

Flow of Matter and Energy Assessment Map

Assessment maps enable users to see the relationships among a set of ideas related to a particular content standard.

LEGEND:

- Key Ideas** (represented by a rounded rectangle)
- Prerequisite Ideas (represented by a rounded rectangle)
- Later Ideas (represented by a rounded rectangle)
- Common Student Ideas (represented by a rounded rectangle)

BSL = Benchmarks for Science Literacy, AAAS, 1993
 MSSS = Making Sense of Secondary Science, Routledge, 1994

The chemical elements that make up the molecules of living things pass through food webs and are combined and recombined in different ways. At each link in a food web, some energy is stored in newly made structures but much is dissipated into the environment as heat. Continual input of energy from sunlight keeps the process going. BSL, p.121

Food provides molecules that serve as fuel and building materials for all organisms. BSL, p. 120

Organisms that eat plants are consumed by other organisms. BSL, p. 120

Organisms that eat plants break down plant structures to produce materials and energy needed to survive. BSL, p. 120

The food plants make can be used immediately for fuel or materials or it may be stored for later use. BSL, p. 120

All organisms, including the human species, are part of and depend on two main interconnected global food webs. BSL, p 104

Students may think of food as anything taken in by an organism. They may believe that food is a requirement for growth, not a source of matter for growth. BSL, p. 342

Plants use the energy in light to make sugar from carbon dioxide [in the air] and water. BSL, p. 120

Students often think that organisms and materials in the environment are different types of matter and not transformable into each other. BSL, p. 342

Some students may believe that plants photosynthesize to provide food for people and other animals, not for themselves. Plants do not respire or do so only in the dark. MSSS, p. 33

Students may think that sunlight is the actual food, is made of molecules, or is a reagent in photosynthesis along with CO₂ and H₂O. They may also believe that plants have multiple sources of CO₂, H₂O, and minerals. MSSS, p. 33

When a new material is made by combining two or more materials, it has properties that are different from the original material. BSL, p. 77

Energy can change from one form to another in living things. BSL, p. 120

Carbon and hydrogen are essential elements of living matter. BSL, p. 78

Plants use sunlight to make their own food; Animals consume energy-rich foods. BSL, p. 104

Some students think that plants get food from the environment rather than making it themselves. BSL, p. 342

Air is a substance BSL, p. 68

Some source of energy is needed for all organisms to stay alive and grow. BSL, p. 119