Organisms have structures to transport materials they need to survive.

Grade 5 Life Science: Transport Systems in Animals and Plants

Introduction and Conceptual Flow Narrative

Science Matters

Organisms demonstrate a hierarchy of structure from cells, to tissues, to organs, to organ systems, to organisms. This hierarchy is essential for organisms to function at all levels of organization. From the microscopic level of individual cells to the macroscopic level of entire organisms, each level is interconnected and dependent on the levels above and below it. This complexity is the result of specialization and organization, allowing organisms to carry out the multitude of functions necessary for survival.

Organisms have structures designed to transport materials and function at each level of organization. These structures include the respiratory system, which transports gases; the circulatory system, which transports nutrients and gases; the digestive system, which transports nutrients; and the excretory system, which transports wastes.

The digestive system consists of the mouth/teeth, esophagus, stomach, small and large intestine, rectum/anus, gall bladder, pancreas, and liver. The respiratory system consists of the nose, trachea, bronchi, lungs (alveoli), and diaphragm. The circulatory system consists of the heart, arteries, veins, and capillaries. The excretory system consists of the kidney, ureters, and urinary bladder.

Oxygen is inhaled and carbon dioxide is exhaled. The heart has four chambers to oxygenate and pump the blood throughout the body. Arteries distribute oxygen and nutrients to tissue via capillaries; veins take away carbon dioxide and waste. Food is converted mechanically and chemically into nutrients and energy. Solid waste is excreted through the anus. Materials are transported system to organ, organ to organ, and organ to tissue cells. From hierarchy of structure from demesntrate a
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Organisms have structures to transport materials they need to survive.

Plants have structures for transporting materials.

Photosynthesis

- Plants have a system of tubes that transport water, minerals, nutrients, and gases.

- Photosynthesis occurs only in plants in which sugar is made and oxygen is released.

- In the process of photosynthesis, carbon dioxide and water are converted, in the presence of chlorophyll and sunlight, into sugar and oxygen.

\[ \text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2 \]

Photosynthesis and cellular respiration are reverse processes.

Cellular respiration occurs in plants and animals in which food is converted to energy and carbon dioxide is released.

Systems interact with each other to help an organism survive. Changes in one system impact other systems.

Individual parts and functions of an organism are systems, which is different than the system of the parts of a system work together to perform a function of various components.

Structures that help transport materials include roots, stems, leaves, and tubes (xylem and phloem).

Structures that help transport photosynthetic reactants and products include roots (H₂O); stomata (CO₂); phloem (sugar); and xylem (H₂O; nutrients).

Plants, trees, leaves and roots have structures for transport for photosynthesis.