

A cell is the basic unit of life...All cells come from preexisting cells ☒ Unicellular ☒ Organisms composed of a single cell ● Multicellular ● Organisms composed of many cells...diversity and specialization of function (over 85 types of cells in the human body Complex Tissue Structure: ● As multicellular organisms, most animals develop specialized cells that group together into tissues with specialized functions. ● A tissue is a collection of similar cells that had a common embryonic origin. ● There are four main types of animal tissues: nervous, muscle, connective, and epithelial. Nervous tissue contains neurons, or nerve cells, which transmit nerve impulses. Muscle tissue contracts to cause all types of body movement. Animals also have specialized connective tissues that provide many functions, including transport (Blood) and structural support (bone). Reproduction ● Asexual Reproduction: – Single parent copies its DNA and then divides or ‘buds’ to produce GENETICALLY IDENTICAL OFFSPRING. – This can mean ‘rapidfire’ reproduction of great numbers of identical organisms ☒ Sexual Reproduction: ☒ Two different parent cells unite to produce the first cells of a new organism. ☒ Offspring are GENETICALLY UNIQUE leading to greater genetic diversity and speciation on Earth All organisms grow and develop ☒ Single celled organisms (like bacteria) growth is mostly a simple increase in size ☒ Multicellular organisms undergo extensive development from a single fertilized egg dividing many, many times to produce the multitude of cells in mature organisms ☒ Differentiation is the changing of shape and structure to perform different functions. Obtain and Use Energy ● All living things obtain energy from their environment or surroundings and use it for growth, development, reproduction, and excretion – these processes occur at different rates... METABOLISM = Anabolism (synthesizing compounds – expends energy) + Catabolism (breaking compounds into simple components – releases energy) = Combination of chemical reactions (total activity) that build and break down materials as organisms carry out their life processes. Living organisms respond to the environment ☒ Organisms detect and respond to a STIMULUS (signal) or anything in the environment that causes a response whether internal or external. Internal stimuli are things like blood glucose level (low levels make you feel hungry, possibly weak, tired, head-achy, etc) External stimuli include light, touch, sound, heat, smell, sight... Homeostasis ☒ The autonomic (self-controlled) processes by which organisms respond to stimuli such that conditions in the body are kept suitable to sustain life for example respond of body to bleeding and heat stress All life is based on a UNIVERSAL GENETIC CODE...DNA, determining the inherited traits of all organisms! ● DNA is a type of biomolecule known as a Nucleic Acid that had a three dimensional shape called a double helix. The shape of DNA allows for duplication and ‘reading’ or expressions of the genes it encodes. EVOLUTION is ability of a group of organisms to change over time. This invaluable for survival in constantly changing environments... ● ADAPTATION is a trait of a living thing that helps it compete and survive to reproduce in its environment The Cell The cell is the lowest level of organization that can perform all activities required for life. All cells are enclosed by a membrane and use DNA as their genetic information. A eukaryotic cell has membrane-enclosed organelles, the largest of which is usually the nucleus By comparison, a prokaryotic cell is simpler and usually smaller, and does not contain a nucleus or other membrane-enclosed organelles The Cell Theory 1. Cells” were named by Englishman Robert Hooke in 1665. 2. The cell is the basic unit of structure and function. 3. All organisms are made of one or more cells. 4. All cells come from pre-existing cells Types of Cells Prokaryotic Cells

● The first and most primitive cells ● Lack a nucleus and other membrane bound organelles (mitochondria, etc) ● Bacteria are the ONLY prokaryotes Eukaryotic Cells ● Most organisms have eukaryotic cells (ex: all plant and animal cells!) ● All genetic material is contained in a nucleus ● Have many membrane bound organelles

Functions of the Plasma Membrane

- 1- Physical Barrier ● Protects all the components of the cell from the outside environment and allows separate activities to occur inside and outside the cell. ● The plasma membrane provides structural support to the cell.
- 2- Selective Permeability ● Plasma membranes are selectively permeable, meaning that only certain molecules can pass through them.
- 3- Endocytosis and Exocytosis ● Endocytosis is ingestion of relatively larger molecules that pass through channels. ● Exocytosis is when the cell releases these materials.
- 4- Cell Signaling ● Facilitate communication and signaling between cells. Proteins on the cell “mark” that cell so that other cells can identify it. The membrane also has receptors that allow it to carry out certain tasks when molecules such as hormones bind to those receptors.