

Modeling Photosynthesis

Title your page the above!

DO NOT EAT THE CEREAL!!!

Before You Begin

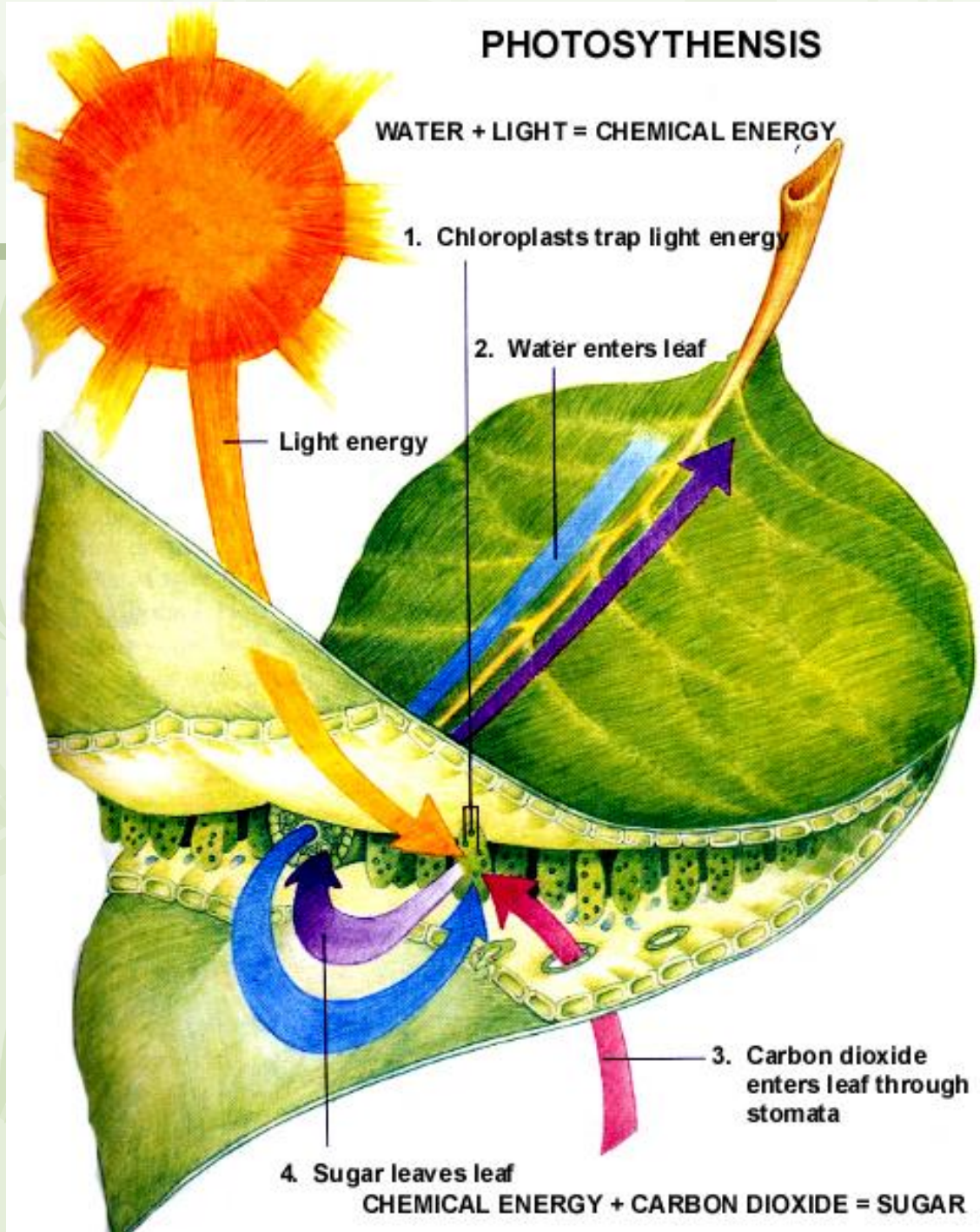
1. You will make this diagram large (use half of your page)
2. Draw a leaf in your science notebook.
3. Use arrows to show the materials that enter the leaf cells during photosynthesis. Label the arrows.
4. Use arrows to show the materials that leave and/or stay in the leaf during photosynthesis. Label the arrows.

What goes in:

1. Water
2. Light energy
3. CO_2

What comes out:

1. Glucose
2. O_2



Directions

1. From the container of cereal:

Count out 18 of the same color pieces and place them in a pile on your drawn leaf.

Count 12 of another color.

Count 6 of another color.

2. Draw the following chart in your science notebook.

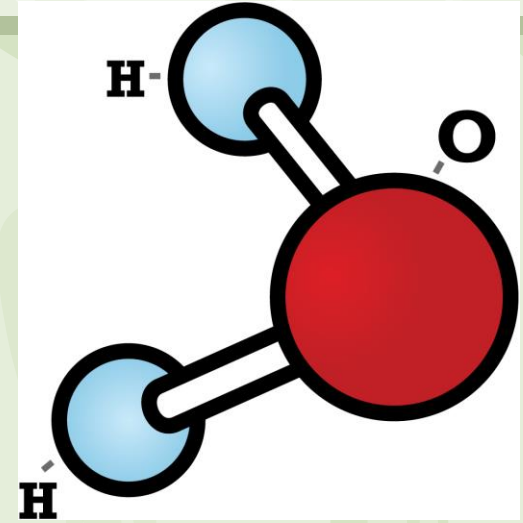
| Cereal Color | # of Pieces | Atoms Represented |
|--------------|-------------|-------------------|
| | 18 | Oxygen (O) |
| | 12 | Hydrogen (H) |
| | 6 | Carbon (C) |

Directions

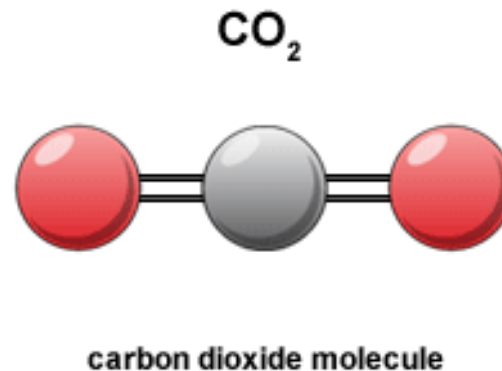
1. Make a water molecule (H_2O).
2. Make a carbon dioxide molecule (CO_2).
3. Continue making water and carbon dioxide molecules until all atoms (cereal pieces) are used up.

What molecules look like:

- Water (H₂O)



- Carbon Dioxide (CO₂)



- You can use this page for the questions:

1. How many molecules (clusters) of water were you able to make?
2. How many molecules of carbon dioxide were made?
3. Write and complete the following sentence on the bottom of your paper: **The reactants of photosynthesis are...**
4. How many oxygen molecules did you make?
5. How many glucose molecules did you make?
6. Write and complete the following sentence on your paper: **The products of photosynthesis are...**
7. How do the total number of reactants and products compare?
8. In nature, where does the energy to break and make bonds come from?
9. During photosynthesis, light is changed to chemical energy. In which product is the chemical energy stored? What is its purpose?
10. What must be present in plant cells in order for photosynthesis to occur?
11. If something occurred which destroyed all the green plants on Earth, what effect would this have on other organisms? Why?
12. **Now write the chemical equation for photosynthesis!**

Answer the following questions on your page.

1. How many molecules (clusters) of water were you able to make?
2. How many molecules of carbon dioxide were made?
3. Complete the following sentence on the bottom of your paper: **The reactants of photosynthesis are...**

Reaction Time!

Energy from sunlight is needed to break the bonds which hold atoms together in the water and carbon dioxide molecules.

Gently shake the leaf to mix up the cereal pieces, making sure to keep all the pieces on the leaf.

Directions

Now simulate photosynthesis by recombining the atoms to form both the food and waste of plant cells.

- Use the same cereal pieces to make a simple sugar molecule called glucose ($C_6H_{12}O_6$).
- With the remaining pieces, put together pairs of oxygen atoms (O_2).

Answer the following questions.

4. How many oxygen molecules did you make?
5. How many glucose molecules did you make?
6. Complete the following sentence on your paper: **The products of photosynthesis are...**

Summary

How many of each kind of atom are in the reactants?

Oxygen =

Hydrogen =

Carbon =

How many of each kind of atom are in the products?

Oxygen =

Hydrogen =

Carbon =

Summary

How many of each kind of atom are in the **reactants**?

Oxygen = 18

Hydrogen = 12

Carbon = 6

How many of each kind of atom are in the **products**?

Oxygen = 18

Hydrogen = 12

Carbon = 6

Answer the following questions.

7. How do the total number of reactants and products compare?

8. In nature, where does the energy to break and make bonds come from?

Answer the following questions.

9. During photosynthesis, light is changed to chemical energy. In which product is the chemical energy stored? What is its purpose?
10. What must be present in plant cells in order for photosynthesis to occur?

Answer the following questions.

Application

11. If something occurred which destroyed all the green plants on Earth, what effect would this have on other organisms? Why?

Now write the chemical equation for photosynthesis!