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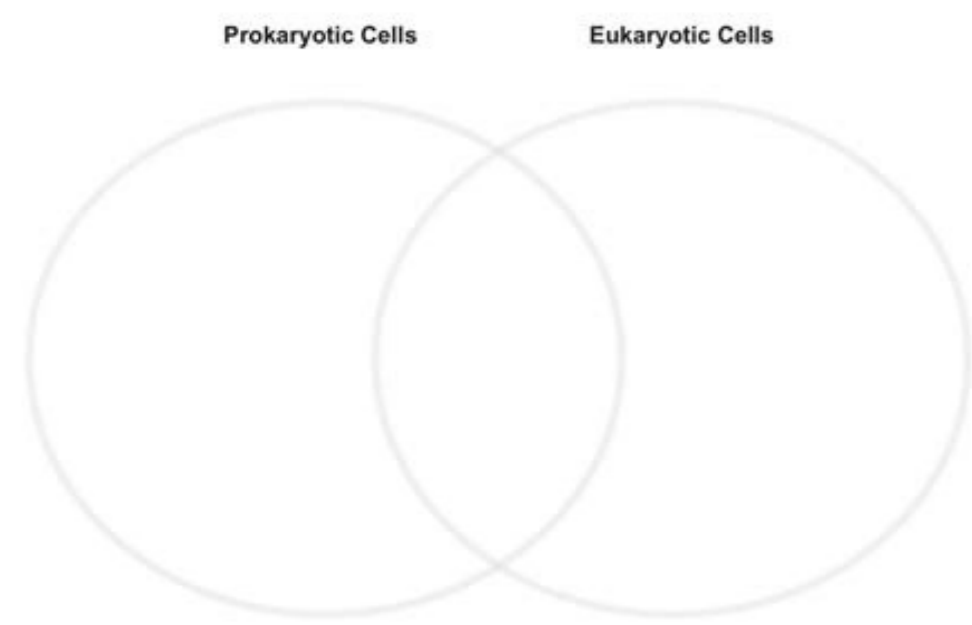
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PROKARYOTIC AND EUKARYOTIC CELLS

What Do You Know?
Compare prokaryotic cells and eukaryotic cells. Read the list of cell characteristics in the box below. Write each characteristic in the correct place on the Venn diagram.

Characteristics of Cells

<ul style="list-style-type: none"> • contain a nucleus • undergo metabolism • contain DNA • are usually smaller than 10 micrometers • are found in fungi • may contain a cell wall • reproduce 	<ul style="list-style-type: none"> • are bacteria and archaea • contain membrane-bound organelles • are found in all multicellular organisms • contain chloroplasts
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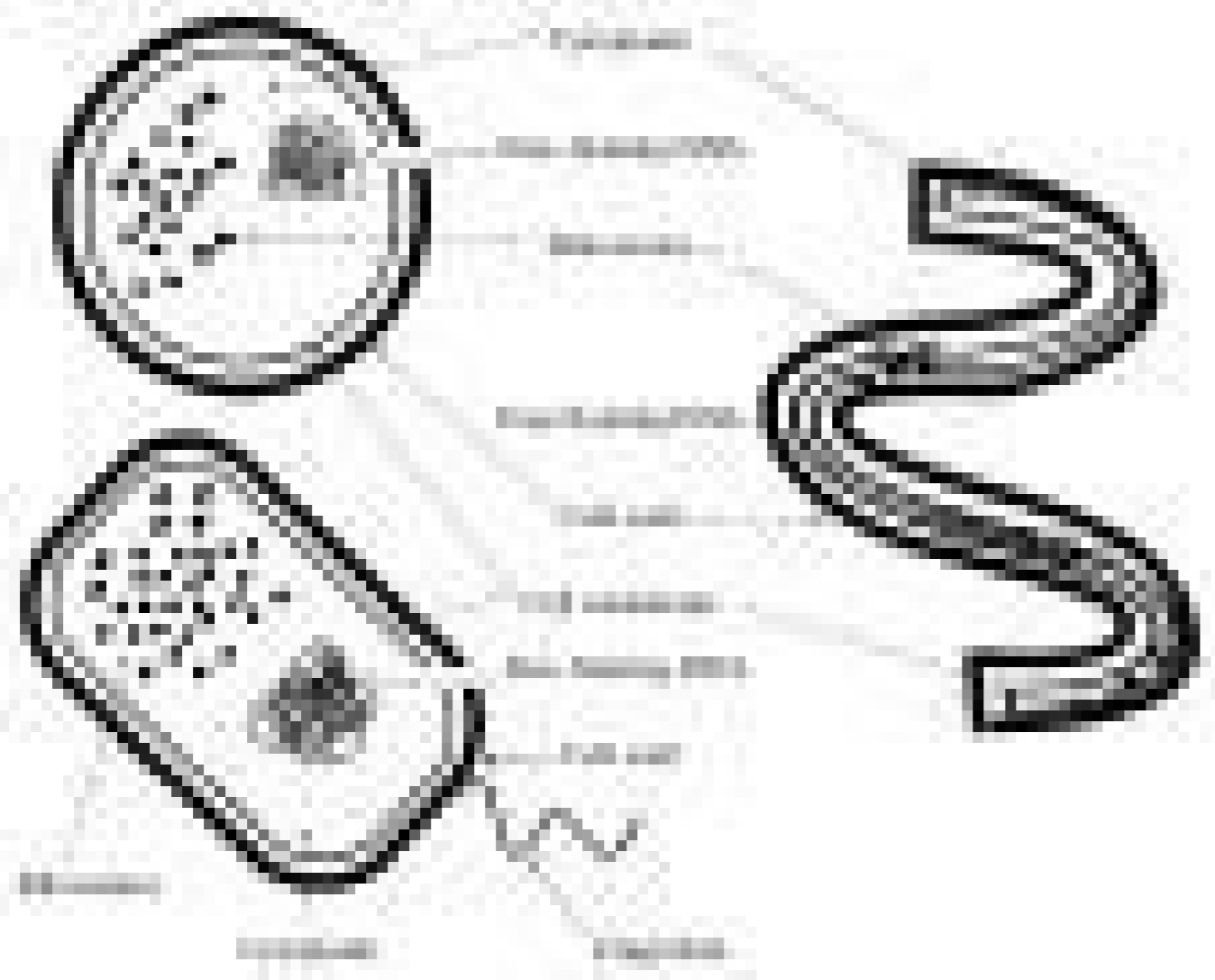
Prokaryotic and Eukaryotic Cells

(An activity for students to complete)

Writing 1

For all biology experiments it is important to write a clear report. This is a chance to show you know, you plan, you observe and you conclude. It all happens in one word: it is a complete way of being in a world of a situation, a large, complex living space with many different things. There are many interesting things, changing, building, breaking, working, etc. something grows, something changes. The report is a chance to describe everything you see, think, feel, do, etc. You can use your own words, diagrams, pictures, etc. to help you write. It is a chance to show you know, you plan, you observe and you conclude. It is a chance to show you know, you plan, you observe and you conclude.

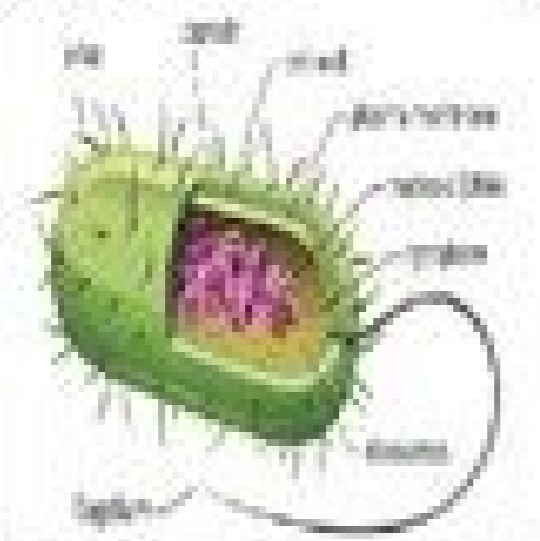
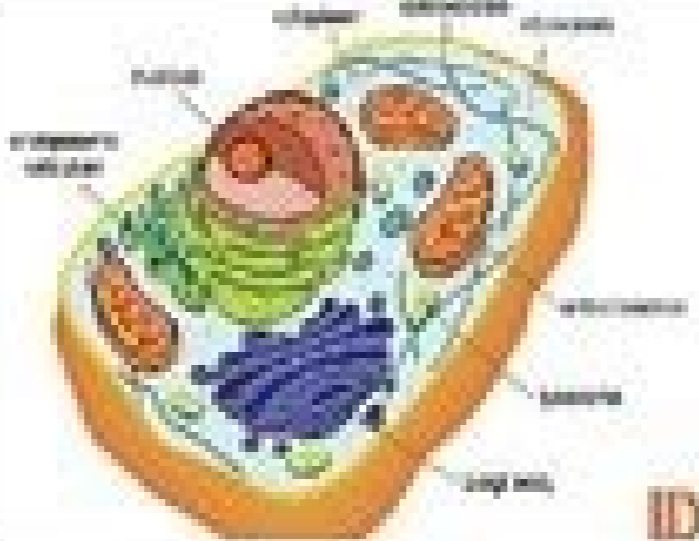
Model 1 - Three Types of Bacterial Cells



1. The diagram shows a spherical cell with a capsule, a rod-shaped cell with a flagellum, and a spiral-shaped cell with flagella. Label the diagram with the correct structures.
2. What is the function of the capsule? (1 mark)
3. What is the function of the flagellum? (1 mark)
4. What is the function of the pili? (1 mark)
5. What is the function of the nucleoid? (1 mark)
6. What is the function of the cell wall? (1 mark)
7. What is the function of the cell membrane? (1 mark)

Prokaryotic and Eukaryotic Cells

All organisms (living things) have at least one or more cell. Cells in our world come in two basic types, **prokaryotic** and **eukaryotic**.

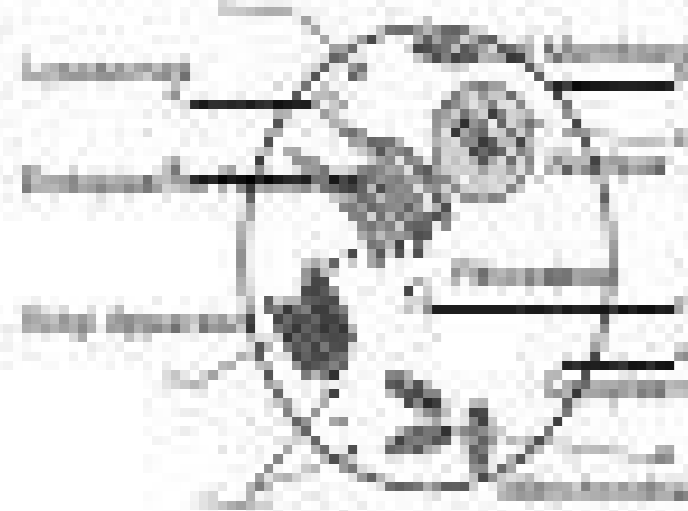
	Prokaryotic	Eukaryotic
Meaning	before a nucleus	possessing a true nucleus
Nucleus (a protective compartment for DNA)	Have no nuclei	Have a true nucleus at the center, bound by a double membrane
Organelles (little cell parts)	No membrane to protect organelles	Protected by membranes and so we call them membrane-bound organelles
Type of Cell	All bacteria	Plant cell, animal cell, fungi, and protists
Cell Membrane/Wall	Has a cell wall	Some have cell wall (plant/fungi cells) Some do not have a cell wall, only a cell membrane (animal cells)
Size	Smaller	Much larger and more complex
DNA	Circular (has no ends)	Linear
Evolution	The first organisms on earth, appearing about 3.5 billion years ago, according to prokaryote fossils	Evolved from prokaryotes
Image		

Organelles in Eukaryotic Cells

What are the functions of different organelles in a cell?

Why?
The word organelle means something that is an organelle. Organelles are structures within cells that carry out various functions. A cell organelle is a small, specialized structure of the cell that carries out a specific function.

Model 1 - How is a Cell Like a Factory?



Model Factory	Cell Organelle	Function
Raw materials (R)	Nucleus	Contains and transmits genetic material (DNA)
Power source	Mitochondria	Cellular energy production
Inventory control (I)	Vacuole	Storage
Production line (P)	Endoplasmic reticulum (ER)	Transport and synthesis of proteins and other biological molecules
Control room (C)	Lysosomes	Breaks down
Waste processing (W)	Mitochondria	Cellular energy production
Shipping department (S)	Golgi apparatus	Sorts & delivers substances
Quality control (Q)	Proteasomes	Breaks down old or damaged
Waste disposal (D)	Vacuole	Cellular waste disposal (breaks down or stores)
Warehouse for storage of products	Vacuole	Temporary storage for wastes, toxins, food, etc.
Working desk (K)	Endoplasmic reticulum	Place of work and site for reactions
Inventory control (I)	Cell membrane	Controls what enters

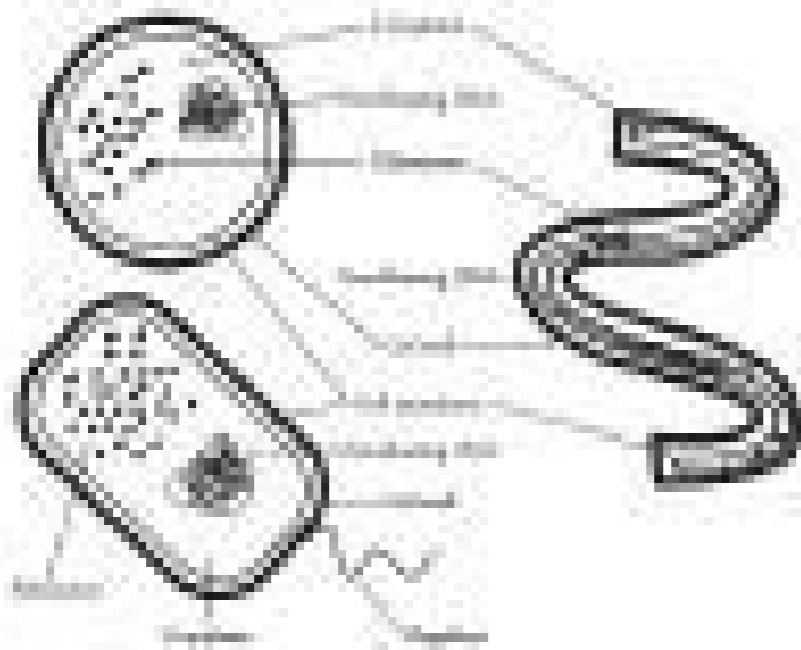
Prokaryotic and Eukaryotic Cells

Student Inquiry

Learning Target
 Differentiate between prokaryotic and eukaryotic cells.
 Compare and contrast the various internal systems and external features of prokaryotic and eukaryotic organisms in a Petri dish.

An efficiency apartment is a nice, small apartment. This apartment is always (over)packed (with tenants) and without your goods. If all happens to you, then it is a disadvantage of living in a small space. It is common to change, complex living spaces with many separate rooms. There are rooms for cooking, eating, sleeping, bathing, reading, watching TV, exercising, guests, exercising and storage. This is not a house and construction is the specific things you would like to include in it. You can live in a complex efficiency or completely built-in units, but with living as a whole unit as a single, as a separate efficiency apartment or as a complex of a structure.

Model 1 - Three Types of Bacterial Cells



- The three bacteriostats in Model 1 are adapted to various habitats (aquatic, terrestrial, soil). Label the diagrams (indicate) with the correct descriptions.
- Model 1 is approximately 100 micrometers in length. Label the correct description.

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The actual length of the animal cta is 60 micron (i¼m). Cá © Lula of Fanned Fanned Palisade cell Bacterium [2 marks] Figure 2 Åshows a bacterial cell and an animal cell as seen in a studenteÅÅÅs textbook. Figure 2 Animal cells store their genetic material in a nucleus, whereas a bacterial cell does not. (a) Give one other way in which a bacterial cell differs from an animal cell. [2 marks] A Brief History of the Microscope (d) Identify which cell from the list below would not contain mitochondria and suggest why this type of cell does not contain this cellular structure. [2 marks] (c) The cell wall of a plant is made from cellulose. Name one type of cell, other than a plant cell, that has a cell wall made from cellulose. Outline one way in which the nucleus is different between these two cells. Suggest an explanation as to why. [2 marks] Magnification Calculations (d) Failure of structure X to develop properly in the cells of a plant root could be catastrophic to a plant. [1 mark] Specialised Cells in Plants (c) Calculate the actual length of structure X in Figure 3. [2 marks] (b) Å Figure 3 shows a photomicrograph of the surface of a plant root. Figure 3 Name structure X. [4 marks] Animal CellsSpecialised Cells in Animals A student is instructed to prepare an uncontaminated culture of bacteria from a tube of liquid nutrient medium. When biologists talk about the size of cells and the structures within them, they are dealing with very small numbers. Describe and explain the techniques the student should use to grow the bacteria on a Petri dish. Page 2 All cells have a number of features in common with each other Å For a cell to be a cell, it has to have the following components: Cellular components & functions table There are two distinct types of cell eÅÅÅ eukaryotic and prokaryotic Plant and animal cells are both eukaryotic cells They have the components listed in the table above (so a cell membrane, cytoplasm and ribosomes), as well as others A defining feature of eukaryotic cells is that their , and the hin s a s a s a s a s a sto visualize mitochondria using a light microscope, but not ribosomes. [2 brands] Cells can be viewed with a light microscope. All cells have a number of characteristics in common with each other For a cell to be a cell, it has to have the following components: Table of cellular components and functions There are two distinct types of cells - eukaryotic cells and prokaryotic Plant and animals are both eukaryotic cells They have the components listed in the table above (so, a cell membrane, cytoplasm and ribosomes), as well as others A defining characteristic of eukaryotic cells is that their genetic material (DNA) is closed within a nucleus eukaryotic cells vary in size, usually between 10 and 100 µm Animal and vegetable cells are both eukaryotic cells as their genetic material is packed into a nucleus Bacterial cells are a type of prokaryotic cells A prokaryotic cell definition feature is that its genetic material is not closed within a single nucleus Cell membranes of all prokaryotic cells are surrounded by a cell wall (usually made of a substance called peptidoglycan) Prokaryotic cells are much smaller compared to eukaryotic cells, with many measures - 1 µm in size Prokaryotic cells do not have a nucleus, and are much smaller than eukaryotic cells Table of prokaryotic cells Cells are very small and require a microscope to be seen Scientists measure cell size in micrometers (µm) 1 µm is equivalent to 0.001 mm, or 1 x 10⁻³ mm (or alternatively 1 million meters, 1 x 10⁻⁶ mm) You need to be able to convert between different measuring units, particularly mm and µm Make sure you are comfortable converting between different units You need to show an understanding of the size and scale of cells (and subcellular structures within them) you need to be aware that many .Llec .Llec mreps a fo suelcun eht morf tnereffid Si llec elcsum a fo suelcun eht ja(.slec lamina desilaiceps era slec mreps DNA elcnhbet citpea & serutluc detanimatnoiss yranib .1 .1 .1 .1 .1 .1 . 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Diffusion in living organisms. For living cells, the principle of the movement down a concentration gradient is the same, but the cell is surrounded by a cell membrane, which can restrict the free movement of the molecules. The cell membrane is a partially permeable membrane - this means it allows some molecules to cross easily, but others with difficulty or not at all 4/2/2021 Animal cells are eukaryotic cells that contain a membrane-bound nucleus. They are different from plant cells in several fundamental factors. These cells lack a cell wall, plastids and other cellular organelles. Explore more: Facts about Animal cell. This was a brief introduction about the plant, animal and bacterial cells. Eukaryotic cells possess a definite nucleus along with a distinct nuclear membrane. It also contains membrane-bound organelles not found in prokaryotic cells. Another important point to note is that the cell wall is absent in other eukaryotic organisms such as animals, only plants possess cell walls. Explore more: Eukaryotic cells 18/3/2022 . Again, don't be fooled by the lack of compartmentalization. Prokaryotic cells are less complex, but they can still perform the same processes similar to eukaryotic functions - ... 12/1/2022 . 4. Ribosomes- Due to the presence of ribosomes in the cytoplasm, it looks granular. It is involved in protein synthesis. Here ribosomes are of (({70S})) type. 5. Some prokaryotic cells have a slimy layer called capsule outside the cell wall which is made up of polysaccharides (sugar polymers). These capsules help the cell to:

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