Role-Play and Mixing-Bowl Analogy of Photosynthesis

Role-Play: How Plants Make Food

Let's do a role-play to help us think about how plants make food. Everyone stand up.

Imagine that you're a plant. Your legs are your roots, your body is the stem, your arms are the branches, and your hands are the leaves.

How can you take in what you need from the environment to make your own food? What do you need before you can make food?

OK. Imagine taking water in through your roots or legs. Then imagine the water moving up your roots, through your stem into your branches, and into your leaves or hands.

Imagine taking the air into your leaves.

Then imagine your leaves soaking in the sunlight. Can you feel the warmth and energy of the Sun in your leaves?

So now what do we have in our leaves? *[**Answer:** Water, air, and sunlight.]*

Now imagine that all three of those things are mixing together in your leaves. Wave your hands around to show that the water, the air, and the sunlight are all mixing together in your leaves.

What does all that mixing make?

Food!

As a plant, what can you do with the food you've just made? *[**Answer:** We can use it to live and grow, and we can store some food to use later.]*

So stretch up tall and show that you're using the food to grow!

Mixing-Bowl Analogy: How Plants Make Food

Materials

- One large green leaf
- Magnifying lens
- Large green mixing bowl
- Flashlight
- Zip-seal, plastic bag (filled with air)
- Bottle of water
- Hand mixer/wire whisk
- Sugar cubes

Look at this leaf. Can you see it making food? No. Even with my magnifying lens, I can't see what's going on inside this leaf. So let me show you one way to imagine what's happening.

Look at this bowl and this leaf. Do they look the same? No. But we're going to imagine that this bowl is a leaf in our model. And we'll imagine that the inside of the bowl is the inside of the leaf. We'll use this bowl to help us think about what happens inside a leaf.

First, a plant takes in water from the soil through its roots, and that water travels from the roots to the leaves. Can someone pour some water into this leaf?

The plant also takes in carbon dioxide from the air through tiny holes on the underside of the leaves. I have a baggie filled with air that contains carbon dioxide. Can someone give the leaf some carbon dioxide?

Now we need someone to be the Sun and shine this flashlight on the leaf.

When water, carbon dioxide, and sunlight come together, an amazing thing happens inside the leaf. All three things mix together and turn into something completely new. I'll use this mixer to combine all these ingredients.

Close your eyes while this change is happening. *[Put sugar cubes in the bowl.]*

Now open your eyes and see what happened! What did the water, the air, and the sunlight change into?

Yes. The water, the air, and the sunlight changed into sugar inside the leaf, and the plant uses this sugar as its food.

Turn and Talk: What did we need to put into the leaf before it could make food?

Whole-group share-out: So what did we need to put into the leaf before it could make food? *[**Answer:** Water, carbon dioxide, and sunlight.]*

That's right! We put water, carbon dioxide, and sunlight into the leaf so it could make food. Remember: Leaves need all three of these things to make food. The leaves take these three things and change them into food the plant can use to live and grow!