

## Alternative Precipitation Measuring Instructions for Blind CoCoRaHS Observers

The below procedure may be useful for individuals who cannot see well enough to read the scale on the side of the inner tube of the standard CoCoRaHS rain gauge. It requires weighing the amount of precipitation collected and converting the weight to the depth of precipitation and hundredths of inches that is to be reported. The weighing can be accomplished with Speaks Volumz, a talking measuring cup whose capacity and precision is sufficient for this purpose.

The below instructions are written for those reporting precipitation in English units (inches). If you are reporting in metric units (mm), a different multiplication factor must be used for the conversion from weight to depth of precipitation.

### Equipment needed:

Two 4-inch CoCoRaHS rain gauges

Cost: \$31 each

Available from [weatheryourway.com](http://weatheryourway.com) or [ambientweather.com](http://ambientweather.com)

Speaks Volumz - Talking 3-Cup Measuring Cup

Cost: \$50-\$60, depending on the vendor

Available from MaxiAids (<http://www.maxiaids.com/speaks-volumz-talking-3-cup-measuring-cup>) and on Amazon (<http://www.amazon.com/Speaks-Volumz-Talking-3-Cup-Measuring/dp/B00VIMMXXG>).

2 AAA batteries for Speaks Volumz (not included with the device).

Tote for carrying rain gauge between kitchen and mounting location.

### Setup:

Install one of the two rain gauges in an appropriate location and choose a time of day at which to measure precipitation. For instructions, see the CoCoRaHS website.

Insert batteries into the Speaks Volumz measuring cup. Then set it to measure water in grams.

To do this:

1. Turn on the unit using the on/off button, the lowest of the four buttons on the side of the unit. Wait until the unit announces "scale ready, 0 grams" or something similar.
2. Repeatedly press the "D" button, the second button from the bottom, until the unit announces "water".
3. If the unit announced "0 ounces" when it was turned on, use the "W" button, the third button from the bottom, to toggle to grams.
4. Wait a couple of minutes for the unit to announce "goodbye" and turn itself off.
5. Turn the unit back on and listen for the announcement. If the unit does not announce "scale ready, 0 grams" shortly after it has been turned on, repeat the above steps or consult the instructions that came with the unit for advice on how to set it to measure water in grams.

### Measuring precipitation:

1. In your kitchen, set the Speaks Volumz onto a hard, flat surface and remove its lid. Do not turn the unit on yet since it may turn off again while you are outside retrieving the rain gauge.
2. Place the rain gauge that is not mounted into a tote in which it cannot tip over and take it outside to where your first gauge is mounted.
3. Remove the funnel from the mounted gauge and place it into the tote for safekeeping.

4. With one finger, reach slightly into the top of the inner tube of the rain gauge. If the inner tube is quite full, exchange the entire mounted gauge with the one in your tote. If the tube is not full, i.e., your finger does not touch the water level, you may choose to only exchange the inner tubes. To do this, remove your second inner tube from the tote, place the tube from your mounted gauge inside the outer cylinder that remains in your tote, and insert the other inner tube into the mounted gauge.
5. Take the tube or gauge you have just removed inside for measuring, being careful to keep it upright at all times to avoid spilling.
6. Press the lowest of the four buttons on the side of the Speaks Volumz to turn on the unit. Wait until you hear the announcement "scale ready, 0 grams".
7. Carefully pour the contents of the inner tube of the rain gauge into the measuring cup, being careful not to rest the tube on the rim of the cup, push down on the cup, or move or shake the cup. Pour by gently tilting the tube until you are holding it upside down above the cup.
8. If there is additional water in the outer cylinder, also add this water to the measuring cup. When pouring from the outer cylinder, it may be helpful to hold a funnel slightly above the measuring cup and pour the water through that funnel.
9. Once you have finished pouring, listen for the measuring cup to announce the weight. The cup may make two or three announcements. If the weights announced are within a gram of each other, use the last weight announced. If wildly different weights are announced, the cup may have been disturbed while measuring. In that case, pour the water out into another container and repeat the measuring steps. If no announcement is made, or the cup announces "0 grams", gently touch the bottom inside the cup to verify that it is dry.
10. To convert from the measured weight to hundredths of inches, divide the number of grams measured by two, since one hundredth of an inch of water in the rain gauge weighs approximately 2 g. The result is the amount of precipitation to report. For example, 22 g of water equals 11 hundredths of an inch, or 0.11 inches of rain. If the cup remained dry, report 0.00. If the inside bottom of the cup was wet, but no nonzero weight was announced, report "T" for a trace amount of precipitation.

Tips:

1. When first beginning to measure precipitation in this way, it is advisable to do so in the presence of a sighted individual who can measure the precipitation in the traditional way for comparison purposes. Testing has shown that the amount read by a sighted user should be within one hundredths of an inch of the amount obtained by following the procedure described above.
2. To ensure accuracy, follow the above procedure even if no rain appears to have fallen during the previous 24 hours. The dampness of vegetation is not a reliable indication of whether it rained or not since dew can form on days without rain, and vegetation can dry off within a few hours when a small amount of rain has fallen.