

Thought Lab 8.1: The Limiting  
Item Answer Key**Answers to Analysis Questions**

1. According to the balanced equation, 75 bolts will produce 75 widgets, 100 washers will produce 100 widgets, and 100 nuts will produce 50 widgets.
  - (a) The nuts are the limiting reactant.
  - (b) The bolts and the washers are present in excess.
  - (c) Since we can only produce 50 widgets, 25 bolts and 50 washers will remain.
  - (d) 2 Nu:1 Bt
  - (e) 2 Nu:1 Wa
2. The amount of a reactant does not affect the quantity of the product obtained. Only the limiting reactant can affect the quantity of product. Only the stoichiometric amount of this reactant will be consumed.
3. Despite being present in the least amount, the bolts were not the limiting reactant due to the ratio of the bolts to the final product. In the reaction, only one bolt was consumed to produce one widget (a 1:1 ratio). Another reactant, the nuts, were consumed in a greater ratio (two nuts to one widget), and this fact, along with the initial amount of nuts present, determined the maximum number of widgets that could be produced.