CELLS! CELLS! CELLS!

Chapter 1.1-1.3 notes
Organisms

• Living things use energy, move, consume water and food, etc.

• Any individual form of life that is capable of growing and reproducing is considered an organism.

• All organisms get water and other materials from the environment.

Identify the organisms:

Rock  Human  Hamburger
Tree  Table  Computer
Fish  Zebra  Bird
Characteristics of Life

- All living things have **six** characteristics of life.
- Its body must be **made up of cells**.
- It must have the **ability to develop and grow**.
- It must be **able to respond to its environment**.
- It must have the **ability to reproduce**.
- It must be able to **use energy**.
- It must be able to **metabolize food or excrete waste**.
Needs of Life

Organisms cannot carry out the activities of life without some necessities.

There are five necessities for every organism:

- Food and Water
- Fats and Proteins
- Air
- Temperature
- Space
Cells

- All living things are made of **cells**.
- Cells are the **smallest** unit of life.
- Cells **Organisms** are either **unicellular** or **multicellular**.
- A unicellular organism is a **single** cell.
- A multicellular organisms is more than **one** cell.

**Examples**
- Unicellular - a **tiny** organism in pond water
- Multicellular - **frogs**
Cell Discovery!

- Most cells are so small that they must be seen with a microscope.

- In the 1660’s Robert Hooke began using microscopes to look at various material. Hooke looked at cork under a microscope and coined the term ‘cell’.

- In the 1670’s Anton van Leeuwenhoek began looking at cells, too. Leeuwenhoek was the first person to describe living cells.

- Using microscopes helped the scientist discover the living things in items such as pond water. This made people ask the question: Do all living things have cells?
Cell theory:

- Another question that many people had was where do cells come from?
- As Scientists began to investigate this question, they developed what is known as the cell theory.

- The cell theory began because people started questing where cells came from.

- The cell theory one of the basic concepts of biology. It states:
  - All living things are made up of one or more cells.
  - Cells carry out the functions needed to support life.
Cell theory:

- The cell theory one of the basic concepts of biology. It states:
  - All living things are made up of one or more cells.
  - Cells carry out the functions needed to support life.
  - Cells come from other living cells.
Louis Pasteur

- A French scientist that lived during the 1800’s
- There was no mechanical refrigeration in homes, which caused foods like milk to spoil.
- Many people during this time died from typhoid fever, tuberculosis, and diphtheria.
- Pasteur discovered microscopic organisms (bacteria) to be the cause of spoiled food and diseases.
- Pasteur discovered a process called pasteurization, which uses heat to kill bacteria. Doing this helps things like milk last longer.
Bacteria & Spontaneous Generation

- Many scientists believed that bacteria grew from nonliving material in what is called spontaneous generation.
- Pasteur thought otherwise and conducted a series of experiments that confirmed the cell theory.
- He found that bacteria are present in the air.
- In his experiments, there were two flasks of broth. One was open, and the other was sealed. Bacteria began growing in the flask that was open, but not the one that was sealed. The sealed one remained clear.
- Knowing this, what do you think would happen to a sealed flask of broth after a week has passed?
The Diverse Cell

Cells have a great variety of size and shape.

The cell membrane is a boundary around the cell that separates the inside of the cell from the outside of the cell. The cell membrane is that protective outer covering that encloses the entire cell. It controls what enters and leaves the cell.

Cytoplasm is a gelatin-like material inside of the cell membrane.

Cells can be divided into two categories: eukaryote and prokaryote.

A eukaryotic cell holds its genetic material inside of the nucleus of the cell.

A prokaryotic cell does not have a nucleus, so its genetic material is in the cytoplasm.
Both plants and animals have eukaryotic cells. Plant and animal cells have a cell membrane and cytoplasm. Plant cells contain a cell wall. The cell wall is a tough outer covering that lies outside the cell membrane. The cell wall supports and protects the cell. There are many organelles that can be found within both the plant and animal cells. An organelle is any part of a cell that is surrounded by a membrane; each organelle's activities are separate from those of other organelles.
Organisms

- If you look around you, there are many living organisms that you can see. There is also a huge number of unicellular organisms.

- Most of the organisms alive on Earth today are unicellular, made of a single cell.

- Examples of single-celled organisms are found in the domains of **Archaea**, **Bacteria**, and **Eukarya**.

- A domain is a broad category of living things based on the characteristics of the cell.
Archaea and Bacteria

- They are prokaryotes and both have tough cell walls.
- The cytoplasm contains ribosomes, but no organelles.
- There is no nucleus for organisms in this category.
- Archaea was first discovered in the 1970s, but bacteria was discovered prior to this time.
Eukarya

- Organisms have cells with a nucleus.
- Includes all of the multicellular organisms on Earth such as plants, animals, and fungi.
- It also includes many unicellular organisms like protists.
- The paramecium is one of the most complex of the unicellular eukaryotes; it has all it needs to live as a single cell.
Multicellular Organisms

- Most **multicellular** organisms are made of different types of **cells** that do different jobs. The cells are all specialized.
- Specialization is when a cell and all of its organelles are organized in a way that allows it to do a specific job.
- An example of specialized cell is a **muscle cell** or **root cell**.
- A nonexample is a paramecium.
- Cells in more **complex** organisms, like plants and animals, are grouped together in **tissues**.
- A **tissue** is a **group of similar** cells that are organized to do a **specific** job. An example is the **two layers of skin tissue** that humans have.
Multicellular Organisms

Different tissues working together to perform a particular function represents an organism.

This is an organ. An example of an organ is the lungs.

Organs and tissues working together form an organ system. An example would be the nervous system.

Organism is the highest level of organization. An example would be a frog.
Cell Models

Scientists use cell models to provide insight into cells.

Models show how cell parts fit together.

Scientific models can be a simple equation or a formula.

It can also be three-dimensional in order to show the scientists what it would look like.

The real cells often look very different from the models that are created of the cell.
Levels of Organization

◦ Use the following link to fill in the blanks about the levels of organization

http://www.scsc.k12.in.us/SMS/Teachers/Martin/replacementlevelsoforganization.htm