

Supplemental Instruction – Biology 2300

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Session: 1 – Cell Biology Introduction

1. What are the two basic forms of cells? What are some defining characteristics?

prokaryotes - simpler, smaller, nucleoid, bacteria

eukaryotes - nucleus, organelles, larger & complex, plants/animals/protists/fungi

2. Bacteria and archaea are prokaryotic cells.

3. Name the region of coiled DNA present in prokaryotic cells.

nucleoid

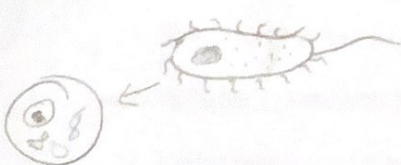
• Is the DNA in prokaryotes surrounded by a membrane?

no.

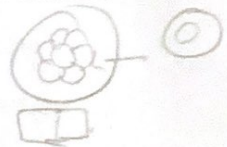
4. T/F: Eukaryotes are the only cells that have a cell wall.

plants, most prokaryotes have a cell wall

5. Some prokaryotes have surface projections. List some surface projections and their function.



1. flagellum - movement (propulsion)  
\* whip-like motion
2. pilus - can help attach prokaryotes to neighboring cells



6. Prokaryotes and eukaryotic cells are similar in several different ways, one of which is the

presence of ribosomes. What is the function of ribosomes? In terms of <sup>infectious</sup> bacteria why is this an important function?

Ribosomes create proteins. Bacteria create a class of proteins called exotoxins, which are secreted and cause damage to host cells & tissue.

7. What are the four elements that make up <sup>98%</sup> 96% of all living matter?

C, H, O, N

C, H, O, N, P, S -  
C, H, N, O, P, S -



8. What is the difference between an element and a compound?

A compound is a substance consisting of two or more elements in a fixed ratio.  $H_2O \rightarrow H_2O$

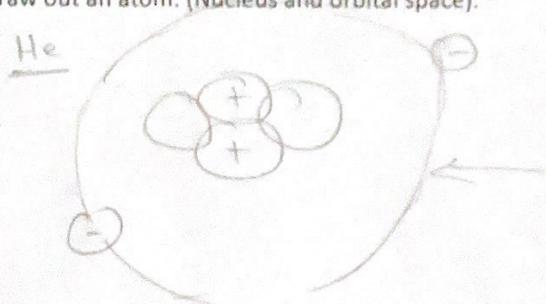
9. Let's talk about atoms and their three subatomic particles. List them and their defining characteristics.

p - (+)

n - (0)

e - (-)

10. Draw out an atom. (Nucleus and orbital space).



What helps keep electrons near the nucleus?



11. What's the difference between the atomic number and the mass number?



12. Electron shells contain electrons and the electrons contained in the outermost shell of an atom are called valence electrons.

13. Noble Gas: An element with a full outer electron shell

14. List and define the two types of bonds that interact by sharing or donating/receiving electrons.

covalent - sharing

ionic - donate/receive

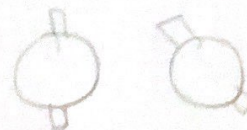


15. What is the name of the structure that is formed when two or more atoms are held together by covalent bonds? molecule

16. T/F: Protons and electrons determine an ~~atom's~~ <sup>element</sup> electronegativity.

17. What is the difference between nonpolar and polar covalent bonds?

nonpolar - equal  
polar - unequal



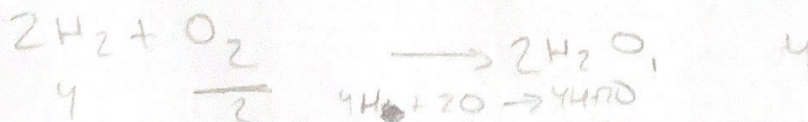
18. A weak attraction of hydrogen to any negative particle is a hydrogen bond. What are some examples?



19. In terms of ionic bonding, an ion with a negative charge is an anion, and a positively charged ion is a cation.

cation  
↓  
(+)

20. T/F: The products and reactants of a chemical reaction are present in equal amounts.



21. What is the defining characteristic of organic compounds?

Carbon-based molecule, H, O, N, S, P

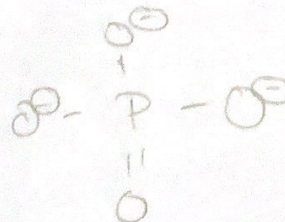
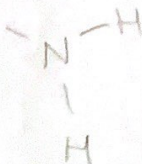
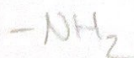
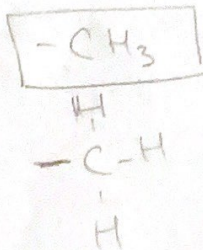
CHONPS

22. How many bonds can carbon form? Why?

4, 4 valence electrons



23. Functional groups we will cover include Amino, Phosphate, and Methyl. Draw each.



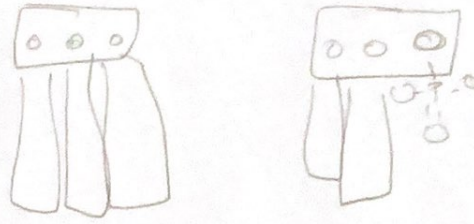






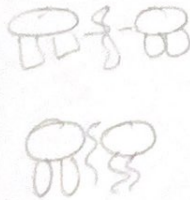
31. Which kind of lipid is the major component of all cell membranes?

phospholipid



32. In terms of the membrane phospholipids cluster together and form a membrane with two layers called a bilayer. The hydrophilic heads are in contact with the environment and the internal part of the cell. The hydrophobic tails cluster together in the center and face each other.

33. Another common component of the cell membrane (used to increase membrane flexibility/rigidity) is cholesterol. It is also a starting material for making steroids (including sex hormones testosterone and estrogen).



steroid - one of the things that diffuses through the cell membrane readily.