

Student Name _____ Tutor: _____

Biology
Tutorial #6

Biology Teacher's Name _____ Period _____

CA State Standard 1c – Students know how prokaryotic cells, eukaryotic cells (including those from plants and animals), and viruses differ in complexity and general structure.

HOW ARE CELLS CATEGORIZED? Cells are classified into two main groups based on their structure. Eukaryotic cells have a nucleus and other membrane-bound organelles. Prokaryotic cells, by contrast, lack membrane-bound organelles. Prokaryotes exist as a single, prokaryotic cell. Eukaryotes can be either single-celled or multicellular. Examples of eukaryotic organisms include plants and animals.

WHAT ARE SIMILARITIES AND DIFFERENCES BETWEEN PROKARYOTIC AND EUKARYOTIC CELLS?

All cells are surrounded by a phospholipid membrane and contain genetic material (DNA or deoxyribonucleic acid): The DNA in a eukaryotic cell is enclosed within a membrane in the nucleus of the cell. Prokaryotes, on the other hand, do not have a well-defined nucleus, and their genetic material floats freely within the cytoplasm. Eukaryotic cells are also generally larger and more complex than prokaryotic cells.

Eukaryotic cells have membrane-bound organelles, which are internal compartments that perform specialized functions. Examples of organelles include the nucleus; the endoplasmic reticulum, which plays a role in protein and lipid production; lysosomes, where the breakdown of older cell components occurs; and mitochondria, the sites of most adenosine triphosphate, ATP, production. Prokaryotic cells do not have membrane-bound organelles.

HOW DIVERSE ARE EUKARYOTIC CELLS? Although all eukaryotic cells share some common features, they can also differ in many ways. Plants have the ability to make their own food via photosynthesis, and many plant cells have chloroplasts, or pigment-containing organelles, in which photosynthesis occurs. Animals must obtain food from the environment, and their cells lack chloroplasts. Animal cells also lack a structure found in most plant cells, the cell wall. For plant cells, cell walls outside of the cell membrane provide a rigid support system. Some eukaryotes, such as fungi and protists, may show some characteristics of both plant cells and animal cells.

WHAT ARE VIRUSES?

Viruses are composed of a strand of genetic material, such as DNA or ribonucleic acid (RNA), surrounded by a protein coat. Viruses such as HIV, chicken pox and influenza viruses are not cells. Viruses are not considered to be alive because they cannot perform any functions on their own. For example, viruses do not have any organelles, and they cannot use energy to build proteins. Unlike eukaryotic and prokaryotic cells, which can undergo cell division, viruses cannot reproduce on their own. A virus must infect another cell in order to reproduce. The virus injects its genetic material into a cell and forces the cell to produce new viruses.

Complete the questions that follow:

1. Name 3 differences between eukaryotic cells and prokaryotic cells:

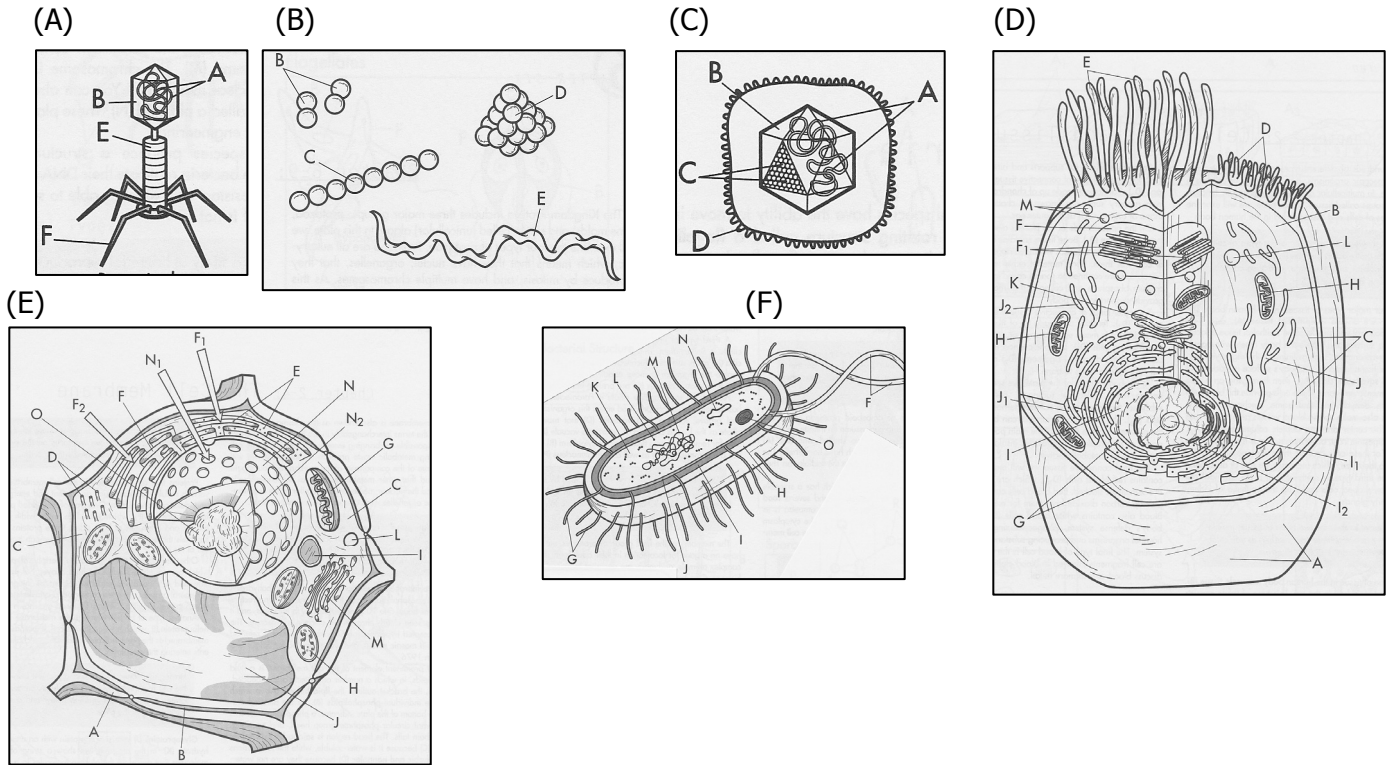
2. Describe the physical structure of a virus:

3. Identify common diseases caused by 2 viruses:

4. Suppose a team of researchers discovers a new particle, and they want to determine what it is. They perform experiments and find that the particle has no organelles and that the particles will only reproduce in the presence of other cells. The particle is probably a(n)

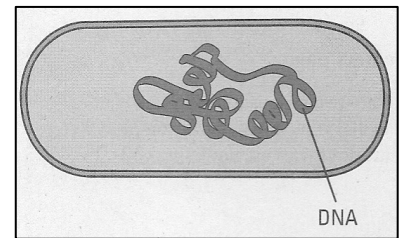
- A) animal cell B) plant cell C) Virus D) bacterial cell.

5. Identify the following as a **Prokaryote**, **Eukaryote** or **Virus** (sizes are not to scale!!!):



6. The diagram (right) shows a cell that has a cell wall and free floating DNA. What type of cell is this one *most* likely to be?

- A) prokaryotic B) eukaryotic C) viral D) animal



7. In eukaryotes, thousands of chemical reactions are able to take part in separate compartments called

- A) prokaryotes B) organelles C) proteins D) bacteria.

8. Identify & Explain: Look at the diagram below. (A) What features of this cell are used to classify it as a eukaryotic cell? (B) Will it be a plant or animal cell? How do you know?

