

**Pump Up the Volume:**  
**Hands-On, Minds-On Measurement Tasks**  
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General Guidelines for Teaching Measurement

1. Real world, applied, appropriately authentic.
2. Activity-oriented. Students actively doing, experimenting, and performing—not passively observing.
3. Students have ownership over measurement when given choice about tools, units, and objects to measure.

Minds-On Measurement

- Benchmarks. For standard unit measurement, real-world BENCHMARKS need to be established. For example, the knuckle to the tip of the finger may be used as a benchmark for 1 inch. A large paper clip may also be used as benchmarks for one inch and for one gram.
- Reasonableness. Does the measurement make sense?
- Estimation. Can and should be revisited during measurement process

Students with Special Needs

Make sure language is precise. Encourage sharing of ideas. Give adequate time. Don't always pair special needs learner with gifted child. Give special needs child chance to lead, explain, and take charge of their own learning (Karp, AMTE, 2013).

Process of Measurement

1. *Choose* a unit. 2. *Estimate* the number of units for the object being measured. 3. *Compare* the unit to the object being measured. 4. *Report* the number of units for the object. 5. *Evaluate* the reasonableness of the measurement.

Linear Measurement

**CLAY WORM RULERS**

**Materials:** play dough or clay, drawings of worms of various lengths, paper

**Instructions:** Roll clay into worms. Lay worm on top of drawings. Take worms off drawings. Lay worms on sheet of paper in order from shortest to longest. Trace around your worms to make a permanent record of your results. Label one end of paper SHORTEST. Label other end of paper LONGEST. Can you make a worm that will fit between two worms in your arrangement?

**CUISENAIRE ROD TRAINS**

**Materials:** Cuisenaire rods (red, yellow, blue), traditional die, die programmed with red, yellow, and blue sides

**Instructions:** Goal is to make the longest train with the rods. Take turns rolling two dice. If you roll a 4 and a RED, take 4 red rods and make a train. On your next turn, add to your train. Continue rolling until each player has had three turns. Compare lengths. The player with the longest train wins. Write about it in your math journal. What strategy did you use to find the winner of the game? How would the game be different if the winner built the shortest train?

**CROOKED PATHS**

**Materials:** masking tape, rope or string (10 feet long, one per group), nonstandard or standard measurement units

**Preparation:** Make two crooked paths using tape. Try to make them about the same in each station. Path A is a zigzag of four straight line segments that total about 9 feet in all. Path B is more S-shaped and is about 7 feet long. Make path B “look” longer by spreading it out more.

**Instructions:** Look carefully at the two lines. Discuss which line you think is longer. Give reasons for your decision. Use string to measure the two lines. Was your guess about which line is longer correct? How can you tell which line is longer? In your math journal draw a sketch of the two lines. Circle the one that is longer. Write about how you measured the lines. What advice would you give someone who is just starting to learn about measuring lines?

**TABLE MAT MEASUREMENT**

**Materials:** plastic tablecloth or butcher paper with stickers placed in random arrangement with lines drawn to connect some of them, small paper clips, large paper clips, straws, craft sticks, other nonstandard units as desired

**Instructions:** Use paper clips to measure distances between stickers. Use reasoning to make estimates about how many craft sticks. Make up your own measurement questions. Write them down. Include an answer key on the back of your paper. Trade with a friend.

**GOING ON A BENCHMARK HUNT**

**Instructions:** Find objects in classroom that approximate an inch or a foot. Use body parts as benchmarks for units.

1 inch	Knuckle to fingertip					
1 foot	Elbow to fingertip					

**WHICH UNIT IS BEST?**

**Materials:** orange and white Cuisenaire rods

**Instructions:** Look carefully at the orange rods and the white rods. Which color of rod is longer? Use rods to measure different items in the room. After you have filled out the recording sheet, write in your journal. If you were measuring the length of the teacher’s desk, which color of rod would be better to use? If you were measuring a paper clip, which color of rod would be better to use? Why?

Temperature

**HOT AND COLD**

**Materials:** scissors, glue, magazines, construction paper

**Instructions:** How would you order ice cube, raindrops, banana, and campfire from hottest to coldest? Label one end of a sheet of paper HOTTEST. Label the other end COLDEST. Cut out pictures from magazines. Try to find pictures of things that are hot or cold. Choose 5 of your pictures. Paste the pictures to the paper in order from HOTTEST to COLDEST. Write in your math journal about how you chose the order of your pictures.

**TEMPERATURE CUTOUT COMPARISONS**

**Materials:** scissors, glue, magazines, toy store and children’s clothing catalogs, large sheets construction paper, markers

**Instructions:** Fold a sheet of construction paper into 8 sections. Cut out word strips (the hottest thing you can find, what you’d wear to the beach, the coldest thing you can find, what you’d wear to go sledding) and glue one strip at the top of each section. Find a picture to match word strip. Share your finished sheet with a friend. Cut sheet apart and work together to order all pictures from HOTTEST to COLDEST. Glue them to a long strip of paper.

Time

**WHICH IS QUICKEST?**

**Materials:** watch with second hand, blank paper, scoop or spoon, beans, tiles, containers, baby doll and doll clothes, shoe and shoelace, easy puzzle

**Instructions:** Consider the tasks: dressing a doll, walking to the classroom door, blinking 5 times, etc. Work with your group to put the activities in order from quickest to longest. Check your guess. Time keeper tells the group when to start and records how long it takes to do an activity. Continue until your group has done all activities and recorded how long each took. Try to become a better estimator of how long it will take to do an activity. When done, put activities in order from quickest to longest. Compare your results with your guess.

**JUST A MINUTE**

**Materials:** watch with second hand or stopwatch or egg timer, blank paper, 1-in. grid paper

**Instructions:** One person in the group is time keeper. Time keeper watches the clock and alerts the group when one minute has passed. Take turns choosing an activity to do for one minute (jumping jacks, write name, draw tally marks, draw hearts, etc.). How close were you to your estimate? Write down how many stars you drew and compare it to your estimate. Now, a different person is the time keeper and someone new chooses an activity. See if you can become a better estimator of one minute.

Money

**DEPOSIT SLIPS**

**Materials:** six zip lock baggies filled with coins and labeled A-F, deposit slips for first grade (coin names only), deposit slips for second grade (coin names and values)

**Instructions:** Work with a partner. Choose a bag full of coins. Dump out the coins and sort them into groups. When grownups take money to the bank, they fill out a form a called a deposit slip. The deposit slip shows how much money the person is giving to the bank. Fill out the deposit slip for your money bag. Repeat the process for each of the money bags. Write about this activity in your journal. For first grade: Which bag had the most coins? Which bag had the fewest coins? For second grade: Use a calculator to figure out the total value of the coins in each bag? Which bag contained the most money (highest value)?

**MONEY IN A SOCK GAMES**

**Materials:** coins, clean sock, for second grade: shopping list, extra coins in bag marked STORE CHANGE

**Kindergarten-First Grade Instructions:** Put all of the coins in the sock. Player One reaches in to feel a coin and describes how the coin feels (ridges along the edge, large). Player One guesses what type of coin it is. Player One removes the coin from the

sock and shows it to the group. The group says aloud the name of the coin and how much it is worth. Put the coin back in the sock and pass the sock to Player Two. Repeat the game.

**Second-Third Grade Instructions:** Players pull a coin from the sock and set aside. Save coins until you have enough money to buy an item you want from the shopping list. Fill out list by writing the cost of item, amount of money you paid, and money you received for change. Use the coins in baggie labeled STORE CHANGE to make any change you need from your shopping list. Continue until all players have had three turns.

#### MONEY STUMPERS

**Materials:** paper and pencil, bag of coins (whatever coin values have been introduced)

**Instructions:** Work with a partner. Player One writes a money amount 99 cents or less. Player Two uses the coins to show two different ways to make that amount. Trade jobs. After each player has had five turns, answer the following questions in your math journal: Which coin you used today is worth the most? Which coin you used today is worth the least? Why is it important to know how much each coin is worth? If you had two quarters, one dime, and four pennies how much money would you have?

#### COIN TRADING GAME

**Materials:** one die, coin board for each player, pennies, nickels, dimes

**Instructions:** Work with a partner. Each partner needs a coin board. Put the play money in the center of the table. Take turns rolling the dice and adding coins to your board. For instance, if Player A rolls a 4, he takes 4 pennies and puts them on his board in the penny column. The idea of the game is to show, in any column, the least number of coins possible. So as soon as you have enough to “trade up” 5 pennies for a nickel—do it. As soon as you have enough to “trade up” 2 nickels for a dime—do it. The first player to have 5 dimes in the dime column is the winner.

#### Capacity

##### CAPACITY SORT

**Materials:** 8 labeled containers of different sizes and shapes, color tiles, Styrofoam packing peanuts, beans, scoop or paper cup

**Instructions:** Look at the containers. One container is marked with the word “target.” Your job is to sort the containers into three groups: those that HOLD MORE THAN, HOLD LESS THAN, or HOLD ABOUT THE SAME amount as the target container. First, make a guess about how you would sort the containers. Record your guess on the recording sheet. Then, check your guesses by using the filler material (choose ONE: peanuts, beans, or tiles) and the paper cup.

#### Weight

##### HEAVY TO LIGHT

**Materials:** Eight potatoes (labeled A through H), recording sheet, pan balance scale, selection of fruits (labeled A through D)

**Instructions:** If you were making baked potatoes for dinner, how could you be sure that the children get lighter potatoes and the adults get heavier potatoes? Put the potatoes in order from heaviest to lightest. Record your guess. Use the pan balance to check your guess. Select four fruits and order them from heaviest to lightest. Record your guess. Use the balance to find the correct order.

#### Area

##### HOW BIG IS YOUR KISS?

**Materials:** Vaseline, marker, split peas, recording sheet

**Instructions:** Work with a group of four or five kids. Write your name on your recording sheet. Put a dab of Vaseline on your lips. Kiss your recording sheet in the box at the top of the paper. Trace around your kiss with a marker. Cover your kiss with split peas. Make sure you lay the peas flat, edge to edge, as you cover your kiss. Count the number of peas to find the area of your kiss. Make a graph to show the area of the kisses of each member of your group.

##### CUT OUT SHAPE AREAS

**Materials:** die cut shapes, 1-cm. grid paper, cm. cubes, calculators, 12”x18” construction paper, glue

**Instructions:** Choose four shapes. Which shape do you think covers the most space? This shape has the largest area. Which shape do you think covers the least space? This shape has the smallest area. Use the cubes to cover each shape. Were your guesses right? Trace each shape onto grid paper. Cut out the shapes. Count the number of squares each shape covers. Write the number on the shape. Glue the shapes to a sheet of construction paper in order from covers the most to covers the least.

**Remember:** Keep tasks hands-on, minds-on. Give students some degree of choice and independence. Emphasize reasoning and sense making. Math for young children can be engaging, rich, and fun!