

EF101 – Engineering Approach to Physical Phenomena
Lab Worksheet 1.1 Units and Measurement
 Fall, 2004

Objectives

- Introduce you to units of length, area, and volume
- Introduce you to the concept of measurement uncertainty
- Give you some estimation tools for future use

Task 1. Establish your pace length.

A section with a length of 50 ft is marked off on the lab floor. Pace this 3 times, each time recording the number of steps (paces) it takes you to cover the distance. Pace at a nice, relaxed, consistent clip, as if you're just casually walking. Record your measurements to the nearest 1/2 pace.

1) _____ paces 2) _____ paces 3) _____ paces Average _____

Now calculate your pace length in feet and in meters. Express your answers in ft/pace and in m/pace.

Pace length: _____ ft _____ m

Task 2. Estimate an area.

Make an initial estimate of the floor area of Estabrook 111 by just looking around the room. Then, using your pacing as a measuring tool, estimate the floor area of the Physical Homework Laboratory. Neglect the small area near the door.

30 second estimate: _____ ft² _____ acres

Pacing estimate: _____ ft² _____ acres _____ m²

Now give an estimate of the uncertainty associated with that estimate (how much you think your estimate might be off)

Uncertainty estimate: _____ %

How did you arrive at this? How much would the neglected areas affect your final estimate?

Task 3. Estimate the height of Neyland Stadium

Height: _____ ft _____ m

Task 4. Estimate the volume of Estabrook 111.

Volume: _____ ft³ _____ m³ _____ gallons

Task 5. Other Estimates and Comparisons

Estimate the weight of an average car: _____ lb _____ N

Estimate the length of an average car: _____ ft _____ m

Which is heavier, 1 pound or 1 Newton? 1 pound or 1 kg?

Which is longer: 1 mile or 1 kilometer? 1 centimeter or 1/4 inch?