THE STANDARD

Role of Photosynthesis

Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.

DCI
DISCIPLINARY CORE IDEA

LS1.C · Organization for Matter and Energy Flow in Organisms

> *Plants, algae (including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen.*

Plants are not eating the soil. They pull carbon dioxide out of the air, water up through their roots, and energy from sunlight, then build sugar (glucose) and release oxygen. The carbon in a tree's trunk came from the sky, not the dirt. **That sugar runs the plant or gets stored for later.**

SEP
SCIENCE & ENGINEERING PRACTICE

Constructing Explanations and Designing Solutions

> *Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.*

Students aren't memorizing a reaction. They're making a claim about where matter goes and where energy goes, and then backing it up with evidence they can point to: bubble counts on a water plant, a color change in an indicator, a starch test on a leaf. **The explanation has to track both the matter and the energy.**

CCC
CROSSCUTTING CONCEPT

Energy and Matter

> *Within a natural system, the transfer of energy drives the motion and/or cycling of matter.*

Energy moves the matter. Light energy flips the system on. Carbon and oxygen atoms get reshuffled into new molecules. The energy ends up locked inside the sugar's chemical bonds, and the matter shows up as plant body or oxygen in the air. **One process, two stories: where the atoms went, where the energy went.**