

PhET Limiting Reagent

Chemistry

Name: _____ Date: _____

Directions: go to pHet online. Click on 'chemistry sims'. Click on 'reactant, products and leftovers' sim.

Or try - [Reactants, Products and Leftovers](#)

On 'sandwiches' 'cheese' sim:

1. Start with 3 breads and 2 cheese.
 - a. How many products are made? _____
 - b. What are the leftovers? _____
2. Add a slice of cheese.
 - a. How many products are made? _____
 - b. What are the leftovers? _____
3. Now I have 8 breads and 3 cheese.
 - a. How many products are made? _____
 - b. What are the leftovers? _____
4. Now try 8 breads and 8 cheese.
 - a. How many products are made? _____
 - b. What are the leftovers? _____
5. With the 8 breads and 8 cheese – what did you run out of first? (this is your limiting reactant) _____
6. Now play with it and find out the max number of products which can be made without any leftovers.
 - a. How many of each reactant were used? _____
 - b. How many of the products were produced? _____

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On 'sandwiches meat and cheese' sim:

7. Play with the sim and try to make only one sandwich with no leftovers.
 - a. How many of each reactant were used? _____
8. Now max every reactant out.
 - a. How many of each reactant is that? _____
 - b. How many products can be made? _____
 - c. How many of these leftovers are created? _____
 - d. Which reactant was your limiting reagent? _____
9. Now maximize the number of products without having any leftovers.
 - a. How many of each reactant are used? _____
 - b. How many products were made? _____

On 'sandwiches custom' sim

10. Set it on a triple decker meat and cheese sandwich at the top.
 - a. How many of each reactant will you need to make one triple decker meat and cheese sandwich? _____
11. Now max out how many products can be made without leftovers.
 - a. How many of each reactant did you use? _____
 - b. How many products did you produce? _____
12. Now max out all of the reactants.
 - a. How many products were produced? _____
 - b. How many of each leftover were there? _____
13. What is the limiting reactant in the triple decker sandwich? _____

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Using the 'molecules – make water' sim

14. Make a single water molecule.

a. How many of each reactant were used? _____

15. a. What is the mole ratio (how many of each reactant and product are there)? _____

b. Now write it as a chemical reaction:

16. Max out how many water molecules that can be made without leftovers/excess.

a. How many of each reactant were used? _____

b. How many products were produced? _____

c. What is the mol ratio (how many of each reactant and product are there)? _____

d. Now express it as a chemical equation:

17. Now max out every reactant.

a. How many products were made? _____

b. How many and what were the leftovers/excess? _____

c. What is the limiting reactant? _____

Using the 'molecules – make ammonia' sim

18. Make a single ammonia molecule.

a. How many of each reactant were used? _____

b. What is the mol ratio? _____

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- c. Write it as a chemical equation:

19. Play with it until you find the max amount of ammonia that can be produced without any leftovers.

- a. How many of each reactant are used? _____
- b. How many ammonia molecules are produced? _____
- c. Write it as a chemical equation:

20. Now max all of the reactants.

- a. How many ammonia molecules are produced? _____
- b. How many of each leftover are there? _____
- c. What is the limiting reactant in this reaction? _____

Using the 'molecules – combust methane' sim

21. Produce a single carbon dioxide molecule without any leftovers.

- a. How many of each reactant are used?

- b. How many of each product are produced? _____
- c. What is the mole ratio: _____
- d. Write the reactant in a chemical equation form:

22. Now max all of the reactants out.

- a. How many of each product are formed? _____

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b. How many of what is leftover are there? _____

23. Now maximize the number of products produced without leftovers.

a. How many of each reactant are consumed? _____

b. How many of each product are produced? _____

c. What is the mol ratio? _____

d. Now write it as a chemical equation:

24. a. What is the limiting reagent in this reaction? _____

b. How do you know? _____

Now use the 'Reactants, Products & Leftovers – Game'

Call the TA over when you have scored an 8 or better on level 1 _____ (teacher initial) You're up to a 'C' for this assignment.

Call the TA over when you have scored an 8 or better on level 2 _____ (teacher initial) You're now up to a 'B' for this assignment.

Call the TA over when you have scored an 8 or better on level 3 _____ (Teacher initial) You're now up to an 'A' for this assignment