

CELL ORGANELLES

Explain how the following organelles work together to perform the life functions of the cell

1. Nucleus and ribosomes

2. Endoplasmic reticulum and Golgi bodies

3. Endoplasmic reticulum and ribosomes

4. Golgi bodies and lysosomes

5. Nucleus and endoplasmic reticulum

6. Endoplasmic reticulum and Golgi bodies and vesicles

7. Endoplasmic reticulum and cell membrane

20. What is the difference between exocytosis and endocytosis? _____

12. Describe the four levels of protein structure:

a. Primary _____

b. Secondary _____

c. Tertiary _____

d. Quaternary _____

13. What happens to a protein during denaturation? _____

14. What are the building blocks of nucleic acids? _____

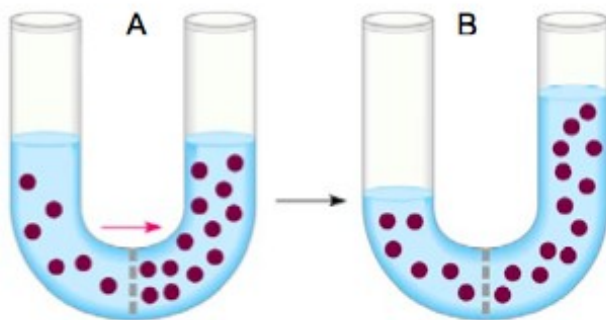
14. What is meant by facilitated diffusion? _____

15. How do active and passive transport differ? _____

10. Define the following:

- a. Diffusion _____
- b. Osmosis _____
- c. Hypotonic _____
- d. Hypertonic _____
- e. Isotonic _____

11. What is happening in the diagram below?



12. What do cells do when placed in solutions that are:

- a. Hypotonic _____
- b. Hypertonic _____
- c. Isotonic _____

1. What is meant by the concept that cells go through a cell cycle?

2. What are the key roles of cell division?

3. What is the significance of chromosome replication?

4. Sketch and label replicated chromosomes.

5. List the phases of the cell cycle with a brief description of what occurs in each phase.

a. _____

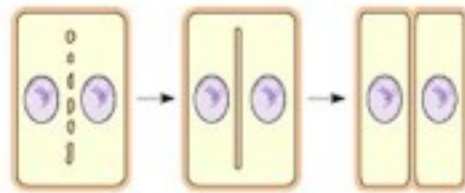
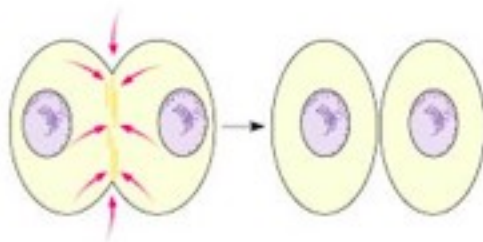
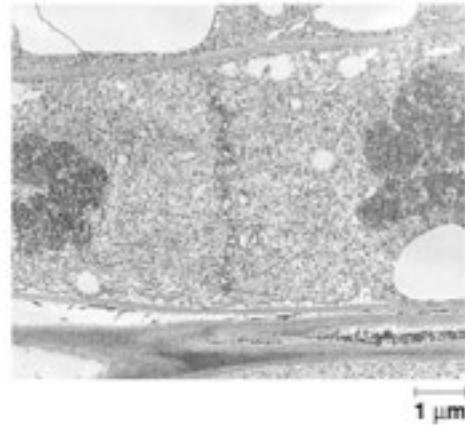
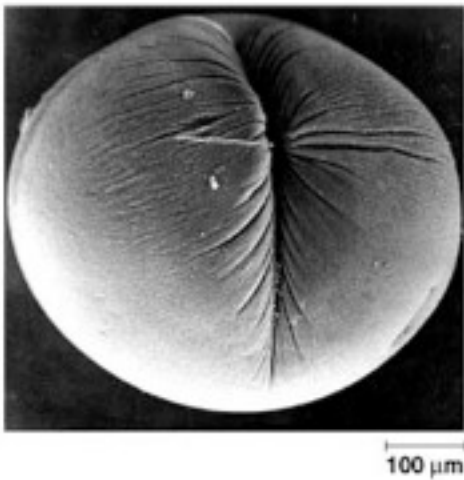
b. _____

c. _____

d. _____

e. _____

9. How does cytokinesis differ in animal and plant cells? Label the diagrams below.



6. Define the following terms.

a. karyotype _____

b. haploid _____

c. diploid _____

d. homologous _____

e. centromere _____

f. chromatid _____

9. How do enzymes affect the energy profile? _____

10. Define activation energy. _____

11. Why are enzymes said to be specific? _____

12. List factors that influence the rate of enzyme reactions. _____

14. How do competitive and noncompetitive inhibitors differ in their enzyme interactions?

15. What happens during allosteric regulation? _____

16. Describe feedback inhibition. _____

1. An important cause of the deterioration in flavor, texture, and vitamin content of frozen fruits and vegetables during storage is the action of hydrolytic enzymes released from the vacuoles of the cells. Blanching (a quick dip in boiling water) prior freezing improves the keeping qualities of produce. How do you suppose blanching works?

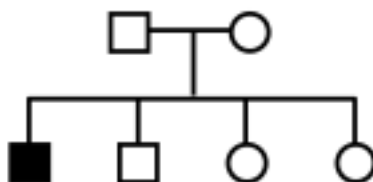
2. Some fruits and vegetables turn brown when peeled because they contain the enzyme catecholase, which catalyzes a reaction between oxygen and a colorless compound, catechol. The product of this reaction is benzoquinone, which forms the red and brown pigments responsible for the browning. When preparing fruit salads, some cooks sprinkle the sliced fruits with lemon juice to prevent discoloration. How might lemon juice act to prevent the browning of fruit?

3. Commercial meat tenderizers often contain papain, a proteolytic (protein-digesting) enzyme derived from papayas. How might such products make meat more tender?

4. Meat tenderizers are sometimes used as a home remedy for treating stings inflicted by the Portuguese man-of-war. Based on this information, to what class of organic compounds do you suppose the toxins released by the man-of-war belongs?

GENETICS PRACTICE 4: PEDIGREES

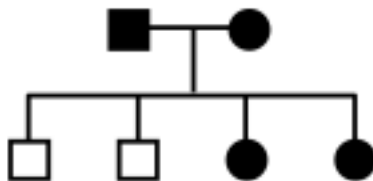
PEDIGREE #1



Could this trait be inherited as a simple...

			If "YES", then suggested genotypes of father mother
a. autosomal recessive?	YES	NO	_____ x _____
b. autosomal dominant?	YES	NO	_____ x _____
c. X-linked recessive?	YES	NO	_____ x _____
d. X-linked dominant?	YES	NO	_____ x _____
e. Y-linked trait?	YES	NO	_____ x _____

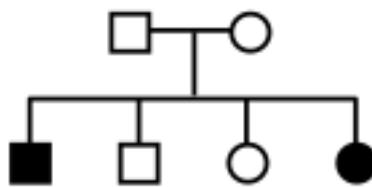
PEDIGREE #2



Could this trait be inherited as a simple...

			If "YES", then suggested genotypes of father mother
a. autosomal recessive?	YES	NO	_____ x _____
b. autosomal dominant?	YES	NO	_____ x _____
c. X-linked recessive?	YES	NO	_____ x _____
d. X-linked dominant?	YES	NO	_____ x _____
e. Y-linked trait?	YES	NO	_____ x _____

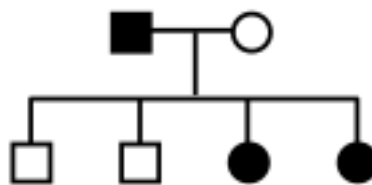
PEDIGREE #3



Could this trait be inherited as a simple...

			If "YES", then suggested genotypes of <u>father</u> <u>mother</u>
a. autosomal recessive?	YES	NO	_____ x _____
b. autosomal dominant?	YES	NO	_____ x _____
c. X-linked recessive?	YES	NO	_____ x _____
d. X-linked dominant?	YES	NO	_____ x _____
e. Y-linked trait?	YES	NO	_____ x _____

PEDIGREE #4



Could this trait be inherited as a simple...

			If "YES", then suggested genotypes of <u>father</u> <u>mother</u>
a. autosomal recessive?	YES	NO	_____ x _____
b. autosomal dominant?	YES	NO	_____ x _____
c. X-linked recessive?	YES	NO	_____ x _____
d. X-linked dominant?	YES	NO	_____ x _____
e. Y-linked trait?	YES	NO	_____ x _____

INCOMPLETE DOMINANCE

1. In radishes, the gene that controls color exhibits incomplete dominance. Pure-breeding red radishes crossed with pure-breeding white radishes make purple radishes. What are the genotypic and phenotypic ratios when you cross a purple radish with a white radish?

2. Certain breeds of cattle show incomplete dominance in coat color. When pure breeding red cows are bred with pure breeding white cows, the offspring are roan (a pinkish coat color). Summarize the genotypes & phenotypes of the possible offspring when a roan cow is mated with a roan bull

CO-DOMINANCE

3. A man with type AB blood marries a woman with type B blood. Her mother has type O blood. List the expected phenotype & genotype frequencies of their children.

4. The father of a child has type AB blood. The mother has type A. Which blood types can their children NOT have? _____
5. A woman with type A blood and a man with type B blood could potentially have offspring with what blood types? _____
6. The mother has type A blood. Her husband has type B blood. Their child has type O blood. The father claims the child can't be his. Is he right? _____
7. The mother has type B blood. Her husband has type AB blood. Their child has type O blood. The father claims the child can't be his. Is he right? _____
8. The mother has type AB blood. The father has type B blood. His mother has type O blood. What are all the possibilities of blood type for their children? _____

LETHAL DOMINANT

9. Achondroplasia (dwarfism) is caused by a dominant gene. A woman and a man both with dwarfism marry. If homozygous achondroplasia results in death of embryos, list the genotypes and phenotypes of all potential live-birth offspring.

What is the expected ratio of dwarfism to normal offspring?

SEX-LINKED

10. The genes for hemophilia are located on the X chromosome. It is a recessive disorder. List the possible genotypes and phenotypes of the children from a man normal for blood clotting and a woman who is a carrier. (HINT: You have to keep track of what sex the children are!)

8. What are Chargaff's rules?

9. If a species has 35% adenine in its DNA, determine the percent of the other three bases.

12. Explain the antiparallel configuration of the DNA molecule

13. What is the advantage of the double-stranded (complementarity) aspect of the DNA? _____

14. What did the experiments of Matthew Meselson and Franklin Stahl show?

7. Why is the genetic code said to be universal? What is the significance of this?

8. The enzyme which transcribes the DNA is _____

The strand of DNA that is transcribed is called _____

The strand of DNA that is *not* transcribed is called _____

1. Briefly describe the function of each type of RNA.

a. rRNA _____

b. mRNA _____

c. tRNA _____

2. Explain the "Central Dogma" of biology.

3. Give an overview of transcription.

4. Give an overview of translation.

5. Out of the work of a number of scientists, we have now determined that the *four* "letters" of the DNA "alphabet" translates to the *twenty* "letters" of the amino acid "alphabet". Briefly explain how this works.

1. Define the following terms.

a. gametes _____

b. somatic cells _____

c. zygote _____

d. fertilization _____

e. diploid _____

f. haploid _____

2. Why is meiosis called "reduction division"? Why is this process necessary for sexual reproduction?

3. Label the diagram of the human lifecycle. Include the chromosome numbers at each stage.

