

Lesson Plan

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Grades 9-12
Meadville Sr. High School

Gage Repeatability and Reproducibility

Subject Area: Statistics

Time: Two 42 minute class periods

Objective: To calculate the Gage Repeatability and Reproducibility (R & R) by the long method.

Materials:

1. R & R data sheets
2. Micrometers
3. Calculators
4. "Products" to measure: coins, paper, leaves, playing cards, jewelry, etc.

Purpose: This lesson will provide the student with some specific examples of hypothesis testing for product reliability in the plastics industry. It was stressed often to me while visiting the industry that students need to calculate the long way for understanding. Only after doing so for several trials should the computer program be used. It is necessary to understand when the computer may not be giving logical answers to computations.

Procedure:

1. Provide background information on C & I Industries and their Quality Control department. Emphasis should be given for hand calculation before running a computer program that does the calculations.
2. Hand out completed data sheets from one of their R & R studies. Review the procedure and formulas for calculations.
3. Divide the class into random groups of 3. Give each group a "product" to measure. Record the data on a blank R & R data sheet. Each member of the group measures the product several times and records data on the blank sheet.
4. Each member calculates the R & R without consulting with their group using the formulas given and discussed in class. Then compare their results with their group members. The results should be the same for each group.
5. One member of each group reports briefly to the class on the product they

sampled and the R & R they calculated.

6. Summarize and introduce the next step in the process -the Capability Study.