

Measurement Accuracy Competition

Difficulty Beginner	Time 45 minutes	Type Competition
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Background

Quality inspectors must make fast, repeatable measurements and report them with the correct precision.

Engineering Problem

Measure a set of mystery parts as accurately and consistently as possible.

Learning Objectives

- Select appropriate measuring tools
- Read scales and calipers correctly
- Record units and precision
- Analyze measurement variation

Materials

- 10-15 mystery objects
- Ruler
- Dial or digital calipers
- Measurement data sheet
- Calculator

Procedure

1. Create a data table with object ID, feature, tool, measurement, and units.
2. Measure each assigned feature once without seeing the reference value.
3. Repeat three selected measurements after a five-minute delay.
4. Calculate the difference between repeated measurements.
5. Compare your results with instructor reference values after all data are submitted.
6. Calculate absolute error for each reference measurement.
7. Identify the tool and feature associated with your largest error.
8. Write a two-step plan for improving measurement reliability.

Engineering Requirements

- Measure at least ten features
- Use the most appropriate available tool
- Record all values with units and realistic precision
- Repeat at least three measurements
- Calculate error or variation correctly

Constraints & Safety

- Do not alter or mark the objects

- Do not share measurements before the class reveal
- Use safe caliper pressure on fragile parts

Deliverables

- Completed measurement table
- Repeated-measurement comparison
- Absolute error calculations
- Accuracy ranking or score
- Improvement plan

Reflection Questions

1. When was a ruler sufficient?
2. When were calipers necessary?
3. Did your repeated measurements agree?
4. What caused your largest error?

Engineering Tip

Close calipers gently. Excess force can compress a part or tilt the jaws.

Common Mistake

Extra decimal places do not make a measurement accurate. Report only the precision supported by the tool.

Stretch Goal

Calculate the class mean and range for three measurements and identify possible outliers.

Career Connection

Quality technicians, machinists, and manufacturing engineers rely on repeatable inspection data to approve parts.