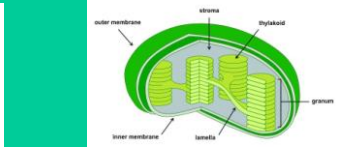
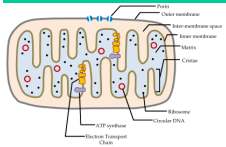
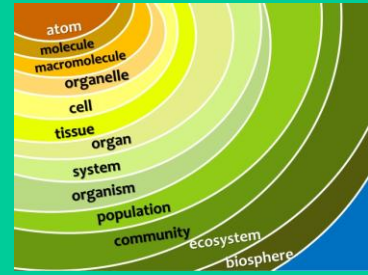


## 2.2 Cell Structure and Function



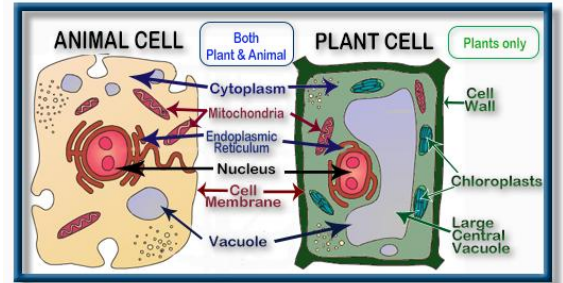
## ENDURING UNDERSTANDING

SYI-1 Living systems are organized in a hierarchy of structural levels that interact.



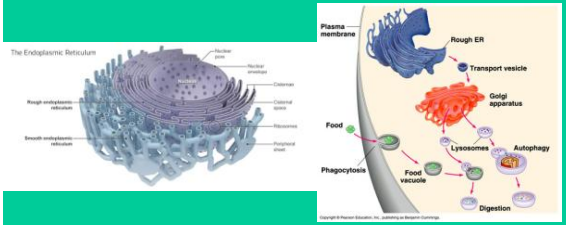
### SYI-1.E Explain how subcellular components and organelles contribute to the function of the cell.

□ Organelles and subcellular structures, and the interactions among them, support cellular function—



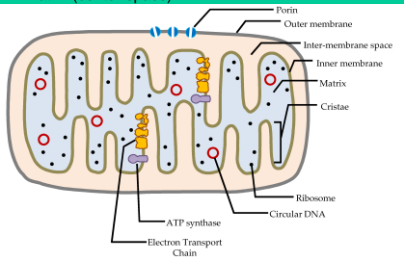
### Organelles and subcellular structures, and the interactions among them, support cellular function—

- Endoplasmic Reticulum
  - Provides mechanical support
  - Carries out protein synthesis on membrane-bound ribosomes
  - Plays a role in intracellular transport.



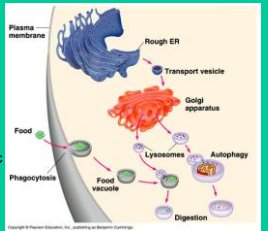
### Organelles and subcellular structures, and the interactions among them, support cellular function—

- Mitochondrial double membrane
  - provides compartments for different metabolic reactions.
    - Inner membrane space
    - Matrix (center space)



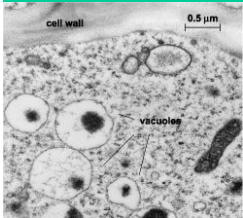
### Organelles and subcellular structures, and the interactions among them, support cellular function—

- Lysosomes
  - Hydrolytic enzymes for
    - Intracellular digestion
      - » Phagocytosis
      - » Lysosomes fuse with vesicles and digest contents.
    - Recycling of a cell's organic materials (autophagy)
    - Programmed cell death (apoptosis)

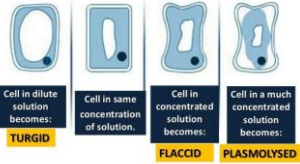


**Organelles and subcellular structures, and the interactions among them, support cellular function—**

- Vacuoles
  - Many roles include
    - Storage and release of macromolecules and cellular waste products.
    - In plants, it aids in retention of water for turgor pressure.

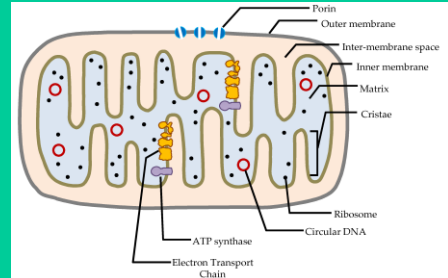


**What happens to PLANT cells?**



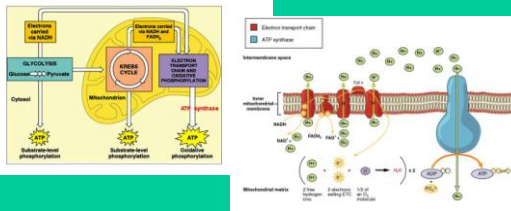
**SY1-1.F Describe the structural features of a cell that allow organisms to capture, store, and use energy**

- The folding of the inner mitochondrial membrane increases the surface area, which allows for more ATP to be synthesized.



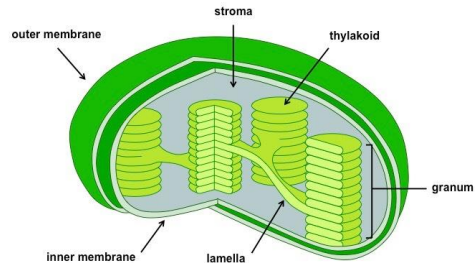
**SY1-1.F Describe the structural features of a cell that allow organisms to capture, store, and use energy**

- The Krebs cycle (citric acid cycle) reactions occur in the matrix of the mitochondria.
- Electron transport and ATP synthesis occur on the inner mitochondrial membrane.



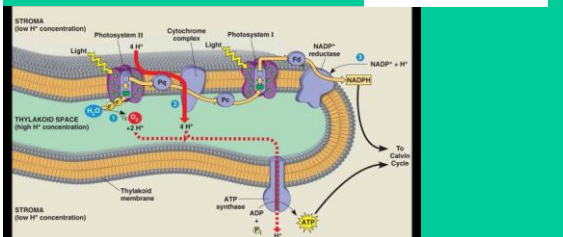
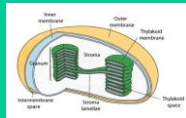
**SY1-1.F Describe the structural features of a cell that allow organisms to capture, store, and use energy**

- Within the chloroplast are thylakoids and the stroma.
- The thylakoids are organized in stacks, called grana.



**SY1-1.F Describe the structural features of a cell that allow organisms to capture, store, and use energy**

- Thylakoid membranes contain chlorophyll pigments and electron transport proteins that comprise the photosystems



**SY1-1.F Describe the structural features of a cell that allow organisms to capture, store, and use energy**

- The light-dependent reactions of photosynthesis occur in the grana.
- The stroma is the fluid within the inner chloroplast membrane and outside of the thylakoid.
- The carbon fixation (Calvin-Benson cycle) reactions of photosynthesis occur in the stroma

