

Please attach this sheet to the front of your assignment

NOTE: Common and Special Causes of variation are sources of variation coming from errors.

Method 1: measured ½ cup of pasta shells - using red opaque measuring ½-cup

Method 2: measured ½ cup of pasta shells - using clear large measuring cup

Data Collection - as directed to whole class.

Graphing

1. Make a back-to-back dot and box plots of the class means. Method 1(red cup) to the left, Method 2(clear cup) to the right. (To ensure a single x-axis for direct comparisons!)
2. Do the same for the standard deviations.
3. Indicate on your **means graphs** the outlier boundaries.
4. Indicate on your **means graphs** the values that lie outside the SE boundaries. Calculate the boundaries using the table below.

Method 1 RED CUP	Method 2 CLEAR CUP
Mean of means ($\bar{\bar{x}}$) =	Mean of means ($\bar{\bar{x}}$) =
mean of s.d.s (s) =	mean of s.d.s (s) =
SE $\frac{2s}{\sqrt{5}}$ =	SE $\frac{2s}{\sqrt{5}}$ =
Standard Error (SE) boundaries:	Standard Error (SE) boundaries:
$\bar{\bar{x}} - SE =$	$\bar{\bar{x}} - SE =$
$\bar{\bar{x}} + SE =$	$\bar{\bar{x}} + SE =$

Write Up - please enumerate your answers on a separate sheet, not on the back of the graphs.

1. How many sample means for each method fall outside the SE boundaries? Which method is more error prone? Precise? Describe what these boundaries tell you about the two methods and the types of error they cause.
2. Identify the pasta counts that indicate different sources of variation. Which would you consider influenced by common cause variation and which by special case variation (if they exist)? Explain why you think this.
3. Which of these two methods would you recommend and why? Back up your recommendation with evidence specifically using center, spread, and shape.
4. Name two other methods we could use to separate measurements affected by Common Causes of variation from those affected by Special causes of variation.

Grading Rubric

Use appropriate vocabulary.

Demonstrate that you understand what center, spread, and the standard error tell you about the distribution of values and the differences in the two methods of measuring used here.

Show that you are thinking about common and special causes of variation, how they show up in the plots, and what this might tell you about the two methods used to measure.

Back your reasoning with specific examples from center, spread, and shape.

Link your analysis to the real world. As examples: If you were at a restaurant would you prefer to be served by a cook that is affected by common cause error or special cause error? If you were a manufacturer, would your customers be less pleased with common or special cause errors in the parts they buy from you?

Calculations, & Graphs	/5
Demonstrated understanding of variation: in general	/5
in specific (separately from error)	/5
Demonstrated understanding of common causes and special causes of variation	/5
Identified common and special causes of variation	/5
Recommended and <u>justified</u> a method	/10
Total	/35
Presentation	/10