

# Yield, Excess, and Percent Yield

Student Worksheet | g09\_u08\_w32

**I can:** calculate theoretical yield, excess, and percent yield from a balanced recipe and collected data.  
**Frozen values:** Classroom calculation values from `audits/atomic_masses_v2024.1.json`, derived from CIAAW/IUPAC Standard Atomic Weights 2024 (accessed 2026-07-26). H 1.008, O 15.999, Mg 24.305. Collected product below theoretical does not mean atoms vanished; state a measurement/collection limit.

1. Define theoretical yield and actual (collected) yield.  
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2. For  $2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$ , state the recipe ratio Mg:MgO.  
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3. Find molar mass MgO.  
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4. Convert 2.00 mol MgO to g.  
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5. If 1.00 mol Mg is limiting, predict mol MgO.  
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6. Predict theoretical g MgO from 1.00 mol Mg.  
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7. If collected MgO is 35.0 g and theoretical is 40.304 g, calculate percent yield.  
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8. If percent yield is 80.0% and theoretical is 40.304 g, find actual yield.  
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9. If actual yield is 30.0 g and percent yield is 75.0%, find theoretical yield.  
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10. With 3.00 mol Mg and 2.00 mol  $\text{O}_2$ , identify limiting reactant and excess mol  $\text{O}_2$ .  
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11. With 12.0 g Mg and excess  $\text{O}_2$ , predict theoretical g MgO.  
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12. With 12.0 g Mg and 10.0 g  $\text{O}_2$ , identify limiter.  
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13. Using item 12, predict theoretical g MgO.  
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14. **Data A:** theoretical 19.9 g MgO; collected 17.4 g. Find percent yield.

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15. **Data B:** theoretical 19.9 g; collected 21.0 g. Find percent yield and one cautious explanation.

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16. Explain why a 105% yield does not prove new atoms were made.

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17. **Data C:** 0.500 mol MgO theoretical and 18.0 g collected. Calculate percent yield.

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18. A student uses collected yield to decide the limiting reactant. Critique the method.

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19. List two assumptions behind using one collected mass as actual yield.

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20. Write an evidence-based conclusion for an open-cup low yield: include theoretical/actual distinction, one likely limitation, and conservation.

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