

Crash Course: Chemosynthesis vs. Photosynthesis



▲ **Tubeworms** (*Riftia pachyptila*) growing from a hydrothermal vent, ripples show the flow.



▲ A sunflower growing up toward the sun.

Definition of Chemosynthesis

Chemosynthesis is the biological conversion of one or more carbon molecules (usually carbon dioxide or methane) and nutrients into organic matter using the oxidation of inorganic molecules (e.g. hydrogen gas, hydrogen sulfide) or methane as a source of energy, rather than sunlight, as in photosynthesis. Large populations of animals can be supported by chemosynthetic primary production at hydrothermal vents, methane clathrates, cold seeps, and whale falls. Chemoautotrophs, organisms that obtain carbon through chemosynthesis, and are responsible for the primary production in oxygen-deficient environments, generally fall into four groups: methanogens, halophiles, sulfur reducers, and thermoacidophiles.

- ◆ Bacteria in the riftia's residual gut break down hydrogen sulfide bubbling out of the vents.
- ◆ With the energy from this process, the bacteria break down carbon dioxide and oxygen from the water to form sugars (reduced carbon compounds . . . organic. . . edible!)
- ◆ The bacteria release sulfur into the water.

Definition of Photosynthesis

The process by which green plants, algae, diatoms, and certain forms of bacteria make carbohydrates from carbon dioxide and water in the presence of chlorophyll, using energy captured from sunlight by chlorophyll, and releasing excess oxygen as a byproduct. In plants and algae, photosynthesis takes place in organelles called chloroplasts.

- ◆ Plant cells called chloroplasts use photic energy (sunlight).
- ◆ With this energy they break down carbon dioxide from the air and form sugars (reduced carbon compounds. . . organic. . . edible!)
- ◆ Plants release oxygen into the air.

Note: red in table below is answers; don't include in student pdf, but in teacher's answers

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PROCESS	Chemosynthesis	Photosynthesis
Where does the energy to fuel this process come from?	hydrogen sulfide from the hydrothermal vents	photic energy (sunlight) from the sun
What kind of cells are the factory for this process?	bacteria	chloroplasts
What kind of food is produced in this process?	sugars (reduced carbon compounds)	sugars (reduced carbon compounds)
What gets sent out into the environment by the organism at the end of the process?	sulfur and water	oxygen

Name: _____

Date: _____

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