1. Give an example of each of the following symbiotic relationships:
   a. Mutualism + +
   b. Commensalism +  no effect
   c. Parasitism - -

2. Define and give an example of a habitat and niche for an organism.
   where the organism lives - deep ocean, forest
   community

3. If a person was to study the interactions between the nake, frog, and fish, they would be studying what part of the biological organization?

4. How does primary and secondary succession occur?
   Change over time: soil -> soil community (primary = no soil) 
   Secondary: soil community -> climax community

5. What is a population that shows a J shaped curve? What is the population doing? What is an S shaped curve population? Why can't it grow indefinitely?
   S: Exponential; people, growing fast, not restricted
   S: Logistic; reach carrying capacity

6. What are the two types of reproduction strategies? Give an example of an animal or plant that shows each one.
   Sexual: cellu
   Asexual: non-cellul

7. Define carrying capacity. Why does this occur?
   Max amount of organisms that can be sustained over time; resources run out

8. What is biodiversity?
   Study of growth characteristics of all variations of organisms

9. What is biodiversity?

10. What are habitat fragmentation, degradation, and loss? Give examples of all three. Which one is the major threat to biodiversity?
    Fragmentation: roads, urbanization; degradation; pollution; loss; deforestation

11. Why does conservation biologist want to protect an endangered species from extinction? How do they protect the species? What is the difference between endangered and threatened species?
    - protect biodiversity, food web balance
    - protect areas, restrict hunting
    - Endangered: low #, danger of being extinct
    - Threatened: danger of being endangered

12. Acid precipitation is caused by what?
    sulfur dioxide, burning coal, NO from cars

13. What chemical was used as a pesticide that caused carnivorous birds to produce fragile eggs?
    DDT

14. Polymer Carbohydrate Lipid Protein Nucleic Acid
   Monomer Sugar Fatty acids Amino acids Nucleotides
   Elements CHO CHO CHO CHON CHON
   Example Glucose Starch cellulose Triglyceride Various hemoglobin DNA RNA

15. How are polymers made? How are they broken down?
    dehydration synthesis, hydrolysis

16. Electron cloud
    How many electrons can go on this outer ring? 4
    How many electrons can go on this inner ring? 2

17. Label where the electron, neutron, and proton are found in the atom.
    Can share 4 electrons
30. What is the chemical equation for photosynthesis?
\[ \text{G} \text{O}_2 + \text{H}_2 \text{O} \rightarrow \text{C}_6 \text{H}_12 \text{O}_6 + \text{O}_2 \]

31. What is the chemical equation for respiration?
\[ \text{C}_6 \text{H}_12 \text{O}_6 \rightarrow \text{CO}_2 + \text{H}_2 \text{O} + \text{ATP} \]

32. Match the following with the genetics vocabulary term from the word bank. (Not all will be used)

- **Word Bank**: Homozygous dominant, heterozygous, homozygous recessive, crossing over, genetics, heredity, hybridization, sperm, egg, zygote, gametes, Punnett Square
- a. When an area of a chromosome is exchanged with the matching area of another, crossing over.
- b. The sides of the Punnett square are represented by the parent's gametes.
- c. This is a way to predict different genotypes in offspring, Punnett square.
- d. Passing genes from parent to offspring, heredity.
- e. Gamete with mother's genes, egg.
- f. Gamete with father's genes, sperm.
- g. Homozygous dominant.
- h. Heterozygous dominant.
- i. Homozygous recessive.

33. Mitosis
- a. Definition: make more cells, identical, diploid
- b. Types of cells: body or sex cells (gametes)

34. Meiosis
- a. Definition: make haploid cells, different.
- b. Types of cells: body or sex cells (gametes).
- c. Define haploid: half the amount of DNA.

35. DNA: Label the sugar phosphate backbone and color it blue. Match up the bases and fill in the missing bases. Who discovered the shape of this molecule? Watson and Crick. What did they call it? double helix.


37. Indicate whether the statement is true or false. If false, change the underlined word to create a true statement.
- a. Earth is approximately 4.6 million years old. True.
- b. Fossils are usually found in sedimentary rocks. True.
- c. There are many ways fossils can be formed. True.
- d. Fossil insects preserved in amber may not contain ancient DNA. True.
- e. In terms of evolution, put the following organisms from oldest to youngest. Cyanobacteria, plants, dinosaurs, mammals. True.
- f. Define the following terms and give examples of each.
  - a. Divergent evolution: organisms become different (different environments).
  - b. Convergent evolution: organisms become similar (similar environments).
  - c. Vestigial structures: organs that no longer have a function.

38. Circle the terms that increase genetic diversity for evolution.
- Polyploidy
- Mutations
- Sexual reproduction
- Spontaneous generation
- Crossing over
- Biogenesis
- Sexual reproduction

39. Cell resp. in absence of O2 makes lactic acid: ATP.
4a. Label the flowers with the following terms: Sepal, Petal, Gynoecium, Stamen, Anther, Nectary, Stigma, Style, Pistil, Ovary, Root, Leaf, Stem.

4b. Define the following words:
- Photosynthesis
- ATP
- Chloroplasts
- Nucleus
- Cell
- Cytoplasm
- Protoplasm
- Lytic enzyme
- Cell division
- Prokaryote
- Eukaryote
- Mitosis
- Meiosis
- Chromosome
- Exocytosis
- Endocytosis
- Tissue
- Anatomy
- Physiology
- Reproduction
- Organism
- Organ
- Tissue
- Cell

4c. Label the diagram with the following terms: Callus, Pollen, Seed, Root, Stem, Leaf, Nerve, Xylem, Phloem.
45. If you were Gregor Mendel, who would your father be?

46. Using the pedigree above, is this trait dominant or recessive?

47. What are the genotypes of each individual?

48. If Donna were to marry a homozygous recessive man, what is the probability their children will also be homozygous recessive?

49. Fill in the table appropriately.

<table>
<thead>
<tr>
<th>Type of Dominance</th>
<th>Definition</th>
<th>Genotype</th>
<th>Phenotype</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete</td>
<td>Two phenotypes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incomplete</td>
<td>Intermediate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Codominant</td>
<td>Both expressed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

50. In fruit flies, the gene for wing shape has an unusual allele called 'curly' (designated 'Cy'). The normal (wild type) allele is designated 'C'. A fly homozygous for Cy (Cy Cy) has normal, straight wings. The heterozygote (Cy Cy) has wings which curl up on the ends (and, incidentally, can't really fly). The homozygote for the Cy allele (Cy Cy) never hatches out of the egg. In other words, this allele is lethal in the homozygous condition. If two curly-winged flies are mated, and the female lays 100 eggs, predict the following, showing appropriate work:
   a. How many eggs will produce living offspring?
   b. How many straight-winged flies do you expect among the living offspring?
   c. What percentage of the living offspring do you expect to be curly-winged like the parents?

51. If a pure-breeding (homozygous) black (dominant) long-haired (recessive) cat is mated to a pure-breeding Siamese, short-haired cat, and one of their male offspring is mated to one of their female offspring, what is the chance of producing a Siamese colored, short-haired kitten?

\[ \text{C x C} \text{ C x C} \]

\[ \frac{3}{16} \]

52. In fruit flies (Drosophila), one eye color gene is X-linked, with a recessive white allele and a dominant red allele. If white-eyed female flies are bred to red-eyed male flies, describe the expected offspring (assume all parental flies are true-breeding, X^R X^-).

53. Mr. Hallderson and his wife just had baby girl number three! What is their probability of having girl number four? Why?

54. What is the difference between these two karyotypes?

55. How do disorders such as (Kleinfelter's, Turner's and Down's Syndrome) occur?

56. Fill out the table accordingly:

<table>
<thead>
<tr>
<th>Blood Type</th>
<th>GENOTYPE</th>
<th>ANTIBODY</th>
<th>RECEIVE FROM</th>
<th>DONATE TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>BAB</td>
<td>AB</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>B</td>
<td>BAB</td>
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<td>O</td>
<td>BAB</td>
<td>AB</td>
<td>B</td>
<td>A</td>
</tr>
</tbody>
</table>

57. Draw a diagram below illustrating how a gene of interest, like human insulin, can be manufactured as a drug.
Echinoderms have radial symmetry.

Reproductive opening

Mouth

Seteae

Gill slit

63. Label the parts of the echinoderm.

C. Adult. J. Echinoderms, starfish, sea urchin

2. Describe 3 simple & 3 compound appendages

62. Name 3 examples of class Echinodermata.

C. What uses do the adaptations serve?

61. What is unique about the appendages compared to all other invertebrates?