Photosynthesis Formula Game

You will need:

- A copy of the gameboard for each player
- Small "tokens" of at least three different colors which will be used to represent carbon, oxygen, and hydrogen atoms. Suggestions: small candies such as M&M's (M&M Minis are even better) or Skittles, Cheerios, Fruit Loops cereal, raisins (If you are playing with a large group of kids you don't know very well, stay away from peanuts. Peanut allergies can be deadly.)
- One spinner (assemble and color spinner according to directions) You will need scissors, glue, a paper fastener, and markers or crayons for this (and a cereal box to glue parts on if you want to make the spinner stury enough to last for a while).

Directions:

This game can be played with any number of players. Divide the players up so that you have four teams. (If you only have two or three players, the game will still work. Even one person can play it, although there won't be competition, of course.) The number of players per team does not have to be equal. Being on the same team simply means that all members of that team will receive the same spinner results on each round, and therefore will be doing the same thing at the same time. This can actually be very beneficial for those students who have trouble catching on to game formats. They can simply follow along with what their team members are doing.

Each player/team is assigned a colored "arm" of the spinner. Each time the spinner is spun, the player/team will read their results from that color. For example, if you are on the red player/team, whatever the red arm lands on is your spin result. Players/teams can take turns spinning the spinner, but the spin will be for everyone. (This is great because there is no "down time" during the game waiting for your turn!)

Each person decides what they will use to represent the atoms on their board: carbon, oxygen, and hydrogen. They will also need just one light token. Make sure they choose their "code" ahead of time. For example: raisins for carbon atoms, Cheerios for oxygen atoms, small red candies for hydrogens, and a dried banana for light.

Whatever the spinner arm lands on is what you build on your game board. If you or your team spins WATER, then you "build" one of the water molecules on the top portion of the board by putting two hydrogen tokens and one oxygen token right on top of one of the water molecules. You only need one light token, so if you land on LIGHT again, you just do nothing for that turn, since you already have light.

Once you have all the molecules filled up on the top half of the board, it then becomes a race (or a cooperation) to see how fast you can rearrange all the atoms to form the molecules on the bottom half of the board. The plant does this, too. It disassembles all the ingredient molecules and uses them to form new molecules.

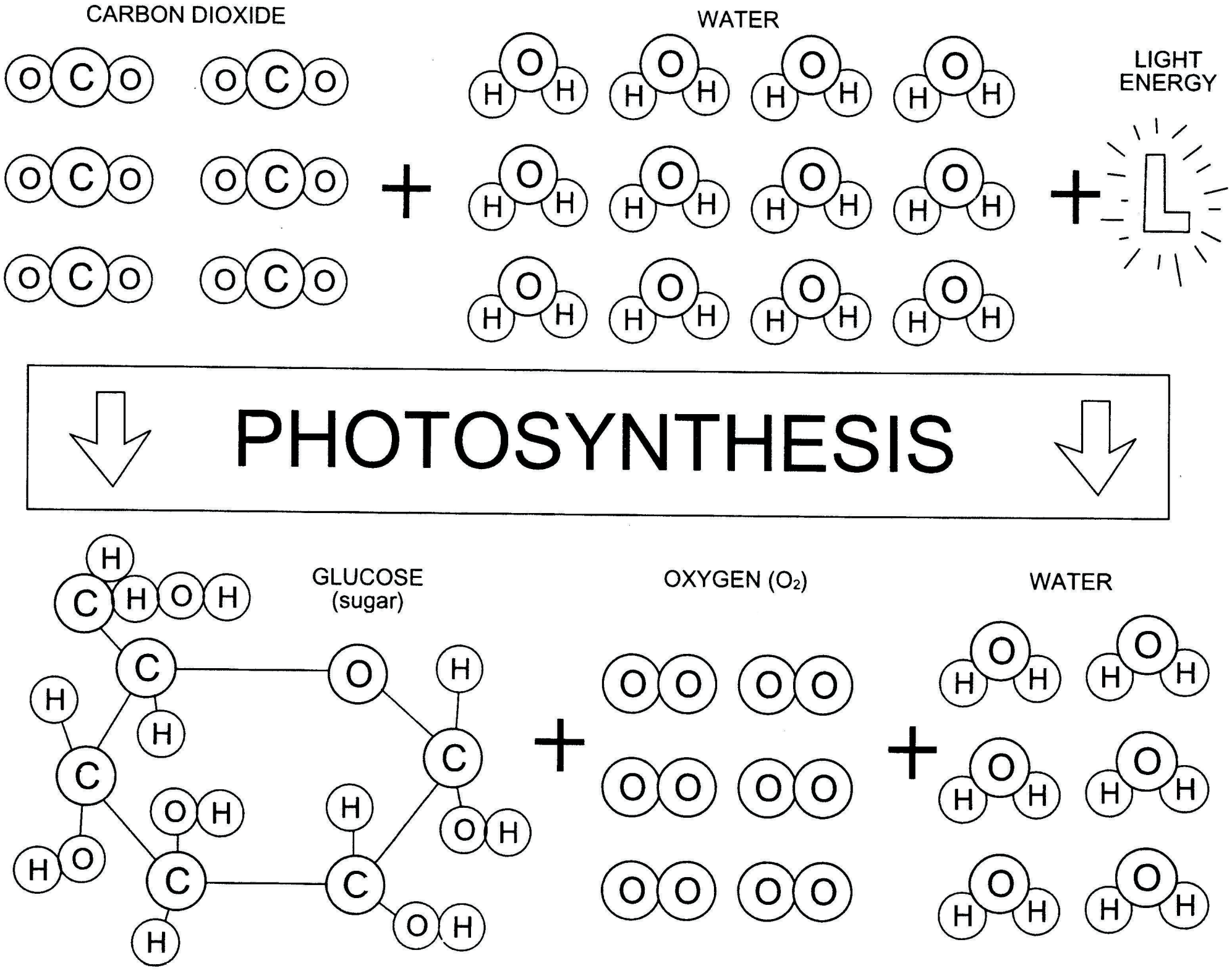
The advantage of using edible tokens is that whenever you have the bottom half of your board complete, you can reward yourself by eating the glucose molecule (and the other molecules, too, if you are still hungry!).

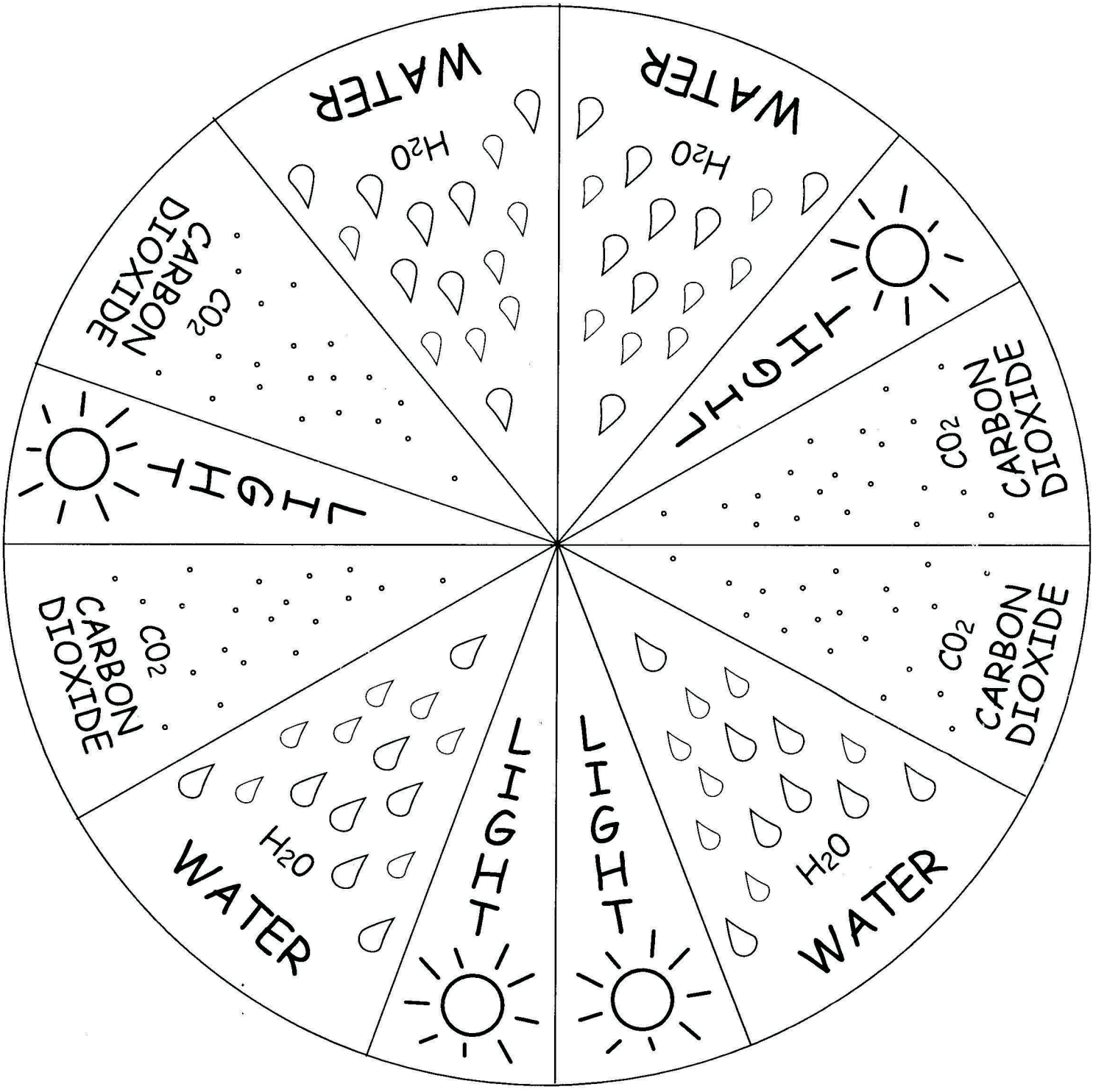
During the course of the game you will certainly hear the following comments. Responses to these are suggested.

"I keep spinning light. I don't need anymore light!" *This is true for plants, as well. Plants living outdoors almost always have enough light. In fact, most of the sun's energy goes to waste. There is way more than enough light shining down. What limits photosynthesis is usually the amount of water available.*

"I don't have enough water. I keep spinning carbon dioxide." *This happens sometimes in real life, too. The weather can produce droughts. There is still plenty of carbon dioxide and light, but not enough water. Fortunately, it always rains eventually. If you keep spinning you are guaranteed to land on water eventually. In fact, you may then have a period of too much water.*

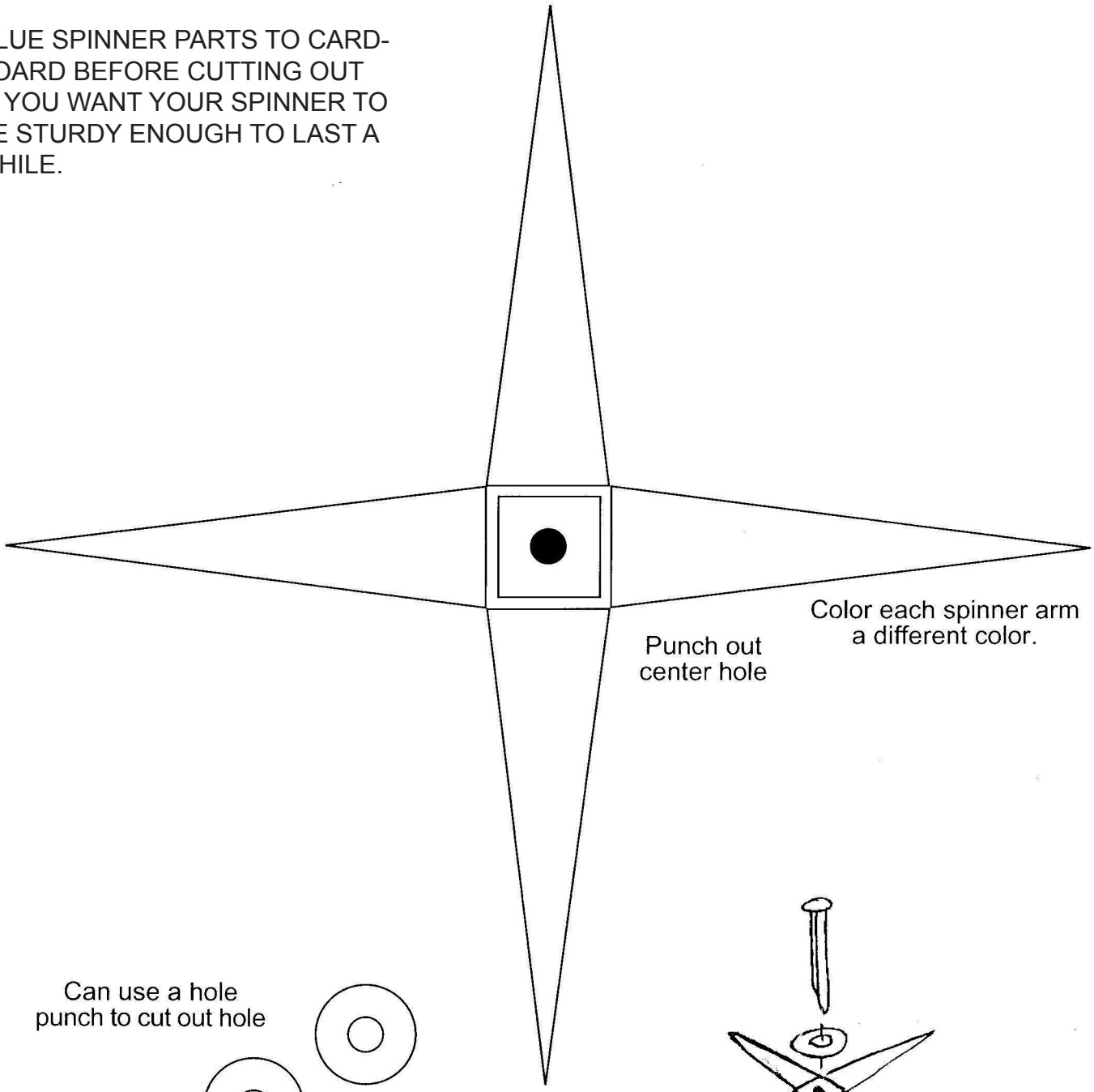
"I have way too much water and not enough carbon dioxide." *Plant could possibly have this problem. If the leaves are covered with water, the air holes in the leaves can get "clogged" up and not let in enough air (which contains carbon dioxide).*


CARBON DIOXIDE
WATER
LIGHT ENERGY
PHOTOSYNTHESIS
GLUCOSE (sugar)
OXYGEN (O_2)
WATER



GLUE SPINNER PARTS TO CARDBOARD (CEREAL BOX WORKS FINE) IF YOU WANT YOUR SPINNER TO BE STUDY ENOUGH TO LAST A WHILE.

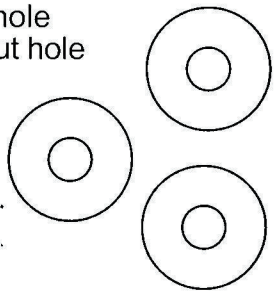
GLUE SPINNER PARTS TO CARD-BOARD BEFORE CUTTING OUT IF YOU WANT YOUR SPINNER TO BE STURDY ENOUGH TO LAST A WHILE.

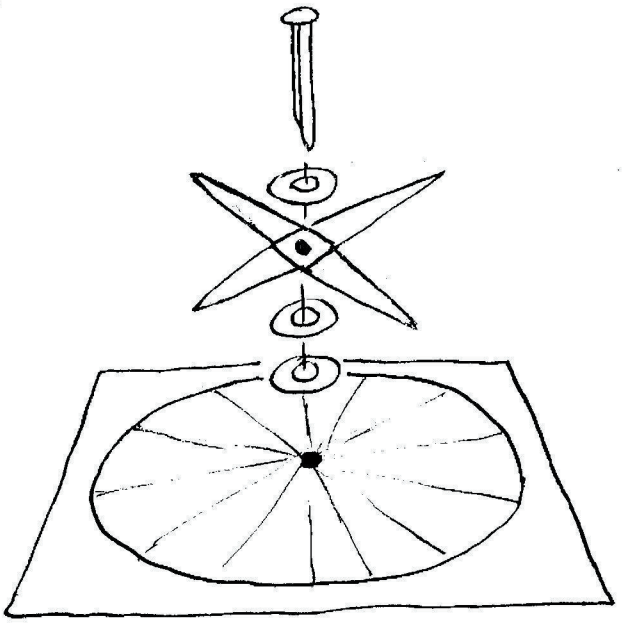


Color each spinner arm a different color.

Punch out center hole

Can use a hole punch to cut out hole





Paper Washers