weight measurements and to have the students finish filling out their KWL chart for their assessment.

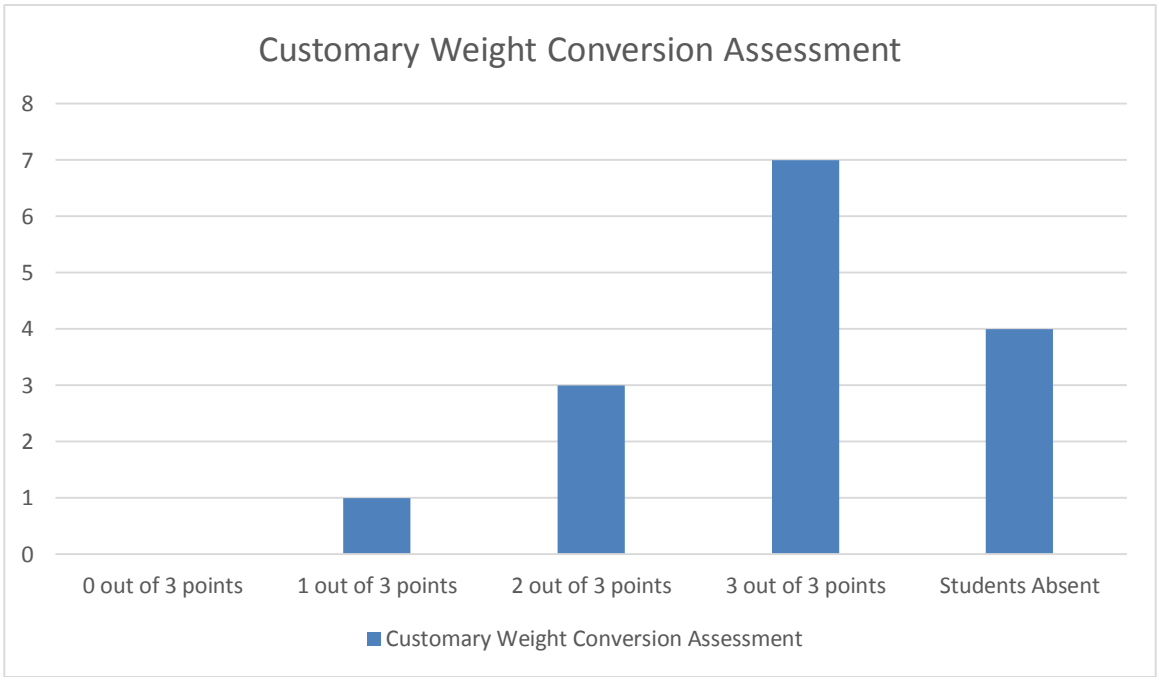
It was unfortunate that this lesson was cut in half. I feel like it was choppy due to scheduling. In the future I want to make sure that lessons can be taught fully at a time or be divided in a smoother way. However, I'm proud of my students and how they have grasped the idea of converting customary weight conversion.

Data Analysis:

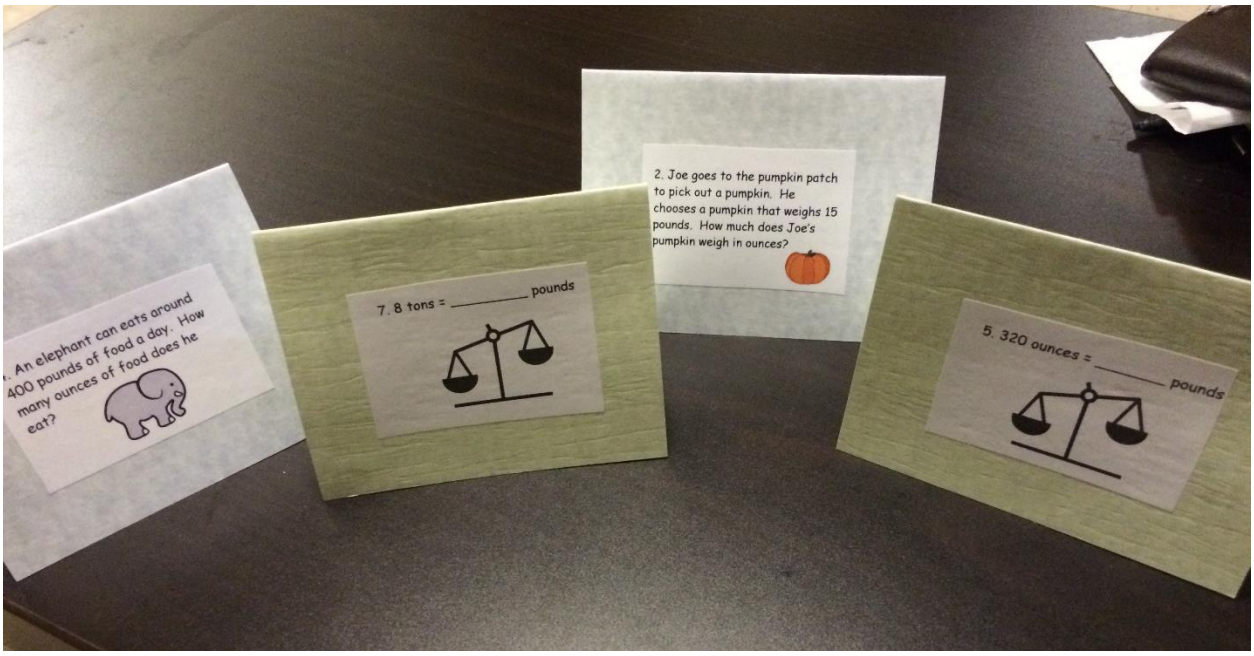
The formative assessment for this lesson was to fill out a KWL chart with three things that were learned during the lesson about converting customary weight. Since this lesson was taught over a two day period, there ended up being students who were absent on one of the two days who couldn't finish their KWL chart. Therefore, there were eleven total students who were assessed and four students who were not.

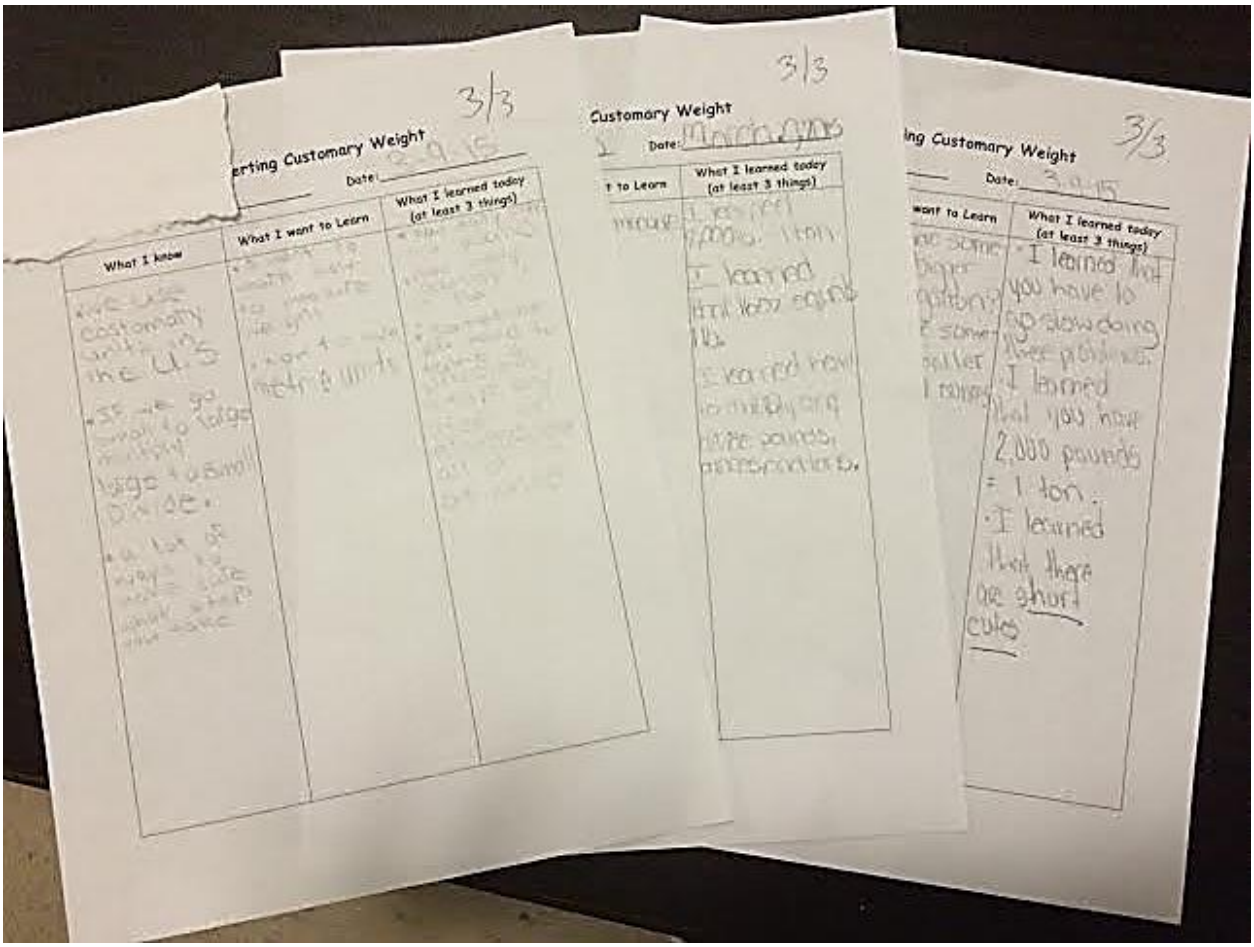
According to the data, the majority of the class met the objective of writing three things they learned during the lesson. There were four students who did not meet the objective for different reasons. However, the students who receive two out of the three points did write accurate facts, but failed to meet the criteria of three things learned. The four students who did not meet the objective will get more access to this material during the review lesson in a couple of days.

The data for this lesson can be seen in the graph below.



Lesson Pictures





KWL: Converting Customary Weight

Name:_____ **Date:**_____

What I know	What I want to Learn	What I learned *today* (at least 3 things)

KWL: Converting Customary Weight

Name:_____ **Date:**_____

What I know	What I want to Learn	What I learned *today* (at least 2 things)

Converting Measurement

Convert: **LARGE** → small → _____ small → **LARGE** → _____
Conversion Steps:

	Customary
Length	1 foot (ft)= ____ inches 1 yard (yd)= ____ feet, ____ inches 1 mile (mi)= _____ yards, _____ feet
Capacity	1 cup (c)= ___ fluid ounces 1 pint (p)= ___ cups, ____ fluid ounces 1 quart (qt)= ___ pints, ___ cups 1 gallon (gal)= ___ quarts, ___ pints, ____ cups
Weight	1 pound (lb)= ____ ounces 1 ton (T)= _____ pounds

Metric Measurement

Prefix	Meaning	Length	Mass	Capacity
Kilo-				
Hecto-				
Deka-				
*Base unit				
Deci-				
Centi-				
Milli-				

Length	Basic unit:	Example:
Capacity	Basic unit:	Example:
Mass	Basic unit:	Example:

Converting Measurement

Convert:

LARGE → small → _____ small → **LARGE** → _____

Conversion Steps:	**Conversion example:**
10. X or ÷ ?	2 ft. = ___ in.
11. How many *smaller* units in **<u>one</u>** *larger* unit?	1. ft. → in. = larger → smaller, so X
12. Solve the problem	2. 12 in. = 1 ft.
	3. 12 X 2 =24
	2 ft. = 24 in.

	Customary
<u>Length</u> How long?	1 foot (ft)= _____ inches 1 yard (yd)= _____ feet, _____ inches 1 mile (mi)= _____ yards, _____ feet
<u>Capacity</u> Amount something can hold	1 cup (c)= ___ fluid ounces 1 pint (p)= ___ cups, _____ fluid ounces 1 quart (qt)= ___ pints, ___ cups 1 gallon (gal)= ___ quarts, ___ pints, _____ cups
<u>Weight</u> How heavy?	1 pound (lb)= _____ ounces 1 ton (T)= _____ pounds

Metric Measurement

Prefix	Meaning	Length	Mass	Capacity
Kilo-		*kilo*	*kilo*	*kilo*
Hecto-		*hecto*	*hecto*	*hecto*
Deka-		*deka*	*deka*	*deka*
*Base unit		meter	gram	liter
Deci-		*deci*	*deci*	*deci*
Centi-		*centi*	*centi*	*centi*
Milli-		*milli*	*milli*	*milli*

Length	Basic unit: Meter (m)	Example:
Capacity	Basic unit: Liter (L)	Example:
Mass	Basic unit: Gram (g)	Example:


SCHOOL BUS

Partner Scoot!

Names:_____ **Date:**_____

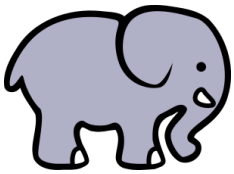
1	2
3	4
5	6
7	8

1. 8 pounds = _____ ounces

2. Joe goes to the pumpkin patch to pick out a pumpkin. He chooses a pumpkin that weighs 15 pounds. How much does Joe's pumpkin weigh in ounces?

3. 2 tons = _____ ounces

4. An elephant can eats around 400 pounds of food a day. How many ounces of food does he eat?



5. 320 ounces = _____ pounds

6. Wanda wants a dog that weighs less than 50 pounds. There's a Brown Lab at the animal shelter that weighs 912 ounces. Will Wanda choose that dog?

7. 8 tons = _____ pounds

8. George buys a 7 pound bag of cat food. George's cat eats 4 ounces of food a day. How many days will the cat food last?

Customary Weight: Extension Instructions

You have the privilege of creating a game based on customary weight conversions!

Game constraints:

- You can make any type of game (ex: board game, card game, etc.) as long as it includes:
  - At least 5 real-world problems about customary weight conversion that you create
  - At least 5 regular customary weight conversion problems that you create (ex: 1 ton=_____pounds)
  - Game title and directions
  - Color!

Do your best and be creative! Make it exciting for other 5th graders!

Measurement Unit: Lesson 6

Grade/Subject: 5th grade Math
Lesson Title: "Measurement Conversion Review"
Date Taught: March 12, 2015
Estimated Time: 75 min. (review), 1 hr. (test), 2 X 90 min. (culminating activity)

Standard:

18.) Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multistep, real-world problems. [5-MD1]

Objective:

When given a summative test, students will convert measurements within a given measurement system by answering fill-in-the-blank questions and solving real-world problems with 80 percent accuracy.

Engagement:

The teacher will begin by reviewing the "Problem of the Day" (6 meters=___millimeters; 9 kilograms=____grams) that reviews the previous lesson of converting metric units. Then she will give each table a baggie with measurement vocabulary and units. She will instruct the students to sort the words into categories they feel are appropriate ("Open Word Sort"). The teacher will give the students about five minutes to complete the activity and then they will transition into instruction.

Good morning everyone! Go ahead and get out your math journal with the problem of the day that you completed earlier this morning. Let's go over it together. Our first problem is asking us how many millimeters are in six meters. What should we do first? Good, we should count the number of spots from meters to millimeters, which is what? Yes, three times. And which way did we move? Good, we moved to the right so our number will be larger. So six meters is equal to how many millimeters? Very good, it's equal to 6,000 millimeters. Ok, so our second problem was asking how many grams are in nine kilograms. What do we do first? Yes, we count the number of spots, which is what? Good, three. Now what? Yes, we moved to the right so our number will be larger. Therefore, nine kilograms equals 9,000 grams. Good job! So now we are going to do a word sorting activity. Each table will receive a baggie with vocabulary words and measurement units. As a table you will need to sort them into categories you create. There is not a specific number of categories you need. If you feel that some words belong in their own category then you can do that, but you need to be able to support your decision. There are blank slips of paper in your baggie also and those are for your category titles, so use as many as you need. Are there any questions? Ok, you will have about five minutes to do this, and then we will go over the words as a class.

Instruction:

Instruction will begin by going over the open sort exercise that the students participated in. The teacher will first ask each table group to share their categories and words. As the groups share, they will discuss the terms and categories as a class. Next, the teacher will go through different measurement systems and categories to review conversion and measurement equivalents. They will talk about some of the measurements and do a couple of conversion problems for each category. Then there will be a question and answer time as a class to clear up any confusion.

Alright, time is up! Let's go around to each table and hear about the categories you created and how you sorted your words. Let's start with table one...Oh, so they created the three categories about customary measurement, metric measurement and both...Table 2...Wow, they really different categories by doing length, capacity, weight, and other terms...Table 3...Table 4...Table 5...Good job everyone! It seems that you really have a good understand of these words and how they are used in measurement. Let's go ahead and review more measurements and how to convert. Let's start with customary length. What units do we use when we are measuring customary length? Good, we use inches, feet, yards, and miles. Without using your notes, what measurements are equivalent to each of these units? (Write on the board) *Yes, there are 12 inches in a foot, 3 feet and 36 inches in a yard, and 5,280 feet and 1,760 yards in a mile. So now that we know about our measurements, let's review conversion. Now remember that customary conversion is different than metric conversion, so you are going to have to think back to last week when we converted within the customary system. So let's convert 90 feet to yards. What will we do first? Good, we have to decide if we need to multiply or divide. So since we are moving from smaller to larger, we will divide. What's our next step? Yes, we need to determine how many feet are in a yard, which is what? Good, 3 feet. So 90 divided by 3 is 30. Therefore, there are 30 yards equals 90 feet. Good job! Let's move on to converting customary capacity units. Don't worry we will practice more later on with each system. So when we are talking about customary capacity what units will we use? Very good, we use fluid ounces, cups, pints, quarts, and gallons. Let's review some of the equivalent measurements for these units, and as we do that think back to when we looked at the graphic with the big "G" and the Gallonman graphic and how each unit looked. So how many fluid ounces are in one cup? Yes, there's 8 fluid ounces in a cup. Remember not to get fluid ounces confused with ounces which is used when we are talking about weight. So how many cups and fluid ounces are in a pint? Awesome, there are two cups in a pint and sixteen fluid ounces in a pint. What about a quart? How many pints are in a quart? Yes, there are two pints in a quart. What about the number of cups in a quart? Very good, there are four cups in a quart. Now for gallons. How many quarts are in a gallon? Yes, four. How many pints? Yes, eight. And cups? Awesome, there are sixteen cups in a gallon. Great job! There's a lot to customary capacity. Let's practice a conversion problem. Are the conversion steps we used in customary length the same as customary capacity? Yes, they*

are. Conversion steps are the same throughout the customary system. It's just the units and values that change. Ok, so let's convert 6 quarts to cups. What's our first step? Yes, we need to decide if we divide or multiply, and since it's large to small we will multiply. Next we need to do what? Good, determine the number of cups in a quart, which is four. So now for the math. 6 times 4 is 24. Therefore, there are 24 cups in 6 quarts. Terrific everyone! What's our last part of the customary system? Yes, weight. What units do we use when talking about weight? Yes, we use ounces, pounds, and tons. Remind me again what the difference is between ounces and fluid ounces. Very good, ounces are used in customary weight and fluid ounces are used in capacity. Ok, so how many ounces are in a pound? Yes, 16 ounces. How many pounds are in one ton? Very good, 2,000 pounds. Let's do a conversion problem. Let's convert 12 pounds to ounces. What's our first step? Yes, we need to decide to multiply or divide and since we are going from large to small we will multiply. What's next? Good, we need to determine the number of ounces in one pound, which is 16. Let's do our math. 12 times 16 which is 192. Therefore there are 192 ounces in 12 pounds. Great job! So this ends the customary system. Are there any questions about the customary system or how to convert in the customary system? Ok, let's move to the metric system then. What was something unique about the metric system? Yes, it uses prefixes, it uses decimals, and it's pretty easy. So I liked how someone mentioned the prefixes. What do those prefixes tell us? Yes, it tells us how much of the base unit. So I'm going to draw a line and we can fill it in with the prefixes in order. What was the acronym that helped us remember the prefixes? Good, King Henry Died By Drinking Chocolate Milk. So using this acronym, what are the prefixes in order from largest to smallest? Good, kilo, hecto, deka, base unit, deci, centi, and milli. What are our base units in the metric system? Yes, meter, liter, and gram. When we convert in the metric system, is it different than converting in the customary system? Yes, it is. Why is it so different? Good, we just have to move place values or decimal points to convert. So let's do a conversion problem. Let's use liters as our base unit. Let's convert 8 kiloliters to centiliters. What do we do first? Yes, let's count the spots we move from kiloliters to centiliters. One, two, three, four, five. So we moved five spots. Did we move to the left or right? Yes, we moved to the right which means what? Good, that the number will be larger and we move the decimal point to the right. Ok, so let's convert. If we move the decimal point five spaces to the right, 8 kiloliters will equal 800,000 centiliters. Good job! Like we said a few minutes ago, conversion is the same throughout the metric system. So if we are dealing with length or mass it will still be the same with the same numbers as it was when we just converting metric capacity. Are there any questions about the metric system or how to convert within the metric system? Alright, let's do some more practice.

Practice:

The students will practice by competing in teams in a Jeopardy themed game to review measurement conversion. There will be two rounds. The first round will be basic unit equivalent measurements and the second round will have

conversion problems and terms to remember. The teacher will explain the point of the game and each team will designate a hand raiser. The hand raiser will raise their hand quickly if the team knows the answer. The first team with a raised hand will get to answer. The teacher will keep score. The winning team will win a prize.

Since we are reviewing today, I thought the best way to practice would be to have a competition. Raise your hand if you have ever watched the show Jeopardy. Ok, so a few of you have. Jeopardy is a game show with different categories and each categories has different point values. If the points are lower than it's an easier question and if it's a higher point value then it's a tougher question. One team will get to choose the first category and point question. But once the question is up anyone can answer. The only way you can answer is if you raise your hand first, so you have to be quick. If you answer correctly then your team can choose the next question. We will play two rounds with different questions. As we start playing it will begin to make some more sense. So I will go ahead and put you all into teams and once you get into your teams you will need to designate a hand raiser. I will only let your group answer if your hand raiser raises their hand first. I will be keeping score on the board, and the winning team will get a prize so work hard. Are there any questions? Ok, let's get started.

Assessment:

The students will be assessed by taking a summative test on measurement conversion. The test will have twenty questions. There will be four fill-in-the-blank questions in which the students will choose a word from the word box that best fits the sentence. There will be twelve conversion problems in which the students will fill in the missing conversion. The last four questions will be real-world problems that the students will have to solve. The students will be considered proficient if they answer 80 percent of questions correctly.

Now that we have learned about converting measurements and have reviewed, it's time to take a test. Make sure you read the directions carefully and do the best you can. We have learned everything on this test and we have reviewed all of it also, so you should be fine. Are there any questions before I pass out the tests? Ok, once you get your test make sure you write your name and date and then you can begin.

Closing:

The unit will close with a culminating activity. The students will find the measurement of their height in customary and metric units. They will also have other body parts to measure, such as their leg or hand. They will have a recording sheet to record their height and other measurements, and then they will fill in the blanks with the conversions of their height and assigned body parts. After the students have measured themselves and converted according to their recording sheet, they will plan their poster. They will receive an instruction sheet that will include the parts of their poster. On their poster they will draw themselves, include their recording sheet with their measurements and

conversions, include a paragraph about themselves, and a title. The poster plan and paragraph will need to be approved by the teacher prior to creating their poster. Once a student's plans is approved, they will be able to assemble their poster. The poster will be graded according to a rubric.

Before we end our unit on measurement conversion, we are going to be doing a project. It's called "Measuring Me." In the end you will be creating a poster about yourself. But in order to get there I have made each of you an instruction sheet with the steps you need to follow. Since we are working with measurements you will be measuring yourselves. You will measure your height, the length of your arm, leg, foot, and hand. You will measure in customary units and in metric units. Then you will convert those measurements to different units. You will be getting a recording sheet where you can record your measurements and conversions. After you complete all your measurements, you will get to plan your poster. Your instructions include everything that needs to be on your poster. You will get to draw yourself, include your measurements, include a paragraph about yourself, and create a title. However, before you get to your poster you will need to have a plan. I will have to approve your plan and the paragraph about yourself before you get your poster. Once you get your poster you can be creative and use your plan to guide what you do. Are there any questions about this project? Ok, go ahead and get a partner and start measuring each other. I will be coming around to give you your instructions and your recording sheet.

Resources/Materials:

- Promethean board
- Open sort words in baggies for each table (words attached)
- Jeopardy game round one (http://equizshow.com/complete/30416)
- Jeopardy game round two (http://equizshow.com/complete/30341)
- Summative test and key (attached)
- Modified summative test and key (attached)
- Culminating Activity Plan (attached)
- Culminating activity materials:
    - Customary and metric measuring tools (tape measure, metric sticks, rulers, yard sticks, etc.)
    - "Measure Me!" Instruction sheet (attached)
    - Measurement and conversion recording sheet (attached)
    - Poster board
    - Markers, colored pencils, etc.
    - Glue/tape
- Extension instructions (attached)
- Reteaching website (http://www.sheppardsoftware.com/math.htm – measurement)

Differentiation:

- Group 4:
    - Each of the students will be placed in a separate team with a higher level learner.

    - They will receive a modified version of the summative test. They will be considered proficient if they answer 9/12 questions correctly.
    - They will receive extra guidance for the culminating activity as they convert and write.
- Extension:
    - Student(s) will have a choice to create a book or a song about measurement conversion. They will receive a two-sided chart that will explain the instructions of each project.
        - Book: Student will create a story or information book based on measurement conversion. They will plan each page and illustration and get their plan approved by the teacher. Then they can use their choice of materials to create their book.
        - Song: Student will create a song based on measurement conversion. They will need to create a chorus and at least two verses. They will sing and record it on an electronic device.
- Reteaching:
    - The teacher will work with student(s) to review any area they need to work with, such as conversion steps or values for each measurement. After students feel confident about measurement conversion they will continue to review by engaging in an online game for extra practice. The website has every area of measurement conversion, and students can choose which area they need more practice in, such as cups to quarts or metric mass.

Reflection:

This lesson was planned to span over several days, and that is exactly how I implemented it in the classroom. We took a day to complete the engagement, instruction, and practice. It was interesting to listen to student conversation as they attempted to sort their vocabulary words. All of the groups ended up sorting them differently and used different categories. It was a beneficial time to hear students talk about why they sorted the words a certain way.

The students did well during instruction, and they remembered how to convert both customary and metric measurements. However, they were struggling with some of the unfamiliar units, such as the customary capacity units. They were able to easily explain how to convert, but they had difficulty determining the unit equivalents. Since the students needed more work with unit equivalents, I decided it was a good time to transition into the team Jeopardy competition. The students loved this activity, and they were answering the questions well. The first game was good because it required students to answer questions about unit equivalents. The students were engaged throughout the review game, and I felt confident that they would do well on their test.

I decided that the test show follow the next day, because I felt that the students knew the material and would do well. However, the scores were very low. I only had four students to meet the unit objective of scoring 80 percent or

higher and a total of six students who scored above a 70. The students seemed very confident the day before, and throughout the unit students seemed to be understanding the content well and I asked many questions to check understanding and even worked one-on-one with some students. However, the students took this test on a Friday, and in this particular classroom Fridays are testing days. Therefore, this math test was the students' fourth test of the morning. I feel that if the students had taken this test first or on a day when there would be no other test, they would have performed better. After reflecting on the tests I also feel that the students could have been more prepared with knowing the unit equivalents, such as the number of cups in a gallon and the number of pounds in a ton. The students showed that they could convert, but they would use the wrong unit equivalent numbers to solve the problem. Therefore, in the future I will allow more time to focus on unit equivalents. This could be done with a small game or rhyme. If my students had a fresh start for their test and knew the unit equivalents, I feel that this test would have had better results.

This lesson also included the unit's culminating activity. This allowed for the students to use their newly acquired knowledge about measurement conversion and to complete a project that resulted in a poster. The students did well working with a partner to help measure each other. This also allowed time to teach students how to properly use and measure with a tape measure. The students did a great job of recording measurements and later converting them. Some of the students needed more support than others, but they were quick to catch on. The most rewarding part of the activity came when students started planning their poster and later created their poster. There were times when you could hear a pin drop because the students were so entranced with their work. Students who usually goof off and rarely complete their work were working hard and were among some of the students who finished early. The work produced was wonderful. Students were creative and used their personality to create their individual posters. They also did a wonderful job of following the activity directions. Overall, the students struggled with their summative assessment, but some of those misconceptions were cleared when working on the culminating activity. I also have reflected and know what still needs to be addressed to clear up student confusion. This unit went well, but I also know how to better teach it if I choose to teach it in the future.

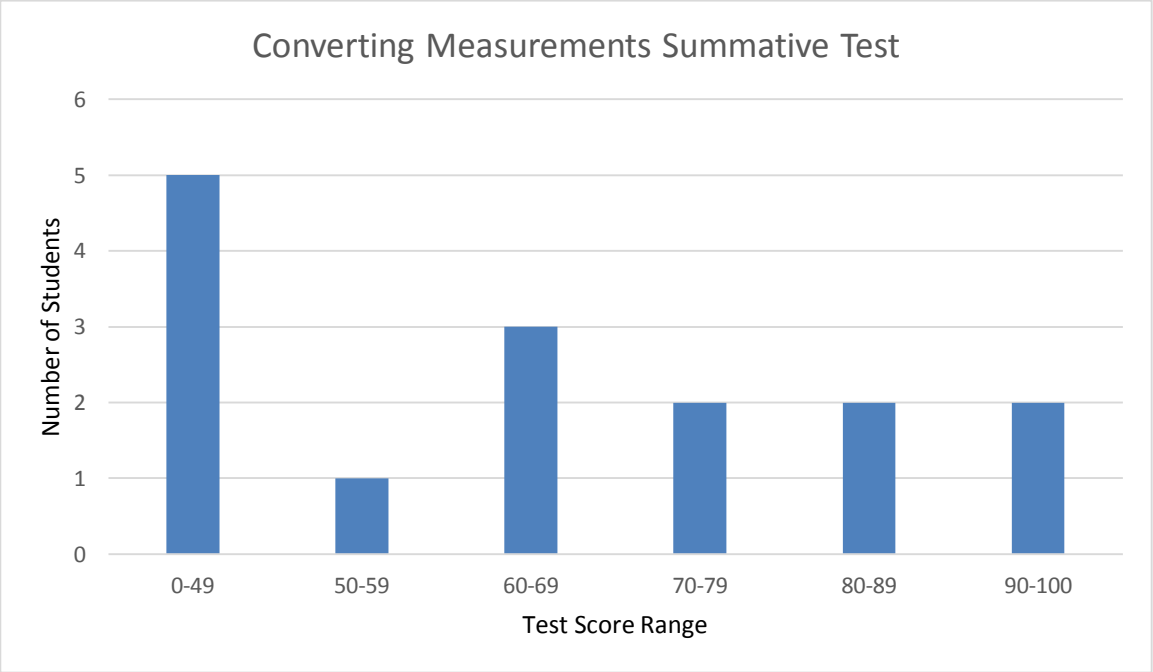
Data Analysis:

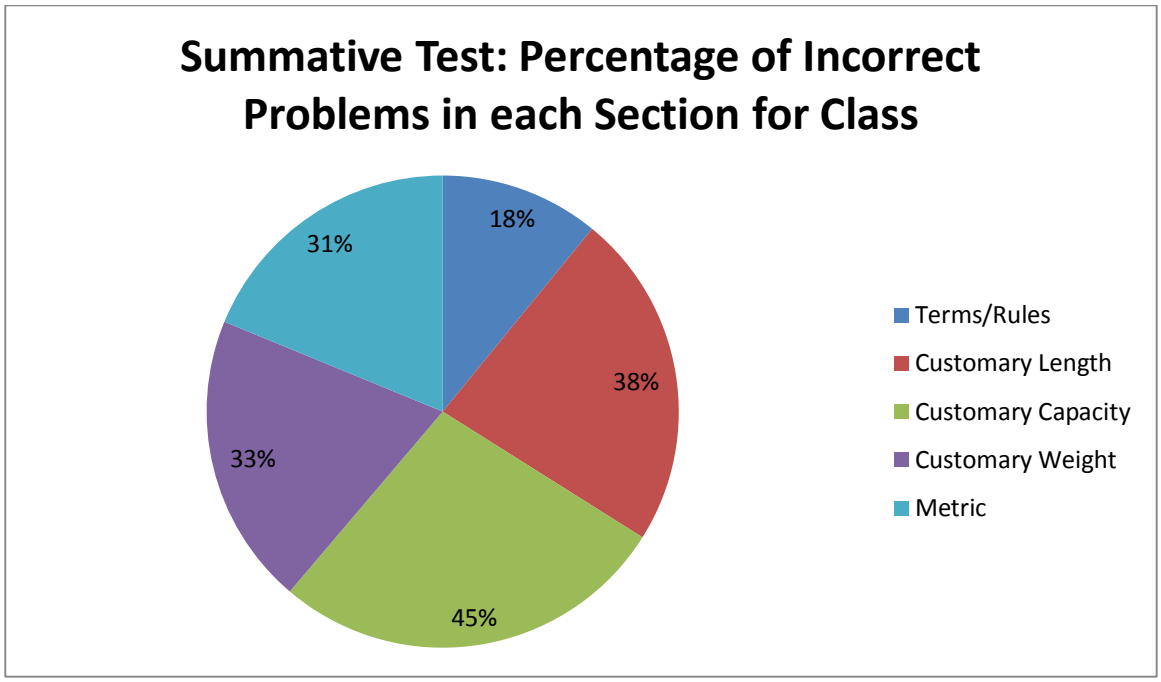
The summative test for this unit was made up of twenty questions, and it included four fill-in-blank, twelve simple conversions, and four real-world problems. Ten of the questions from the summative test were also on the pre-test so growth could be measured. The graph for the summative test scores and the chart for the pre-test compared to the summative test can be seen below. A pie chart of the percentage of incorrect answers for each part of the test can be seen below also.

The summative test data shows that only four students met the unit objective and that six students total scored higher than 70 percent. Eleven students did not meet the unit objective. The pie chart below shows the sections

of the test with the highest percentage of incorrect answers. The data shows that a higher percentage of the students answered questions about customary capacity incorrectly. There were also a high percentage of students that answered questions about customary length incorrectly also. The students did the best on the terms and rules and metric system. This pie chart is informative about the material that needs to be retaught based on the percentage of incorrect answers. The students need more work in converting customary capacity and customary length.

Prior to the unit students took a pre-test about converting measurements. The original scores can be seen in the chart below. The pre-test included questions from the summative test; therefore, the correlating column shows the comparison of scores of the pre-test and summative test. There was only one student who did not improve based on the pre-test. The remaining scores show positive growth of the students through the unit. Therefore, although the summative test scores were not up to par, the majority of the students improved on their knowledge of converting measurements.





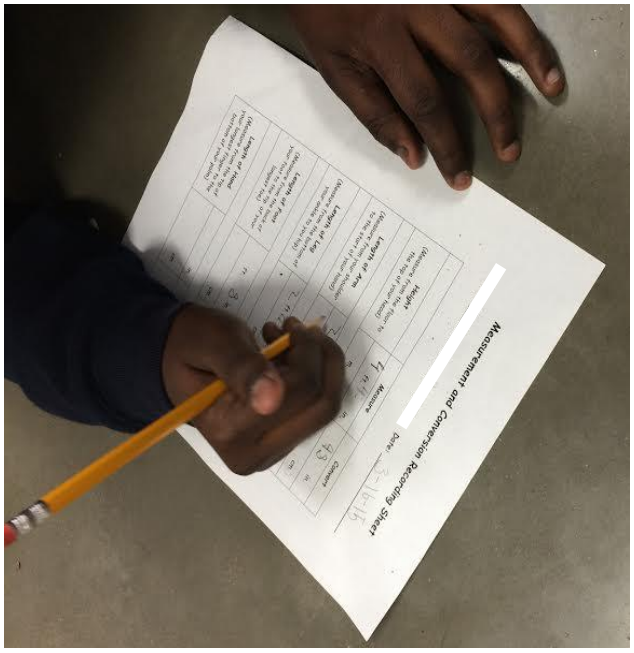
Pre-Test Score	Score after Summative Test
60	70, 100
50	20
40	70, 90, 100
30	80
20	60, 80, 90
0	30, 50, 90

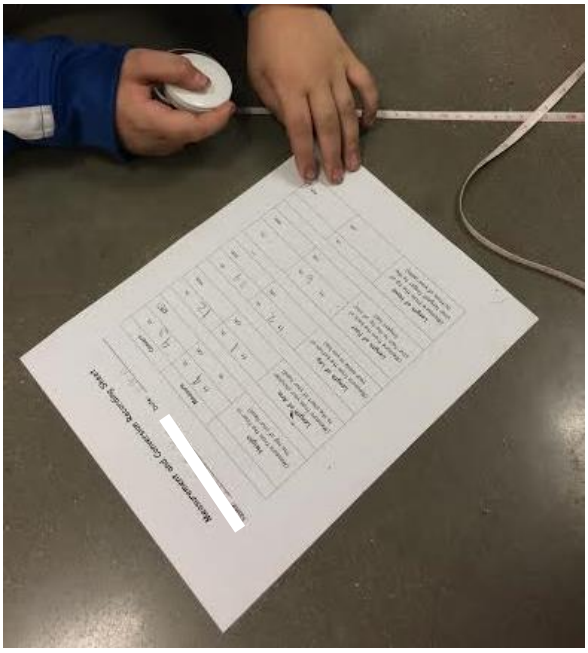
Color Key

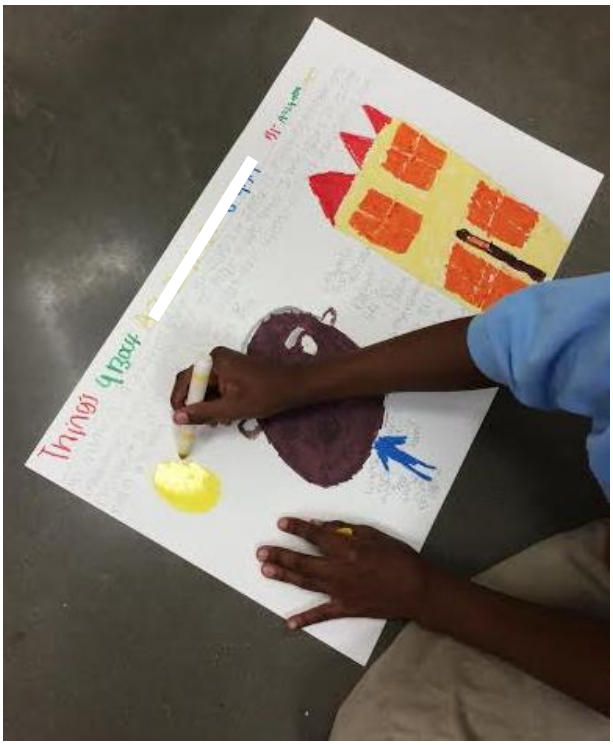
Blue numbers=Positive growth

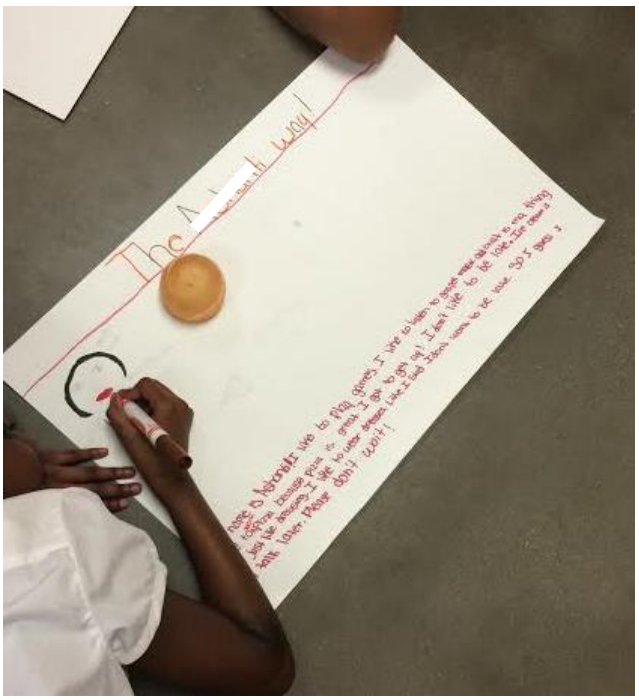
Red numbers=Negative growth

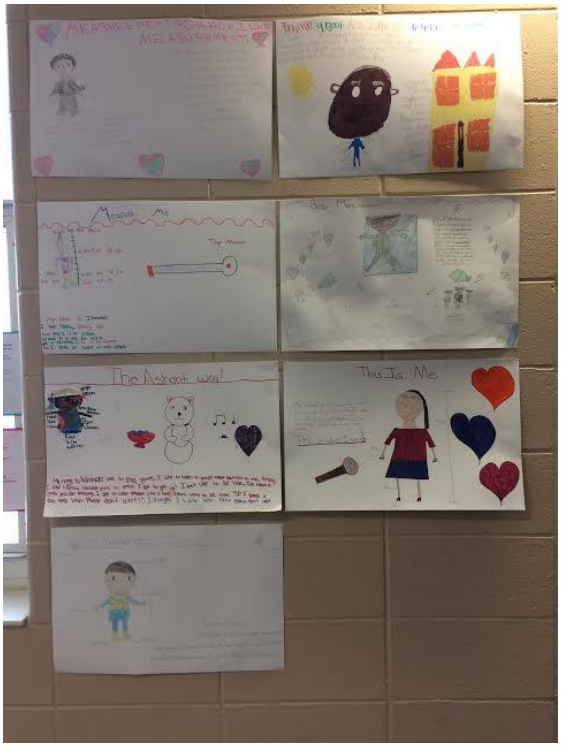
Culminating Activity Pictures

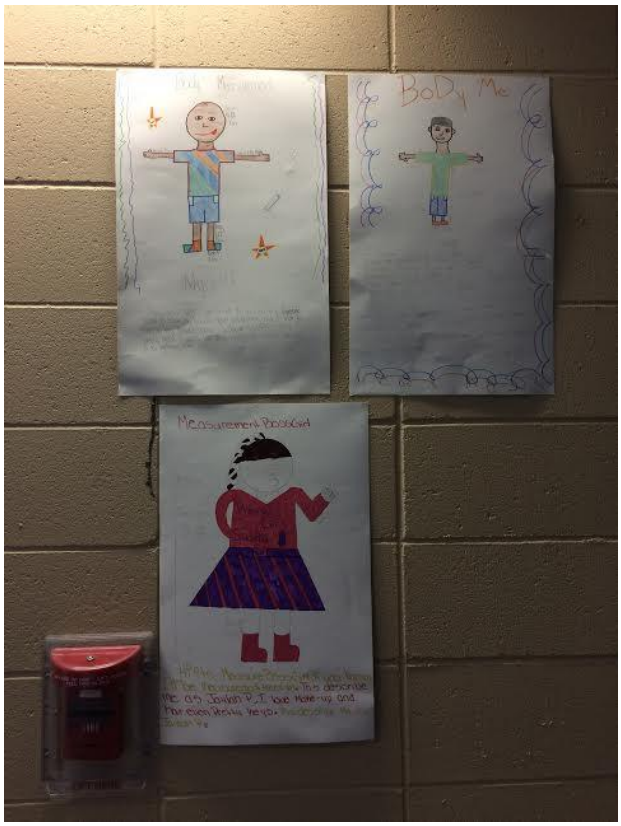









Measure Me
This Is Me


Body Me

Inch	Foot
Yard	Mile
Cup	Pint
Quart	Gallon
Ounce	Pound
Ton	Meter
Liter	Gram
Kilo-	Hecto-
Deka-	Deci-
Centi-	Milli-
Length	Mass
Weight	Capacity

Converting Measurements

Name: _____ Date: _____

Directions: Use the words in the word box to fill in the blanks.

customary	multiply	metric	divide

1. When you convert from a larger unit to a smaller unit you _____.

2. When you convert from a smaller unit to a larger unit you _____.

3. The _____ system uses decimals and it's used throughout the world.

4. The _____ system is used for measurement in the United States.

Directions: Fill in the blank with the correct conversion.

5. 9 yards = _____ feet
6. 48 inches = _____ feet
7. 3 yards = _____ inches
8. 24 feet = _____ yards
9. 3 gallons = _____ quarts
10. 2 pints = _____ cups
11. 32 ounces = _____ pounds
12. 4 tons = _____ pounds
13. 4 meters = _____ centimeters
14. 9 kilometers = _____ meters
15. 12 milliliters = _____ liters
16. 15 milligrams = _____ kilograms

Directions: Solve each word problem and circle your final answer.

17. David needs 24 feet of fabric to make a bedspread. How many yards does he need?

18. Dan is making lemonade for a party. The recipe calls for 2 gallons of water, but he only has a one-cup container. How many cups will he need to make 2 gallons?

19. Mary buys an 8 pound bag of dog food. How many ounces of dog food are in one bag?

20. Chris measured a line for his art project. It is 200 millimeters long. How long is the line in centimeters?

Converting Measurements

Name: ___Answer Key_____ Date: _____

Directions: Use the words in the word box to fill in the blanks.

customary	multiply	metric	divide

1. When you convert from a larger unit to a smaller unit you multiply

2. When you convert from a smaller unit to a larger unit you divide

3. The metric system uses decimals and it's used throughout the world.

4. The customary system is used for measurement in the United States.

Directions: Fill in the blank with the correct conversion.

5. 9 yards = ___27 feet
6. 48 inches = ____4 feet
7. 3 yards = _108__ inches
8. 24 feet = __8__ yards
9. 3 gallons = __12___ quarts
10. 2 pints = ___4___ cups
11. 32 ounces = _2___ pounds
12. 4 tons = _8,000__ pounds
13. 4 meters = _400___ centimeters
14. 9 kilometers = __9,000__ meters
15. 12 milliliters = _.012_ liters
16. 15 milligrams = .000015_ kilograms

Directions: Solve each word problem and circle your final answer.

17. David needs 24 feet of fabric to make a bedspread. How many yards does he need? 8 yards

18. Dan is making lemonade for a party. The recipe calls for 2 gallons of water, but he only has a one-cup container. How many cups will he need to make 2 gallons? 32 cups

19. Mary buys an 8 pound bag of dog food. How many ounces of dog food are in one bag? 128 ounces

20. Chris measured a line for his art project. It is 200 millimeters long. How long is the line in centimeters? 20 centimeters

Converting Measurements

Name: _____ Date: _____

Directions: Circle the word that fits the sentence best.

1. When you convert from a larger unit to a smaller unit you (multiply / divide).

2. When you convert from a smaller unit to a larger unit you (multiply / divide).

3. The (customary / metric) system uses decimals and it's used throughout the world.

4. The (customary / metric) system is used for measurement in the United States.

Directions: Write the correct number in the blank to complete the conversion.

5. 2 feet = _____ inches	**8**
6. 4 yards = _____ feet	**2,000**
7. 2 gallons = _____ quarts	**24**
8. 4 cups = _____ pints	**500**
9. 4 pounds = _____ ounces	**12**
10. 5 meters = _____ centimeters	**0.003**
11. 2 kiloliters = _____ liters	**2**
12. 3 milligrams = _____ grams	**64**

Converting Measurements

Name: Answer Key Date: _____

Directions: Circle the word that fits the sentence best.

1. When you convert from a larger unit to a smaller unit you (multiply / divide).

2. When you convert from a smaller unit to a larger unit you (multiply / divide).

3. The (customary / metric) system uses decimals and it's used throughout the world.

4. The (customary / metric) system is used for measurement in the United States.

Directions: Write the correct number in the blank to complete the conversion.

5. 2 feet = 24 inches — **8**

6. 4 yards = 12 feet — **2,000**

7. 2 gallons = 8 quarts — **24**

8. 4 cups = 2 pints — **500**

9. 4 pounds = 64 ounces — **12**

10. 5 meters = 500 centimeters — **0.003**

11. 2 kiloliters = 2,000 liters — **2**

12. 3 milligrams = 0.003 grams — **64**

Converting Measurements: Culminating Activity Plan

Standard:

18.) Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multistep, real-world problems. [5-MD1]

Objective:

Students will create a poster about their personal measurements and conversions according to a rubric.

Task:

1. Each student will receive a "Measure Me!" instruction sheet and recording sheet. The teacher will take the time to explicitly go over the instructions with the students.

2. Students will pair with a pre-assigned partner. Students will take turns helping measure the following things for their partner: height, arm length, leg length, foot length, and hand length. As the measure, they will record their measurements in the correct column. *During this time the teacher will be walking around to assure that students are measuring correctly.*

3. Students will work on their own to convert their measurements and record the conversions in the correct column. When they are finished converting, students will need to get their conversions approved by the teacher before moving on to the next step.

4. Students will receive a blank sheet of paper to use to plan their poster. They will include the following parts on their plan and poster:

    a. They will create a title that will be clearly displayed on the poster.
    b. They will draw a picture of themselves (head to toe) that will take up the majority of the poster.
    c. They will choose a measurement system (customary or metric). According to the measurement system chosen, they will label their drawing with the measurements and conversions for each body part. For example, a student might label the arm on the drawing 2 feet and 24 inches (measurement and conversion).
    d. They will write a descriptive paragraph about themselves. The paragraph will include their descriptions and things they are interested in. The paragraph should be at least five sentences.

5. The teacher will approve poster plan prior to the students moving to the next step.

6. Each student will receive a half sheet of poster board. They will use their plan to help create it. The poster should be informative, neat, and colorful.

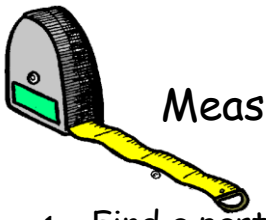
7. Students will present their poster to the class. They will describe their different measurements and read their paragraph about themselves.

Assessment:

Students will be assessed on their poster according to a rubric. They will be graded on the accuracy and completion of their measurement recording sheet and on the different aspects of their poster. For each grading component, students will receive a 1, 2, or 3. The highest score a student can receive is 21 points.

Materials:

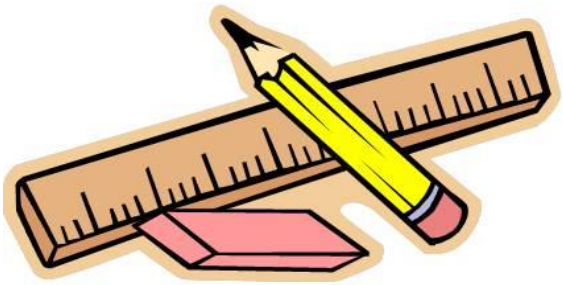
- Customary and metric measuring tools (tape measure, rulers, meter stick, yard stick, etc.)
- "Measure Me!" instruction sheet
- Measurement and conversion recording sheet
- Poster board (cut in half)
- Markers, colored pencils, etc.
- Glue/tape



Measure Me!

Measurement Conversion Project Instructions

1. Find a partner and a measuring tool. Measure the following things: your height, arm length, leg length, foot length, and hand length.
2. Use the Measurement and Recording Sheet to write down your measurements and convert to other units. Your recording sheet will tell you what unit to convert to. Miss Treadway will approve your conversions before you move on.
3. On a piece of blank paper, plan out your poster. Your poster should include the following:
    - Title
    - Drawing of yourself (head to toe)
    - Measurement labels on your drawing (ex: 8 in. by your hand to represent that it's 8 in. long)—Choose one unit from your recording sheet to label your drawing (ex: all labels are in centimeters or all labels are in inches)
    - A paragraph about yourself. This paragraph should be a description about you and things you are interested in. Remember that a paragraph has at least 5 sentences.
4. Show your poster plan to Miss Treadway to approve. She will give you your poster board.
5. Put together your poster. It should be colorful and include everything listed above. Be creative!



Measurement and Conversion Recording Sheet

Name: _____ **Date:** _____

	Measure	**Convert**
Height (Measure from the floor to the top of your head)	ft. in,	in.
	m. cm.	cm.
Length of Arm (Measure from your shoulder to the start of your hand)	ft. in.	in.
	cm.	mm.
Length of Leg (Measure from the bottom of your ankle to you hip)	ft. in.	in.
	cm.	mm.
Length of Foot (Measure from the back of your foot to the tip of your longest toe)	ft. in.	in.
	cm.	mm.
Length of Hand (Measure from the tip of your longest finger to the bottom of your palm)	in.	
	cm.	mm.

Measure Me! Rubric

	3	2	1
Measurements and Conversions	Student completed measurement and conversion recording sheet	Student has completed most of the measurement and conversion recording sheet	Student is missing most measurements/ conversions on recording sheet
	Student's conversions are equivalent to their original measurements	Most of student's conversions are equivalent to their original measurements	The student's conversions are mostly not equivalent to their original measurements
Poster	Student included all of the parts required for poster (title, drawing, labels & conversions, paragraph)	Student is missing one or two parts of the required parts for the poster	Student is missing most/all of the required parts for the poster
	Student's paragraph is at least 5 sentences	Student's paragraph has 3-4 sentences	Student's paragraph is less than 3 sentences
	Student's paragraph describes themselves	Student's paragraph is somewhat descriptive of themselves	Student's paragraph is off topic and lacks descriptive qualities
	Student's paragraph is free of spelling and grammar errors	Student's paragraph has a few spelling and grammar errors	Student's paragraph has several spelling and grammar errors
	Poster is colorful and creative.	Poster has some color and some creativity.	Poster lacks color and creativity

Extension Instructions

Think about what you have learned about converting measurements. In order to show what you know and have learned, choose to either create a book or a song. You can follow the directions below for whichever task you choose.

Create a book	**Create a song**
Create a book based on measurement conversion. Your book can be a fictional story that involves a character converting or it can be an informational book that explains measurement conversion. Your book needs a title and you need to plan each page. Make sure to include illustrations also. Once you have made your plan, show it to Miss Treadway and she will approve it. Be creative and make your book interesting!	Create a song based on measurement conversion. It can be any version of music, such as a pop, rap, or country themed. Your song should have a chorus and at least two verses. Once your song is written, you will sing and record it on an electronic device.

Section Three: *Assessment*

Assessment Summary

Throughout this unit I have created various assessments to monitor student progress and to have evidence that my students are learning measurement conversion skills. I have created a pre-assessment for my students to take prior to the beginning of the unit, and it includes exact questions pulled from the summative assessment. Therefore, once the students finish the unit and are tested, they're growth can easily be measured by comparing the questions on the pre-assessment to the ones on the summative assessment.

This unit has six total lessons. The last lesson serves as a review and the assessment is the summative assessment. However, the other five lessons have formative assessments built in at the end of each lesson. The formative assessments I have created involve students writing and turning in a hard copy of some sort. Therefore, after each lesson I can review the students' assessments and gauge whether or not I should move on to new material the next day. Although my official formative assessments are hard copies of student knowledge, I will also be observing and asking questions during instruction and as students practice. In most of my lessons I also include a time when I ask the students to give me a thumbs up, in the middle, or down depending on their confidence level with the content. However, my official formative assessments will serve as a record of student growth throughout the unit.

My formative assessments take on different roles. I have created an exit slip, chart paper problems, and a single problem slip to test students' abilities to convert measurements, but I have also included a KWL chart and a sticky note post where they write about one thing they learned and one thing they are unsure about. These

assessments alternate somewhat so the students have chances to think about what they've learned and to also show what they learned.

In order to assess the entire unit I have also created and put in place a summative assessment. As mentioned earlier, the pre-assessment includes some of the same questions as the summative test. The summative test has twenty questions. There are four questions where the students have to fill-in-the-blank with the correct term, twelve questions where they have to simply convert from one unit to another, and four questions that are in the form of real-world problems. Everything included on the summative test was addressed in the lessons and reviewed during the last lesson.

Homework is assigned for four of the six lessons, and it is listed at the end of the practice sections on the lesson plans. The homework given is one page taken from the students' math book and correlates to the material taught during the lesson. The homework serves as extra practice for the students and occurs after the students participate in a lesson.

Most of my assessments asses just the math content, but some of the assessments like the KWL and ones that include word problems require that students write well and read accurately. I also assess writing skills on the culminating activity when students are required to write a descriptive paragraph about themselves.

Every lesson, including the assessments, are reduced and modified for a small group of the students in my classroom. Each of their assessments relate directly to the content, but they are simplified to assess the bare skill in measurement conversion. Therefore, my assessments have been thoroughly thought through and relate directly to the standards and objectives for each lesson.

Assessment Matrix

Lesson	Lesson Objective	Formative Assessment	Summative Assessment
1.”Measurements and Conversions”	When given an exit slip, students will be able to sort ten measurement units into the correct measurement system and they will be able to decide whether to multiply or divide when converting measurements with an accuracy of 9/12 correct answers.	Exit Slip	Test numbers: 1, 2, 3, 4
2. “Converting Customary Length”	Students will be able to solve a real-world customary length conversion problem with a 2/3 accuracy.	Real-world customary length problem	Test numbers: 5, 6, 7, 8, 17
3. “Converting Customary Capacity”	Students will be able to explain in complete sentences something they learned and something they are unsure about when converting customary capacity measurements according to the lesson.	One thing learned and one thing unsure about from the lesson	Test numbers: 9, 10, 18
4. “Converting Customary Weight”	When given a KWL chart, students will be able to accurately explain three things they learned from the lesson about customary weight conversion.	KWL chart	Test numbers: 11, 12, 19
5. “Metric System Conversion”	When given five problems around the room, students will be able to solve metric conversion problems with 80 percent accuracy.	Five problem check	Test numbers: 13, 14, 15, 16, 20
6. “Measurement Conversion Review”	When given a summative test, students will convert measurements within a given measurement system by answering fill-in-the-blank questions and solving real-world problems with 80 percent accuracy.	Summative Assessment	

Unit Pre-Assessment

What do you know about Measurement Conversions?

Name: _____ **Date:** _____

Directions: Use the words in the word box to fill in the blanks.

customary	multiply	metric	divide

1. When you convert from a larger unit to a smaller unit you _____.

2. When you convert from a smaller unit to a larger unit you _____.

3. The _____ system uses decimals and it's used throughout the world.

4. The _____ system is used for measurement in the United States.

Directions: Fill in the blank with the correct conversion.

5. 9 yards = _____ feet

6. 48 inches = _____ feet

7. 3 gallons = _____ quarts

8. 32 ounces = _____ pounds

9. 4 meters = _____ centimeters

10. 12 milliliters = _____ liters

What do you know about Measurement Conversions?

Name: _____ **Date:** _____

Directions: Circle the word that fits the sentence best.

2. When you convert from a larger unit to a smaller unit you (multiply / divide).

2. When you convert from a smaller unit to a larger unit you (multiply / divide).

3. The (customary / metric) system uses decimals and it's used throughout the world.

4. The (customary / metric) system is used for measurement in the United States.

Directions: Write the correct number in the blank to complete the conversion.

5. 2 feet = _____ inches

6. 2 gallons = _____ quarts

7. 4 pounds = _____ ounces

8. 5 meters = _____ centimeters

What do you know about Measurement Conversions?

Name: _____Key_____ **Date:** _____

Directions: Use the words in the word box to fill in the blanks.

customary	multiply	metric	divide

1. When you convert from a larger unit to a smaller unit you _multiply_____.

2. When you convert from a smaller unit to a larger unit you ___divide____.

3. The __metric__ system uses decimals and it's used throughout the world.

4. The ___customary___ system is used for measurement in the United States.

Directions: Fill in the blank with the correct conversion.

5. 9 yards = _27__ feet

6. 48 inches = __4__ feet

7. 3 gallons = __12__ quarts

8. 32 ounces = ___2_ pounds

9. 4 meters = ___400__ centimeters

10. 12 milliliters = ____.012__ liters

What do you know about Measurement Conversions?

Name: _____Key_____ **Date:** _____

Directions: Circle the word that fits the sentence best.

3. When you convert from a larger unit to a smaller unit you (multiply / divide).

2. When you convert from a smaller unit to a larger unit you (multiply / divide).

3. The (customary / metric) system uses decimals and it's used throughout the world.

4. The (customary / metric) system is used for measurement in the United States.

Directions: Write the correct number in the blank to complete the conversion.

5. 2 feet = ___24__ inches

6. 2 gallons = ___8__ quarts

7. 4 pounds = ___64__ ounces

8. 5 meters = ___500___ centimeters

Formative Assessments

Lesson One: Original

Exit Slip

Name: _____ **Date:** _____

Directions: Decide which measurement system each word belongs to, and write the word on the correct side.

mile	gram	pound	ton	meter	inch
liter	gallon	millimeter	dekameter		

Customary Measurement	Metric Measurement

Directions: Fill in the blank with the correct mathematical operation.

small → **LARGE** → _____ **LARGE** → small → _____

Lesson One: Answer key

Exit Slip

Name: _____ **Date:** _____

Directions: Decide which measurement system each word belongs to, and write the word on the correct side.

mile	gram	pound	ton	meter	inch
liter	gallon	millimeter	dekameter		

Customary Measurement	Metric Measurement
Mile Pound Ton Inch Gallon	Gram Meter Liter Millimeter Dekameter

Directions: Fill in the blank with the correct mathematical operation.

small → **LARGE** → divide **LARGE** → small → multiply

Lesson Two: Original

***Note: Answers to each question will be posted on the wall and students will go to the answer for their particular problem.

Customary Length Slip

Name: _____ **Date:** _____

Justin took a trip to New York City. The famous Woolworth building was built in 1913 and is 792 feet tall. How high is the building in yards?

Customary Length Slip

Name: _____ **Date:** _____

Ms. Treadway is redoing her living room. She wants to buy a couch cover, but the covers are measured in inches. Her couch is 8 feet long. How long is her couch in inches?

Customary Length Slip

Name: _____ **Date:** _____

Oliver's basketball court is 75 feet long. How long is the court in inches?

Customary Length Slip

Name: _____ **Date:** _____

The length of a football field is 100 yards. How many feet is that?

Lesson Two: Answer Key

Customary Length Slip

Name: _____ **Date:** _____

Justin took a trip to New York City. The famous Woolworth building was built in 1913 and is 792 feet tall. How high is the building in yards?

264 yards

Customary Length Slip

Name: _____ **Date:** _____

Ms. Treadway is redoing her living room. She wants to buy a couch cover, but the covers are measured in inches. Her couch is 8 feet long. How long is her couch in inches?

96 inches

Customary Length Slip

Name: _____ **Date:** _____

Oliver's basketball court is 75 feet long. How long is the court in inches?

900 inches

Customary Length Slip

Name: _____ **Date:** _____

The length of a football field is 100 yards. How many feet is that?

1,200 feet

Lesson Three: Original

The students will be formatively assessed through a sticky note exercise. The students will receive one sticky note and write in a complete sentence one thing they learned from the lesson about converting customary capacity measurements and one thing they are still unsure about. Once they have written, they will go to the board and post it on the chart paper titled "Converting Customary Capacity." The teacher will be able to notice what information stuck most with the students and if they wrote anything that communicates a misconception.

Lesson Four: Original

KWL: Converting Customary Weight

Name:_____ **Date:**_____

What I know	What I want to Learn	What I learned *today* (at least 3 things)

Lesson Five: Original

*****This assessment takes place around the classroom. There will be five sheets of chart paper around the room each with a conversion problem. Each student will have five sticky notes and will walk around and solve each problem and post their sticky note answer with their name on the back.

1. 5 kilometers = _____ centimeters
2. 10 milliliters = _____ liters
3. 7 kilograms = _____ milligrams
4. 21 meters = _____ kilometers
5. 8 deciliters = _____ milliliters

Lesson Five: Answer Key

1. 5 kilometers = 500,000 centimeters
2. 10 milliliters = 0.01 liters
3. 7 kilograms = 7,000,000 milligrams
4. 21 meters = 0.021 kilometers
5. 8 deciliters = 800 milliliters

Unit Summative Assessment

Converting Measurements

Name: _____ Date: _____

Directions: Use the words in the word box to fill in the blanks.

customary	multiply	metric	divide

1. When you convert from a larger unit to a smaller unit you _____.

2. When you convert from a smaller unit to a larger unit you _____.

3. The _____ system uses decimals and it's used throughout the world.

4. The _____ system is used for measurement in the United States.

Directions: Fill in the blank with the correct conversion.

5. 9 yards = _____ feet
6. 48 inches = _____ feet
7. 3 yards = _____ inches
8. 24 feet = _____ yards
9. 3 gallons = _____ quarts
10. 2 pints = _____ cups
11. 32 ounces = _____ pounds
12. 4 tons = _____ pounds
13. 4 meters = _____ centimeters
14. 9 kilometers = _____ meters
15. 12 milliliters = _____ liters
16. 15 milligrams = _____ kilograms

Directions: Solve each word problem and circle your final answer.

17. David needs 24 feet of fabric to make a bedspread. How many yards does he need?

18. Dan is making lemonade for a party. The recipe calls for 2 gallons of water, but he only has a one-cup container. How many cups will he need to make 2 gallons?

19. Mary buys an 8 pound bag of dog food. How many ounces of dog food are in one bag?

20. Chris measured a line for his art project. It is 200 millimeters long. How long is the line in centimeters?

Converting Measurements

Name: ___Answer Key_____ Date: _____

Directions: Use the words in the word box to fill in the blanks.

customary	multiply	metric	divide

1. When you convert from a larger unit to a smaller unit you multiply

2. When you convert from a smaller unit to a larger unit you divide

3. The metric system uses decimals and it's used throughout the world.

4. The customary system is used for measurement in the United States.

Directions: Fill in the blank with the correct conversion.

5. 9 yards = ___27 feet
6. 48 inches = ____4 feet
7. 3 yards = _108__ inches
8. 24 feet = __8__ yards
9. 3 gallons = __12___ quarts
10. 2 pints = ___4___ cups
11. 32 ounces = _2___ pounds
12. 4 tons = _8,000__ pounds
13. 4 meters = _400___ centimeters
14. 9 kilometers = __9,000__ meters
15. 12 milliliters = _.012_ liters
16. 15 milligrams = .000015_ kilograms

Directions: Solve each word problem and circle your final answer.

17. David needs 24 feet of fabric to make a bedspread. How many yards does he need? 8 yards

18. Dan is making lemonade for a party. The recipe calls for 2 gallons of water, but he only has a one-cup container. How many cups will he need to make 2 gallons? 32 cups

19. Mary buys an 8 pound bag of dog food. How many ounces of dog food are in one bag? 128 ounces

20. Chris measured a line for his art project. It is 200 millimeters long. How long is the line in centimeters? 20 centimeters

Converting Measurements

Name: _____ Date: _____

Directions: Circle the word that fits the sentence best.

1. When you convert from a larger unit to a smaller unit you (multiply / divide).

2. When you convert from a smaller unit to a larger unit you (multiply / divide).

3. The (customary / metric) system uses decimals and it's used throughout the world.

4. The (customary / metric) system is used for measurement in the United States.

Directions: Write the correct number in the blank to complete the conversion.

5. 2 feet = _____ inches	**8**
6. 4 yards = _____ feet	**2,000**
7. 2 gallons = _____ quarts	**24**
8. 4 cups = _____ pints	**500**
9. 4 pounds = _____ ounces	**12**
10. 5 meters = _____ centimeters	**0.003**
11. 2 kiloliters = _____ liters	**2**
12. 3 milligrams = _____ grams	**64**

Converting Measurements

Name: Answer Key Date: _____

Directions: Circle the word that fits the sentence best.

1. When you convert from a larger unit to a smaller unit you (multiply / divide).

2. When you convert from a smaller unit to a larger unit you (multiply / divide).

3. The (customary / metric) system uses decimals and it's used throughout the world.

4. The (customary / metric) system is used for measurement in the United States.

Directions: Write the correct number in the blank to complete the conversion.

5. 2 feet = 24 inches — **8**

6. 4 yards = 12 feet — **2,000**

7. 2 gallons = 8 quarts — **24**

8. 4 cups = 2 pints — **500**

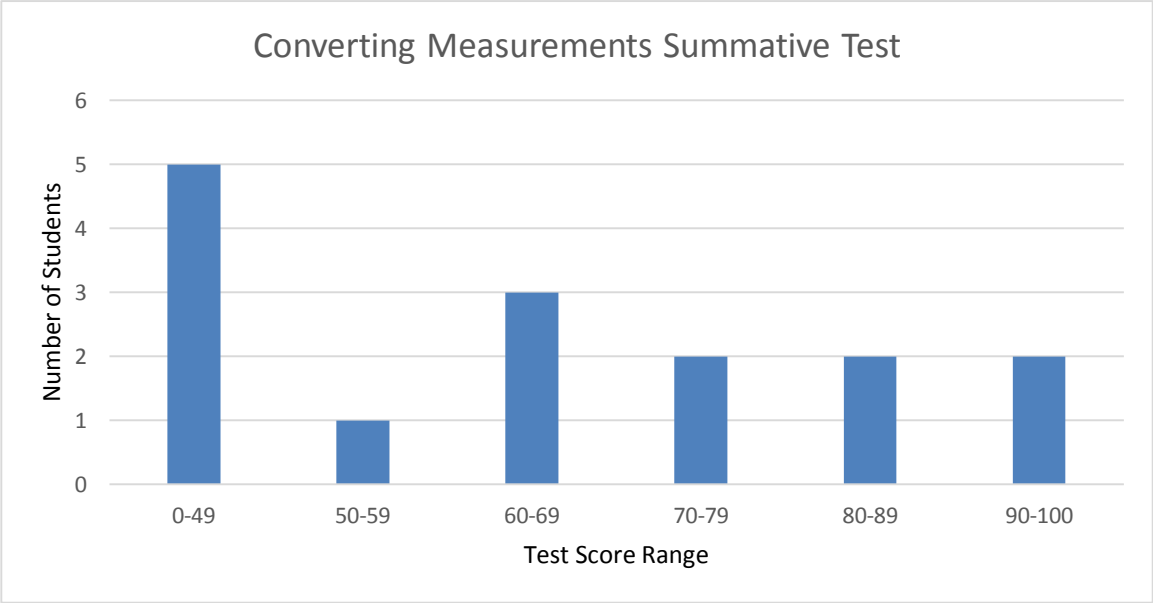
9. 4 pounds = 64 ounces — **12**

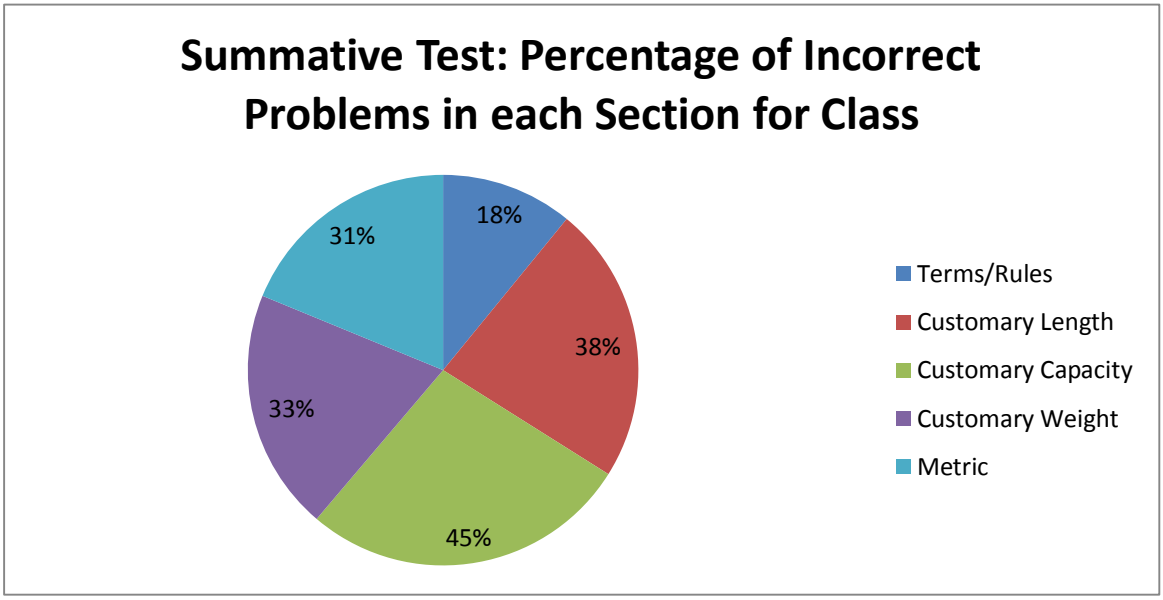
10. 5 meters = 500 centimeters — **0.003**

11. 2 kiloliters = 2,000 liters — **2**

12. 3 milligrams = 0.003 grams — **64**

Summative Assessment Data and Reflection





Pre-Test Score	Score after Summative Test
60	70, 100
50	20
40	70, 90, 100
30	80
20	60, 80, 90
0	30, 50, 90

Color Key

Blue numbers=Positive growth

Red numbers=Negative growth

The summative test for this unit was made up of twenty questions, and it included four fill-in-blank, twelve simple conversions, and four real-world problems. Ten of the questions from the summative test were also on the pre-test so growth could be measured. The graph for the summative test scores and the chart for the pre-test compared to the summative test can be seen on the prior page. A pie chart of the percentage of incorrect answers for each part of the test can be seen below also.

The summative test data shows that only four students met the unit objective and that six students total scored higher than 70 percent. Eleven students did not meet the unit objective. The pie chart below shows the sections of the test with the highest percentage of incorrect answers. The data shows that a higher percentage of the students answered questions about customary capacity incorrectly. There were also a high percentage of students that answered questions about customary length incorrectly also. The students did the best on the terms and rules and metric system. This pie chart is informative about the material that needs to be retaught based on the percentage of incorrect answers. The students need more work in converting customary capacity and customary length.

Prior to the unit students took a pre-test about converting measurements. The original scores can be seen in the chart on the prior page. The pre-test included questions from the summative test; therefore, the correlating column shows the comparison of scores of the pre-test and summative test. There was only one student who did not improve based on the pre-test. The remaining

scores show positive growth of the students through the unit. Therefore, although the summative test scores were not up to par, the majority of the students improved on their knowledge of converting measurements.

After looking back on the unit I realized that the students have the knowledge and skills needed to convert measurements, but they are lacking knowledge about the simple unit equivalents in different measurement systems, such as the number of pints in one gallon or the number of ounces in one pound. The majority of the time students were answering problems incorrectly due to a lack of knowledge of unit equivalents and not the lack of knowledge of measurement conversion. Therefore, in the future I need to implement more opportunities for the students to know their unit equivalents. I feel that the instruction and practice opportunities created helped the students grow in their knowledge about conversion, but they were still unsure about unit equivalents. Therefore, in order to modify instruction, I will implement an extra component in each lesson for the students to learn and practice unit equivalents.

Section Four: *Students*

Summary Page: Students

Throughout my lesson plans I have planned for accommodations for different kinds of learners. Each lesson plan has its own "Differentiation" section. Within that section I have accounted for three groupings of learners. The first grouping I always address is called "Group 4." This is a group of four students in my classroom that need a little more scaffolding and accommodations. Their differentiation is mostly seen in their graphic organizer, formative assessments, pre-test and summative test, and groupings. The two other kinds of learners I plan for are the ones who will need reteaching and the higher learners who may need an extension to their learning.

As mentioned earlier, I have differentiated by tweaking certain aspects of the graphic organizer and assessments. The questioning that occurs on the assessments are simpler for my "Group 4" students, but more complex for my whole class group. All levels are assessed somewhat similarly in format, but the questions and scaffolds are different among the levels. For example, I created an exit slip as one of my formative assessments. "Group 4" had less questions than the whole class, but they still tied directly to the learning objective.

The plans I have made for students who need reteaching and extensions differ greatly. The students who need reteaching usually meet with the teacher to receive a more individualized or smaller group approach to what was taught. The content is very straightforward and uses more graphics. It also allows for the student(s) to be less intimidated to ask questions and receive help. The students who are higher learners and would receive an extension activity will receive a set of instructions. It usually involves a little research or practice followed by a small project. It allows for the

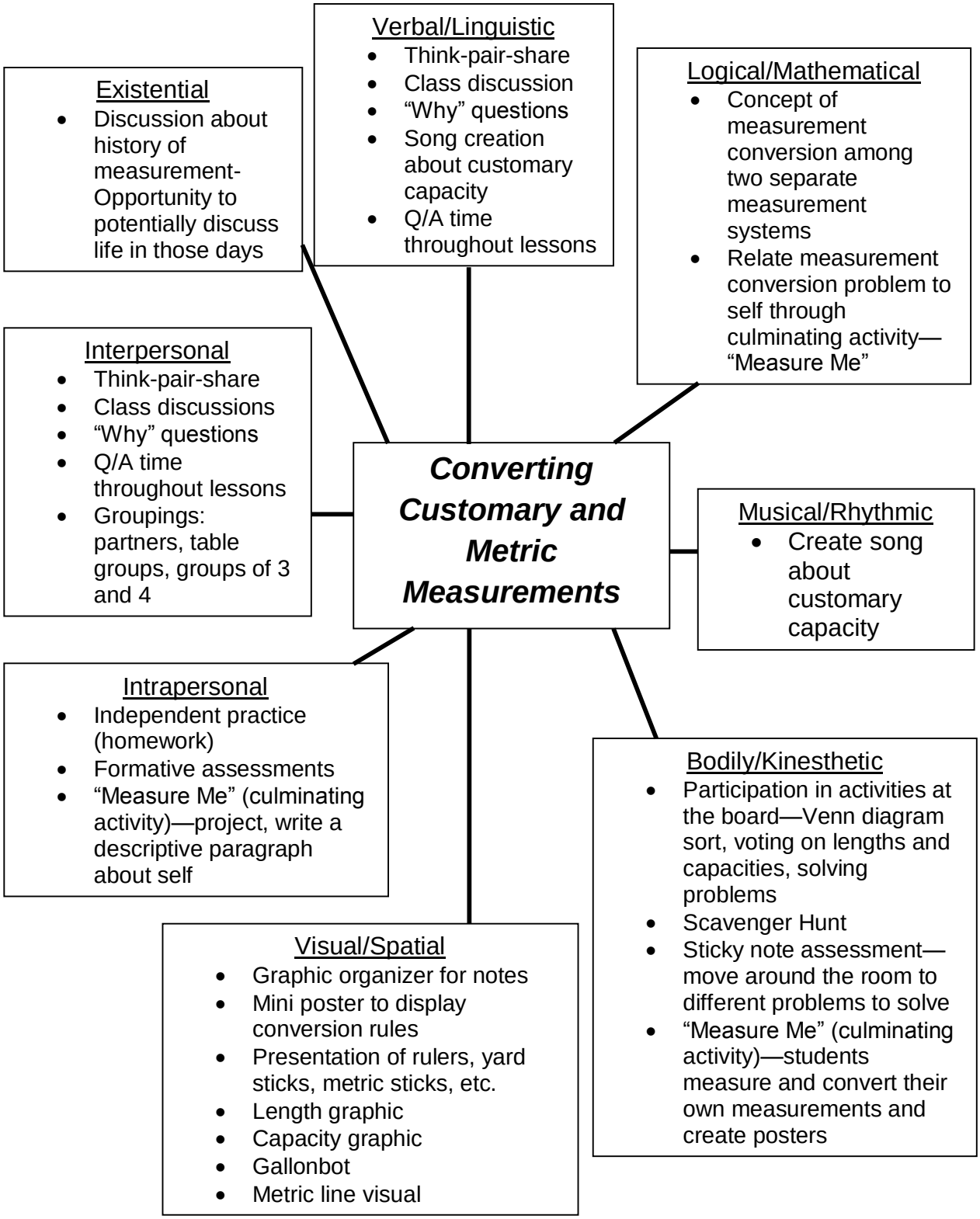
students to be very creative and to think and expand their knowledge as they complete their project.

I have used a wide variety of groupings throughout this unit. I have included groupings such as partners, table groups, individuals, assigned partners and small groups, and whole class instruction and practice. The grouping descriptions are explained throughout the lessons, which provides for easy management. The groupings are also appropriate for the assigned task.

Excluding the first lesson, each lesson starts by reviewing a "Problem of the Day." It helps the students warm up their newly learned skills. Following a little review, I have used a variety of engagement strategies. A couple of the lessons involve voting on larger measurements before the students know how to convert the numbers. I have also included a KWL chart, a book, and a short video. I have used a variety of engagements so the students do not grow bored of the same engagements each day. They all allow for the students to engage their thinking and think about the upcoming lesson. Throughout the lessons I have also implemented collaboration opportunities, interactive practice sessions, and hands on learning.

Since this unit is designed for a specific class and a unique set of students, I have thoroughly thought through each student's learning abilities and styles. I feel that I have included a variety of strategies and tasks to help all of the students in my class learn. I have differentiated instruction so that all students can learn and use their abilities to succeed.

Multiple Intelligences Addressed Throughout the Unit



Student-Learning Differences

Lesson	"Group 4"	Extension	Reteaching
1 "Measurements and Conversions"	• They will receive a more scaffolded version of the graphic organizer. • They will each be paired with a partner who is a higher learner so that they can learn and be guided along the way. • They will receive a reduced version of the exit slip and be expected to answer 6/8 parts correctly to be considered proficient.	Students who quickly grasp the concept of converting measurements will get to research the customary system and the metric system. They will use a graphic organizer provided to take notes and write down important vocabulary and an example of a conversion. They will use their notes to create a measurement conversion research cube. Each side of the cube will have information from the notes for the following measurement areas: customary length, customary capacity, customary weight, the metric system, fun facts, and a title side. In the extension packet, student(s) will have a graphic organizer with the instructions for their research cube and an attached cube template.	Student(s) will meet with the teacher. They will review that sometimes measurements have to be converted to be understood. The teacher will give each student a visual step by step example of conversion. They will practice the steps of conversion according to the different process.
2 "Converting Customary Length"	• They will receive a more scaffolded version of the graphic organizer. • The teacher will lead a station so the students can receive extra instruction. She will ask the students questions to test their knowledge of what they picked up during the lesson.	Student(s) who need an extended activity will receive an extension instruction sheet. Their instruction sheet will have them go through a customary length conversion practice game online. After they complete the practice activity, they will be instructed to create a real-world customary length conversion problem in which they will write on a sheet of construction paper and illustrate. They will attach	The teacher will have the students watch a video on customary length conversion. Then as a small group, they will discuss what they learned from the video. The teacher will also have three rulers and a yard stick. She will show them how three rulers fit in a yard stick and how they equal the same length. She will show them a

	Depending on knowledge, the teacher will either use the reteaching model below or just skip to extra practice with scaffolding. • They will receive a modified version of the assessment slip.	their work used to solve the problem they created, which will show their work for each conversion step.	customary length conversion graphic that shows what to do when converting different units. Then she will model a simple customary length conversion problem and use the ruler and yard stick as needed to help explain. Then she will have the students help her solve another problem. Finally, the students will work together to complete the practice problems from the video.
3 "Converting Customary Capacity"	• They will receive a more scaffolded version of the graphic organizer. • The teacher will help guide them as they practice converting (ex: guiding reading, prompting next step, etc.)	Student(s) will create their own Gallonbot and color coat him to better see the different units. They will write a customary capacity conversion story about Gallonbot. The story will be five paragraphs, and it will begin by introducing the story and scenario in the first paragraph, then it will present a problem (need of conversion) and solve it within the three body paragraphs, and finally it will all be tied together in the closing paragraph. The Gallonbot and story will be posted together in the classroom.	Student(s) will receive their own copy of Gallonbot. They will be instructed to color coat each of the units to highlight how everything fits together to make a gallon. Student(s) will then use their color coated Gallonbot to help them solve simple customary capacity conversion problems, as well as a real-world problem. During this time, students will be guided by the teacher. She will ask questions that will help them think deeper and better understand the concept of capacity measurements.

4 "Converting Customary Weight"	• They will receive a scaffolded version of the graphic organizer. • They will be paired with a higher level learner during the practice time to help guide them. • They will receive a reduced KWL chart (Write 2 things learned)	Student(s) will create a game involving customary weight conversion. They will receive an instruction sheet that will have the parameters of the activity. They can create any type of game as long as it involves at least 5 real-world problems and 5 regular weight conversion problems. They will be the ones to create the problems for the game. After the game is completed, it can be used for review activities and students who need more practice with customary weight.	The teacher will meet with student(s) in small group and break down weight conversion into simpler terms, such as using very simple numbers to model conversion. The teacher will show the student an online practicing tool to practice conversion. They will work through a few problems together. The student will practice converting on their own, while the teacher observes and notes any misconceptions. Misco nceptions will be addressed immediately so the student can better understand.
5 "Metric System Conversion"	• They will receive a scaffolded version of the graphic organizer. • They will only complete three of the assessment questions.	Student(s) will receive an extension instructional sheet. They will be asked to use a metric stick to measure the dimensions of the classroom. They can measure in any unit they like, but they will have to convert each measurement to three other units. They will use their measurements and conversions to find the perimeter and area of the classroom in their four chosen units. After they have their measurements and areas and perimeters, they will use a poster board to draw the outline of the classroom and the areas and perimeters they found.	Student(s) will watch a video that explicitly outlines the metric system and how to convert. They will have a chance to ask questions to clarify information. Student(s) will complete the online quiz as practice following the video.

6 "Measurement Conversion Review"	• Each of the students will be placed in a separate team with a higher level learner. • They will receive a modified version of the summative test. They will be considered proficient if they answer 9/12 questions correctly. • They will receive extra guidance for the culminating activity as they convert and write.	Student(s) will have a choice to create a book or a song about measurement conversion. They will receive a two-sided chart that will explain the instructions of each project. • Book: Student will create a story or information book based on measurement conversion. They will plan each page and illustration and get their plan approved by the teacher. Then they can use their choice of materials to create their book. • Song: Student will create a song based on measurement conversion. They will need to create a chorus and at least two verses. They will sing and record it on an electronic device.	The teacher will work with student(s) to review any area they need to work with, such as conversion steps or values for each measurement. After students feel confident about measurement conversion they will continue to review by engaging in an online game for extra practice. The website has every area of measurement conversion, and students can choose which area they need more practice in, such as cups to quarts or metric mass.

Literacy Strategies

Lesson	Literacy Strategies Used

1. "Measurements and Conversions"	• Read aloud: *Millions to Measure*
	  ○ Discuss words and meanings throughout
	• Frontload vocabulary
	  ○ Venn Diagram closed word sort
	• Graphic organizer—note taking device
	• Exit slip—closed word sort
	• Extension activity—research and record notes on a cube template, then make cube (organizer)

2. "Converting Customary Length	• Graphic organizer—note taking device • Activate prior knowledge—"Problem of the Day;" fill in missing spots on organizer prior to instruction • Vocabulary definitions • Reading comprehension practice—word problems • Extension activity—create, write, and illustrate a customary length conversion word problem
3. "Converting Customary Capacity"	• Graphic organizer—note taking device • Activate prior knowledge—"Problem of the Day;" fill in missing spots on organizer prior to instruction • Vocabulary definitions • Make connections—volume to capacity • Reading comprehension practice—word problems • Formative assessment—write complete sentences: one thing learned and one thing unsure about from lesson • Extension activity—Write a five paragraph story about Gallonbot converting customary capacity.
4. "Converting Customary Weight"	• Graphic organizer—note taking device • Activate prior knowledge—"Problem of the Day;" KWL chart; fill in missing spots on organizer prior to instruction • Reading comprehension practice—word problems • Extension activity—create a game with 5 real-world problems and 5 regular conversion problems
5. "Metric System Conversion"	• Graphic organizer—note taking device • Activate prior knowledge—"Problem of the Day;" fill in missing spots on organizer prior to instruction • Make connections—metric system video to book; metric prefix line to number line with decimals • Prefix meanings
6. "Measurement Conversion Review"	• Activate prior knowledge—"Problem of the Day" • Vocabulary review ○ Open word sort (create own categories) • Reading comprehension practice—word problems • Culminating activity—Write a descriptive paragraph about yourself • Extension activity—create a book or song about measurement conversion

Students with Limited Language Proficiency

None of the students in my classroom are of limited language proficiency. Therefore, I have not included any accommodations for students who have limited language skills.

Section Five: *Technology*

Summary Page: Technology Integration

Technology has a great place in the classroom and can be used to enhance instruction and learning. Throughout the unit the Promethean board is always used. However, the students are not always in direct contact with the board. The board is usually used by the teacher to model conversions during instruction. Though, the students do use the board when voting on the larger measurements during engagement activities. Other technology integration comes during practice stations when students are on computers, a Bill Nye video to introduce metric conversion, a specially created Jeopardy review game, and various technology integrated activities for reteaching and extensions.

The technology I have integrated in this unit serves as motivators to learn and practice material. For example, I have specially created a Jeopardy review game to practice everything learned throughout the unit. My class loves competitions so the Jeopardy game serves as a great motivator to solve problems correctly and win the game. The computer station I have also implemented involves students interacting with technology to practice customary length conversion. They enjoy computer centers, so I feel that this implementation will also serve as a motivator to students.

There are a variety of activities that could be used in place of technology, but the technology used serves to motivate and increase students' technological skills and understanding. Technology offers a variety of tools and learning opportunities that other activities do not. Although I have included other activities that do not require technology, I have made sure that I have implemented technology into certain areas where they fit best.

The classroom offers a somewhat limited supply of technology, because there is one Promethean board and about five computers. However, the technology I have included uses stations of small student groupings for computers and whole group learning using the Promethean board. I feel that I have been strategic to offer technology to all students.

Most of the technology implemented involves pre-existing websites. However, in order to review unit material I made two separate Jeopardy games using an online tool. I have included the two separate links to the games on the sixth lesson plan, but the games can also be found by using the following web addresses: **http://equizshow.com/complete/30416** and **http://equizshow.com/complete/30341**.

Technology Used Throughout the Unit

Lesson	Technology Used
1. "Measurements and Conversions"	• Promethean board—*Activeinsprire* • Extension—computer for research
2. "Converting Customary Length"	• Promethean board—*Activinspire* • Computers/laptops • Computer station webpage—www.buzzmath.com/Docs#F6KM17F&page=1 • Extension—computer, webpage (www.buzzmath.com/Docs#F6KM17F&page=1) • Reteaching/small group station—video and practice quiz on customary length conversion (www.turtlediary.com/grade-3-games/math-games/customary-and-metric-unit-conversions.html)
3. "Converting Customary Capacity"	• Promethean board—*Activinspire*
4. "Converting Customary Weight"	• Promethean board—*Activinspire* • Reteaching—online practice tool (www.thatquiz.org/tq-n/science/metric-system/)
5. "Metric System Conversion"	• Promethean board—*Activinspire* • Bill Nye Introduction into the Metric System (www.youtube.com/watch?v=U04nHNUMfPA) • Reteaching—Metric system video and online quiz (www.education-portal.com/academy/lesson/how-to-convert-units-in-the-metric-system.html#lesson)
6. "Measurement Conversion Review"	• Promethean board—*Activinspire* • Jeopardy game round one (http://equizshow.com/complete/30416) • Jeopardy game round two (http://equizshow.com/complete/30341) • Extension—electronic device to record song

Section Six: *Cross Curricular Activities*

Summary Page: Cross Curricular Standards

I have chosen three standards from subject areas that can easily enhance the topic of measurement conversion. These standards come from the subjects of Language Arts, Science, and Technology.

For Language Arts I found Standard 13, which focuses on the meanings of academic and domain-specific words relevant to fifth grade subject areas. Measurement involves many important words to understand, such as various measurement units and parts of measurement systems, like capacity or length. Students would work in pairs to complete a vocabulary sort and definition matching activity. Each pair would receive two baggies—one with terms and category titles and another one with definitions. The students would first sort their words then match the definitions. In order to assess students on this standard, they would complete a simple vocabulary fill-in-the-blank quiz that would include a portion of the words the students worked with during the activity. This connection to Language Arts would help the students to increase their vocabulary knowledge on the topic of measurement conversion.

For Science I found Standard 11, which focuses on comparing the distances from the sun to planets in the solar system. This standard easily correlates with measurement conversion because it focuses on distances. As an activity I would have my students work in groups of threes to research and convert planet distances from the sun. For example, if their research distances were in kilometers they could convert to meters. They would use their research to create a visual of choice to display their research and conversions. They would later be assessed by completing a worksheet

that involved them converting planet distances and putting them in order from closet to farthest away from the sun. This connection to Science would be beneficial for the students because it's a real-world connection to the math content and it would be presented in an engaging and practical way.

For Technology I found Standard 9, which focuses on using technology to organize, interpret and display data. This standard fits in easily with measurement conversion, because it is a great way to display data and findings. As an activity I would have students measure a small list of items that could be found around the room, such as a door or a pencil. Students would record their measurements and later convert them all to one single unit. They will take their data and create a graph on blank paper. Later they would input their data on a spreadsheet and graph it. They would be assessed on their final product of their technology-based graph. This connection to Technology correlates well with measurement conversion because both involve types of data and the technology can help to display the data found.

Cross Curricular Standards

Cross Curricular Standard	Objective	Activity	Assessment
Language Arts: 13.) Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a Grade 5 topic or subject area. [RI.5.4]	When given a fill-in-the-blank quiz, students will write the correct measurement terms to complete the sentence with 80 percent accuracy.	Students will work with a partner to complete a word sorting and definition activity. Each pair will receive a baggie with measurement terms and category titles and a baggie with definitions. The partners will work together to sort the words into the correct categories. Then they will take the definitions and match them to the correct term.	Fill-in-the-blank quiz
Science: 11.) Compare distances from the sun to planets in our solar system. • Relating the size of Earth to the size of other planets in our solar system • Identifying technology used to study planets	When given a solar system conversion worksheet, students will convert the distances from the sun and list the planets in order from closet to farthest away from the sun with 75 percent accuracy.	Students will work in groups of threes to create a visual of the solar system and the distances of each planet from the sun. They will first do research to find the distances, and then they would convert the measurements to another unit, such as kilometers to meters. After their research and conversions are complete, they will create a visual of choice to display the distances in an engaging way.	Solar system conversion worksheet
Technology: 9.) Use technology tools to organize, interpret, and display data. Examples: spreadsheets, databases, electronic graphing tools	When given access to a spreadsheet program, students will record and graph data about measurement conversion according to a checklist.	Students will each receive small list of various items to measure, such as a door or a pencil. All of the measurements would be done in different units of the same system (customary or metric). Students will record their measurements on a chart. Then they will choose one unit to convert all measurements to. They will use their data to then create a graph on paper. They would later input their data on a spreadsheet program to make a technology-based graph. (The finished product would be the assessment)	Technology-based graph of conversions

Section Seven: *Culminating Activity*

Converting Measurements: Culminating Activity Plan

Standard:

18.) Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multistep, real-world problems. [5-MD1]

Objective:

Students will create a poster about their personal measurements and conversions according to a rubric.

Task:

8. Each student will receive a "Measure Me!" instruction sheet and recording sheet. The teacher will take the time to explicitly go over the instructions with the students.

9. Students will pair with a pre-assigned partner. Students will take turns helping measure the following things for their partner: height, arm length, leg length, foot length, and hand length. As the measure, they will record their measurements in the correct column. *During this time the teacher will be walking around to assure that students are measuring correctly.*

10. Students will work on their own to convert their measurements and record the conversions in the correct column. When they are finished converting, students will need to get their conversions approved by the teacher before moving on to the next step.

11. Students will receive a blank sheet of paper to use to plan their poster. They will include the following parts on their plan and poster:

    a. They will create a title that will be clearly displayed on the poster.
    b. They will draw a picture of themselves (head to toe) that will take up the majority of the poster.
    c. They will choose a measurement system (customary or metric). According to the measurement system chosen, they will label their drawing with the measurements and conversions for each body part. For example, a student might label the arm on the drawing 2 feet and 24 inches (measurement and conversion).
    d. They will write a descriptive paragraph about themselves. The paragraph will include their descriptions and things they are interested in. The paragraph should be at least five sentences.

12. The teacher will approve poster plan prior to the students moving to the next step.

13. Each student will receive a half sheet of poster board. They will use their plan to help create it. The poster should be informative, neat, and colorful.

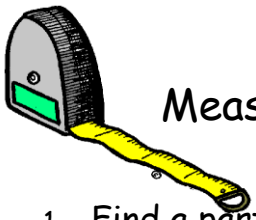
14. Students will present their poster to the class. They will describe their different measurements and read their paragraph about themselves.

Assessment:

Students will be assessed on their poster according to a rubric. They will be graded on the accuracy and completion of their measurement recording sheet and on the different aspects of their poster. For each grading component, students will receive a 1, 2, or 3. The highest score a student can receive is 21 points.

Materials:

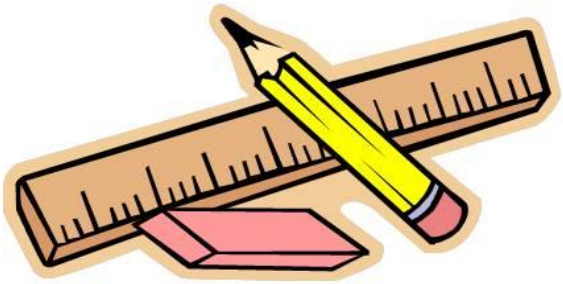
- Customary and metric measuring tools (tape measure, rulers, meter stick, yard stick, etc.)
- "Measure Me!" instruction sheet (attached)
- Measurement and conversion recording sheet (attached)
- Poster board (cut in half)
- Markers, colored pencils, etc.
- Glue/tape
- "Measure Me!" rubric (attached)



Measure Me!

Measurement Conversion Project Instructions

1. Find a partner and a measuring tool. Measure the following things: your height, arm length, leg length, foot length, and hand length.
2. Use the Measurement and Recording Sheet to write down your measurements and convert to other units. Your recording sheet will tell you what unit to convert to. Miss Treadway will approve your conversions before you move on.
3. On a piece of blank paper, plan out your poster. Your poster should include the following:
    - Title
    - Drawing of yourself (head to toe)
    - Measurement labels on your drawing (ex: 8 in. by your hand to represent that it's 8 in. long)—Choose one unit from your recording sheet to label your drawing (ex: all labels are in centimeters or all labels are in inches)
    - A paragraph about yourself. This paragraph should be a description about you and things you are interested in. Remember that a paragraph has at least 5 sentences.
4. Show your poster plan to Miss Treadway to approve. She will give you your poster board.
5. Put together your poster. It should be colorful and include everything listed above. Be creative!



Measurement and Conversion Recording Sheet

Name: _____ **Date:** _____

	Measure	**Convert**
Height (Measure from the floor to the top of your head)	ft. in,	in.
	m. cm.	cm.
Length of Arm (Measure from your shoulder to the start of your hand)	ft. in.	in.
	cm.	mm.
Length of Leg (Measure from the bottom of your ankle to you hip)	ft. in.	in.
	cm.	mm.
Length of Foot (Measure from the back of your foot to the tip of your longest toe)	ft. in.	in.
	cm.	mm.
Length of Hand (Measure from the tip of your longest finger to the bottom of your palm)	in.	
	cm.	mm.

Measure Me! Rubric

	3	2	1
Measurements and Conversions	Student completed measurement and conversion recording sheet	Student has completed most of the measurement and conversion recording sheet	Student is missing most measurements/ conversions on recording sheet
	Student's conversions are equivalent to their original measurements	Most of student's conversions are equivalent to their original measurements	The student's conversions are mostly not equivalent to their original measurements
Poster	Student included all of the parts required for poster (title, drawing, labels & conversions, paragraph)	Student is missing one or two parts of the required parts for the poster	Student is missing most/all of the required parts for the poster
	Student's paragraph is at least 5 sentences	Student's paragraph has 3-4 sentences	Student's paragraph is less than 3 sentences
	Student's paragraph describes themselves	Student's paragraph is somewhat descriptive of themselves	Student's paragraph is off topic and lacks descriptive qualities
	Student's paragraph is free of spelling and grammar errors	Student's paragraph has a few spelling and grammar errors	Student's paragraph has several spelling and grammar errors
	Poster is colorful and creative.	Poster has some color and some creativity.	Poster lacks color and creativity

Section Eight: *Rationale for Unit Design*

Summary Page: Rationale

I chose the topic of measurement conversion for my unit, because my cooperating teacher had not yet taught it and it seemed like it could relate to various hands-on and kinesthetic activities. I have strategically included various instructional strategies, assessments, and resources based on the students in my classroom and the materials available.

I have done my best to include a wide variety of instructional strategies that are engaging and balance well with my students and their learning styles. There is a lot of content when it comes to the units in each measurement system and their equivalent measurements. However, imbedded in my instruction is time for the students to think-pair-share, have think time, collaborate to fill in graphic organizers, engage in active participation with questions and discussions, hands-on learning with word sorts, and other various instructional strategies. I have also included throughout my lesson plans the use of technology, visuals, differentiated instruction, formative assessments to gauge growth, praise, worksheets, and projects. Instructional strategies are very important and it is also important to note that all students do not learn in the same way. Therefore, that is why I have included a wide variety of strategies that are research-based and can appeal to various learners.

Assessments are crucial to monitor learning and to see growth among the students throughout the unit. Therefore, I have created different types of assessments to check students' knowledge. The first assessment my students will take in this unit is a pre-assessment to see what they know. I took ten questions from the summative assessment to make up the pre-assessment because it will be easier to see growth at the end of the unit. Following each lesson I have implemented formative assessments. Some of the assessments involve students solving problems while others require

students to write about what they have learned and something they are still unsure about. These assessments are informal ways to monitor student progress throughout the unit. I have included formative assessments, such as an exit slip, KWL chart, chart paper questions to post sticky note answers, and more. Each lesson has a different assessment so that the students are always engaging in different types of quick learning checks. The unit ends with a summative test. The summative test assesses students on content from each lesson. Each of the lesson contents are assessed in three to five questions on the summative assessment. I decided that their summative test be paper-based with conversions and real-world problems because that is what my students are currently used to with assessments and it is more similar to their upcoming state test.

My lessons include a wide variety of resources. I have included simple resources, such as computers with related learning games, self-created worksheets, graphic organizers for notes, formative assessments, and a specially created Jeopardy game. I have also included resources that relate to students moving around the classroom and engaging in hands-on activities, such as a scavenger hunt, poster project materials, word sort cards, and literal measurement and conversion exercises with real objects. The resources mentioned are just a few of the resources used throughout my unit, but they serve as an example to show that my resources serve different purposes. Some of my resources are used during instruction while others are used during practice. Each of the resources pair with instructional strategies to help increase student learning, such as the hands-on learning activity that requires students to measure an object, convert the measurement, and solve a real-world problem.

I feel that everything I have chosen to be included in and created for my unit each serve a specific purpose and that is to increase student learning and engagement so that all of the students can be successful with measurement conversion. Each of the

strategies and materials chosen best suit the students in my particular classroom and have been well thought through so that they can learn best.

Philosophy of Education

I believe the purpose of education is to provide every student the opportunity to succeed in life and achieve their perspective goals. Everyone sets a goal at some point in their lifetime, and with the help of education, a person has more opportunities to reach that goal. Education should not be a time that is solely dedicated to tests and assessments. Instead, education should be enjoyable and a time to explore and learn about different ideas that broaden one's knowledge of the world around them. Therefore, while students are in my classroom they will be exposed to hands-on projects that require collaboration with others.

I believe my role as an educator is to introduce my students to ideas and skills that will benefit them throughout life. I believe it is my job to instill in them confidence and positive attitudes towards learning, because they are more likely to exhibit higher drives towards their perspective goals. To develop positive attitudes in my students, I believe my teaching should lead to learning that is both engaging and interesting. Allowing students to explore and collaborate lead them to learning more about concepts and their own beliefs. Therefore, my role will take the form of a facilitator to ensure that students experience authentic learning. While in the classroom I will also have a positive outlook on learning, because my students will most likely follow suit; therefore, my students will develop a deeper desire for learning that will carry them throughout life.

I believe children learn best when a lesson addresses the variety of learning styles exhibited in Howard Gardner's multiple intelligences theory. Some children learn best from just one of these styles and others learn in a variety of ways. However, if various learning styles are addressed in the lesson, students are more likely to understand what they are being taught. I am very organized and usually follow a certain order in everything I do, but I am flexible when I need to be. I believe my organization

and structure will reflect in my students by decreasing confusion and increasing understanding.

Overall, my goals for students are to allow them to grow in their enjoyment for learning and to teach skills and ideas that will benefit them throughout life in whatever endeavor they choose. Goals I have for myself as a teacher are to be a positive and caring role model for my students and to address all of my students' needs so that they can learn to their ultimate ability. I plan to achieve these goals in the classroom by creating authentic learning experiences for my students that address various learning needs and to be positive and uplifting in everything I do.

Student learning is important in any classroom, but evidence of student learning provides a solid foundation to build upon as my teaching continues throughout each school year. There are many ways to collect evidence of student learning, and one of the main techniques is tests and quizzes. I plan on giving a few tests and quizzes in order to prepare for end-of-year testing and other future tests, but I also plan on collecting evidence through authentic assessments, such as observations and notes, projects, and student portfolios.

In order for students to learn best, I believe the classroom should reflect a community that works together in an encouraging manner. I think it's important that my students understand the different cultures present in the classroom, and by teaching about various cultures and allowing students to discuss their personal traditions, the class will learn about diversity and form an attitude of respect towards people who are different from them. Through discussion and more diverse student participation in activities, those particular students will feel more at ease and will be more likely to learn and participate. When everyone works together and encourages each other through

helpful collaboration, I believe a classroom transforms into a community of learners that exhibits actions and attitudes that will benefit every student as they go through life.

Section Nine: *Resources and Materials*

Summary Page: Resources/Materials

Resources and materials are an important aspect of student learning. Therefore, my resources and materials are different and cover a variety of learning styles. Some examples of the materials and resources I have chosen to include in my unit are a Promethean board, chart paper to display important notes and visuals, various objects to measure and convert, simple/interactive worksheets, computers and online learning games, word sorts, posters and materials, and much more.

These materials serve to help students learn and practice. Some of the materials I have included that will allow students to further practice the content are computers, a scavenger hunt with conversion problems, a Jeopardy game, conversion stations, poster creating, and more. All of the practice opportunities have been designed to be interactive and engaging and the resources and materials used help to support those tasks.

I have already mentioned some of the ways I am using technology resources, but more specifically within my unit is the use of a Promethean board, computers, online games, videos, and a Jeopardy game. I have also included a task that involves music. During a scavenger hunt, students will be searching for a hidden message. Each table will have a different message and after they decode their message they will put it to a tune, such as a rap. As a class each tune will be put together to create a song about converting customary capacity. Art is incorporated through the creation of a mini poster about measurement conversion and during the culminating activity when students have to create a poster of themselves and their measurements. During these activities students are encouraged to be as creative as possible and to design their posters in a way that is interesting and appealing.

I feel that various resources and materials have been used throughout the unit and serve to support a further increase in student learning.

Unit Resources and Materials

Unit Lesson	Resources and Materials
1. “Measurements and Conversions”	• *Millions to Measure* by David M. Schwartz • A type of board/wall for Venn diagram drawing • Sticky notes with vocabulary words • Graphic organizer for notes • Scaffolded graphic organizer • “Converting Measures” anchor chart • Chart paper • Ruler • Promethean board/white board • Construction paper • Markers/colored pencils/crayons • Instructions for poster to be written on the board • Exit slip • Reduced exit slip • Extension packet • Computer • Reteaching step by step example of conversion
2. “Converting Customary Length”	• Promethean board • Graphic organizer • Scaffolded graphic organizer • Chart paper with customary length graphic • Rulers • Real-world conversion problem involving miles • Computer station website page • Computers • Measure and convert interactive worksheet • Measuring objects: pencil, printer paper, cup, sticky note (place in basket) • Carrot Conversions sheet • Assessment slip • Modified assessment slip • Assessment answers (post one on each wall) • Extension instruction sheet • Extension webpage (www.buzzmath.com/Docs#F6KM17F&page=1) • Reteaching graphic • Yard stick • Reteaching website (www.turtlediary.com/grade-3-games/math-games/customary-and-metric-unit-conversions.html)
3. “Converting Customary Capacity”	• 2 cups filled with different amounts of water-

	Cup 1 and Cup 2 (Cup 2 will have 2 cups of water and Cup 1 will have 1.5 cups of water) • Measuring cup to measure water • Promethean board • Graphic organizer • Scaffolded graphic organizer • Anchor chart with gallon graphic • Real-world question for instruction • Gallonbot picture • Scavenger Hunt questions sheet • Scavenger Hunt answer cards with secret codes • Sticky notes • Chart paper with title: "Converting Customary Capacity" • Extension Gallonbot story instructions • Re-teaching question and answer sheet
4. "Converting Customary Weight"	• KWL chart • Reduced KWL chart • Graphic organizer • Scaffolded graphic organizer • Pictures of the following: school bus, school desk, largest watermelon (make into tent cards so they can stand up and write the weight on the picture) • Promethean board • Scoot recording sheet • Scoot real-world problems (to be attached to a tent card) • Extension instruction sheet • Reteaching practice website (www.thatquiz.org/tq-n/science/metric-system/)
5. "Metric System Conversion"	• Bill Nye's Introduction into the Metric System YouTube video (www.youtube.com/watch?v=U04nHNUMfPA) • Promethean board • Graphic organizer • Scaffolded graphic organizer • Chart paper with drawn metric graphic • Meter stick/ruler • Deck of playing cards • Small whiteboards • Dry erase markers • Chart paper with metric conversion problems written at the top • Sticky notes (five for each student) • Extension instructional sheet • Reteaching video (www.education-

	portal.com/academy/lesson/how-to-convert-units-in-the-metric-system.html#lesson)
6. “Measurement Conversion Review”	• Promethean board • Open sort words in baggies for each table • Jeopardy game round one (http://equizshow.com/complete/30416) • Jeopardy game round two (http://equizshow.com/complete/30341) • Summative test and key • Modified summative test and key • Culminating Activity Plan • Culminating activity materials: 1. Customary and metric measuring tools (tape measure, metric sticks, rulers, yard sticks, etc.) 2. “Measure Me!” Instruction sheet 3. Measurement and conversion recording sheet 4. Poster board 5. Markers, colored pencils, etc. 6. Glue/tape • Extension instructions • Reteaching website (http://www.sheppardsoftware.com/math.htm – measurement)

Additional Resources

Additional Resource #1: *Measurements around the Room*

Name: _____

Measurements around the Room

1. How many inches in a foot? _____

2. How many feet in a yard? _____

3. How many inches in a yard? _____

4. Write the fraction. An inch is _____ of a foot.

5. Write the fraction. A foot is _____ of a yard.

6. Write the fraction. An inch is _____of a yard.

Complete the chart on the back then answer the following questions after.

1. Which objects were easiest to measure in*

Yards? _____

Feet? _____

Inches? _____

2. Using question 1, what conclusions can you draw?

_____

_____

3. What objects would you not want to use inches to measure? Why not?

_____

_____

4. What objects were difficult to measure in yards? Why?

_____

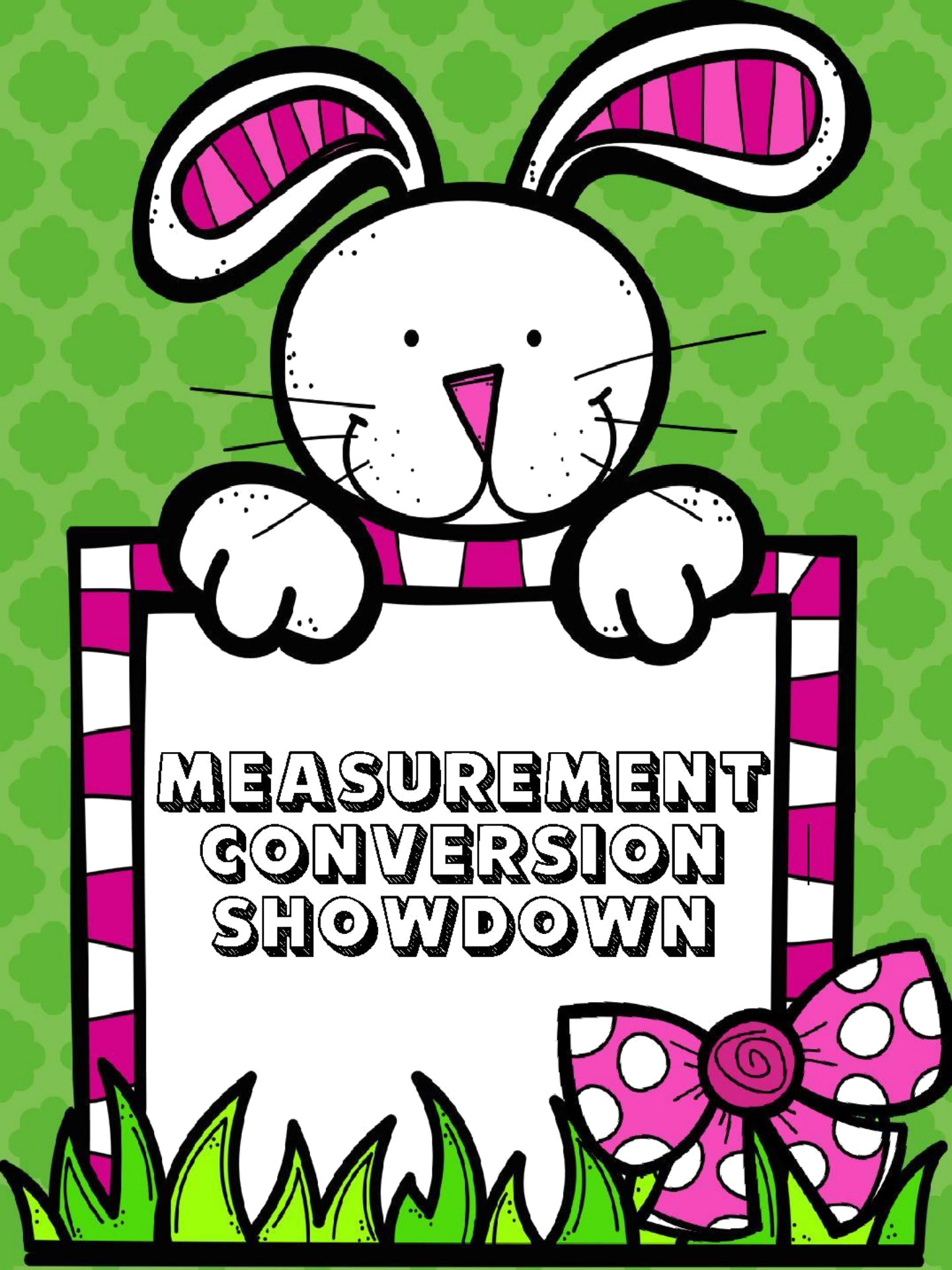
_____

Name: _____

Measurements around the Room

Write the names of the objects you measure in this column.	Yards	Feet	Inches	Was it easiest to measure this object in yards, feet or inches?

Additional Resource #2: *Measurement Conversion Showdown*


MEASUREMENT
CONVERSION
SHOWDOWN

Showdown Directions

Materials Needed:

7. **Showdown Cards**
8. **Dry erase boards and markers (one per student)**

Preparation: Print out Showdown Cards (1 set for each team). Laminate for durability, Seat students in teams of 3 to 5 and give each person a dry erase board and marker. You'll also need a set of problem cards for each group. Designate who will be the first Leader in each team.

Directions:

5. Stack the problem cards face up in the center of the team.

6. The Leader reads the first problem aloud and places the card face up in the center of the team.

7. Without talking, everyone (including the Leader) writes the answer on his or her own dry erase board.

8. All students place their dry erase boards face down when finished.

9. The Leader says "Showdown!"

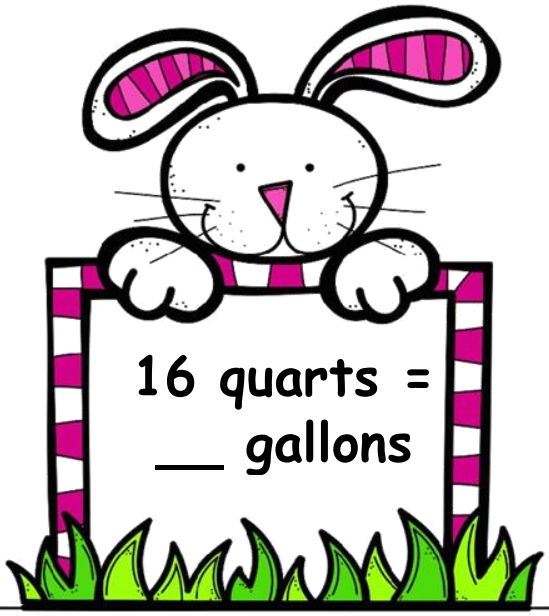
10. Students flip over dry erase boards and show answers. Discuss answers that are different and celebrate correct answers.

11. If everyone had the correct answer, remove the card from the deck. If not, place it at the bottom to repeat later.

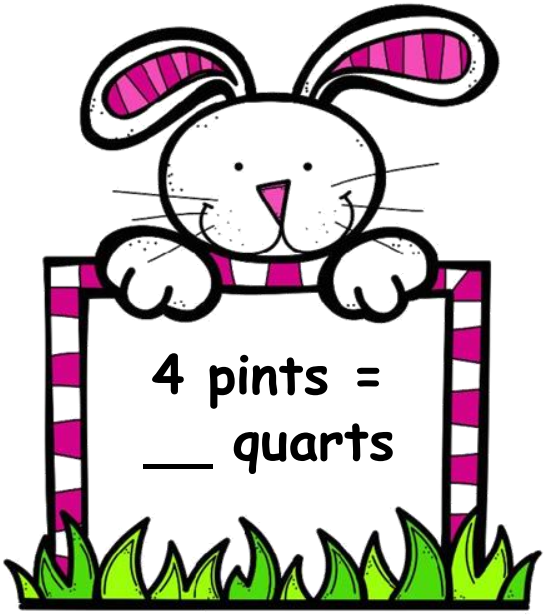
12. Rotate Leaders clockwise for each round. Repeat as time allows.


6 tons =
___ pounds


3 yards =
___ inches


16 quarts =
___ gallons


4 pounds =
___ ounces

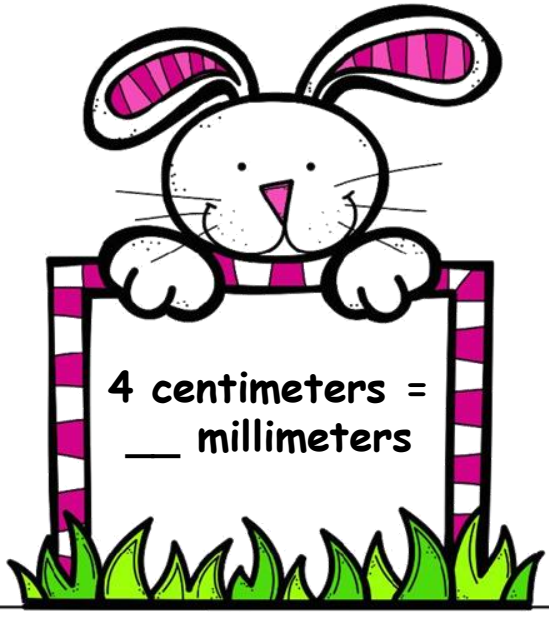

4 pints =
___ quarts

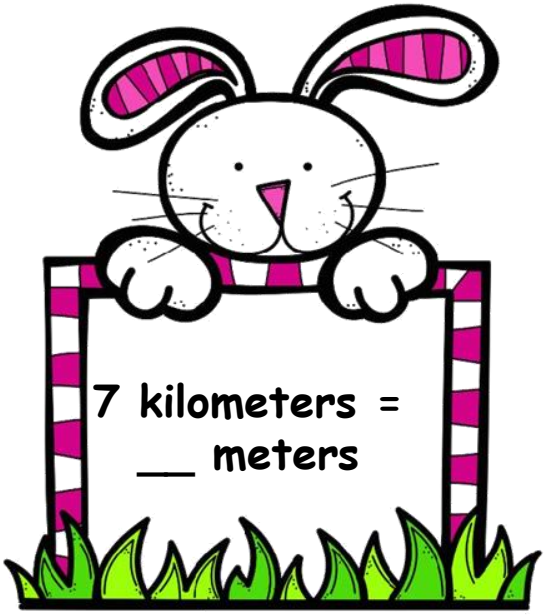

2 cups =
___ ounces


8 yards =
__ feet

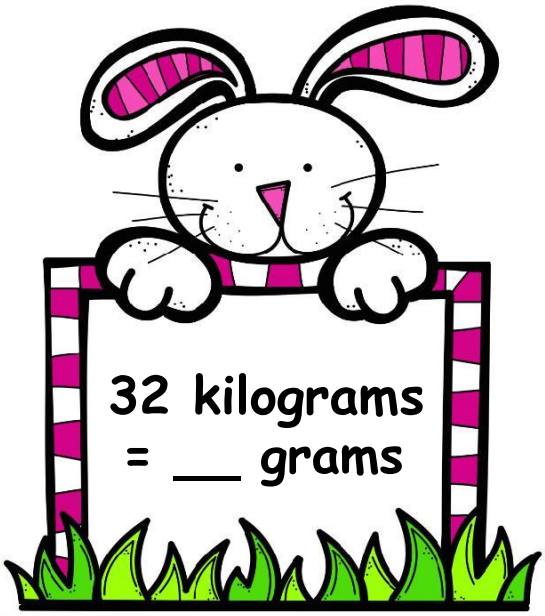

60 inches
= __ feet

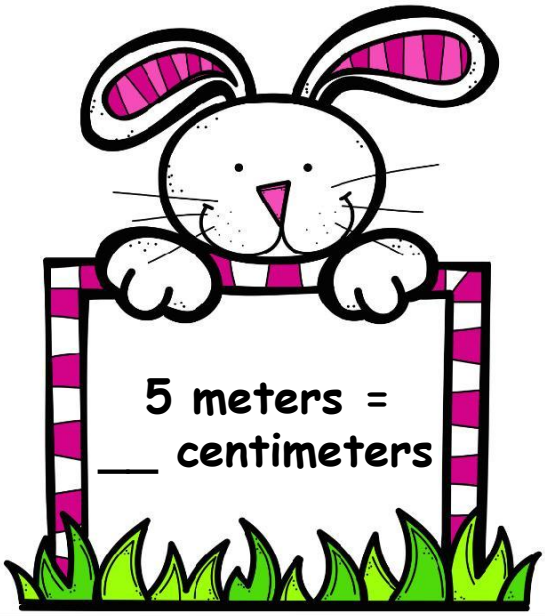

3 kilograms
= __ grams


4 centimeters =
__ millimeters


7 kilometers =
__ meters


4 liters =
__ milliliters


32 kilograms
= ___ grams


5 meters =
___ centimeters


6 days =
___ hours


5 decades =
___ years


3 centuries =
___ years


36 months =
___ years

KEY

1. 12,000 pounds
2. 108 inches
3. 4 gallons
4. 64 ounces
5. 2 quarts
6. 16 ounces
7. 24 feet
8. 5 feet
9. 3,000 grams
10. 40 millimeters
11. 7,000 meters
12. 4,000 milliliters
13. 32,000 grams
14. 500 centimeters
15. 144 hours
16. 50 years
17. 300 years
18. 3 years

Additional Resource #3*: Metric Conversions from Outer Space*

Planet	Distance from the Sun (Approximate km)	Diameter (km)
Mercury	57 million km	4,878 km
Venus	108 million km	12,104 km
Earth	149 million km	12,756 km
Mars	227 million km	6,787 km
Jupiter	778 million km	142,796 km
Saturn	1,427 million km	120,660 km
Uranus	2,871 million km	51,118 km
Neptune	4,497 million km	48,600 km
Pluto (a dwarf planet)	5,913 million km	2,274 km

9. How many meters is the distance from the sun to Mars?

_____

10. How many centimeters is the distance from the sun to Mars?

_____

11. What is the diameter of Pluto in millimeters?

_____

12. How far is Jupiter from Earth in kilometers?

_____

13. How far is Jupiter from Earth in meters?

_____

14. How many centimeters is it from Saturn to Venus?

_____

15. Round the answer to number 6 to the nearest 100 trillion. About how many 30cm rulers would you need to measure from Saturn to Venus?

_____

Planet	Distance from the Sun (Approximate km)	Diameter (km)
Mercury	57 million km	4,878 km
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Uranus	2,871 million km	51,118 km
Neptune	4,497 million km	48,600 km
Pluto (a dwarf planet)	5,913 million km	2,274 km

8) How many meters is the distance from the sun to Mars?

227,000,000,000m (227 billion meters)

9) How many centimeters is the distance from the sun to Mars?

22,700,000,000,000cm (22 trillion 700 billion centimeters)

10) What is the diameter of Pluto in millimeters? 2,274,000,000mm (2 billion 274 million millimeters)

11) How far is Jupiter from Earth in kilometers?

629,000,000km (629 million kilometers)

12) How far is Jupiter from Earth in meters?

629,000,000,000m (629 billion meters) 13) How many centimeters is it from Saturn to Venus?

131,900,000,000,000cm (131 trillion 900billion centimeters)

13. Round the answer to number 6 to the nearest 100 trillion. About how many 30cm rulers would you need to measure from Saturn to Venus?

3,333,333,333,333 rulers (3 trillion, 333 billion, 333 million, 333 thousand, 333 rulers)

Additional Resource #4: *Customary Units of Measure War*

Customary Units of Measure War

Directions:

1. One person shuffles the deck and deals an equal number of cards to both players.

2. Players remove top card from their deck and place it face up on the table in front of them.

3. The player with the longest length keeps both cards. The winner must explain why their card is longer.

4. If both cards have the same value, “war” is declared. Both players place three cards face down on the table. They then turn the fourth card face up and compare the lengths. The player whose card has the longest length keeps all the cards for that round.

5. Play continues until one person wins all the cards, or until time is up. If time is called, the winner is the player with the most cards.

Teachers: Copy cards onto cardstock and cut apart. You will need one set for every pair of students.

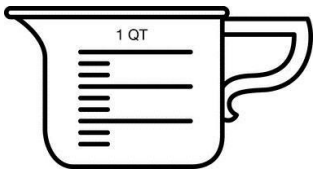
7 feet	6 feet
14 feet	12 feet
2 feet	16 feet
12 inches	5 inches
24 inches	2 inches
72 inches	8 inches
2 yards	5 yards

1,760 yards	3 yards
1 yard	14 yards
1 mile	2 miles
3 miles	5 miles
5,280 feet	10,560 feet
500 yards	144 inches
60 feet	288 inches

Additional Resource #5: *Customary Measurement Practice*

Name _____

Customary Measurement Practice



Length

1. 1 yard = _____ feet
2. 1 foot = _____ inches
3. 1 mile = _____ feet

Weight

4. 1 ton = _____ pounds
5. 1 pound = _____ ounces

Capacity

6. 1 pint = _____ cups
7. 1 gallon = _____ quarts
8. 1 quart = _____ pints
9. 1 cup = _____ fluid ounces
10. 1 gallon = _____ cups

Set A

11. 60 inches = _____ feet
12. 4 miles = _____ feet
13. 5 yards = ____ feet
14. 4 tons = _____ pounds
15. 8 cups = _____ pints
16. 3 quarts = _____ cups
17. 5 pounds = _____ ounces
18. 4 pints = _____ cups
19. 6 feet = _____ inches
20. 3 gallons = _____ quarts

Set B

21. 6,000 pounds = _____ tons
22. 64 ounces = _____ pounds
23. 4 yards = _____ feet
24. 7 miles = _____ feet
25. 7 feet = _____ inches
26. 6 yards = _____ feet
27. 8 cups = _____ quarts
28. 5 gallons = _____ quarts
29. 3 cups = _____ ounces
30. 48 ounces = _____ cups
31. 15 feet = _____ yards
32. 31,680 feet = _____ miles
33. 10 cups = _____ pints
34. 7 quarts = _____ cups

Additional Resource #6: *Changing Units*

Name_____ Date_____

Changing Units

For the following task, measure an item using one unit of measure and then predict the item's length with different unit of measure. You will then check your prediction by measuring the item and find the difference between your prediction and the actual measurement.

Item to measure	Exact length	Prediction of length	Exact length	Difference of prediction and actual measurement
Unsharpened pencil	_____in	_____cm	_____cm	_____ cm
Unsharpened pencil	_____mm	_____cm	_____cm	_____ cm
Top of desk	_____ft	_____in	_____in	_____ in
Top of desk	_____dm	_____cm	_____cm	_____ cm
Door	_____yd	_____ft	_____ft	_____ ft
Door	_____m	_____cm	_____cm	_____ cm
Book	_____in	_____cm	_____cm	_____ cm
Book	_____cm	_____mm	_____mm	_____ mm
Bulletin board	_____yd	_____ft	_____ft	_____ ft
Bulletin board	_____m	_____cm	_____cm	_____ cm

Additional Resource #7: *Measurement Match Up!*

Measurement Match Up!

Created by Kelly Whittier

www.teacherspayteachers.com/Store/Kelly-Whittier

These matching cards are from a soon to be released measurement unit.

Graphics from The 3AM Teacher

http://the3amteacher.blogspot.com

www.teacherspayteachers.com/Store/The-3am-Teacher

1 yard

3 feet

1 yard

36 inches

1 foot

12 inches

1 mile

5,280 feet

1 meter

100 centimeters

1 centimeter

10 millimeters

1

decimeter

10

centimeters

1 meter

10

decimeters

1
kilometer

1,000
meters

1
pound

16
ounces

1
ton

2,000
pounds

1 kilogram

1,000 grams

1 gram

1,000 milligrams

1 liter

1,000 milliliters

1 gallon

4 quarts

1 quart

2 pints

1 pint

2 cups

Additional Resource #8: Conversion Practice Worksheet

\

Name _____ Date _____

Converting Standard Sized Units of Measurement - Independent Practice Worksheet

Complete all the problems.

A)

16. Which is more, 5 ounces or 1 pound?

___ 5 ounces

___ 1 pound

___ neither; they are equal

17. Which is more, 1 pint or 2 cups?

___ 1 pint

___ 2 cups

___ neither; they are equal

18. Which is more, 16 fluid ounces or 1 cup?

___ 16 fluid ounces

___ 1 cup

___ neither; they are equal

19. Which is more, 6 ounces or 1 pound?

___ 6 ounces

___ 1 pound

___ neither; they are equal

Name _____ Date _____

14. Which is more, 2 feet or 1 yard?

___ 1 yard

___ 2 feet

___ neither; they are equal

15. Which is more, 1 pound or 13 ounces?

___ 1 pound

___ 13 ounces

___ neither; they are equal

B)

Convert.

= _____ ton = 2000 pounds

= 4 cups = _____ quarts

= 1 pound = _____ ounces

= 3 feet = _____ yards

= 1 mile = _____ feet

3 10 kg = _____ grams

Additional Resource #9: *Converting Pounds and Ounces*

Coverting Pounds and Ounces

The conversion rate for pounds and ounces is

16 ounces (oz.) = 1 pound (lb.)

When converting pounds to ounces, we multiply.
When converting ounces to pounds, we divide.

EXAMPLE: 3 lbs = ? oz
3 lbs x 16 = 48 ounces <-> we multiply by 16 because 1 lb = 16 oz.

Read each question below and solve the problem by using multiplication or division. Be sure to show all of your work in the space provided.

1.) Lucy made 3 cakes that each weighed 32 ounces. How many pounds of cake did Lucy make?

2.) Mike's turkey burger recipe calls for 4 pounds of ground turkey. How many ounces of ground turkey should Mike purchase at the local grocery store?

3.) Sarah's dog weighs 64 ounces. How many pounds does Sarah's dog weigh?

4.) Jim's soccer bag weighs 48 ounces. He removed his cleats and shin guards that weighed a total of 1 pound. How much does his soccer bag weigh now?

Coverting Pounds and Ounces

The conversion rate for pounds and ounces is

16 ounces (oz.) = 1 pound (lb.)

When converting pounds to ounces, we multiply. When converting ounces to pounds, we divide.

EXAMPLE: 3 lbs = ? oz

3 lbs x 16 = 48 ounces <-> we multiply by 16 because 1 lb = 16 oz.

Read each question below and solve the problem by using multiplication or division. Be sure to show all of your work in the space provided.

1.) Lucy made 3 cakes that each weighed 32 ounces. How many pounds of cake did Lucy make?

6 pounds

2.) Mike's turkey burger recipe calls for 4 pounds of ground turkey. How many ounces of ground turkey should Mike purchase at the local grocery store?

64 ounces

3.) Sarah's dog weighs 64 ounces. How many pounds does Sarah's dog weigh?

4 pounds

4.) Jim's soccer bag weighs 48 ounces. He removed his cleats and shinguards that weighed a total of 1 pound. How much does his soccer bag weigh now?

2 pounds or 32 ounces

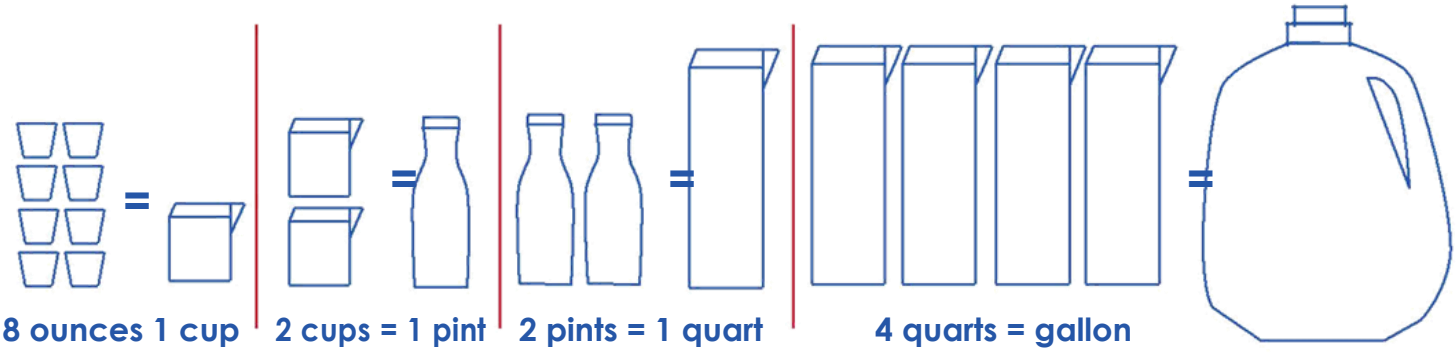
Additional Resource #10: *Liquid Conversion*

CONVERSION

LIQUID

LEMONADE MANIA!

In one week Sarah was invited to five different parties. She volunteered to make lemonade for each party. Her mother told her that bringing 8 ounces per person would be enough. Calculate how much she has to bring to each party.



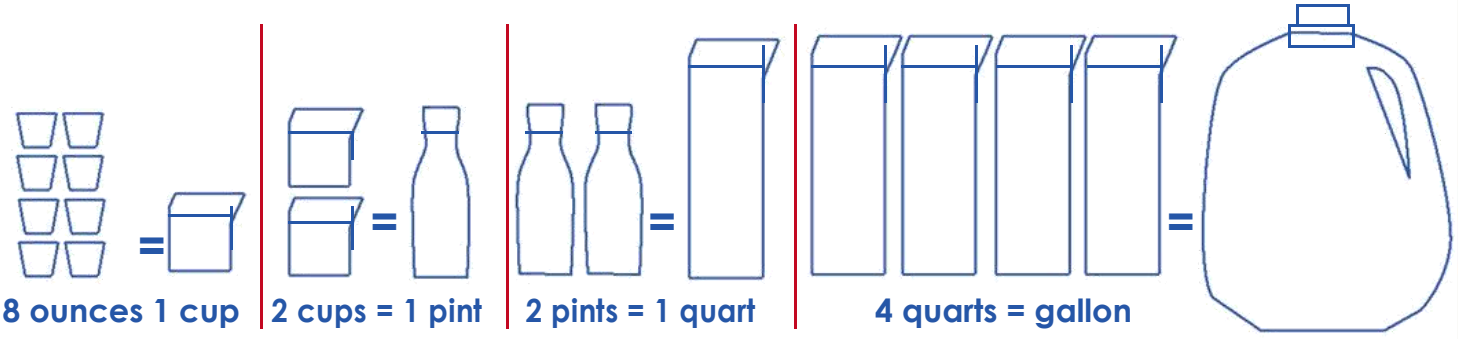
DAY OF PARTY	MONDAY	TUESDAY	THURSDAY	FRIDAY	SATURDAY
HOW MANY PEOPLE ATTENDING	4 PEOPLE	8 PEOPLE	16 PEOPLE	32 PEOPLE	40 PEOPLE
HOW MUCH SHE NEEDS TO BRING in					
... ounces?	_____	_____	_____	_____	_____
... cups?	_____	_____	_____	_____	_____
... pints?	_____	_____	_____	_____	_____
... quarts?	_____	_____	_____	_____	_____
... gallon	_____	_____	_____	_____	_____

CONVERSION

LIQUID

LEMONADE MANIA!

In one week Sarah was invited to five different parties. She volunteered to make lemonade for each party. Her mother told her that bringing 8 ounces per person would be enough. Calculate how much she has to bring to each party.



DAY OF PARTY	MONDAY	TUESDAY	THURSDAY	FRIDAY	SATURDAY
HOW MANY PEOPLE ATTENDING	4 PEOPLE	8 PEOPLE	16 PEOPLE	32 PEOPLE	40 PEOPLE
HOW MUCH SHE NEEDS TO BRING in					
... ounces?	32	64	128	256	320
... cups?	4	8	16	32	40
... pints?	2	4	8	16	20
... quarts?	1	2	4	8	10
... gallons?	$\frac{1}{4}$	$\frac{1}{2}$	1	2	$2\frac{1}{2}$

Section Ten: References

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