

MEASUREMENT MARATHON

Grade Level or Special Area: 3rd Grade/ Math Measurement

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I. ABSTRACT

It is time to get your rulers, yardsticks, scales, clocks, and thermometers out of the cabinets and watch your students start to measure up. This unit is designed to aid in the understanding of third grade students regarding mathematic skills in measurement. Spark your students' interest in measurement with motivational activities, patterns, worksheets, and games. The students will be able to showcase their skills as they do hands-on learning activities to measure, estimate, weigh, and record their results.

II. OVERVIEW

A. Concept Objectives

1. Understand measurable attributes of objects and the units, systems, and process of measurement.
2. Choose and use the appropriate units and measurement tools to quantify the properties of object (eg., length [ruler], width [ruler], or mass [balance scale]) of measurement.
3. Demonstrate understanding of the need of measuring with standard units and become familiar with standard units in the U.S. customary system.
4. Identify properties (e.g., length, area, weight, volume) and select the appropriate types of unit for measuring each property.
5. Students will understand processes for measuring temperature using customary units or measurement and metric units.
6. Identify time to the nearest minute (elapsed time) and relate time to everyday events.
7. Identify and use time intervals (eg., hours days, weeks, months, years).

B. Content from the *Core Knowledge Sequence*

1. Mathematics
 - a. Measurement
 1. Linear Measure
 - (a) Make linear measurements in yards, feet, and inches; and in centimeters and meters. [p. 79]
 - (b) Know that one foot = 12 inches; one yard = 36 inches; 3 feet = 1 yard; 1 meter = 100 centimeters; 1 meter is a little more than one yard. [p. 79]
 - (c) Measure and draw line segments in inches (to $\frac{1}{4}$ inch), and in centimeters. [p. 79]
 - (d) Estimate linear measurements, then measure to check estimates. [p. 79]
 2. Weight (Mass)
 - (a) Compare weights of objects using a balance scale. [p. 80]
 - (b) Estimate and measure weight in pounds and ounces; grams and kilograms. [p. 80]
 - (c) Know abbreviations: lb., oz., g, and kg [p. 80]
 3. Capacity (Volume)

- (a) Estimate and measure liquid capacity in cups, pints, quarts, gallons, and liters. [p. 80]
 - (b) Know that 1 quart = 2 pints; 1 gallon = 4 quarts. [p. 80]
 - (c) Compare U.S. and metric liquid volumes: quart and liter (one liter is a little more than one quart). [p. 80]
4. Temperature
- (a) Measure and record temperatures in degrees Fahrenheit and Celsius. [p. 80]
 - (b) Know the degree sign: ° [p. 80]
 - (c) Identify freezing point of water as 32° F = 0°C. [p. 80]
5. Time
- (a) Read a clock face and tell time to the minute as either A.M. or P.M.; tell time in terms of both “minutes before” and “minutes after” the hour. [p. 80]
 - (b) Solve problems on elapsed time (how much time has passed?). [p. 80]
 - (c) Using a calendar, identify the date, day of the week, month, and year. [p. 80]
 - (d) Write the date using words (for name of month) and numbers, and only numbers. [p. 80]

C. Skill Objectives

1. Demonstrate understanding of the need for measuring with standard units and become familiar with standard units in the U.S. customary system (New Mexico Math Measurement Strand, Standard III 3.1)
2. Choose and use the appropriate units and measurement tools to quantify the properties of objects (e.g., length [ruler], width [ruler], or mass [balance scale]). (New Mexico Math Measurement Strand, Standard III 3.2)
3. Identify time to the nearest minute (elapsed time) and relate time to everyday events. (New Mexico Math Measurement Strand, Standard III 3.3)
4. Identify and use time intervals (e.g., hours, days, weeks, months, years). (New Mexico Math Measurement Strand, Standard III 3.4)
5. Identify properties (e.g., length, area, weight, volume) and select the appropriate type of unit for measuring each property. (New Mexico Math Measurement Strand, Standard III 3.5)
6. Demonstrate understanding that measurements are approximations, investigate differences in units and their effect on precision, and consider the degree of accuracy for different situations. (New Mexico Math Measurement Strand, Standard III 3.6)

III. BACKGROUND KNOWLEDGE

- A. For Teachers
 1. Current adopted Math curriculum
- B. For Students
 1. Students will be able to identify familiar instruments of measurement, such as a ruler, balance scale, thermometer, clock, and a calendar. [Grade 1, p. 36 and Grade 2, p. 57-58]
 2. Students will be able to measure length in inches, feet, and centimeters; associate temperature in degrees, read a clock face. [Grade 1, p.36 and Grade 2, p. 57-58]

IV. RESOURCES

- A. Your adopted Math Curriculum textbook
- B. Book
 - 1. Wells, R. *How Do You Know What Time It Is?* Morton Grove, Illinois Albert Whitman & Company, 2002, ISBN 0-8075-7939-4
- C. One three-pronged folder per student
- D. One ruler per student with standard measurements and metric measurements
- E. One paper clip per student
- F. One baseball bat
- G. One blue map pencil per student
- H. One red map pencil per student
- I. One green map pencil per student
- J. One balance scale with weights
- K. One gallon container, 4 quart containers, 8 pint containers, and 16 cup containers
- L. One Fahrenheit and Celsius thermometer or a thermometer that have both Fahrenheit and Celsius markings
- M. Water and ice
- N. One 3 by 5 sticky note for each student
- O. One large circular face clock with movable hands
- P. One individual circular clock with movable hands for each student
- Q. One package of cotton balls
- R. Two bags of marbles
- S. One clear pitcher
- T. Three bags of white rice

V. LESSONS

Lesson One: Sizing Up

A. Daily Objectives

- 1. **Concept Objective(s)**
 - a. Understand measurable attributes of objects and the units, systems, and process of measurement. (New Mexico Math Measurement Strand, Standard III 3.1)
- 2. **Lesson Content**
 - a. Make linear measurements in yards, feet, and inches, and in centimeters and meters. (Page 79)
 - b. Know that one foot = 12 inches; one yard = 36 inches; 3 feet = 1 yard; 1 meter = 100 centimeters; 1 meter is a little more than one yard. (Page 79)
- 3. **Skill Objective(s)**
 - a. Demonstrate understanding of the need for measuring with standard units and become familiar with standard units in the U.S. customary system. (New Mexico Math Measurement Strand, Standard III 3.1)
 - b. Choose and use the appropriate units and measurement tools to quantify the properties of objects (e.g., length [ruler], width [ruler], or mass [balance scale]). (New Mexico Math Measurement Strand, Standard III 3.2)
 - c. Identify properties (e.g., length, area, weight, volume) and select the appropriate type of unit for measuring each property. (New Mexico Math Measurement Strand, Standard III 3.5)

B. **Materials**

1. One three pronged folder with tens sheets of wide ruled notebook paper (preferably have the same color of folder for each student in the class) – Label “Math Folder”
2. One ruler per student with standard measurements and metric measurements
3. One paper clip per student
4. One baseball bat

C. **Key Vocabulary**

1. **Customary units of measurement** are units of measure that are used in the United States.
2. **Metric system of measurement** are units of measure that are used in other countries. It is based on the decimal system.
3. **Standard unit** is a measuring unit in which each unit is the same size.
4. **Linear** is a measure of length.
5. A **ruler** is a straight strip of wood, metal, or plastic often marked in inches and/or centimeters used for drawing or a tool to measure length.
6. To **measure** is to find the size or amount of anything (length, dimensions, capacity, or quantity.)
7. An **inch** (in) is a customary unit of length.
8. A **foot** /feet (ft) is a customary unit of length. One foot = 12 inches
9. A **yard** (yd) is a customary unit of length. One yard = 36 inches; 3 feet = 1 yard
10. A **centimeter** (cm) is a metric unit of length.
11. A **meter** (m) is a metric unit of length. 1 meter = 100 centimeters; 1 meter is a little more than one yard.

D. **Procedures/Activities**

1. Assess prior knowledge on measurement by distributing a copy of Appendix B to each student.
2. Teacher will model how to complete Appendix B using a compass as an example.
3. Draw on the board a picture of a compass. Underneath the picture draw a line and have students tell you what the picture is. Label it compass. Then have students provide responses for the question “*What shape is a compass?*” (*round, sphere*); “*What appears on a compass face?*” (*cardinal directions*); “*What is the function of a compass?*” (*to find directions*); “*How does a compass work?*” (*uses the magnetic pull from the Earth*)
4. Students will place their completed Appendix B in their Math Folder. The teacher will collect students Math Folders and review their completed copy of Appendix B. Check-off the items of which students had prior knowledge. You will be using Appendix B throughout the unit to check-off each skill as mastery is achieved.
5. Read the book, The True Book of Metric Measurement, by June Behrens to the class.
6. Explain the two different types of measuring systems. Say, “*There are two basic measuring systems used in the world today. The two measuring systems are the customary units of measurement and the metric system of measurement. In the United States we use both systems of measurement. The metric system is used by scientists all over the world. Today, all but a few countries use the metric system.*”

7. Ask, “*Why is the United States the only major country in the world using both the customary system of measurement and the metric system?*” (Accept reasonable answers)
8. Ask, “*How are customary units of measurement different from metric units of measurement?*” (Accept reasonable answers)
9. Distribute copies of Appendix A to each student. Introduce the key vocabulary for Lesson one. Pronounce the word and then have the class repeat each word. Choose a student to read the definition and then use the word in a sentence. Make sure students understand that they need to learn the appropriate abbreviations for the different measurements.
10. Teacher will demonstrate how to use a ruler to measure a paper clip, a piece of notebook paper, and a baseball bat using the customary units of measurement as the students follow along using their rulers.
11. Teacher will then demonstrate how to use the metric side of a ruler to measure a paper clip, a piece of notebook paper, and a baseball bat as the students follow along using their rulers.

E. Assessment/Evaluation

1. The teacher will evaluate the students’ prior knowledge of measurement. See Appendix B.
2. The teacher will check-off the appropriate items using Appendix C.

Lesson Two: Measurement Maneuvers

A. Daily Objectives

1. **Concept Objective(s)**
 - a. Understand measurable attributes of objects and the units, systems, and process of measurement. New Mexico Mathematics Strand Measurement Content Standard
2. **Lesson Content**
 - a. Measure and draw line segments in inches (to $\frac{1}{4}$ inch), and in centimeters. (Page 79)
 - b. Estimate linear measurements, then measure to check estimates. (Page 79)
3. **Skill Objective(s)**
 - a. Demonstrate understanding of the need for measuring with standard units and become familiar with standard units in the U.S. customary system. (New Mexico Math Measurement Strand Standard III 3.1)
 - b. Choose and use the appropriate units and measurement tools to quantify the properties of objects (e.g., length [ruler], width [ruler], or mass [balance scale]). (New Mexico Math Measurement Strand, Standard III 3.2)
 - c. Identify properties (e.g., length, area, weight, volume) and select the appropriate type of unit for measuring each property. (New Mexico Math Measurement Strand, Standard III 3.5)

B. Materials

1. Math Folder
2. One ruler per student with standard and metric measurements
3. One red map pencil
4. One blue map pencil
5. One green map pencil

C. **Key Vocabulary**

1. Review vocabulary words 1-11 on Appendix A in Math Folder

D. **Procedures/Activities**

1. To make a student ruler using a piece of notebook paper. Using the top blue line of a piece of notebook paper and the pink left hand line as the starting point, draw a line $5\frac{1}{2}$ inches long. (The distance on the notebook paper from pink line on the right to the pink line on the left is $5\frac{1}{2}$ inches.) Demonstrate on the board and check the students papers before proceeding.
2. Counting the top line, count down to the fifth line and draw another line $5\frac{1}{2}$ inches long. Trace down the left side pink line and the right side pink line to finish making the ruler guide. (Teacher demonstrates and checks the students papers)
3. Next, using a blue map pencil and their ruler as a guide, have students draw on a piece of notebook paper the correct line markings for 1 inch, 2 inches, 3 inches, 4 inches and 5 inches. Under each inch line marking with the blue map pencil label the numbers 1-5 in the correct places. (Teacher demonstrates and checks the students papers)
4. Using a red map pencil have students draw the correct shorter line markings for $\frac{1}{2}$ inch, $1\frac{1}{2}$ inches, $2\frac{1}{2}$ inches, $3\frac{1}{2}$ inches, $4\frac{1}{2}$ inches, and $5\frac{1}{2}$ inches. Under each $\frac{1}{2}$ inch line marking, label in red $\frac{1}{2}$ inch, $1\frac{1}{2}$ inches, $2\frac{1}{2}$ inches, $3\frac{1}{2}$ inches, $4\frac{1}{2}$ inches, and $5\frac{1}{2}$ inches. Use the abbreviation in. (Teacher demonstrates and checks the student's papers)
5. Using a green map pencil have students draw the correct shorter line markings for $\frac{1}{4}$ inch and label $\frac{1}{4}$ in., $\frac{3}{4}$ in., at each appropriate interval. (Teacher demonstrates and checks the student's papers)
Students will now have a color-coded ruler guide to put in their Math Folder.
6. Have students work with a partner. The teacher calls out different units of measurement, to the nearest $\frac{1}{4}$ inch, for the students to measure and draw line segments with their ruler on notebook paper.
7. Have students change and work with a new partner. The teacher will ask students to estimate the length of their pencil, to the nearest $\frac{1}{4}$ inch and in centimeters, and write it down on their same piece of notebook paper. Then have students measure the actual length of their pencil. Do this same activity with a crayon and a piece of notebook paper (width and length).
8. Ask why some measures may have varied and what factors came into play.

E. **Assessment/Evaluation**

1. On a piece of notebook paper in the student's Math Folder, on the top blue line, have students write the heading: "Measure and Draw Line Segments in Inches and Centimeters." The teacher will continue to have the students measure and draw as many line segment lengths as needed to master measuring to the nearest $\frac{1}{4}$ inch and in centimeters. Teacher will check off correct item on Appendix C.
2. On a piece of notebook paper in the student's Math Folder, on the top blue line, have students write the heading: "Estimate Linear Measurements and Check Estimates." The teacher will continue to have students estimate linear measurements and then measure to check estimates as needed for mastery (such as the width and length of a textbook, width and length of their desk, width of door to the classroom), teacher will check off correct item on Appendix C.

Lesson Three: A Balancing Act

A. **Daily Objective**

1. **Concept Objective**

- a. Choose and use the appropriate units and measurement tools to quantify the properties of object (e.g., length [ruler], width [ruler], or mass [balance scale]) (New Mexico Math Measurement Strand, Standard III 3.1)

2. **Lesson Content**

- a. Compare weights of objects using a balance scale.
- b. Estimate and measure weight in pounds and ounces; grams and kilograms
- c. Know abbreviations: lb, oz, g, kg

3. **Content Objectives**

- a. Demonstrate understanding of the need for measuring with standard units and become familiar with standard units in the U.S. customary system. (New Mexico Math Measurement Strand, Standard III 3.1)
- b. Choose and use the appropriate units and measurement tools to quantify the properties of objects (e.g., length [ruler], width [ruler], or mass [balance scale]). (New Mexico Math Measurement Strand, Standard III 3.2)
- c. Identify properties (e.g., length, area, weight, volume) and select the appropriate type of unit for measuring each property. (New Mexico Math Measurement Strand, Standard III 3.5)

B. **Materials**

1. Students need their three-pronged Math Folder to learn new vocabulary terms and their abbreviations. Tell if the measurement belongs to the metric unit or customary unit.
2. A balance scale and different items to weigh (look around your classroom). Bring a varied of items from home that are labeled in pounds, ounces, grams and kilograms. (Example; box cereal, can of soup, and box of soda)

C. **Key Vocabulary:**

1. A **balance** is when one weight is equal to another.
2. A **balance scale** is a simple weighing machine used to compare the weight of two things.
3. A **gram** is a metric unit of mass.
4. **Kilogram** (kg) is a metric unit of mass.
5. **Mass** is a measure of amount of matter in an object and does not change
6. An **ounce** (oz) is a customary unit of weight that is used to measure small amounts.
7. A **pound** (lb) is a customary unit of weight equal to 16 ounces.
8. A **scale** is an instrument /tool for weighing things.
9. A **ton** (T) is a customary unit for weight equal to 2,000 pounds
10. A **weight** is measure of how heavy an object is: weight is measure of the pull of gravity on an object and is not constant, but changes as the force of gravity changes.

D. **Procedures/Activities**

1. With your balance scale show the students that 16 ounces equals 1 pound. Next show a kilogram weighs about 2.2 pounds and there are 1,000 grams in a kilogram. A gram is much smaller than an ounce. An ounce is about 28 grams. Students may need to make a few notes for themselves to help remember these facts in their Math Folder.
2. Using the items from home have the students predict which is lighter/heavier/equal.
3. Using a balance scale place different items on the scale to see if the items are lighter/heavier/equal. (Items to use; pencils are different sizes, notebook, markers, rulers,

paper back book, hard book, any thing from your classroom.) To help the students make the connections tell how much each item weighs.

4. If your students have snacks look on the labels to see if they are getting more or less than their buddy. Look at the labels on items in their lunch pail that day.
5. Have students look at home tonight to see what they can find that is measured in ounces, pounds, grams, and kilograms. Students can make a list to share with classmates.
6. With a piece of white butcher paper label four columns ounces, pounds, grams, and kilograms. Students can write one item from each of the groups to share with class.
7. Leave the balance scale out and let the students play with it all year long.

Lesson Four: Volume Victim

A. Daily Objective

1. Concept Objective

- a. Demonstrate understanding of the need of measuring with standard units and become familiar with standard units in the U.S. customary system (New Mexico Mathematics Strand Measurement Content Standard III 3.1)
- b. Identify properties (e.g., length, area, weight, volume) and select the appropriate types of unit for measuring each property. (New Mexico Math Measurement Strand, Standard III 3.5)

2. Lesson Content

- a. Estimate and measure liquid capacity in cups, pints, quarts, gallons, and liters. (page 80)
- b. Know that 1 quart = 2 pints; 1 gallon= 4 quarts (page 80)
- c. Compare U.S. and metric liquid volumes: quart and liter (one liter is a little more than one quart). (page 80)

3. Skill Objectives

- a. Demonstrate understanding of the need for measuring with standard units and become familiar with standard units in the U.S. customary system. (New Mexico Math Measurement Strand, Standard III 3.1)
- b. Choose and use the appropriate units and measurement tools to quantify the properties of objects (e.g., length [ruler], width [ruler], or mass [balance scale]). (New Mexico Math Measurement Strand, Standard III 3.2)
- c. Identify properties (e.g., length, area, weight, volume) and select the appropriate type of unit for measuring each property. (New Mexico Math Measurement Strand, Standard III 3.5)

B. Materials

1. Gallon, quart, pint, liter, and cup containers
2. Water for containers
3. Make the Gallon Gal/Guy for your classroom (directions on procedures number 3) 1-gallon container, 4 quarts containers, 8-pint containers, and 16-pint containers.

C. Key Vocabulary

1. **Volume** is the amount of space inside a solid shape.
2. **Capacity** is the amount a container can hold.
3. A **cup** (c) is a customary unit of capacity.
4. A **quart** (qt) is a customary unit of capacity.
5. A **pint** (pt) is a customary unit of capacity.
6. A **gallon** (gal) is a customary unit of capacity.

7. A **liter** is a metric unit of capacity that is a little more than a quart.

D. **Procedures/Activities**

1. Students will need to get out Math Folders to look at Appendix A. Vocabulary Words, as teacher introduces new vocabulary words for capacity. As you show each of the containers say their names and abbreviations. Tell if the container belongs to the metric unit or customary unit.
2. Teacher will demonstrate: 4 quarts = 1 gallon. (A helpful hint is to tell the students remember that 4 quarter equal one dollar, the quarts (quarters) - gallon (dollar) to help recall that 4 quarts = 1 gallon. Show that a liter is just a little more than a quart. If you have time, let the students play with the containers.
3. As whole classes project you need to put together your Gallon Gal/Guy (CK Teacher Handbook pg. 344)
The body is the gallon container, the arms will include the quart first then the 2 pints, and the fingers will be the 4 cups, the legs will go down from the gallon container, the legs will include 1 quart, 2 pints, and the toes will be 4 cups. You will need to add a head and face to the top of the gallon container. This is a great visual for the students. If you would like, the children can draw this in their Math Folder.
If you do not want to make the Gallon Gal/Guy, you can write a large G on a piece of paper, inside the G put 4 Q's, inside each Q place 2 P's, inside the each P's place 2 cups. 1 gallon = 4 quarts, 8 pints = 1 gallon, 16 cups = 1 gallon. This is something great for the Math Folder.
4. Ask, "How many quarts equal a gallon?" 4 quarts = 1 gallon.
5. Ask, "How many pints equal a quart?" 2 pints = 1 quart
6. Ask, "How many quarts equal a half-gallon?" 2 quarts = a half-gallon.
7. Ask, "How many cups in a pint?" 2 cups = 1 pint
8. Ask, "Which one is almost the same in the metric and customary units?" the liter is just a little more than the quart.

E. **Assessment/Evaluation**

1. Teacher will work several conversion problems on the board to show the children how you work the problems. On the board make sure to have 4 quarts = 1 gallon; 2 pint = 1 quart; 2 quart = half gallon; 2 cups = 1 pint *12 quarts = 3 gallons or 6 half gallons, 2 pints = 4 cups, 10 pints = 5 quarts, 5 gallons = 20 quarts, 12 cups = 6 pint*
2. Students can provide the amounts as well.
3. Students will be able to work the conversion Appendix D

Lesson Five: Turning up the Heat

A. **Daily Objectives**

1. **Concept Objective**
 - a. Students will understand processes for measuring temperature using customary units of measurement and metric units New Mexico Mathematics Strand Measurements Content Standard
2. **Lesson Content**
 - a. Measure and read temperature in degrees Fahrenheit and Celsius. (page 80)
 - b. Know the degree sign: ° (page 80)
 - c. Identify freezing point of water as 32° F = 0° C.(page 80)
3. **Skill Objective**
 - a. Students will understand processes for measuring temperature using customary units of measurement and metric units. Choose and use the appropriate units and measurement tools to quantify the properties of

objects (New Mexico Math Measurement Strand, Standard III 3.1 and 3.2)

B. Materials

1. A Fahrenheit and Celsius thermometer or a thermometer that have both Fahrenheit and Celsius on them. Have students work in groups if you do not have a thermometer for each student.
2. A cup of tap water, a cup with ice.

C. Key Vocabulary

1. **Temperature** is the degree of hotness or coldness of an object of space.
2. A **thermometer** is an instrument/tool used to measure temperature degrees.
3. Degree in **Fahrenheit** ($^{\circ}\text{F}$) is the standard unit of temperature.
4. Degree in **Celsius** ($^{\circ}\text{C}$) is the metric unit of temperature.
5. To change from liquid to a solid is called **freezing point**. In Fahrenheit freezing point is 32°F and 0°C for Celsius.

D. Procedures/Activities

1. Show the students a thermometer and show them how to count from the bold line up and down to learn the degrees it shows.
2. Have the students read the temperature on the thermometer before you place it in your cup of tap water. While waiting for the correct temperature, place the thermometer under a child's tongue. Read the temperature after it stops moving next show and read the thermometer.
- d. Place the thermometer into a cup of ice and see if it will go to freezing point.
- e. Say, "*The thermometer outside is showing 32°F ?*" Ask, "Is 32°F very cool or freezing?"
- f. Say, "*The thermometer outside is showing 79°F ?*" Ask, "Would the weather outside be warm or cool?"
- g. Say, "*The thermometer outside is showing 0°C ?*" Ask, "Would the weather outside be warm or cool?"
- h. Say, "*The thermometer outside is showing 90°C ?*" Ask, "Would the weather outside be warm or cool?"

E. Assessment/Evaluation

1. Students will do Appendix E to assess if they can read a thermometer.

Lesson Six: Always Changing

A. Daily Objectives

1. **Concept Objective(s)**
 - a. Identify time to the nearest minute (elapsed time) and relate time to everyday events. (New Mexico Math Measurement Strand, Standard III 3.3)
 - b. Identify and use time intervals (e.g., hours, days, weeks, months, years). (New Mexico Math Measurement Strand, Standard III 3.4)
2. **Lesson Content**
 - a. Using a calendar, identify the date, day of the week, month, and year (p. 80)
 - b. Write the date using words (for name of month) and numbers, and only numbers. (p. 80)
3. **Skill Objective(s)**
 - a. Identify and use time intervals (e.g., hours, days, weeks, months, years). (New Mexico Math Measurement Strand, Standard III 3.4)

B. Materials

1. Math Folder
 2. One calendar
 3. One copy of any month for each student (to be put in Math Folder)
- C. **Key Vocabulary**
1. An **hour** is a unit of time equal to 60 minutes.
 2. A **day** is a unit of time equal to 24 hours.
 3. A **week** is a unit of time equal to 7 days.
 4. A **month** is one of the 12 parts into which a year is divided.
 5. A **year** is a unit of time equal to 365 days or 52 weeks or 12 months. A year is how long it takes for Earth to move all the way around the Sun.
- D. **Procedures/Activities**
1. Show students your calendar and explain that it is divided into 12 months. Point to where the name of the month is located and the positioning of the days of the week. The first day of the week is Sunday and the last day of the week is Saturday. Show the date on the calendar for today.
 2. Next, point to a day on the calendar and ask one of the students to tell you what the date is.
 3. Ask questions, *“What will the date be in 4 days?” “What day of the week will it be in 9 days?” “What month comes next?”*
 4. Say to the class, *“Pretend you don’t have a calendar to look at”. How would you figure out the answers to the questions I just asked you?”* Allow time for answers. (critical thinking – accept reasonable responses)
 5. Have the students suggest some different activities that they do where the time involved is measured in hours, days, weeks, months, or years. The statements must be in complete sentences. For example: I will go to school for 180 days this school year.
 6. Using a piece of notebook paper in the students Math Folder; on the top blue line have students write the heading: “Months of the Year.” Have students skip two lines and then number their paper one to twelve skipping lines after each number. Go back to the line that has number one and going across the line leave a space (about two fingers) after the number and write the word January. Continue on the same line and leave another space and write the abbreviation for January (Jan.) Repeat this process for each month.
 7. Say to the class, *“I am going to ask each one of you about your birthday month.” “I want you to tell me the month, spelling it correctly, then spell the abbreviation correctly, or tell me your particular month does not have an abbreviation. Next, you will tell me your birthday month’s number.”*
 8. Explain to the class that on their assignments you will tell them to write the date using words for the name of the month, or to write the abbreviation for the name of the month, or use only numbers for the name of the month, day, and year.
- E. **Assessment/Evaluation**
1. Using a calendar, call students up one at a time and have them identify the date, day of the week, month and year. Teacher will check-off under the appropriate heading on Appendix C.
 2. Writing the date using words (for name of month) and numbers, and only numbers will be an on-going assessment throughout the year by checking the students’ daily assignments.

Lesson Seven: Time Matters

A. Daily Objectives

1. **Concept Objective(s)**

- a. Students will understand measurable attributes of objects and the units, systems, and process of measurement.
- 2. **Lesson Content**
 - a. Read a clock face and tell time to the minute as either A.M. or P.M.; tell time in terms of both “minutes before” and “minutes after” the hour. (p. 80)
 - b. Solve problems on elapsed time (how much time has passed?) (pg.80)
- 3. **Skill Objective(s)**
 - a. Demonstrate understanding of the need for measuring with standard units and become familiar with standard units in the U.S. customary system. (New Mexico Math Measurement Strand, Standard III 3.1)
 - b. Identify time to the nearest minute (elapsed time) and relate time to everyday events. (New Mexico Math Measurement Strand, Standard III 3.3)
 - c. Identify and use time intervals (e.g., hours, days, weeks, months, years). (New Mexico Math Measurement Strand, Standard III 3.4)

B. Materials

- 1. One 3 by 5 sticky note for each student:
- 2. How Do You Know What Time It Is?, by Robert E. Wells
- 3. Math Folder
- 4. One large circular face clock with movable hands for demonstration
- 5. One individual circular face clock with movable hands for each student (may order from Really Good Stuff – www.reallygoodstuff.com or call 1-800-366-192; Item name: It’s About Time Student Clocks, Order Number 154410PK for 12 plastic clock faces (4” by 4” each) for \$13.80
- 6. One copy of Appendix F: Time Marches On!

C. Key Vocabulary

- 1. A **second** is a unit of time. 60 seconds equal 1 minute.
- 2. A **minute** (min.) is a unit of time equal to 60 seconds.
- 3. An **hour** (hr.) is a unit of time equal to 60 minutes.
- 4. A **quarter of an hour** is 15 minutes.
- 5. **A.M.** or a.m. is the abbreviation for ante meridian. It is the time between midnight and noon.
- 6. **P.M.** or p.m. is the abbreviation for post meridian. It is the time between noon and midnight.
- 7. **Elapsed time** is the amount of time between the beginning of an event and the end of the event

D. Procedures /Activities

- 1. When class begins, have the question “*What would your life be like without a clock?*” written on the board. Distribute one sticky note to each student. Tell them they have five minutes to write an answer on their sticky note and stick it on the board under the question.
- 2. Read the students responses to the class.
- 3. The teacher will show the students the book *How Do You Know What Time It Is?* by Robert E. Wells. Ask students to look at the title and picture on the front cover. Ask the question, “*What tools for telling time are found on the front cover?*” (alarm clock, sun, sandglass, sundial, clock with pendulums) The teacher will then read *How Do You Know What Time It Is?* After reading the book, ask students the question “*What genre was this book?*” (nonfiction)

4. Introduce the key vocabulary for Lesson Seven. Pronounce each word and then have the class repeat the words. Choose a student to read the definition and then use the word in a sentence.
5. Distribute one individual face clock to each student. Have the students look at the clock. Explain to the students that the clock has a minute hand and an hour hand. Tell your students that there is an easy trick to help them remember which hand is which on a clock. The word minute is the longer word and that the minute hand is the longer hand on a clock. The word hour is the shorter word and that the hour hand is the shorter hand on a clock.
6. The teacher will model placing the correct hour hand and minute hand on a clock. The teacher will say a time (such as 10:00 o'clock) and demonstrate where the hour and minute hand should be placed. Repeat this procedure with different times. Then, say a time and give students a couple of minutes to set their clocks. The teacher will model the correct answer on her clock.
7. Draw attention to the minute marks. Have the students count the marks between each set of large numbers. Ask the students "*What pattern do you see?*" (They are counting by five) Write the word "one quarter" on the board. Ask "*How does the value of a quarter compare to a dollar?*" (4 quarters in a dollar) Have a student draw a circular clock face on the board then draw a straight line between the 12 and the 6. Draw another line between the 3 and the 9. Ask the students "*What is the clock divided into?*" (4 parts or 4 quarters) Say, "So, a quarter is 15 minutes"
8. Using the terminology "minutes before" and "minutes after" the hour, have students set their clocks to different times. Set your clock for 11:28 and ask students what time is shown on the clock. Ask them to calculate how many minutes after the hour. Show the students how to count each minute mark or count by five until they get close to the minute hand and then count each minute mark. (28 minutes after 11) Continue the modeling process for five different time settings.
9. Using the terminology "minutes before" the hour, have students set their clocks to different times. Set your clock for 11:28 and ask students what time is shown on the clock. Ask them to calculate how many minutes before the hour. Show the students how to count each minute mark or count by five until they get close to the minute hand and then count each mark. (32 minutes before 12 o'clock) Another way to solve the problem is to subtract. Since there are 60 minutes in one hour, you subtract the minutes after the hour (28) from (60). $60 - 28 = 32$. Continue the modeling process for five more time settings.
10. Demonstrate how to solve problems on elapsed time. Set your clock for 9:00. Ask, "*What time will it be in 2 hours?*" Demonstrate on your clock by moving the hour hand two complete turns. (11:00) Repeat the same process with students working on their clocks.

E. **Assessment/Evaluation**

1. Appendix F: Time Marches On!

VI. **CULMINATING ACTIVITY**

A. **Let the Games Begin!**

This festive activity is the perfect way for mathematicians to showcase their skills. Set up the classroom into six stations with a different task at each station.

- The stations are:
1. Put Your Best Foot Forward,
 2. Cotton Ball Shot Put,

3. Left-Handed Marble Grab,
4. Half Full or Half Empty?,
5. What's the Temp?
6. Like Clockwork.

Divide the class into six groups. Each group is assigned to one station. Give each student a copy of Appendix G and go over directions. After each person performs the activity he/she measures and records his/her estimate and actual length, weight, volume, temperature or time. Everyone records the starting time under Station 6. Like Clockwork (agree as a class the exact time). Explain rules: be fair, you only get one turn at each activity, measure to the nearest whole unit; rotate clockwise when the teacher tells you to move.

1. Put Your Best Foot Forward – remove one shoe and estimate the length of your foot in centimeters. Record your answer. Have a member in your group trace your foot on paper. Measure the actual length in centimeters using a tape measure and record answer.
2. Cotton Ball Shot Put – place both feet on starting line. Throw one cotton ball forward. Estimate the distance in inches, then measure the actual distance using a tape measure. Measure distance from starting line to the cotton ball. Record answer.
3. Left-Handed Marble Grab – with the left hand grab as many marbles as possible. Place the marbles on a balance scale. Estimate in grams the weight (mass) of marbles you were able to pick up. Record your answer. Measure the actual weight (mass) of the marbles in the balance pan. Record your answer.
4. Half Full or Half Empty? – estimate how many cups of rice are in the see through pitcher and record answer. Using a one-cup measuring cup fill the see through pitcher to line marking. Record the number of cups.
5. What's the Temp? – behind thermometer #1 is a question. (Which is warmer 30°C or 90°F?) Lift up the thermometer, read the question and record the answer. Behind thermometer #2 is another question. (Which is colder 16°F or 8°C?) Lift up the thermometer, read the question and record your answer.
6. Like Clockwork – Have every student in your class write down the same time started and then the same time ended. Each student will calculate the amount of elapsed time on their worksheet.

VII. HANDOUTS/WORKSHEETS

- | | | |
|----|-------------|---|
| A. | Appendix A: | Measurement Marathon 3 rd grade Vocabulary Words (lessons 1-7) |
| B. | Appendix B: | Measurement Marathon KWL chart (lesson 1) |
| C. | Appendix C: | Measurement Marathon teacher check list (Lesson one-seven) |
| D. | Appendix D: | Volume Victim (Lesson 4) |
| E. | Appendix E: | Volume Victim Answer Key (lesson 4 key) |
| F. | Appendix F: | Turn Up the Heat (lesson 5) |
| G. | Appendix G: | Turn up the Heat Answer Key (lesson 5 key) |
| H. | Appendix H: | Time Marches On! (lesson 7) |
| I. | Appendix I: | Time Marches On! Answer Key(lesson 7 key) |
| J. | Appendix J: | Let the Game Begin! |

VIII. BIBLIOGRAPHY

- | | |
|----|---|
| A. | Behrens, J. <i>The True Book of Metric Measurement</i> . Regenstein Publishing 1975 |
|----|---|

Canada ISBN # 0-516-01146-4

- B. Perry S. *How did we Get Calendars & Clocks*
- C. Shimek W. *An Early Metric Book The Gram*
- D. Wells, R. *How Do You Know What Time It Is?* Morton Grove, Illinois Albert Whitman & Company 2002 ISBN # 0-8075-7939-4
- E. Willis S. *Whiz Kids Tell Me How Much It Weighs* ISBN # 053111827
- F. *Online material:* Student Judy clocks are available in the Really Good Stuff teacher magazine to locate them go on-line to: www.reallygoodstuff.com

Appendix A
Measurement Marathon 3rd grade Vocabulary Words

Customary units of measurement are units of measure that are used in the United States.

Metric system of measurement are units of measure that are used in other countries. It is based on the decimal system.

Standard unit is a measuring unit in which each unit is the same size.

Linear is a measure of length.

A **ruler** is a straight strip of wood, metal, or plastic often marked in inches and/or centimeters used drawing or a tool to measure length

To **measure** is to find the size or amount of anything (length, dimensions, capacity, or quantity.)

An **inch** (in) is a customary unit of length.

A **foot** /feet (ft) is a customary unit of length. One foot = 12 inches

A **yard** (yd) is a customary unit of length. One yard = 36 inches; 3 feet = 1 yard

A **centimeter** (cm) is a metric unit of length.

A **meter** (m) is a metric unit of length. 1 meter = 100 centimeters; 1 meter is a little more than one yard.

A **balance** is when one weight is equal to another.

A **balance scale** is a simple weighing machine used to compare the weight of two things.

A **gram** is a metric unit of mass.

Kilogram (kg) is a metric unit of mass.

Mass is a measure of amount of matter in an object and does not change

An **ounce** (oz) is a customary unit of weight that is used to measure small amounts.

A **pound** (lb) is a customary unit of weight equal to 16 ounces.

A **scale** is an instrument /tool for weighing things.

A **ton** (T) is a customary unit for weight equal to 2,000 pounds

A **weight** is measure of how heavy an object is: weight is measure of the pull of gravity on an object and is not constant, but changes as the force of gravity changes.

Volume is the amount of space inside a solid shape.

Capacity is the amount a container can hold.

A **cup** (c) is a customary unit of capacity.

A **Quart** (qt) is a customary unit of capacity.

A **pint** (pt) is a customary unit of capacity.

A **gallon** (gal) is a customary unit of capacity.

A **liter** is a metric unit of capacity that is a little more than a quart.

Temperature is the degree of hotness or coldness of an object of space.

A **thermometer** is an instrument/tool used to measure temperature. degrees

Degree in **Fahrenheit** (°F) is the standard unit of temperature

Degree in **Celsius** (°C) is the metric unit of temperature

To change from liquid to a solid is called **freezing point**. In Fahrenheit freezing point is 32°F and 0°C for Celsius.

A **second** is a unit of time. 60 seconds equal 1 minute.

A **minute** (min.) is a unit of time equal to 60 seconds.

An **hour** (hr.) is a unit of time equal to 60 minutes.

A **quarter of an hour** is 15 minutes.

A.M. or a.m. is the abbreviation for ante meridian. It is the time between midnight and noon.

P.M. or p.m. is the abbreviation for post meridian. It is the time between noon and midnight.

Elapsed time is the amount of time between the beginning of an event and the end of the event






Name _____

Appendix B

Measurement Marathon KWL Chart

Assess prior knowledge on Measurement for 3rd grade

Under each picture label what category in measurement it belongs.
Under each category list all you know about that picture or heading.

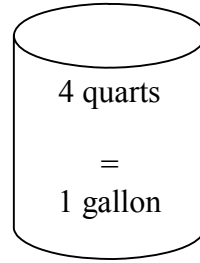
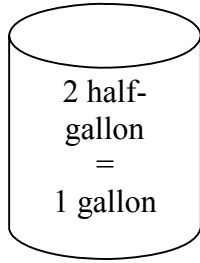
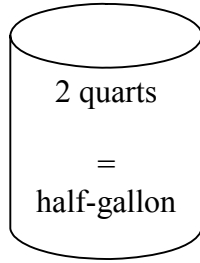
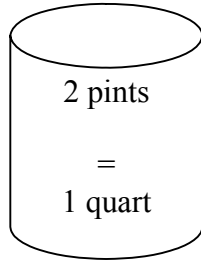
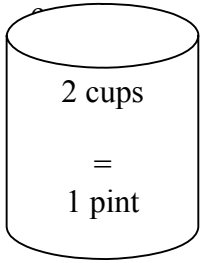
				

Appendix C
Measurement Marathon Teacher checklist for 3rd grade linear measurement unit

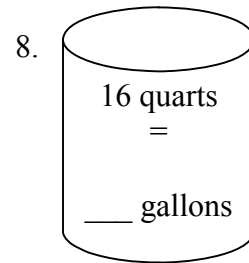
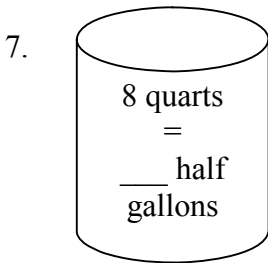
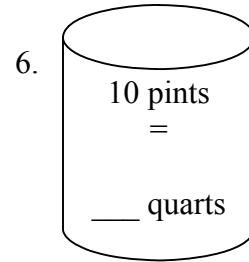
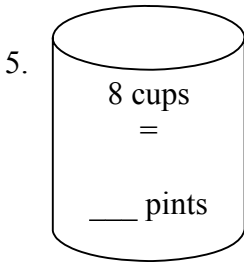
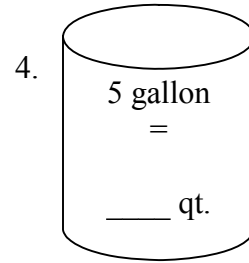
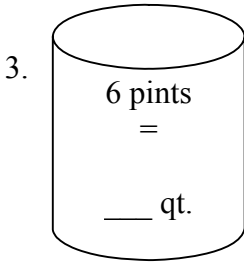
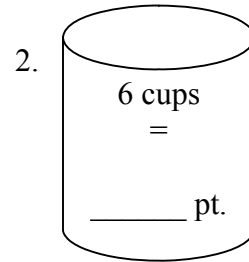
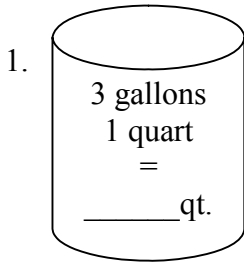
Student Name	linear measurement yd., ft., in. cm, and m.	Know that 1 ft. = 12 in. 1 yd. = 36 in., 3 ft.	Measure & draw line segments in inches and in cm.	Estimate linear measurements, then measure to check estimates	Estimate & measure weight in pounds, ounces, grams, & kilograms	Estimate & measure liquid, capacity cups, pints quarts, gallons, liters.	Read temperature in Fahrenheit & Celsius	Tell time on a clock, solve story problems, calendar, days of the week	Teacher Comments
	Prior Mastery	Prior Mastery	Prior Mastery	Prior Mastery	Prior Mastery	Prior Mastery	Prior Mastery	Prior Mastery	

Name _____

Appendix D
Volume Victim

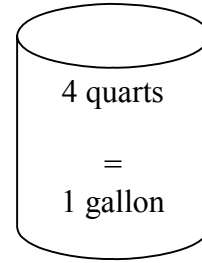
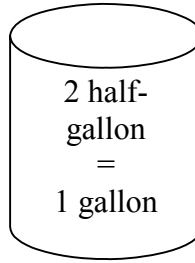
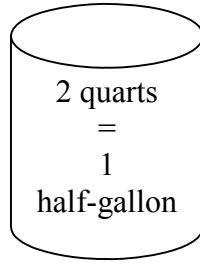
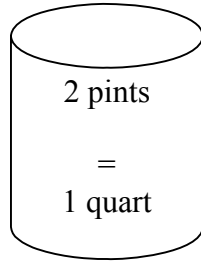
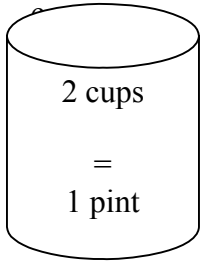


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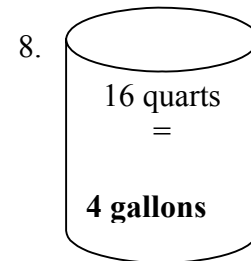
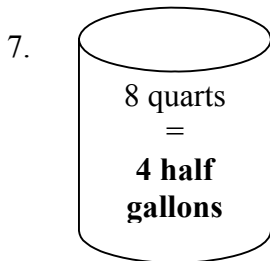
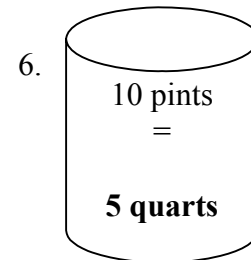
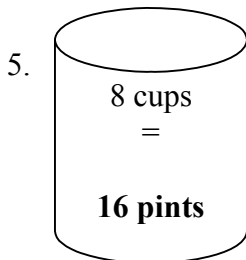
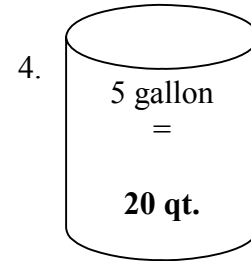
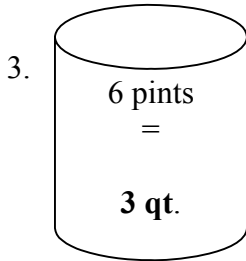
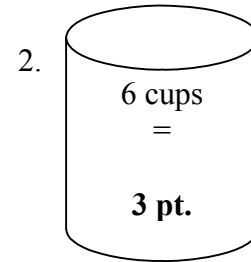
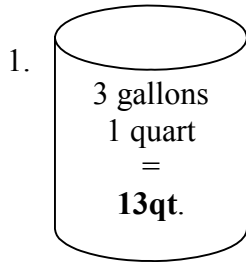


Name _____

Appendix E
Volume Victim Answer Key



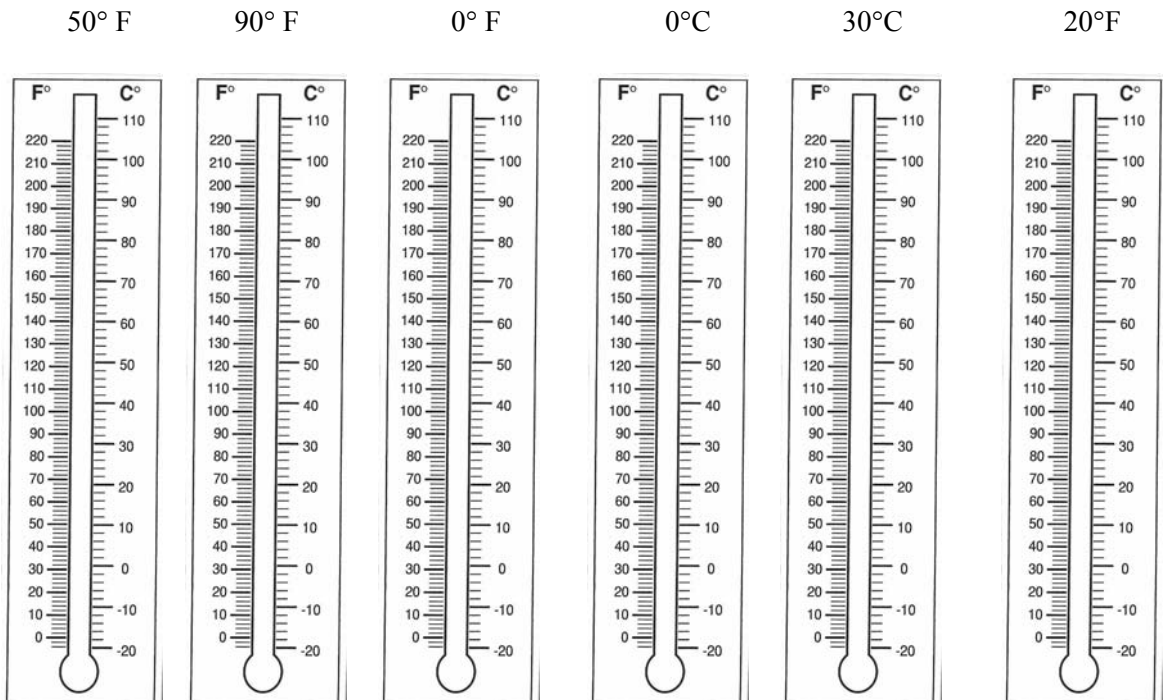
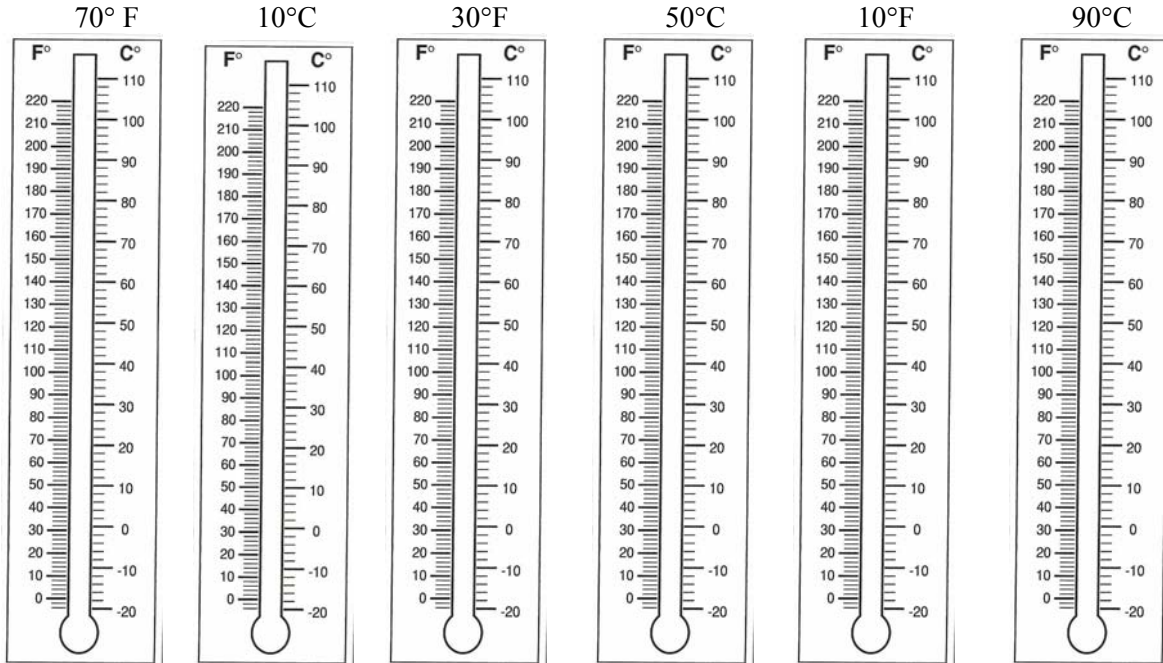
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Name _____

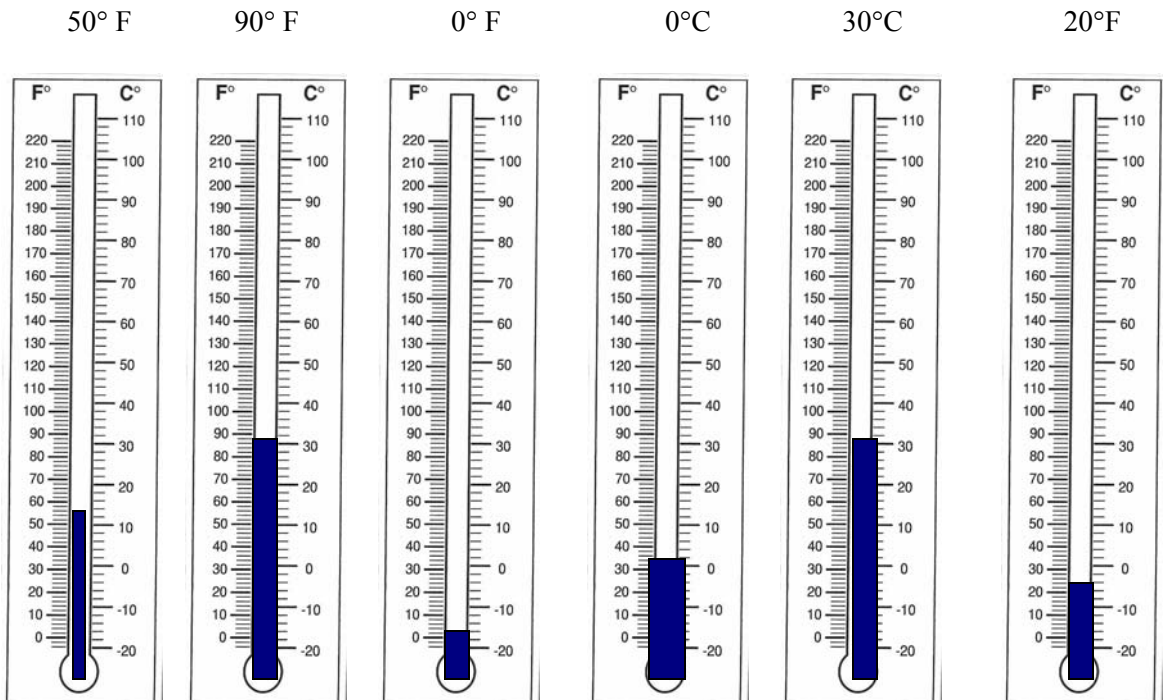
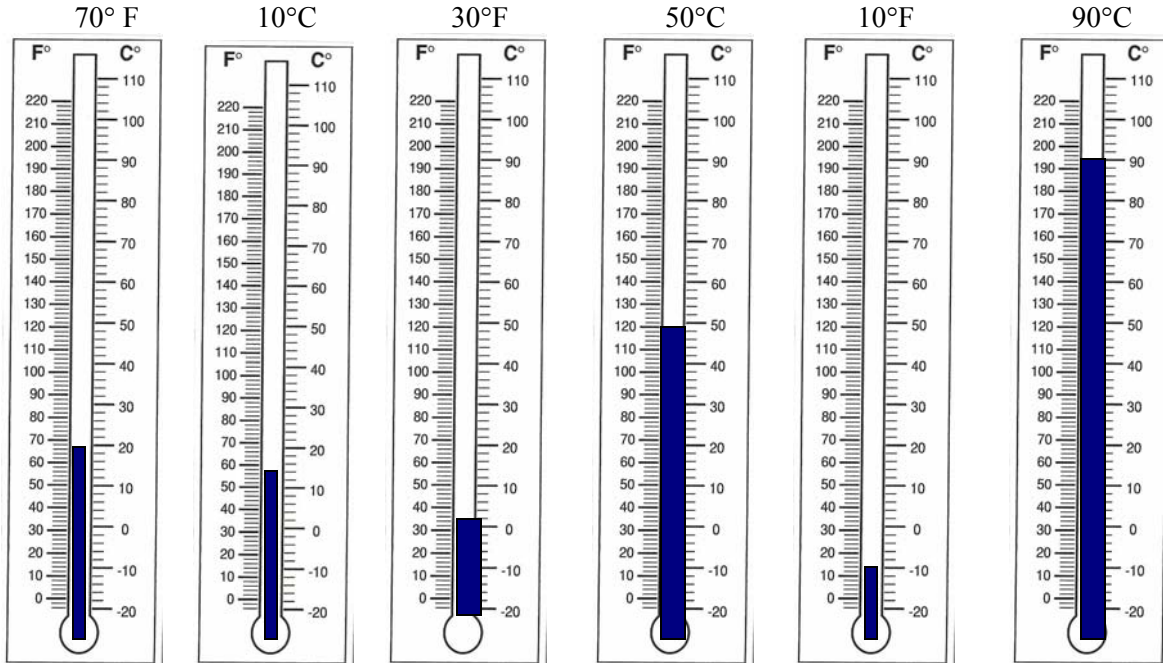
Appendix F Turn up the Heat

On each thermometer show the correct temperature.



Appendix G
Turn up the Heat Answer Key

On each thermometer show the correct temperature.



Name _____

Appendix H Date _____
TIME MARCHES ON!

Assessment to monitor progress from Lesson 6 on time in the Measurement Marathon Unit (Pg. 80)
Read each problem. Write the time on the line. Draw hands on the clock to match.

1. It is twenty minutes before ten o'clock in the evening. Example



2. Show the time seven thirty in the morning.



3. If it is 6:00 A.M., what time will it be in 5 hours?



4. Kathy begins school at 8:00 in the morning. It takes her 17 minutes to walk to school. What time does she need to leave her house to get to school?



5. Jim is to meet Mike for soccer practice at 7:00 P.M. If Mike arrives 1 and a half hours early, what time will it be?



6. Mary plans to meet Ann for lunch at 12:00 noon. If they eat lunch for an hour what time will they finish?



7. It is 43 minutes after 6:00 P.M.



8. John rides a bicycle for 45 minutes. If he begins at 2:45 what time does he stop?



9. It is a quarter past eight o'clock in the evening.



Name _____

Appendix I

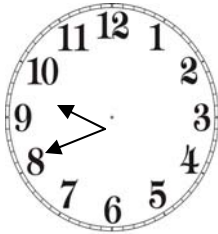
Date _____

TIME MARCHES ON! Answer Key

Assessment to monitor progress from Lesson 6 on time in the Measurement Marathon Unit (Pg. 80)

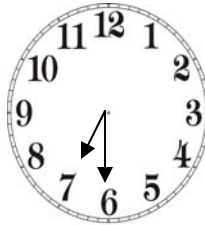
Read each problem. Write the time on the line. Draw hands on the clock to match.

1. It is twenty minutes before ten o'clock in the evening. Example



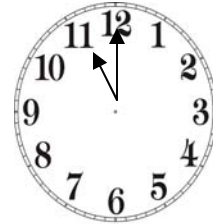
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2. Show the time seven thirty in the morning.



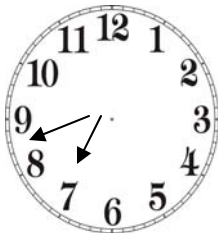
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3. If it is 6:00 A.M., what time will it be in 5 hours?



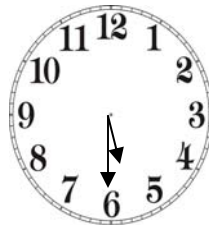
11:00A.M.

4. Kathy begins school at 8:00 in the morning. It takes her 17 minutes to walk to school. What time does she need to leave her house to get to school?



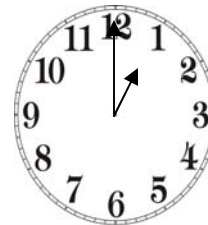
7:43

5. Jim is to meet Mike for soccer practice at 7:00 P.M. If Mike arrives 1 and a half hours early, what time will it be?



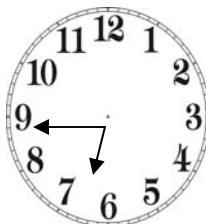
5:30P.M.

6. Mary plans to meet Ann for lunch at 12:00 noon. If they eat lunch for an hour what time will they finish?



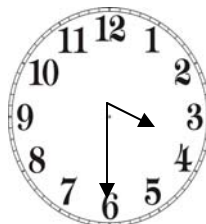
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7. It is 43 minutes after 6:00 P.M.



6:43P.M.

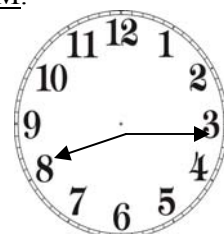
8. John rides a bicycle for 45 minutes. If he begins at 2:45 what time does he stop?



3:30

9. It is a quarter past eight o'clock in the evening.

8:15P.M.



Appendix G

NAME _____ DATE (numbers only) _____

LET THE GAMES BEGIN!

EVENT	ESTIMATE	ACTUAL	SCORE	(DIFFERENCE)
-------	----------	--------	-------	--------------

1. Put Your Best Foot Forward	_____ in.	_____ in.	_____ in.	_____
-------------------------------	-----------	-----------	-----------	-------

2. Cotton Ball Shot Put	_____ cm.	_____ cm.	_____ cm.	_____
-------------------------	-----------	-----------	-----------	-------

3. Left-Handed Marble Grab	_____ g	_____ g	_____ g	_____
----------------------------	---------	---------	---------	-------

4. Half Full or Half Empty?	_____ c.	_____ c.	_____ c.	_____
-----------------------------	----------	----------	----------	-------

TOTAL _____

5. What's the Temp?	Question # 1 _____
	Question # 2 _____

6. What Time Started?	_____ AM or PM
What Time Ended?	_____ AM or PM

AMOUNT OF ELAPSED TIME _____