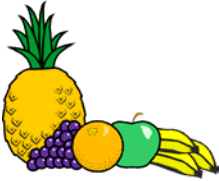


## Food Glorious Food.....



**Food** is a word we use in many contexts. For instance, you may:

- shop at the grocery store for food for dinner (or stop at the fast-food restaurant).
- give your household **pet cat food**.
- add **plant food** to the soil to keep your plant healthy.
- put out seeds as **bird food** (and sometimes squirrel food) in winter.
- use the CRSEP emails as **food for thought**...

It's clear that we use the word **food** in different ways. For now, let's deal with the domain of science. Scientifically, what's the purpose of what we commonly refer to as **food**? The hamburger and salad you have for lunch, the sun flowers the blue jay eats, the grass the mouse eats all have **two functions**:

1. to provide energy
2. to provide raw materials for growth and repair

The story is more complicated when it comes to plants. Plants also need energy and raw materials for growth and repair. Plants get their energy from the sun. Plants get raw materials for synthesis, growth and repair from the atmosphere and from the soil.

During photosynthesis, plants convert energy from the sun into energy rich compounds (simple sugars). Two of the raw materials for these compounds, carbon (C) and oxygen (O), come from CO<sub>2</sub> and O<sub>2</sub> in the atmosphere. Hydrogen (H) and some oxygen (O) from water (H<sub>2</sub>O) come from the plants' surroundings.

As plants synthesize compounds other than simple sugar, they get energy from the **respiration** of the high energy compounds (simple sugars). Sugars also provide *raw materials* for **synthesis**, as do minerals, and compounds of nitrogen (N), phosphorous (P), and potassium (K). The sugars are the product of photosynthesis; minerals, nitrogen compounds, and phosphorous compounds come from the plants' surroundings. (For plants anchored in soil by their roots, these raw materials come from the soil.)

So when we say that we have given our house or garden plants **food**, we are not giving them energy, just minerals, nitrates and phosphates they need for synthesis. The “**food**” we feed plants provides only a few specific raw materials for growth. Minerals, phosphates and nitrates play a similar role in the lives of plants as vitamin pills play in the lives of humans. They provide raw materials for synthesis, not energy. A plant could no more live in the dark with only plant food than you could live on vitamin pills alone.

What we call **food** in our everyday language doesn't mean the same thing for all organisms. If we, as educators, use it interchangeably, it can be confusing to students. The youngest preschoolers see plants more similar to rocks than to animals; plants are not considered animate. However, partly due to the way we speak about plants, older preschoolers see both plants and animals as living things. They need **food**; they grow; they die. Conceptually, this is a step in the right direction.

However, as students mature, if we continue to reinforce the idea of plants taking in **food**, we're setting students up to be confused by the process of photosynthesis. It's a complicated enough concept without the interference of previously-held, scientifically inaccurate beliefs.

We've identified the problem. Now what's to be done about it? We suggest a focus on *language*. One of the wonderful and frustrating things about science is the precise use of language. We've seen that a scientific word can have a different meaning in everyday language (e.g., *food*, *work*, *respiration*). In science, words are more likely to have precise definitions and guidelines for use. There is less room for misunderstandings and false assumptions.

### So what do we suggest?

- Develop children's understanding of what they get from the foods they eat.
- Distinguish what humans get from food (*energy* and raw materials for growth and repair) from what plants get from the “plant” food we feed them (raw materials for synthesis—growth and repair).
- Be clear that plants can no more live in the dark with only plant food than you could live on vitamin pills alone.

The language may seem to complicate the issue, but, since it does not reinforce inaccurate beliefs on the part of the students, it will be less likely to interfere with future learning. It may take a bit longer to teach this way, but it's helping to pave a smoother road for complicated topics.

So just chew on that for a while....

Coming up next week: We look at another topic specially requested by teachers.

*“What's the matter?”*

