

## 2.5: Thinking about the material

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### 2.5.1: Reflect and research

1. Often, physicists will report a measured number with a “standard” uncertainty and indicate that there is a 68% that the true value lies within the range covered by the uncertainty. Where does the number 68% come from?
2. Why can the derivative method only be used when the relative uncertainties are small?
3. How would you estimate the height of a tall building?

### 2.5.2: Experiments to try at home

1. Estimate the volume of your room, and how many people could be piled into the room. State your assumptions and how you determined the values.

### 2.5.3: Experiments to try in the lab

1. Newton’s Universal Theory of gravity predicts that the distance,  $x$ , covered by an object that has fallen for a length of time,  $t$ , is given by:

$$x = \frac{1}{2}gt^2$$

Determine the value of  $g$  (with uncertainty) by performing an experiment that will allow you to determine  $g$  by determining the slope of a line of best fit.

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