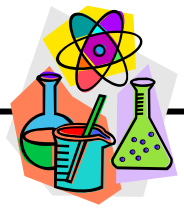
Science 10-4 Unit C: Investigating Matter and Energy in Living Systems



Comparing Living Systems

Did You Know? The breathing processes of plants and animals maintain the Earth's natural balance of oxygen and carbon dioxide.

Human energy: The source of the body's power or ability to do work, e.g., we take energy from food and use it to help us walk, run, lift, jump.

Respiration: Air is inhaled to fill the lungs. Then, oxygen works to break down nutrients to produce energy. Carbon dioxide is released.

Word equation: Oxygen + Protein ⟶ Carbon Dioxide

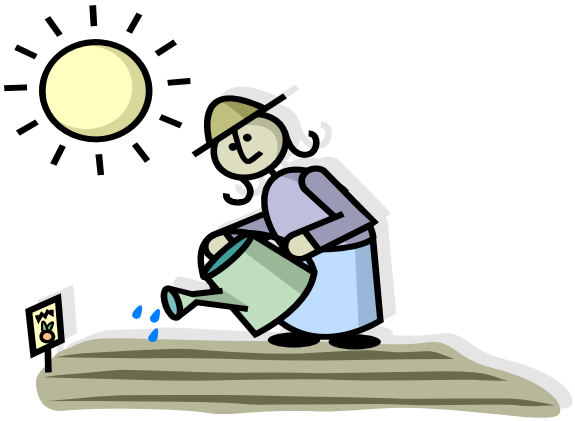
1. Investigate the process of respiration and describe how it affects your everyday life. Respond to the questions below and other questions generated by you and your classmates.

   - What organs are involved in the respiratory system?
   - What factors positively and negatively affect the respiratory system, e.g., exercising, smoking?
   - How can we maintain a healthy respiratory system?

Use Tools Question Organizer I or Question Organizer II and Note Taking III.

Photosynthesis: Using the energy of sunlight, carbon dioxide and water to produce carbohydrates and release oxygen.

Word equation: Carbon Dioxide + Water ⟶ Oxygen + Carbohydrates



2. Locate and/or draw and label a diagram that shows the process of photosynthesis. Review Processing and Displaying Data for tips on drawing a scientific diagram.

3. Use a diagram or other strategy to compare how energy is used in respiration in animals and photosynthesis in plants.

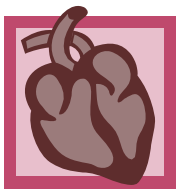
4. With a group, brainstorm all the life functions you can think of that are found in living things; e.g.:

    - energy conversion
    - growth
    - reproduction
    - conservation or dissipation of thermal energy (heat)
    - hibernation and dormancy.

    Using several items from your list of life functions, create a chart like the following and fill it out.

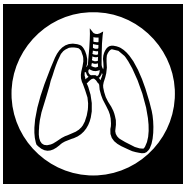
Life Function	fish	trees	birds	humans	insects	lizards	bears
reproduction	eggs laid by female and fertilized by male	seeds fall from mature tree (sometimes in fruit)	etc.				
etc.							

5. Fill out the following chart to show the different organs and systems in plants and animals that perform life functions.



Animal or Plant	Organs or System	Life Function

6. Fill out the following chart to describe the organ systems in humans that perform life functions.

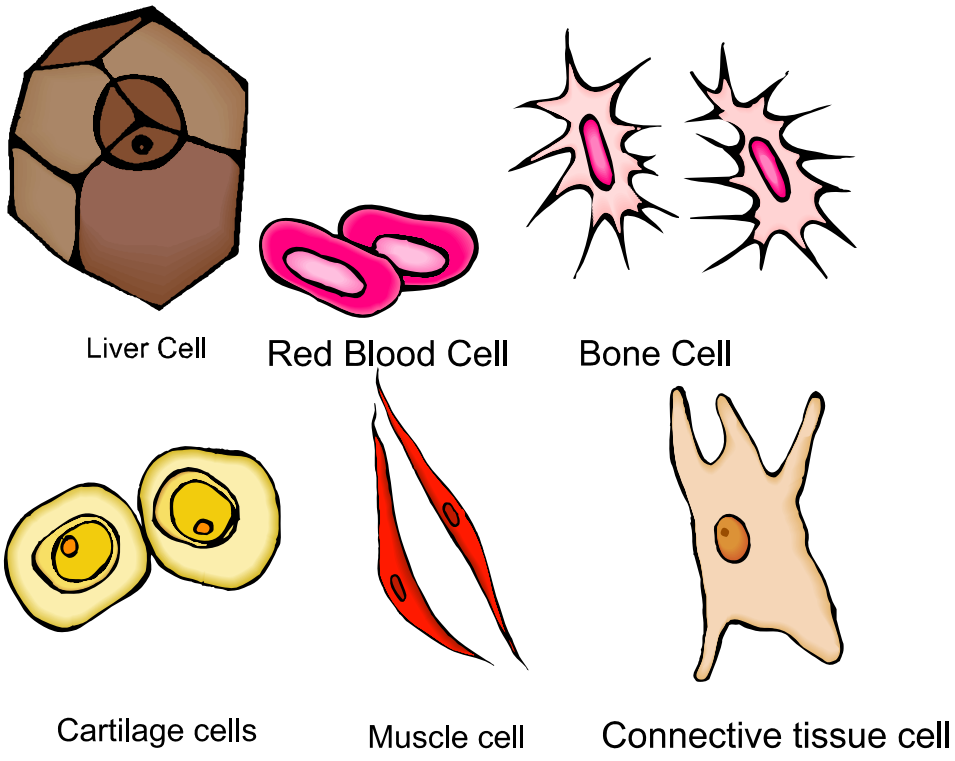


Life Function	Human Organ System
energy conversion	system: organs in the system: how they work together:
growth	system: organs: how they work together:
reproduction	system: organs: how they work together:
conservation or dissipation of thermal energy (heat)	system: organs: how they work together:

7. Investigate different cells of plants and animals and describe how their structures are different for different life functions. For example:

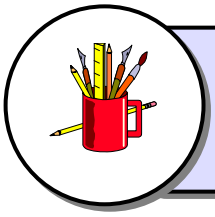
   - skin cells are flat to cover a large surface area
   - plant cell walls provide structural support
   - nerve cells are long for the transmission of impulses.

   Think about the functions of the cell (e.g., used for storage, transmitting substances, protection) and how that affects its shape, size and other features.



8. With your teacher's help, plan a visit to a health clinic or hospital. List the tools that doctors, nurses and technicians use, e.g., heart monitors, x-ray machines, ultrasound, blood pressure cuff, CAT scan or ECG machine.

   Investigate and create a presentation about one of the technological tools, including how it used and how it helps enhance, maintain and/or monitor human health.



Use Tools Note Taking I or Note Taking II and Thinking About Form for Presentations.