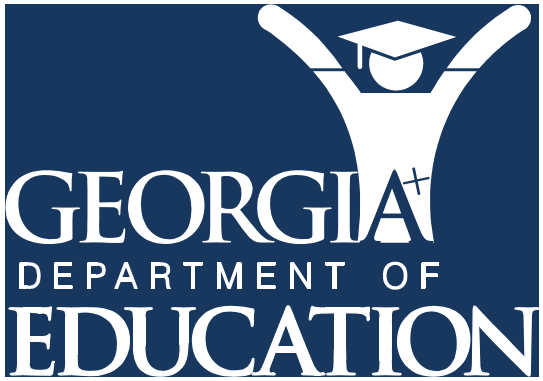


Exam Preparation for Science and Social Studies Program

ExPreSS

June 8 through June 19
2009

TEACHER

Georgia High School Graduation Test

Monday, June 8

Objective

Domain: Cells and Heredity

- Students describe the structures of cells and the structure and function of their components.
  - describing the roles of cell organelles in the following:
    - information feedback
    - motility
    - obtaining, storing, and using energy
    - protein construction
    - reproduction
    - transport of material
    - waste disposal

Time	Activity/Task	Assessment
15 min	*Guiding Questions – Cell Organelles Index Cards.* The teacher asks students three questions (see Warm-up Index Cards questions for biology on the Monday materials section) and gives students enough time to write their answers on three different index cards (one for each question). The teacher asks for two or three volunteers to share their answers and write these answers on a bulletin board to be visited again after the activity is completed.	Students complete all index cards.
15 min	*Cell Structure and Function Activity* Divide the students in groups of two and assigned each group a particular organelle. Provide each group with the appropriate organelle handout information sheet and ask them to complete the Cell Structure and Function activity sheet. (See Cell Structure and Function activity instructions on the Monday materials section). *Teacher note: The function of the organelles is a major focus of this activity. Relating the functions to different types of cells is also critical. The assessment of this activity should not be a diagram of the cell to label the specific parts but rather a comparison of why some organelles are in some cells but not others. The assessment should also include the relationship of the cell organelles to the life processes (protein synthesis, respiration, photosynthesis, etc.).*	Students complete their organelle's model
25 min	*Cell Structure and Function Activity* Teachers need to prepare a corner of the classroom to place a classroom size model of a cell and its organelles. The teacher should ask each group to present their model to the class and to place it on the classroom cell model. This model should stay visible to the students, and be referred to through the two weeks of the program. Students should take notes of the important features of each organelle on the Cell Organelles hand out. (See Cell Organelle handout on the Monday materials section).	Students presentations

Monday, June 8 (continuation)		
Objective **Domain: Cells and Heredity** • Students examine the similarities and differences between prokaryotic and eukaryotic cells.		
Time	**Activity/Task**	**Assessment**
15 min	*Differentiating between Eukaryotic and Prokaryotic Cells Activity* Ask students to read the handout The Cell (see The Cell handout in the Monday materials section) and create a drawing of a prokaryote and a eukaryote cell based on the description given on the handout for each one of them.	Students' drawings
10 min	*Differentiating between Eukaryotic and Prokaryotic Cells Activity* Select some students and ask them to present their drawings to the class and to explain why they think their drawing is correct.	Students' drawings
10 min	*Differentiating between Eukaryotic and Prokaryotic Cells Activity* Provide them with the handout Pictures of Prokaryotic and Eukaryotic Cells (see Prokaryotic and Eukaryotic Cells handout in the Monday materials section) and ask the students to compare and contrast these pictures with their own drawings. *Teacher note: walk around the classroom and check for understanding by asking questions to the students about their conclusions.*	Students' complete their compare and contrast table
25 min	*Review Questions 1* Provide students with a set of questions (see Review Questions 1 handout in the Monday materials section) about the cell organelles, their function and the differences between prokaryotic and eukaryotic cells. Give them 15 minutes to answer the questions individually. Conduct a group discussion of the answer to the questions and ask the students to correct their own answer if necessary and to write an explanation of why the answer needed to be corrected. The explanation must state the original reason the student chose the wrong answer and what makes the correct answer correct.	Student questionnaire
10 min	*Closing for Biology Day 1* Review the original answers to the warm-up questions and write the correct answer on the bulletin board.	

Monday, June 8 (continuation)		
Objective **Domain: Structure and Properties of Matter** • Students describe atoms, understanding the structure of an atom. • Students identify the symbol, atomic number, and atomic mass of the first 20 elements on the periodic table.		
Time	**Activity/Task**	**Assessment**
10 min	*Guiding Questions – Atomic Structure* The teacher asks students three questions (see Warm-up Index Cards questions for physical science in the Monday materials section) and gives students enough time to write their answers on three different index cards (one for each question). The teacher asks for two or three volunteers to share their answers and write these answers on a bulletin board to be visited again after the activity is completed.	Students complete all index cards.
25 min	*Atomic Number and Atomic Mass Activity* Follow the instructions given on the Atomic Number and Atomic Mass (see Atomic Number and Atomic Mass handout in the Monday materials section).	Completion of the activity
15 min	*Atomic Number and Atomic Mass Activity* At the end of the activity ask the students to write one of two paragraphs addressing the following questions: 1. How are atomic numbers assigned? 2. How is the atomic mass calculated? 3. What is the difference between atomic mass and atomic number? 4. What is the importance of knowing the atomic mass and atomic number of an element?	Reflection paper
10 min	*Structure of the atom* Put the students in groups of three and ask them to complete the anticipation guide Structure of the atom (see Structure of the atom anticipation guide in the Monday materials section).	Completing the reading anticipation guide.
25 min	*Structure of the atom* Either individually or in groups, asks the students to see video Physical Science Series: Atomic Structure and the Periodic Table (only the first 11 segments) on unitedstreaming.com. Conduct a round table discussion of the video and ask the students to review their anticipation guide by including any new information that they may have learned.	Round table discussion
20 min	*Structure of the atom* Provide students with the Atomic Structure tiles (see Atomic Structure tiles handout in the Monday materials section) and ask them to answer the questions. Due to time constrains you may want to assign different groups to each student or groups of students and then have the students or groups present the information to the class. If you decided for the latter option, make sure that the students fill in the missing answers in their own tiles.	Answering the questions for each atom tile.

Monday, June 8 (continuation)		
Time	**Activity/Task**	**Assessment**
20 min	*Review Questions 2* Provide students with a set of questions (see Review Questions 2 handout in the Monday materials section) about the structure of the atom and the concepts of atomic number and atomic mass. Give them 15 minutes to answer the questions individually. Conduct a group discussion of the answer to the questions and ask the students to correct their own answer if necessary and to write an explanation of why the answer needed to be corrected. The explanation must state the original reason the student choose the wrong answer and what makes the correct answer correct.	Student questionnaire
10 min	*Closing for Physical Science Day 1* Review the original answers to the warm-up questions and write the correct answer on the bulletin board.	

Monday's Materials Section

Possible Index Card Warm-Up Questions –Biology Day 1

1. What structures can be identified in a typical animal or plant cell?

2. Compare prokaryotic and eukaryotic cells.

3. Describe the role of the cell membrane in maintaining homeostasis.

4. Which of the following statements about plant and animal cells is true?

   A. Plant cells have a nucleus and a cell wall; animal cells do not have either of these structures.
   B. Plant cells have a cell wall and chloroplasts; animal cells do not have either of these structures.
   C. Plant cells have a cell wall and a cell membrane; animal cells have a cell wall but not a cell membrane.
   D. Plant cells have chloroplasts and mitochondria; animal cells have chloroplasts but do not have mitochondria.

5. Which of these is a function of the cell membrane in all cells?

   A. Producing cellular nutrients.
   B. Preserving cellular wastes.
   C. Neutralizing chemicals.
   D. Maintaining homeostasis.

6. In which organelle are proteins produced?

   A. nucleus
   B. lysosome
   C. ribosome
   D. mitochondria

7. **Experimental Observations**

   1. Nucleus is present.
   2. Cell wall is present.
   3. Chloroplasts and mitochondria are both present.

The eukaryotic organism described above should be classified as

   A. an animal
   B. a bacterium
   C. a fungus
   D. a plant

Possible Index Card Warm-Up Questions –Physical Science Day 1

1. Compared to the charge and mass of a proton, an electron has

   A. the same charge and a smaller mass
   B. the same charge and the same mass
   C. an opposite charge and a smaller mass
   D. an opposite charge and the same mass

2. Which symbols represent atoms that are isotopes?

   A. C-14 and N-14
   B. O-16 and O-18
   C. I-131 and I-131
   D. Rn-222 and Ra-222

3. Which atom contains exactly 15 protons?

   A. P-32
   B. S-32
   C. O-15
   D. N-15

4. What is the mass number of an atom which contains 28 protons, 28 electrons, and 34 neutrons?

   A. 28
   B. 56
   C. 62
   D. 90

5. The mass number of an element is 19 and the atomic number is 9. The total number electrons in the atom is:

   A. 19
   B. 9
   C. 29
   D. 10

6. The atom z has a mass number of 32. It contains in its nucleus:

   A. 32 protons
   B. 32 protons and 32 electrons
   C. a total of 40 protons and neutrons
   D. 16 protons and 16 neutrons

1 H 1 1							2 He 4 2
3 Li 7 2-1	4 Be 9 2-2	5 B 11 2-3	6 C 12 2-4	7 N 14 2-5	8 O 16 2-6	9 F 19 2-7	10 Ne 20 2-8

Table 1

7. Based on the table above, the total number of electrons in an atom of any element equals which of the following quantities?

   A. The element's atomic mass
   B. The element's atomic number
   C. The sum of the element's atomic mass and the element's atomic number
   D. The difference between the element's atomic mass and the element's atomic number

Lab Activity: Cell Structure and Function

Research the organelles found in a cell.

Your group has been assigned the organelle _____

1. Your group will research the organelle. Be sure to include the following information:
   - If it is found in a prokaryotic cell, eukaryotic cell or both.
   - If it is found in a plant cell, animal cell or both.
   - Explain where the organelle is found in the cell (nucleus or cytoplasm)
   - Explain the function of the organelle (what it does).

2. Construct a model of your organelle. Make sure it is colorful and labeled. Make sure it is large enough to be seen. Make your organelle as realistic looking as possible and be prepared to explain its function in the cell to the class.

3. Each member in the group must write a paragraph describing the organelle researched. Include all information discussed in step number 1. It must be in your own words and will help you prepare for your oral presentation.

4. Your group will add your model to the classroom cell and teach the class about your organelle. Be sure to include all information found in #1.

5. As each group presents their information, complete the organelle chart provided to you by your teacher.

Cell Organelles

Name: _____

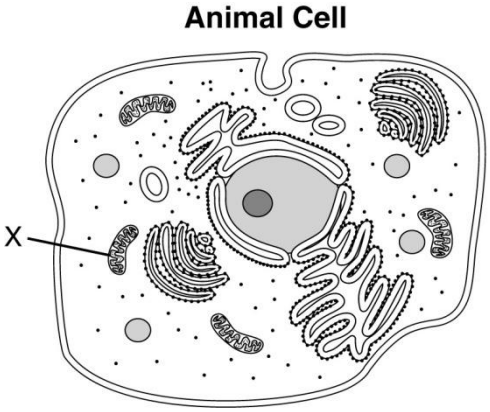
Organelle	Prokaryotic or Eukaryotic or Both	Plant or Animal or Both	Location in cell [nucleus or cytoplasm]	Describe the function
Nucleus				
Cell Membrane				
Cytoplasm				
Ribosomes				
Endoplasmic Reticulum				
Golgi Apparatus				
Lysosomes				
Mitochondria				
Chloroplasts				
Cell Wall				
Plasmid				
Chromosome				

Review Questions 1
Cell Organelles: Structure and Function

1. Which cell structure is a passageway for materials, provides protection, and allows cell recognition?

   A. cell membrane
   B. Golgi apparatus
   C. mitochondrion
   D. nucleus

2. This diagram represents structures within an animal cell.



   Structure X is a mitochondrion. What is the function of structure X?

   A. to make new cells
   B. to make cellular energy
   C. to store information
   D. to control movement

3. Which type of organelle allows glucose to enter cells?

   A. cell membrane
   B. mitochondria
   C. nucleus
   D. ribosomes

4. Which organelle breaks down food into particles the cell can use?

   A. Golgi apparatus
   B. lysosome
   C. endoplasmic reticulum
   D. mitochondrion

5. Which organelle makes proteins using coded instructions that come from the nucleus?

   A. Golgi apparatus
   B. mitochondrion
   C. vacuole
   D. ribosome

6. Which organelles help provide cells with energy?

   A. mitochondria and chloroplasts
   B. rough endoplasmic reticulum
   C. smooth endoplasmic reticulum
   D. Golgi apparatus and ribosomes

7. Which of the following is a function of the cell membrane?

   A. breaks down lipids, carbohydrates, and proteins from foods
   B. stores water, salt, proteins, and carbohydrates
   C. keeps the cell wall in place
   D. regulates which materials enter and leave the cell

8. Which organelle is the principal site of protein synthesis in eukaryotic cells?

A. Nucleus
B. Ribosomes
C. Mitochondria
D. Chloroplasts

9. Which of these is a function of the cell membrane in all cells?

A. Producing cellular nutrients.
B. Preserving cellular wastes.
C. Neutralizing chemicals.
D. Maintaining homeostasis.

10. In which organelle are proteins produced?

A. nucleus
B. lysosome
C. ribosome
D. mitochondria

11. Which of the following clues would tell you whether a cell is prokaryotic or eukaryotic?

A. the presence or absence of a rigid cell wall
B. whether or not the cell is partitioned by internal membranes
C. the presence or absence of ribosomes
D. whether or not the cell carries out cellular metabolism

12. You would expect a cell with an extensive Golgi apparatus to

A. make a lot of ATP.
B. secrete a lot of material.
C. move actively.
D. store large quantities of food

13. Of the following organelles, which group is involved in manufacturing substances needed by the cell?

A. lysosome, vacuole, ribosome
B. ribosome, rough ER, smooth ER
C. vacuole, rough ER, smooth ER
D. smooth ER, ribosome, vacuole

14. Some unicellular organisms are motile (have the ability to move) and some are nonmotile. Which cellular structures are associated with movement?

A. Ribosomes
B. Flagella
C. Chloroplasts
D. Vacuoles

15. Which characteristic of prokaryotic organisms makes them different from eukaryotes?

A. Prokaryotic cells do not have membrane-bound organelles.
B. Prokaryotes do not have chromosomes.
C. Prokaryotes are made of cells.
D. Prokaryotes have DNA.

16. A cell with numerous ribosomes is probably specialized for

A. enzyme storage
B. energy production
C. cell division
D. protein synthesis

The Cell

Cells are the common building block of life. The simplest cells are **prokaryotic cells** such as bacteria. The cells in plants and animals are much more complex than prokaryotic cells and are named **eukaryotic cells**.

The **modern cell theory** states that all organisms are composed of cells and those cells arise from other cells. According to this theory, for example, viruses are not living organisms. They are not composed of cells. Another theory of the origin of cell types, the **endosymbiont theory** suggests that the more complex eukaryotic cells arose from less complex prokaryotic cells several billion years ago. During this process, it is thought that mitochondria and chloroplasts, once free-living prokaryotes, gave up their independent lifestyle in favor of living together inside a larger, complex cell – the eukaryotic cell. This more complex eukaryotic cell, or eukaryote, had internal membranes and cell organelles specialized for different functions. These complex eukaryotic cells allowed the evolution of multicellular organisms with different types of cells.

Let's compare the characteristics of prokaryotes and eukaryotes:

PROKARYOTES	EUKARYOTES
Typically considered to have no internal membranes, other than cytoplasmic membrane.	Have internal membranes surrounding and in many organelles.
No organized nucleus	Have an organized nucleus with nuclear membrane
Few specialized cell organelles (for example - ribosomes without their own membranes)	Contain a variety of specialized membrane enclosed organelles like mitochondria, vacuoles, chloroplasts etc.
Typically contain circular DNA strands with no histones	Contains DNA with histones attached; forms chromosomes
Metabolism is often anaerobic (without oxygen), or aerobic (with oxygen)	Most metabolism is aerobic
Mostly unicellular (one-celled)	Both unicellular and multicellular types
Cells are typically small (1 to 10 microns)	Cells are larger (10 to 100 microns)
Classified into Kingdoms of Archaebacteria and Eubacteria.	Classified in Protist (Protista), Fungi, Plant and Animal Kingdoms
Primitive structures	More organized structures

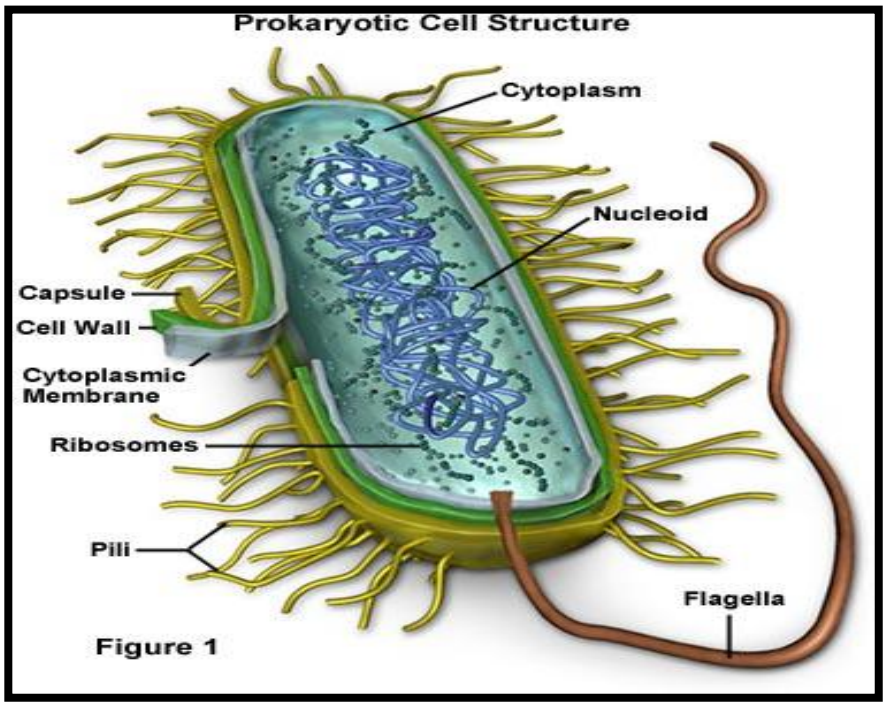
Language

Prokaryotic Cells: are cells that lack a membrane-bound nucleus. The word prokaryote comes from the Greek meaning before nuclei. These cells have few internal structures that are distinguishable under a microscope.

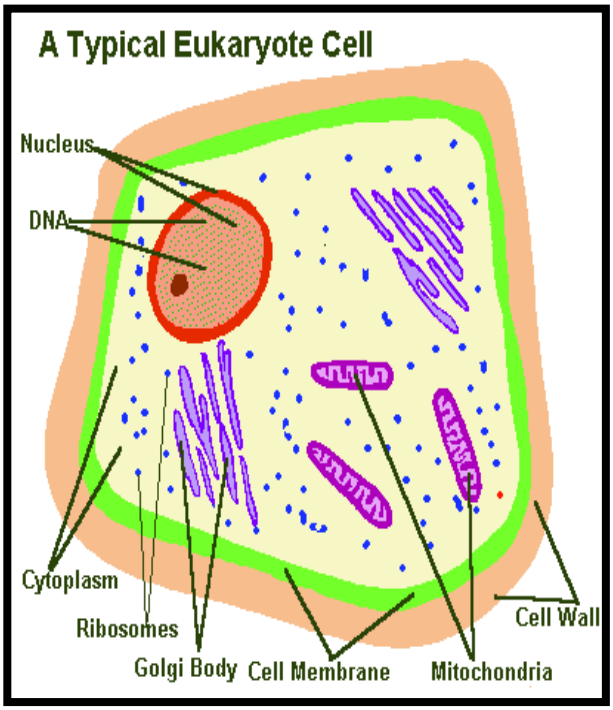
Eukaryotic Cells: is an organism whose cells are organized into complex structures enclosed within membranes. Most living organisms, including all animals, plants, fungi, and protists, are eukaryotes.

Cytoplasmic Membrane: The cytoplasmic membrane, also called a cell membrane or plasma membrane lies internal to the cell wall and encloses the cytoplasm of the bacterium.

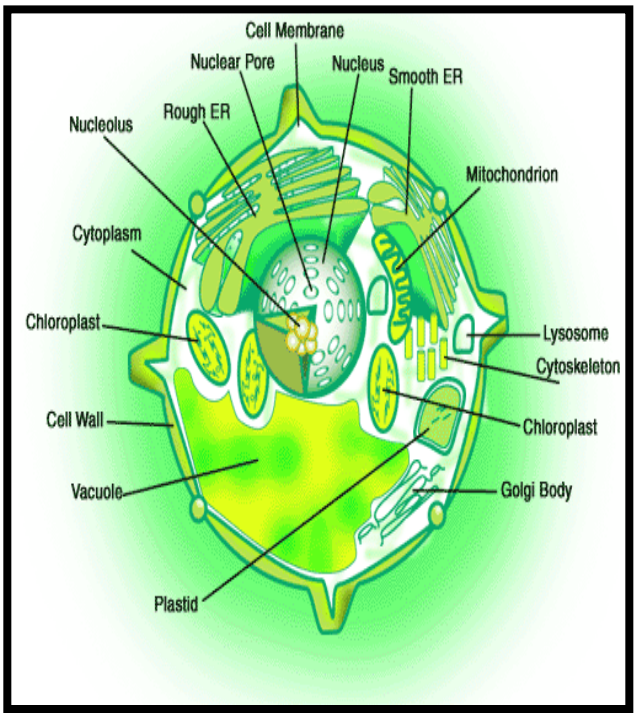
Prokaryotic and Eukaryotic Cells



Eukaryotic Animal Cell



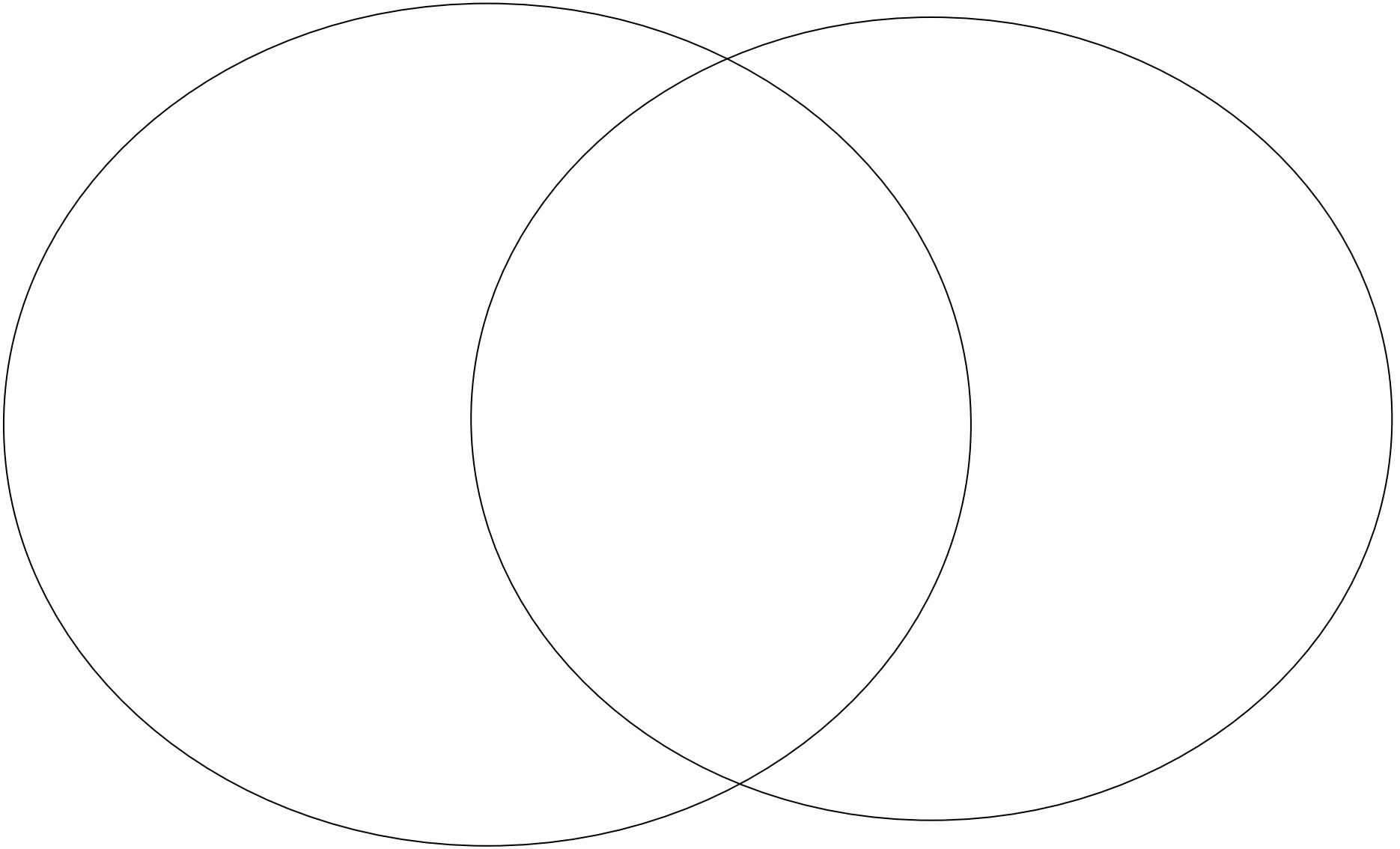
Eukaryotic Plant Cell



Compare and Contrast your Model for a Eukaryotic Cell

My Model's characteristics

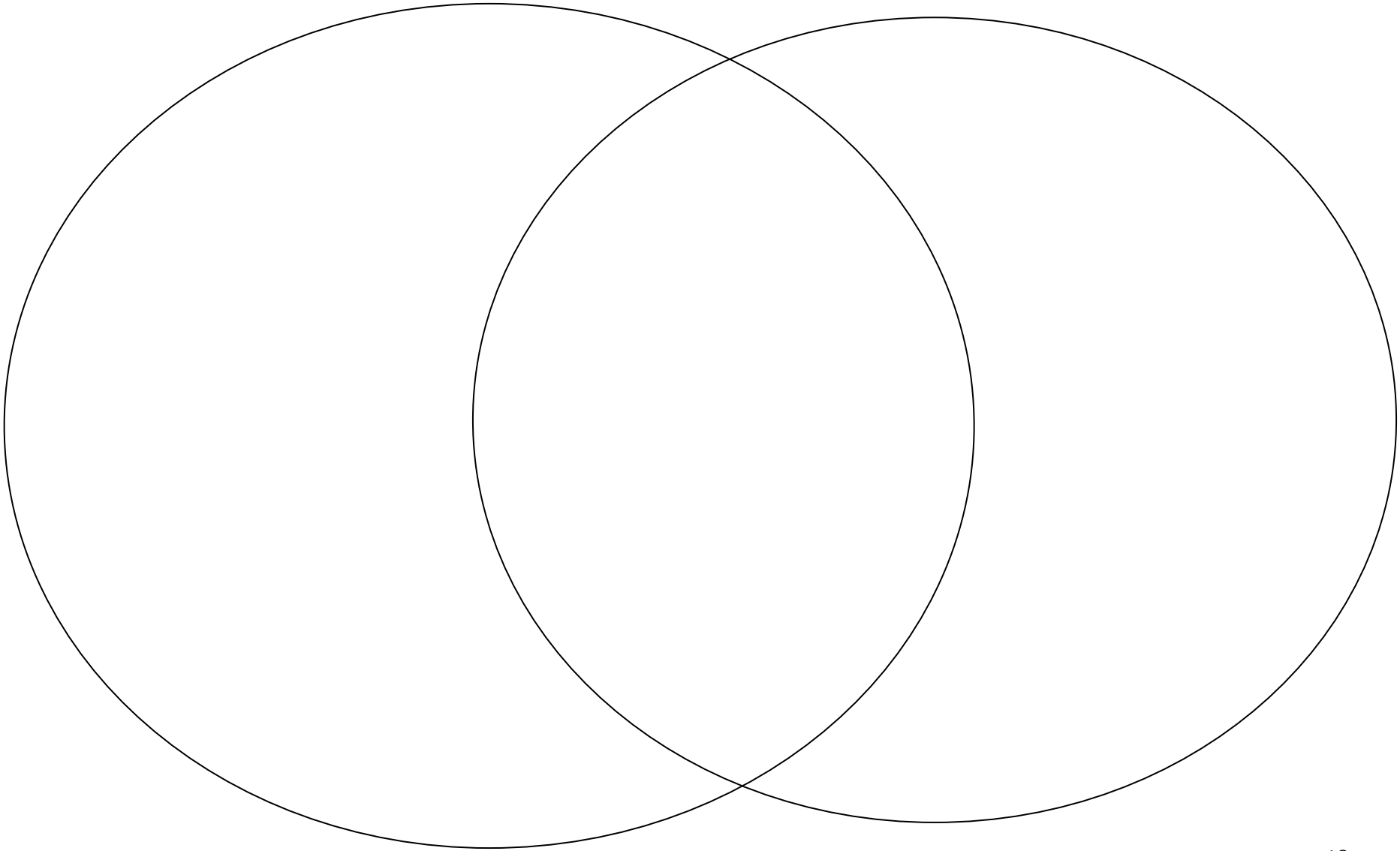
Picture's characteristics



Compare and Contrast your Model for a Eukaryotic Cell

My Model's characteristics

Picture's characteristics



Atomic Number and Atomic Mass Activity

Essential Question(s):
How do the subatomic particles of an atom affect its characteristics?

Pre-Assessment: Students will be given a periodic table block, asked to identify the parts and determine the number of protons, neutrons and electrons. Student volunteers will post this information on a white board, board, or multimedia presentation. The teacher will use this information to determine the direct instruction needed for this task.

	ANALYTICAL	PRACTICAL	CREATIVE
Outcome/ Performance Level Indicator	Given the mass number and atomic number for an atom, calculate the number of protons, neutrons and electrons. Explain how each number is determined. Design a geocaching task.	Design a model using bingo chips to demonstrate how to determine the number of protons, neutrons, and electrons for a given atom. Design a geocaching task.	Construct an elaborate flow chart with pictures; create a song or performance to determine the number of protons, neutrons, and electrons for a given atom. Design a geocaching task.
Performance Task: (Detailed Description) Teacher role	The teacher will provide direct instruction correlating the blocks on the periodic table with the atomic number and atomic mass. The teacher will explain the difference between atomic mass and mass number. The teacher will demonstrate how to use the atomic number and the mass number to determine the number of protons, electrons and neutrons.		
Resources	Computer, computer projector, multimedia presentation, whiteboard or board, markers, global positioning devices	Bingo chips, colored pencils. Opaque computer, camera projecting device (optional), global positioning devices	Computer, multimedia presentation program, butcher paper, markers, global positioning devices
Homework/Extension	Select 5 more atoms to analyze.	Select 5 more atoms to analyze.	Select 5 more atoms to analyze.

	ANALYTICAL	PRACTICAL	CREATIVE
Performance Task: (Detailed Description) Student role?	Individually students will determine the definitions for atomic number and atomic mass. Student volunteers will write their definitions on the board. Students will complete the pretest and volunteers will help identify the items in the periodic tile. Students will work in teacher-selected pairs to calculate the number of protons, neutrons and electrons for 5 atoms. Students will demonstrate one problem on the white board or board. Students will create geocaching sites and clues for atoms with different numbers of protons, neutrons and electrons. For example, what element has a mass number of 14 and an atomic number of 6? Students will have an element grid. The clue matching carbon-14 is the next location. Student groups will exchange geocaching clues and see who finds the final cache first.	Individually students will determine the definitions for atomic number and atomic mass. Student volunteers will write their definitions on the board. Students will complete the pretest and volunteers will help identify the items in the periodic tile. Students will work in teacher-selected diverse pairs using 3 colors of bingo chips to determine the number of protons, neutrons and electrons. Each student will draw one of the structures using colored pencils and present it to the class. Students will create geocaching sites and clues using pictures. For example, students will draw a nucleus with 12 protons, 13 neutrons, and 12 electrons in the energy levels. What is the atomic mass? The answer is 25. On the grid in the cache box, the number 25 will indicate the next clue. Student groups will exchange geocaching clues and see who finds the final cache first.	Individually students will determine the definitions for atomic number and atomic mass. Student volunteers will write their definitions on the board. Students will complete vocabulary squares for these words. Student volunteers will share their squares with the class. Students will complete the pretest and volunteers will help identify the items in the periodic tile. Students will design a flowchart to determine the number of protons, neutrons, and electrons for atoms using a multimedia projector or Butcher paper. They will demonstrate how to use their chart to solve a problem for the class. Students will create geocaching site and clues using flow charts or graphic organizers. For example, students may design a flow chart for neon-20 with branches to protons, neutrons and electrons. The circle for electrons is blank. On the grid in the cache box, the correct answer (10) will have the directions to the next cache. Student groups will exchange geocaching clues and see who finds the final cache first.

Instructional Tasks Accommodations for ELL Students	Work in teacher-selected pairs. Atoms to build are arranged from simple to complex. Teachers will save whiteboard, Multimedia presentation and/or overhead projector work and assemble a review multimedia presentation. For non-computer based work, butcher paper presentations can be posted for review.
Instructional Tasks Accommodations for Students with Disabilities	For homework, provide one example for students. Teacher will provide a written set of instruction on a poster or for the individual. Students may have a study buddy to consult for homework. Students will work in teacher-selected diverse pairs. Teachers will save whiteboard, Multimedia presentation and/or overhead projector work and assemble a review multimedia presentation. For non-computer based work, butcher paper presentations can be posted for review.
Instructional Tasks Accommodations for Gifted Students	Design the multimedia presentation review for the class. Research isotopes and present models and/or diagrams to explain the difference. Assist others in setting up caches and using GPS devices.

Names:			
Structure of the Atom			
What I know I know			
What I think I know			
What I think I will learn			

Atomic Structure Tiles

1. **How many protons would this element have?** 2. **How many electrons?** 3. **How many neutrons?** 4. **If the isotope of lithium, Li-9 were given you, how many neutrons would you have?** 5. **How many valence electrons are in an atom of this element?** 6. **How will this atom bond?** 7. **Will it lose, gain, or share electrons?**	1. **How many protons would this element have?** 2. **How many electrons?** 3. **How many neutrons?** 4. **If the isotope of beryllium, Be-13 were given you, how many neutrons would you have?** 5. **How many valence electrons are in an atom of this element?** 6. **How will this atom bond?** 7. **Will it lose, gain, or share electrons?**	1. **How many protons would this element have?** 2. **How many electrons?** 3. **How many neutrons?** 4. **If the isotope of boron, B-12 were given you, how many neutrons would you have?** 5. **How many valence electrons are in an atom of this element?** 6. **How will this atom bond?** 7. **Will it lose, gain, or share electrons?**	1. **How many protons would this element have?** 2. **How many electrons?** 3. **How many neutrons?** 4. **If the isotope of carbon, C-16 were given you, how many neutrons would you have?** 5. **How many valence electrons are in an atom of this element?** 6. **How will this atom bond?** 7. **Will it lose, gain, or share electrons?**
3 **Li** 6.94	4 **Be** 9.01	5 **B** 10.81	6 **C** 12.01

Atomic Structure Tiles

1. **How many protons would this element have?** 2. **How many electrons?** 3. **How many neutrons?** 4. **If the isotope of nitrogen, N-18 were given you, how many protons & electrons would you have?** 5. **How many valence electrons are in an atom of this element?** 6. **How will this atom bond?** 7. **Will it lose, gain, or share electrons?**	1. **How many protons would this element have?** 2. **How many electrons?** 3. **How many neutrons?** 4. **If the isotope of oxygen O-17 were given you, how many neutrons would you have?** 5. **How many valence electrons are in an atom of this element?** 6. **How will this atom bond?** 7. **Will it lose, gain, or share electrons?** 8.	1. **How many protons would this element have?** 2. **How many electrons?** 3. **How many neutrons?** 4. **If the isotope of fluorine, F-25 were given you, how many neutrons would you have?** 5. **How many valence electrons are in an atom of this element?** 6. **How will this atom bond?** 7. **Will it lose, gain, or share electrons?**	1. **How many protons would this element have?** 2. **How many electrons?** 3. **How many neutrons?** 4. **If the isotope of neon, Ne-22 were given you, how many neutrons would you have?** 5. **How many valence electrons are in an atom of this element?** 6. **How will this atom bond?** 7. **Will it lose, gain, or share electrons?** 8.
7 **N** 14.01	8 **O** 16.00	9 **F** 19.00	10 **Ne** 20.18

Atomic Structure Tiles

1. **How many protons would this element have?** 2. **How many electrons?** 3. **How many neutrons?** 4. **If the isotope of sodium, Na-27 were given to you, how many neutrons would you have?** 5. **How many valence electrons are in an atom of this element?** 6. **How will this atom bond?** 7. **Will it lose, gain, or share electrons?**	1. **How many protons would this element have?** 2. **How many electrons?** 3. **How many neutrons?** 4. **If the isotope of magnesium, Mg-26 were given to you, how many neutrons would you have?** 5. **How many valence electrons are in an atom of this element?** 6. **How will this atom bond?** 7. **Will it lose, gain, or share electrons?**	1. **How many protons would this element have?** 2. **How many electrons?** 3. **How many neutrons?** 4. **If the isotope of aluminum, Al-30 were given to you, how many neutrons would you have?** 5. **How many valence electrons are in an atom of this element?** 6. **How will this atom bond?** 7. **Will it lose, gain, or share electrons?**	1. **How many protons would this element have?** 2. **How many electrons?** 3. **How many neutrons?** 4. **If the isotope of silicon, Si-29 were given to you, how many neutrons would you have?** 5. **How many valence electrons are in an atom of this element?** 6. **How will this atom bond?** 7. **Will it lose, gain, or share electrons?**
11 **Na** 22.99	12 **Mg** 24.31	13 **Al** 26.98	14 **Si** 28.09

Atomic Structure Tiles

1. **How many protons would this element have?** 2. **How many electrons?** 3. **How many neutrons?** 4. **If the isotope of phosphorus, P-32 were given to you, how many neutrons would you have?** 5. **How many valence electrons are in an atom of this element?** 6. **How will this atom bond?** 7. **Will it lose, gain, or share electrons?**	1. **How many protons would this element have?** 2. **How many electrons?** 3. **How many neutrons?** 4. **If the isotope of sulfur, S-35 were given to you, how many neutrons would you have?** 5. **How many valence electrons are in an atom of this element?** 6. **How will this atom bond?** 7. **Will it lose, gain, or share electrons?**	1. **How many protons would this element have?** 2. **How many electrons?** 3. **How many neutrons?** 4. **If the isotope of chlorine, Cl-39 were given to you, how many neutrons would you have?** 5. **How many valence electrons are in an atom of this element?** 6. **How will this atom bond?** 7. **Will it lose, gain, or share electrons?**	1. **How many protons would this element have?** 2. **How many electrons?** 3. **How many neutrons?** 4. **If the isotope of argon, Ar-42 were given to you, how many neutrons would you have?** 5. **How many valence electrons are in an atom of this element?** 6. **How will this atom bond?** 7. **Will it lose, gain, or share electrons?**
15 **P** 30.97	16 **S** 32.07	17 **Cl** 35.45	18 **Ar** 39.95

Atomic Structure Tiles

1. **How many protons would this element have?** 2. **How many electrons?** 3. **How many neutrons?** 4. **If the isotope of potassium, K-41 were given to you, how many neutrons would you have?** 5. **How many valence electrons are in an atom of this element?** 6. **How will this atom bond?** 7. **Will it lose, gain, or share electrons?**	1. **How many protons would this element have?** 2. **How many electrons?** 3. **How many neutrons?** 4. **If the isotope of calcium, Ca-42 were given to you, how many neutrons would you have?** 5. **How many valence electrons are in an atom of this element?** 6. **How will this atom bond?** 7. **Will it lose, gain, or share electrons?**	1. **How many protons would this element have?** 2. **How many electrons?** 3. **How many neutrons?** 4. **If the isotope of hydrogen, H-3 were given to you, how many neutrons would you have?** 5. **How many valence electrons are in an atom of this element?** 6. **How will this atom bond?** 7. **Will it lose, gain, or share electrons?**	1. **How many protons would this element have?** 2. **How many electrons?** 3. **How many neutrons?** 4. **If the isotope of helium, He-5 were given to you, how many neutrons would you have?** 5. **How many valence electrons are in an atom of this element?** 6. **How will this atom bond?** 7. **Will it lose, gain, or share electrons?**
19 **K** 39.10	20 **Ca** 40.08	1 **H** 1.01	2 **He** 4.00

Review Questions 1
The Atom and its Structure

1. Compared to the charge and mass of a proton, an electron has

   A. the same charge and a smaller mass
   B. the same charge and the same mass
   C. an opposite charge and a smaller mass
   D. an opposite charge and the same mass

2. Which symbols represent atoms that are isotopes?

   A. C-14 and N-14
   B. O-16 and O-18
   C. I-131 and I-131
   D. Rn-222 and Ra-222

3. The nucleus of sodium-23 contains:

   A. 23 protons and 11 neutrons
   B. 23 protons and 11 electrons
   C. 11 protons and 12 electrons
   D. 11 protons and 12 neutrons

4. Which pair of elements is MOST similar?

   A. Ca and F
   B. Na and Cl
   C. Ne and Ar
   D. Li and H

5. The mass number of an element is 19 and the atomic number is 9. The total number electrons in the atom is:

   A. 19
   B. 9
   C. 29
   D. 10

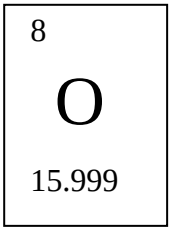
6. Which of the following pairs are isotopes of the same element?

   A. atom J (27 protons, 32 neutrons) and atom L (27 protons, 33 neutrons)
   B. atom Q (56 protons, 81neutrons) and atom R (57 protons, 81 neutrons)
   C. atom V (8 protons, 8 neutrons) and atom W (7 protons, 8 neutrons)
   D. atom S (17 protons, 18 neutrons) and atom T (18 protons, 17 neutrons)

7. Which of the following are transferred of shared when two atoms react chemically?

   A. protons
   B. neutrons
   C. electrons
   D. photons

8. The illustration below shows the box from the Periodic Table that represents the element Oxygen (O)



   Based on the information provided, how many neutrons do most oxygen atoms contain in their nucleus?

   A. 4
   B. 6
   C. 8
   D. 15