What are Cells?

Name: _____ Date: _____

How Were Cells Discovered?

- _____ are so small that they remained hidden unit the invention of the microscope about 400 years ago.
- English scientist Robert Hooke used a microscope to look at a slice of _____.
- Observed that cork contained tiny _____.
- The matter in cork is _____, its cells are empty.
- They look like little boxes filled with _____.
- Hooke named the holes "_____".
- Anton van Leeuwenhoek
  - Dutch _____ maker
  - Was the first person to study _____ cells
- Leeuwenhoek looked at _____ _____ with his microscope and saw it was filled with tiny living things.
- He called these living things "_____".

Modern Cell Theory

- Credit for developing the cell theory belongs to _____ German scientists:
  - _____ Matthias Schleiden
    - Identified that all _____ are made up of cells
  - _____ Theodor Schwann
    - Identified that all _____ are made up of cells
  - _____ Rudolf Virchow
    - Cells come from _____ cells
- During the Middle Ages, it was commonly believed that living organisms could come from _____ things.
- Many scientists believed in this idea of _____ generation
- However, _____ _____ felt that there was another explanation.
- He heated meat broth in special flasks that had long necks bent in the shape of an ____.
- He designed the necks this way so air could enter the flask but living things would be _____ in the bend of the neck and never reach the broth.

- He left the flasks _____ and waited to see what would happen.
- Months later, no living things had grown in the _____.
- When the flasks were _____, living organisms did begin to grow in the broth.
- Pasteur concluded that when living organisms grew in the broth it was because they had gotten in the broth from the _____.
- Principles of Cell Theory
  - All living organisms are composed of _____ or _____ cells.
  - The cell is the basic unit of _____ in all organisms
  - All cells come from _____ cells
- Since the development of the cell theory, scientists have learned much more about cells, their complexities, and their _____.
- _____ helps scientists as they continue to study the cell and its connection to life.

Origin of the Cell

- The Bible describes the creation of all life by an all-wise and all-powerful _____.
- For _____ of years most people believed that life came from some intelligent, higher being.
- Christians, Jews, and Muslims believe that the Creator was the God of the _____.
- Many people today still accept the Bible story as a _____ account of the origin of life.
- In the ____ _____ while scientists were working to disprove the theory of spontaneous generation.
- Charles Darwin's theory of _____ was becoming popular.
- His theory was focused mostly on the origin of different _____.
- However, scientists who did not believe in God created life took the concept of evolution _____.
- Alexander Oparin suggested that living cells arose gradually from nonliving matter _____ of years ago.
- This idea is called _____.
- In 19th century microscopes showed a cell as a simple looking _____.
- To believe a simple blob could have come from something _____ was not too hard to believe since people have been believing in spontaneous generation for years.
- Today with powerful _____ we can see the amazing complexities of the cell.

- Scientist now know that what once looked like a simple blob is a highly-sophisticated system of parts that work together to _____ life.

Cells

- Basic building blocks of _____
- _____: any life form that consists of one cell
- Many of the organisms that Leeunwenhock and Pasteur examined can live almost _____
  - Examples: bacteria, yeast, algae, and protozoa
  - Bacteria are among the _____of the unicellular creatures
- The unit μm stands for _____
- Bacteria can be as small as _____
- Human hair is about _____
- Eggs laid by birds are _____, so the largest single cell is an ostrich egg!
- _____: organisms contain more than one cell
- Can contain millions or even _____ of cells
- Human body is thought to contain _____
- Animals and plant cells are _____
- Even at that size there's room for _____ on the period at the end of a sentence.

Cell Parts

- Cells are made up of many parts that form a _____.
- Cells are an organized collection of material protected by a thin "skin" or _____ _____.
- Cell Membrane is formed by two layers of _____ molecules with special proteins scattered throughout.
- Things needed to _____ life are constantly passing in and out of cells.
- Cell membrane is selectively _____.
- _____ Permeable: controls what materials are allowed in and out of the cell.
- Water and gases can easily pass _____ and _____ of the cell through the cell membrane.
- _____ molecules do not enter and exit the cell as easily.
- The _____ in the cell membrane help the larger molecules pass through.
- Located throughout the inside of the cell is a fluid known as _____.

    - It is a complex _____.
    - Contains many tiny structures that make, package, store, and transport everything the cell needs to carry on the _____ of life.
- Cell membranes and cytoplasm are found in _____ plant and animal cells.
- Plant cells contain a _____ _____.
- _____ _____: provides additional structure to help plants hold their shape.

Cell Transport

- God designed the cell with some incredibly complex _____ systems.
- _____: the movement of molecules from an area of high concentration to an area of less concentration.
- If you have been in a _____ when strong-smelling foods are cooking, you have observed diffusion at work.
- Diffusion of molecules also happens in _____.
- _____ Diffusion: the process of proteins embedding in the cell membrane to help move molecules in and out of the cell.
- There are _____ _____ in the cell membrane that allow some small molecules, like oxygen and carbon dioxide, to enter and exit.
- This process happens with water molecules by _____.
- _____: refers to the diffusion of water molecules through a membrane.
- Types of transportation to and from the cell
    - _____ Transport
    - _____ Transport
- Passive Transport: no _____ required to move molecules in and out of a cell.
    - Molecules from area of _____ concentration to areas of _____ concentration.
    - Examples: diffusion, facilitated diffusion, and osmosis
- Active Transport: _____ is required to move molecules in and out a cell.
    - Molecules go from areas of _____ concentration to areas of _____ concentration.
- _____ specific types of active transport processes are endocytosis and exocytosis.
- _____: if energy is used to send materials out of the cell.
- _____: if energy is used to bring materials into the cell.