

Activity 4.1 Cellular Respiration Handout

Decomposers need air to grow. How are air and growth connected?

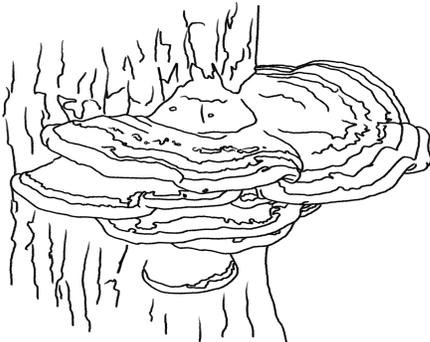
What do decomposers get from food?

You've already learned that decomposers get organic matter from the foods they absorb. These are carbohydrates, proteins, and fats. This organic matter is digested and broken down to monomers and taken to cells. Sometimes cells rebuild the monomers back into polymers in order to grow. But most monomers are used by cells in a different way: they are "reacted" with oxygen in the cells. What happens when organic matter is reacted with oxygen? Do you have any ideas?

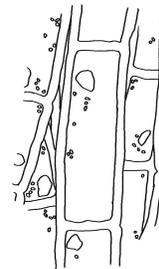
How do decomposers get energy from food?

Every cell in a decomposer's body needs energy, but how does it get energy? At first the energy is stored in **food molecules** as chemical energy. The food molecules have carbon-carbon and carbon-hydrogen bonds. The cell can change this chemical energy into other forms of energy, such as kinetic energy, more chemical energy, or heat. The cell does this by reacting food molecules with oxygen and changing the organic food matter into waste products it doesn't need: **carbon dioxide and water**. How can it get rid of the waste products? Give them back to the air!

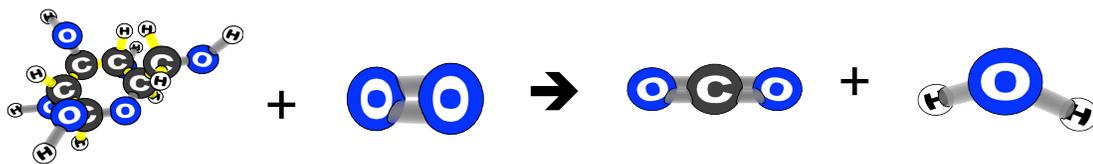
Macroscopic: 1 Meter (10^0)



Microscopic: 2 Micrometers (10^{-6})



Atomic-Molecular: 100-500 Picometers (10^{-10})



MATTER: $\text{Glucose}(\text{C}_6\text{H}_{12}\text{O}_6) + 6\text{Oxygen}(\text{O}_2) \rightarrow 6\text{Carbon Dioxide}(\text{CO}_2) + 6\text{Water}(\text{H}_2\text{O})$

ENERGY: chemical energy \rightarrow kinetic energy + heat

Evidence of Cellular Respiration

Decomposers give off CO₂ and H₂O:

As cells work, they give off carbon dioxide and water that they do not need. Carbon dioxide and water are inorganic molecules that do not have chemical energy. These molecules leave the cells and go back into the air. What ways could you measure the H₂O and CO₂ decomposers give off?

Decomposers Give Off Heat:

Just like when you burn a piece of wood, burning food in also changes chemical energy to heat. Decomposer cells do this during cellular respiration. In fact, the heat you get from a mushroom you eat is the same amount of heat that would be given off if you burned the mushroom in a pan on the stove! A scientist name Max Rubner proved this to be true over 100 years ago. He found that burning dog food released the same amount of energy as was released if the dog ate and metabolized the food.

