Name _____ Per_____ Date _____

# Biology Semester 1 Study Guide

The following Gizmos meet the standards assessed by the Biology EOC and should be reviewed during the first semester:

1. Rabbit Population by Season Gizmo
2. Food Chain Gizmo
3. Photosynthesis Lab Gizmo

**Vocabulary to Review:**

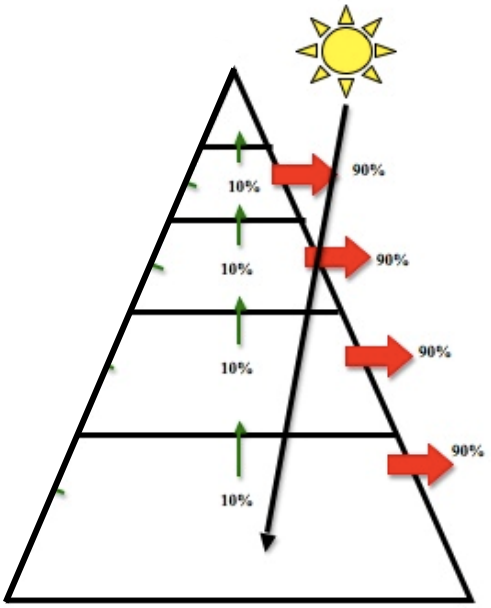
| | | |
|---|---|---|
| Trophic Level | Transpiration | Passive Transport |
| Primary Consumer | Stomata | Hypotonic |
| Secondary Consumer | Xylem and Phloem | Hypertonic |
| Producer | Capillary Action | Chromosome |
| Limiting factor | Cohesion and Adhesion | Mitosis |
| Energy pyramid | Aerobic Respiration | Cancer |
| Carrying capacity | Anaerobic Respiration | Meiosis |
| Carbon cycle | Photosynthesis | Sister chromatids |
| Water cycle | ATP | Crossing over |
| Nitrogen cycle | Cell Theory | Mutation |
| Acid rain | Prokaryote | Translation |
| Primary Succession | Eukaryote | Codon |
| Secondary Succession | Cell Organelles | mRNA and tRNA |
| Cellular Respiration | Active Transport | Transcription |

Questions to Ponder:

1. When you remove an organism from a food web or add an organism to a food web, what are some consequences that can occur?

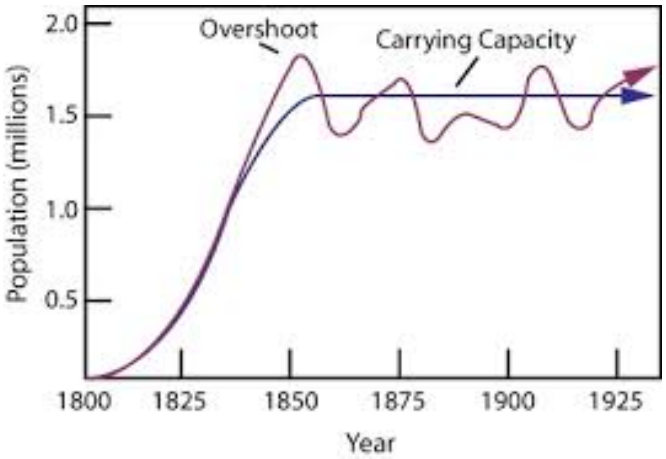
2. Can a population of organisms grow exponentially forever? Why or why not? Give an example.

3. Explain what is happening to the energy in the energy pyramid to the right.




4. Matter cycles and energy flows in one direction. Explain this statement.

5. Explain what is happening to the population in this graph. What is one reason why this could be occurring?




6. Carbon must be recycled because new carbon is never made. List the processes shown in the diagram that can change carbon from one form to another.

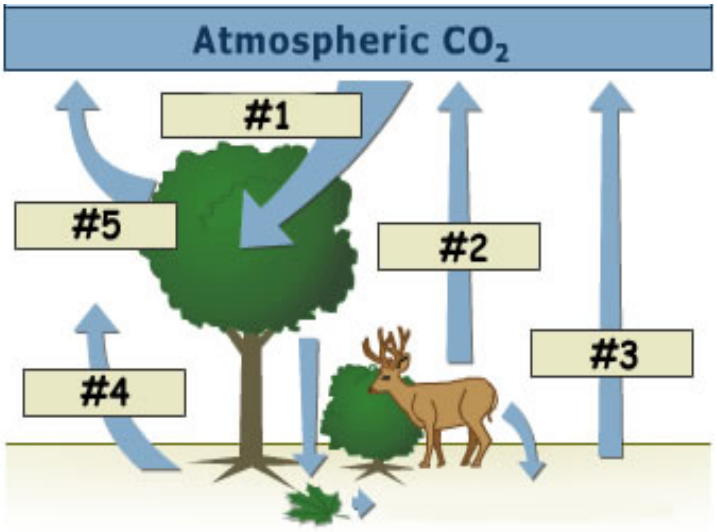
#1 _____

#2 _____

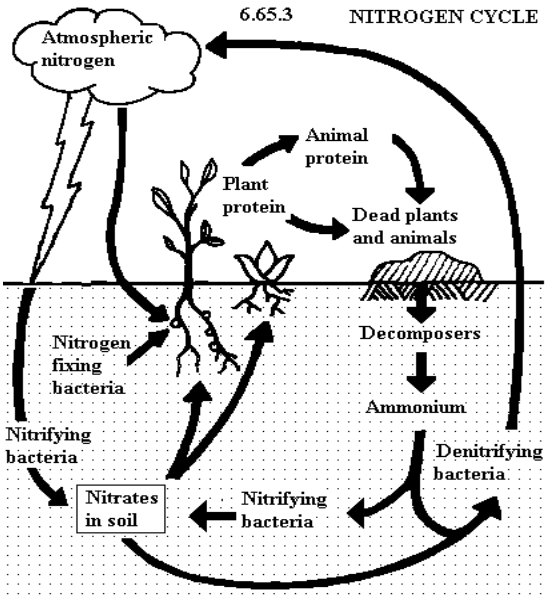
#3 _____

#4 _____

#5 _____



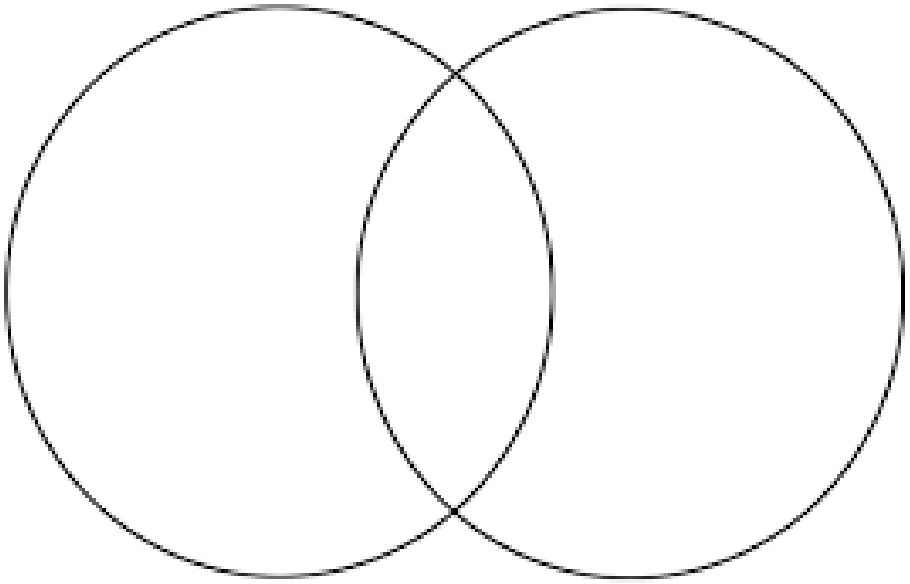
7. Nitrogen is essential in building proteins and nucleic acids in organisms and nitrogen must be recycled because new nitrogen is never created. Study this diagram and describe where most of the nitrogen cycle occurs and why.



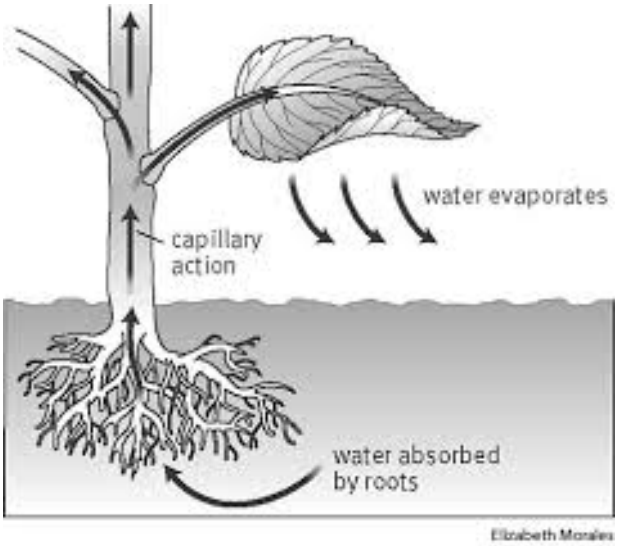

8. What are some human actions that have caused many animals to become endangered on our planet? What can we do to counteract these negative actions?

| Negative Action | Possible remedy |
|---|---|
| | |
| | |
| | |

9. Compare and contrast primary and secondary succession in a Venn diagram.



10. What process is occurring in this diagram? What properties of water make this process possible?




11. What environmental factors could speed up or slow down the process shown in #10?

12. Write the two formulas for photosynthesis and cellular respiration. Circle the reactants in photosynthesis and put a square about the products for cellular respiration. How do they compare?

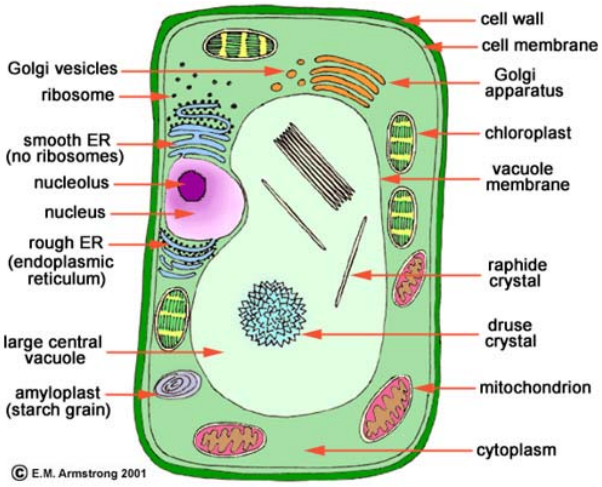
13. Compare/contrast aerobic and anaerobic respiration.

| Commonalities | Differences |
|---|---|
| | |

14. Fill in the table comparing prokaryotes vs. eukaryotes.

| | Prokaryote | Eukaryote |
|---|---|---|
| Nucleus present? | | |
| DNA present? | | |
| Cytoplasm present? | | |
| Cell membrane present? | | |
| Cell wall present? | | |
| | | |

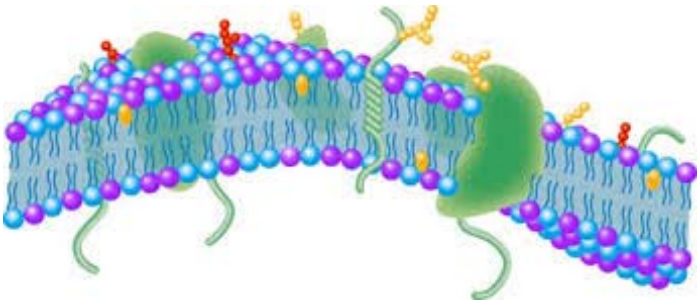
15. What type of cell is shown to the right? How do you know?




Make sure that you review the parts of the cell and that you know what job each part of the cell is responsible for.

| Organelle | Found in a Pro-karyote | Found in a Eu-karyote | Function |
|---|---|---|---|
| Cell Membrane | | | |
| Cytoplasm | | | |
| Golgi Apparatus | | | |
| Lysosome | | | |
| Mitochondria | | | |
| Nucleus | | | |
| Nucleolus | | | |
| Ribosome | | | |
| Rough ER | | | |
| Smooth ER | | | |
| Vacuole | | | |
| Cell wall (plant only) | | | |
| Chloroplast (plant only) | | | |
| Central Vacuole (plant only) | | | |

16. What is this an image of?



What is its primary role?

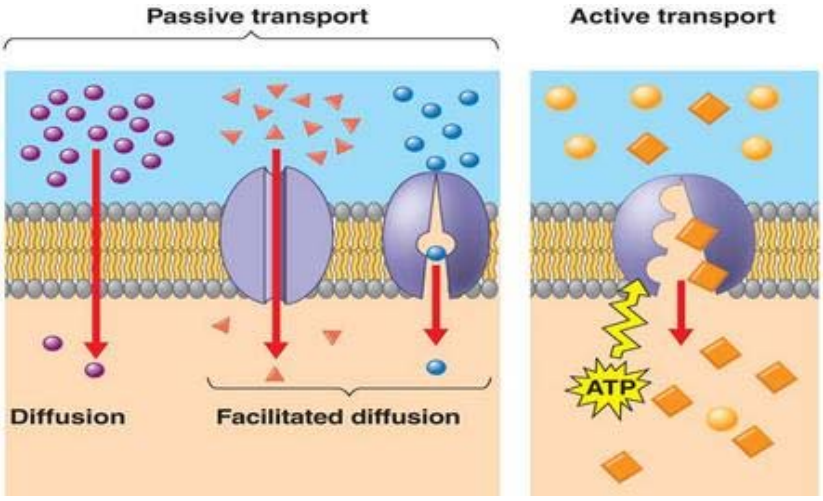
What macromolecule is it made of?

17. A. Label each of the three beakers as hypotonic, hypertonic, or isotonic.

_____ _____ _____

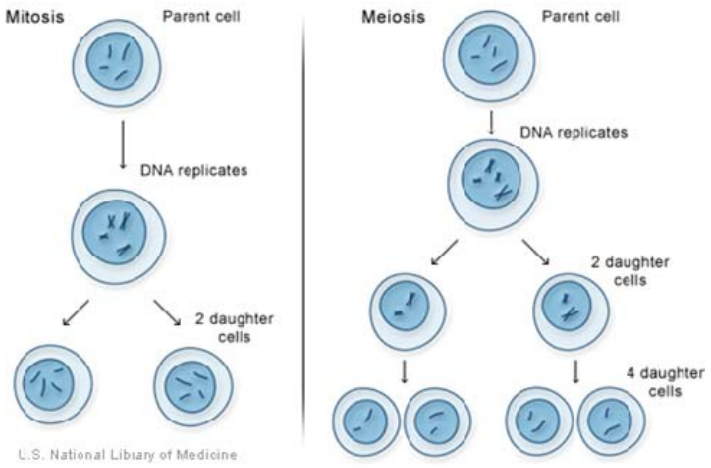

B. Explain what happens to the cell placed in each of the three beakers.

18. Use evidence from the diagram to explain the differences between passive and active transport.



19. Why must DNA be replicated before cell division?

20. This diagram shows sexual vs asexual reproduction. Explain three major differences between these two processes.



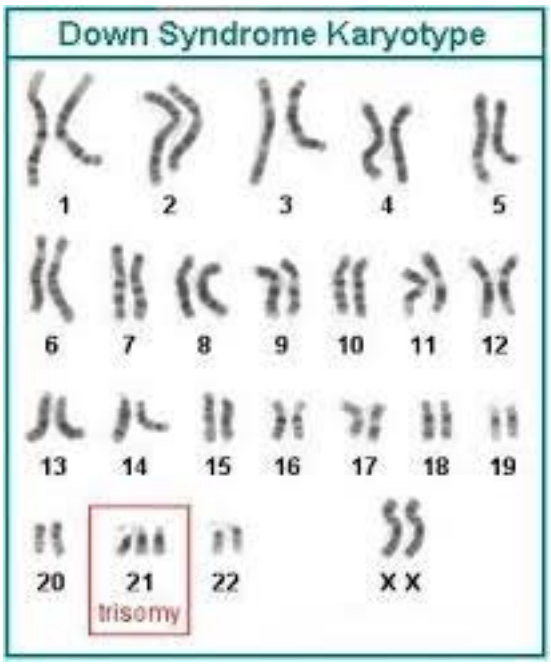

21. How do the daughter cells compare to the parent cell after mitosis has occurred? Give an example.

22. Fill in the table comparing mitosis and meiosis.

| | **Mitosis** | **Meiosis** |
|---|---|---|
| Number of divisions? | | |
| Diploid or Haploid daughter cells? | | |
| Crossing over occurs? | | |
| Genetically identical or different daughter cells? | | |

23. Environmental and genetic factors can cause cancer. What is cancer? What goes wrong in the cells?

24. The following karyotype shows the chromosomes for a person with Down Syndrome. What happened during cell division that would cause this to occur?




25. Describe what occurs during the following types of chromosomal mutations:

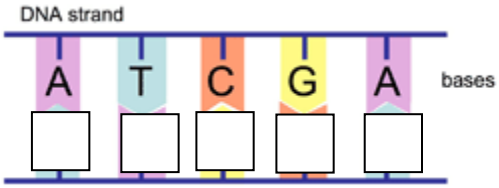
A. Deletion

B. Insertion

C. Nondisjunction

D. translocation

26. Write the complementary strand of DNA to this DNA template strand.




27. Write the complementary strand of RNA to this DNA template strand.

DNA: T A G G A A T T T T T G

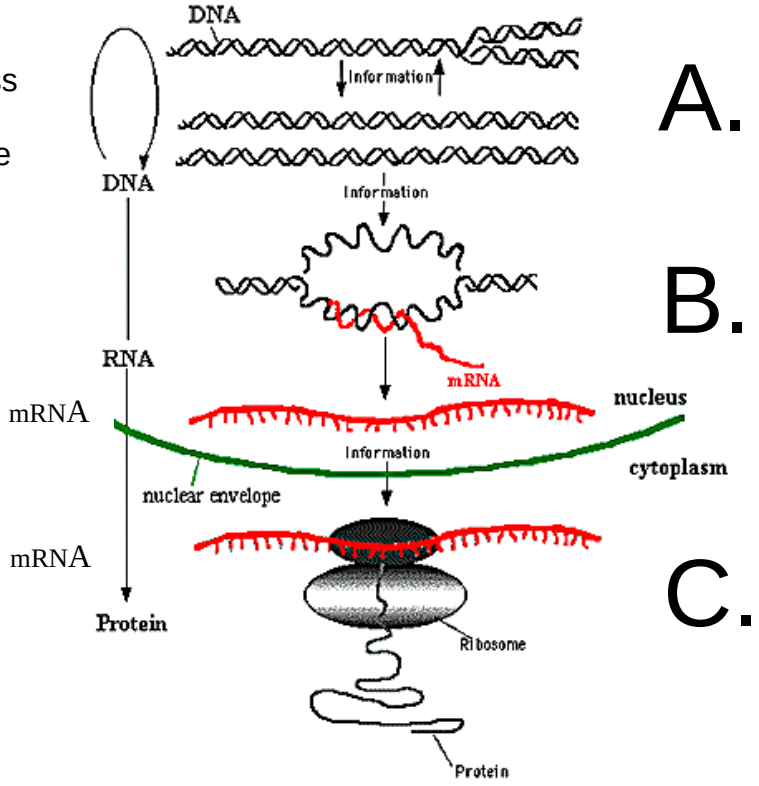
RNA: _____

28. This diagram shows the process of protein synthesis. Describe what is happening at each of the major steps.

A.

B.

C.




28. The following codon chart can figure out which amino acid is represented by which codon. Use the table to figure out which amino acids would be represented by the mRNA chain.

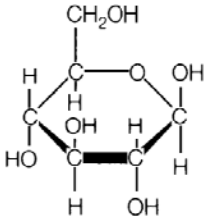
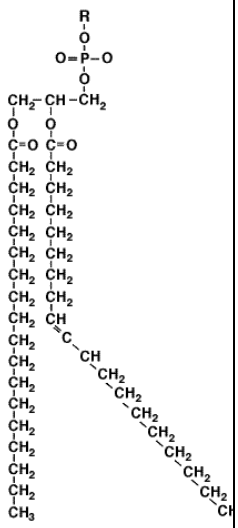
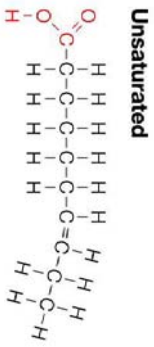
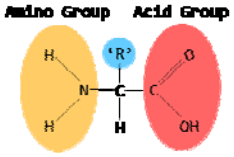
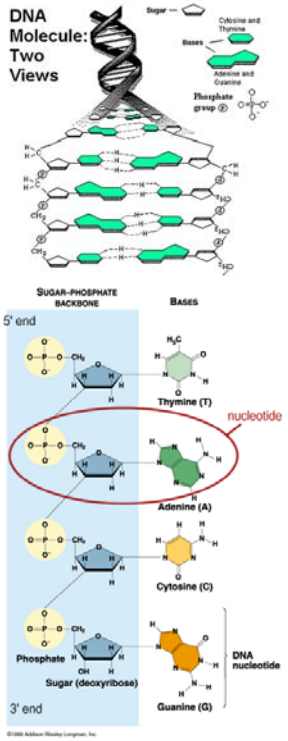
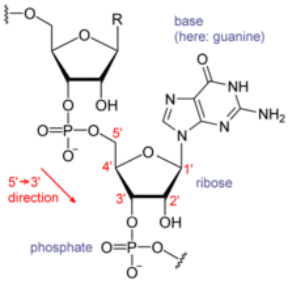
mRNA: A U G C A G G C A U U A

a mino acids: _____ _____ _____ _____

Second Position

| First Position | U | | C | | A | | G | | Third Position |
|---|---|---|---|---|---|---|---|---|---|
| | code | Amino Acid | code | Amino Acid | code | Amino Acid | code | Amino Acid | |
| U | UUU | phe | UCU | ser | UAU | tyr | UGU | cys | U |
| | UUC | | UCC | | UAC | | UGC | | C |
| | UUA | leu | UCA | | UAA | STOP | UGA | STOP | A |
| | UUG | | UCG | | UAG | STOP | UGG | trp | G |
| C | CUU | leu | CCU | pro | CAU | his | CGU | arg | U |
| | CUC | | CCC | | CAC | | CGC | | C |
| | CUA | | CCA | | CAA | gln | CGA | | A |
| | CUG | | CCG | | CAG | | CGG | | G |
| A | AUU | ile | ACU | thr | AAU | asn | AGU | ser | U |
| | AUC | | ACC | | AAC | | AGC | | C |
| | AUA | | ACA | | AAA | lys | AGA | arg | A |
| | AUG | met | ACG | | AAG | | AGG | | G |
| G | GUU | val | GCU | ala | GAU | asp | GGU | gly | U |
| | GUC | | GCC | | GAC | | GGC | | C |
| | GUA | | GCA | | GAA | glu | GGA | | A |
| | GUG | | GCG | | GAG | | GGG | | G |

29. Look at the Pictures and fill in the following Macromolecule table:

| Name the macromolecule | | | | |
|---|---|---|---|---|
| What are the elements found in the macromolecule | | | | |
| What are the biological functions of the macromolecule | | | | |
| Picture of Macromolecule | Glucose  Starch   | Phospholipid  Triglyceride   | Amino acid   | DNA   RNA   |