Cellular Structure Worksheet *Name*_____

Section A: Characteristics & Organization of LIFE

1. A garden pea plant forms flowers that undergo self or cross pollination to produce seeds. These seeds mature in two to three weeks. Which characteristics of living things are being described here?
   a. reproduction and response to environment
   b. cellularity and use of energy
   c. growth and reproduction
   d. homeostasis and evolution
2. Stomata's are small openings present on plant leaves. On a hot dry day, the stomata remains closed to reduce the loss of water. Which characteristic of living things is described here? _____ _____
3. What is the difference between sexual and asexual reproduction? _____ _____
4. A bird like an osprey can catch a fish. The osprey has massive flight muscles, a white breast and belly to camouflage its presence, and strong feet and claws to hold onto the slippery fish. This is an example of which characteristics of life? _____
5. Which of the following is the pattern of organization starting with the simplest?
   a. tissue, cells, organs, systems
   b. organs, cells, systems, tissue
   c. cells, tissue, organs, systems
   d. systems, tissue, organs, cells

Section B: The Wacky History of the Cell Theory (https://www.youtube.com/watch?v=4OpBylwH9DU)

1. What famous discovery did the Dutchman – Anton Von Leeuwenhoek (1600's) – make using his home-made microscope? _____
2. What was Robert Hooke (1600's) famous for? _____
3. What was he looking at when he named these simple structures of life? _____
4. What discovery did the German Botanist – Matthias Schleiden – make about plants? _____ _____
5. What discovery did the German scientist – Theodore Schwann – make about animals? _____
6. What discovery did the scientist – Rudolf Virchow – make about the Cell Theory? _____

Section C: Prokaryote & Eukaryote CELLS

Read the following statements and mark whether it is describing a prokaryote, eukaryote, or both.

		Prokaryote	Eukaryote	Both
1	Eric is looking through the microscope and sees one cell and there is no evidence of a nucleus or organelles.			
2	Angie explains to the class how at her old school they spent an entire day learning about the flagella.			
3	David sees hundreds of unicellular cells moving around under the microscope.			
4	Travis has been told that they are going to be looking at examples of bacteria cells under the microscope today.			
5	Adam looks under the microscope and notices that the cell has a cell membrane.			
6	Tina is describing a cell that she saw to her teacher. She remembers seeing a nucleus and organelles that resembled the mitochondria and chloroplasts.			

		Prokaryote	Eukaryote	Both
7	Courtney tells a student that was absent the day before that they were trying to identify genetic material (DNA or RNA) within a cell.			
8	The teacher tells the class to take a leaf and look at it under the microscope.			
9	Nick remembers learning in school about the cells found in protists.			
10	Bailey is telling her friend about the cell that was the first to evolve.			
11	Stacey saw a picture of a cell with cytoplasm and ribosomes.			
12	Marcus wonders what type of cells make up the fungus.			
13	Molly looks into the microscope and sees an organism that is multicellular			

Section D: The Evolution of a Cell

Click on "Websites-Cells" page then select "The Evolution of a Cell". Read and answer these questions.

1. What are the oldest cells on Earth? _____
2. How did the Earth's atmosphere change? _____
   _____
3. When the Earth's atmosphere changed, what occurred next? _____
   _____
4. Bacteria are _____ organisms with a _____.
5. What organelles were once primitive bacterial cells? _____
6. Explain the endosymbiotic theory. _____
   _____
7. Over millions of years of evolution, _____ and _____ became more specialized.
8. How are mitochondria and chloroplast similar to bacterial cells? _____
   _____
   _____
9. How is mitochondrial DNA different from other types of DNA? _____
   _____
10. How was the Earth different 4 billion years ago? _____
    _____
11. What organisms still thrive in extreme habitats? _____
12. How are archae being used by astrobiologist? _____
    _____
13. Where can you find archae living today? _____

❖ Watch the "Endosymbiosis video"……how did organelles and eukaryotic cells come into existence.
_____
_____

Section E: PROKARYOTE vs. EUKARYOTE

PROKAROTE	BOTH	EUKARYOTE

Section F: Concept Check

1. Which of the following statements about cells is TRUE?
   a. All cells are visible to the naked eye.
   b. All cells contain cytoplasm surrounded by a cell wall.
   c. All cells contain a nucleus.
   d. All cells arise from preexisting cells.
2. Which of the following is a major difference between prokaryotic cells and eukaryotic cells?
   a. Prokaryotic cells have a nucleoid region whereas eukaryotic cells have a nucleus.
   b. Prokaryotic cells arise spontaneously whereas eukaryotic cells arise by cell division.
   c. Prokaryotic cells have cytoplasm surrounded by cell walls whereas eukaryotic cells have cytoplasm surrounded by plasma membranes.
   d. Prokaryotic cells contain no genetic material and eukaryotic cells contain genetic material.
3. Which of the following is a difference in genetic material between prokaryotes and eukaryotes?
   a. Most prokaryotic genes don't code for proteins and eukaryotic genes do code for proteins.
   b. Most prokaryotic cells contain one circular chromosome whereas eukaryotic cells contain several linear chromosomes.
   c. Most prokaryotic genetic material is enclosed by a nuclear envelope whereas eukaryotic genetic material is free in the cytoplasm.
   d. Most prokaryotic genetic material is RNA whereas eukaryotic genetic material is DNA.
4. Which of these features is NOT a component of all cells?
   a. cell membrane
   b. mitochondria
   c. cytoplasm
   d. ribosomes
5. Which of these cellular components is distinguishing of eukaryotic cells?
   a. endomembrane system
   b. cytoplasm
   c. plasma membrane
   d. genetic material

Section G: Cellular Structures

Click on "Websites-Cells" page then select "Cells". Click on "How Big" on the left side of the screen.

1. Arrange the cells/particle in order of size starting with the largest (1) to the smallest (4).

E. coli (bacteria)	Baker's yeast (fungi)	Ebola (virus)	Red Blood Cell
_____	_____	_____	_____

Click on "Websites-Cells" page then select any of the links… "Cells", "Eukaryotic Organelles", "Inside a Cell", "Eukaryotic Cells", "Animal Cells", "Plant Cells".....go through each tutorials, practice labeling and reviewing organelle functions. Use these websites or notes to fill in the information on the chart.

	Found In (check)			Function	Sketch
	Animal	Plant	Bacteria		
Nucleus					
Chromatin - Chromosomes					
Plasma Membrane (Cell Membrane)					
Cell Wall					
Nuclear Membrane					
Smooth ER					
Rough ER					
Golgi Apparatus					

	Found In (check)			Function	Sketch
	Animal	Plant	Bacteria		
Cytoplasm					
Ribosome					
Nucleolus					
Lysosome					
Vacuole					
Mitochondria					
Chloroplast					
Cilia & Flagella					
Cytoskeleton					

Section H: Cellular Structures & Functions

1. _____ site of ribosome production
2. _____ controls what goes in and out of the nucleus
3. _____ thick, inflexible layer that provides support and protection for a cell
4. _____ contains the DNA and is the control center
5. _____ process, packages and distributes materials out of the cell
6. _____ stores food and removes excess water.
7. _____ controls what goes in and out of the cell
8. _____ contains digestive enzymes that digest old cells parts and pathogens
9. _____ site of protein production.
10. _____ transport and modify proteins
11. _____ fluid that surrounds organelles
12. _____ tangled DNA
13. _____ transport and modify lipids
14. _____ use energy from food to make ATP
15. _____ site of photosynthesis
16. _____ provides internal support
17. _____ short hair-like structures used in cellular movement
18. _____ long structures used in cellular movement

Section I: Concept Check

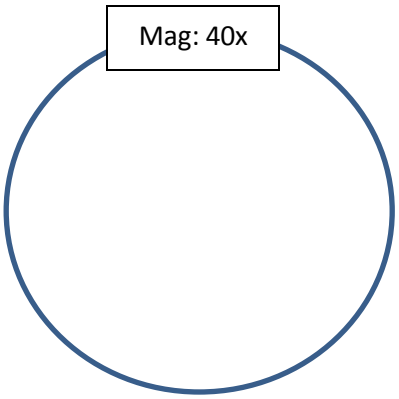
1. A cell from a heart muscle would probably have an unusually high proportion of what organelle? _____
2. Why would muscle cells have a higher proportion of this organelle? _____ _____
3. Which membrane-bound organelle converts solar energy into glucose? _____
4. Which structure makes proteins using coded instructions from DNA? _____
5. Which organelle would store water and dissolved materials? _____
6. A wet mount of stained onion cells is observed using high power (400x) of a compound light microscope. Which structure would likely be observed? _____
7. Which two structures allow unicellular organisms to move? _____
8. What structures would allow a student to tell the difference between a plant and animal cell? _____
9. Which structure is the most influential in maintaining homeostasis within a cell? _____
10. If a cell needed to use digestive enzymes to destroy old worn out organelles or foreign materials, which organelle would be involved in this digestive process? _____
11. Explain the formation and exocytosis of a protein. _____ _____
12. How is the function of the Rough ER and the Smooth ER different? _____ _____
13. The existing ribosomes are fully functional, but a cell is still producing a low amount of proteins. What possibly could be wrong with the cell? _____

Section J: Cell Lab

1. Newspaper letter 'e'
    a. Place a cut-out of the letter 'e' on a glass slide and cover with a coverslip. Place the slide under the microscope so that the letter is facing you. Observe it under 40x and draw what you see. What has happened to the 'e' image?

    _____

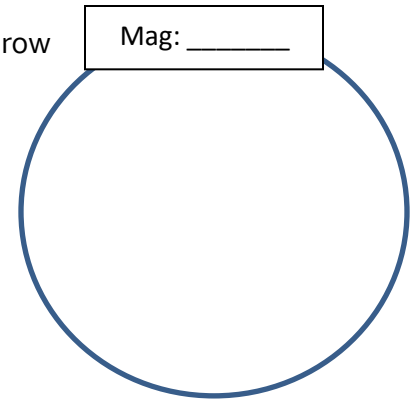
    _____



2. Cheek Cell
    a. Put a drop of methylene blue on your slide.
    b. Take a toothpick and scrap the inside of your cheek. Roll the toothpick end containing the cells in the droplet on the slide. Throw the toothpick in the trash.
    c. Place a cover slip on and examine the slide under the microscope.
        - Sketch only one cell in detail. Record the magnification.
        - Label the nucleus, cytoplasm and cell membrane.
        - Why did you stain your cells with methylene blue?

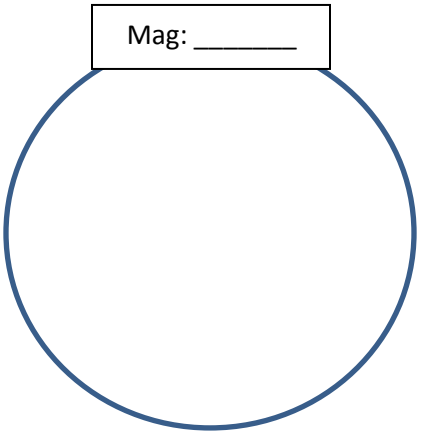
          _____

          _____



3. Onion Cell
    a. Obtain a small piece of onion and place it on your slide.
    b. Add a drop of iodine on the onion and place a cover slip on top.
        - Sketch only one cell in detail. Record the magnification.
        - Label the nucleus, cytoplasm, cell membrane, cell wall and vacuole.
        - Why are the cheek cells and onion cells different shapes? _____

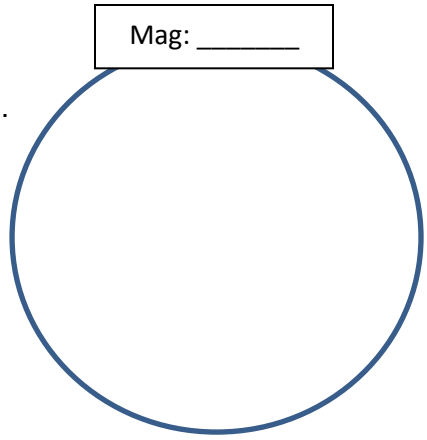
          _____
        - What organelles are found in plant cells and NOT animal cells? _____

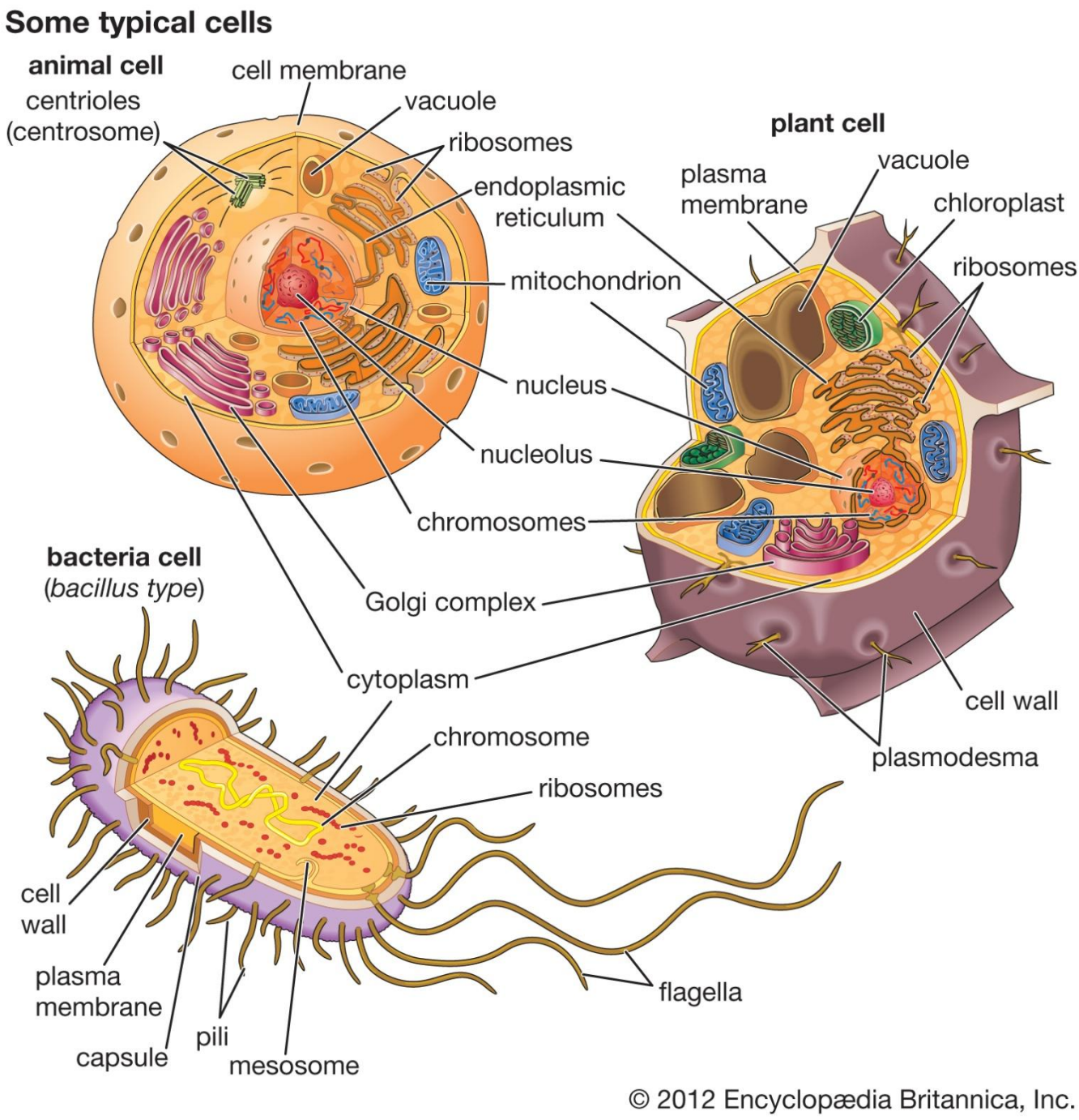


4. Elodea Cells
    a. Obtain an elodea leaf from the beaker.
    b. Place the leaf on the slide and put a coverslip on top.
        - Sketch only one cell in detail. Record the magnification.
        - Label the cell membrane, cell wall and chloroplast.
        - Why were chloroplast found in these plant cells, but not in the onion cell?_____

          _____
        - What is the function of the chloroplast?

          _____
        - What structure surrounds the cell membrane and provides support? _____





Quizzes & Games

http://www.sheppardsoftware.com/health/anatomy/cell/index.htm

http://home.comcast.net/~cmedelbr/cellpartsreview.htm

http://www.sciencegeek.net/Biology/review/U1CellTypes.htm

http://www.sciencegeek.net/Biology/review/U1animalcells.htm

http://www.sciencegeek.net/Biology/review/U1animalcells2.htm

http://www.sciencegeek.net/Biology/review/U1plantcells.htm

http://www.sciencegeek.net/Biology/review/U1Organelles.htm