

Biology Mid-Term Study Guide

H

Genetics and Heredity

Define the following terms:

1. genetics
2. hybrid
3. gene
4. allele
5. dominant
6. recessive
7. probability
8. homozygous
9. heterozygous
10. phenotype
11. genotype

Be able to correctly complete the following crosses.

Monohybrid: (dominant/recessive)

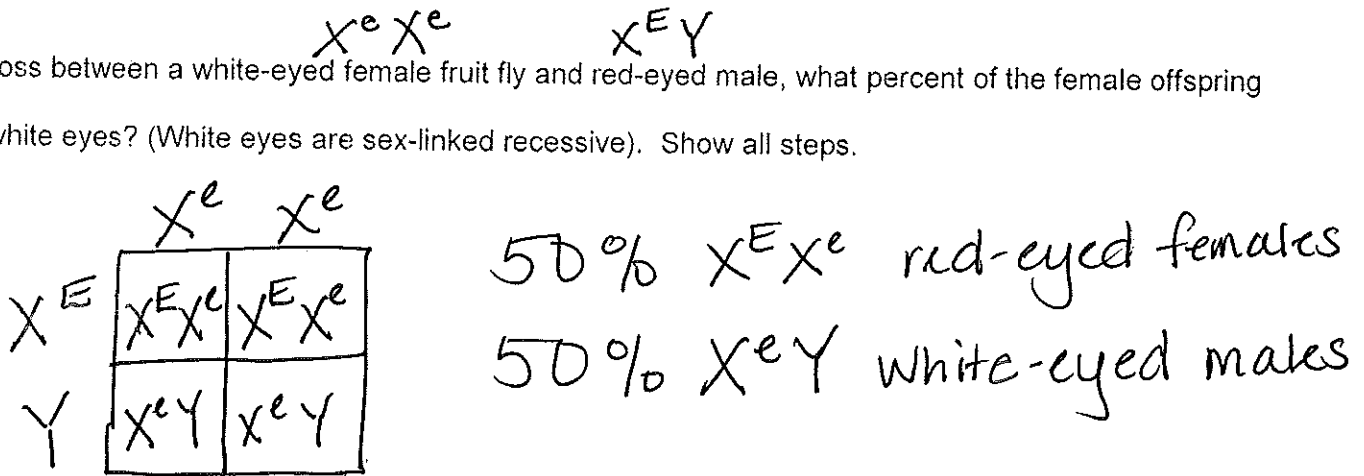
12. Having red hair (H) is a dominant gene. What is the probability that the children, of someone who is a homozygous for red hair with and a person who does not have red hair, will have red hair? (hint: you should probably make a punnett square to determine the probability)

	H	H
h	Hh	Hh
h	Hh	Hh

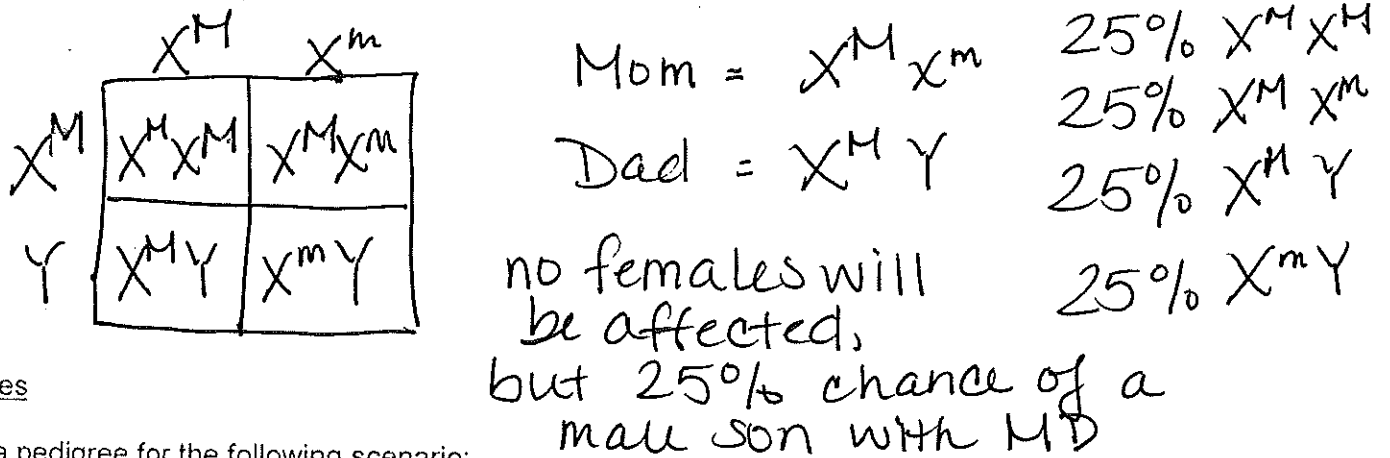
100% red hair
heterozygous

Sex-linked: (male = XY & Female = XX)

16. In a cross between a white-eyed female fruit fly and red-eyed male, what percent of the female offspring will have white eyes? (White eyes are sex-linked recessive). Show all steps.



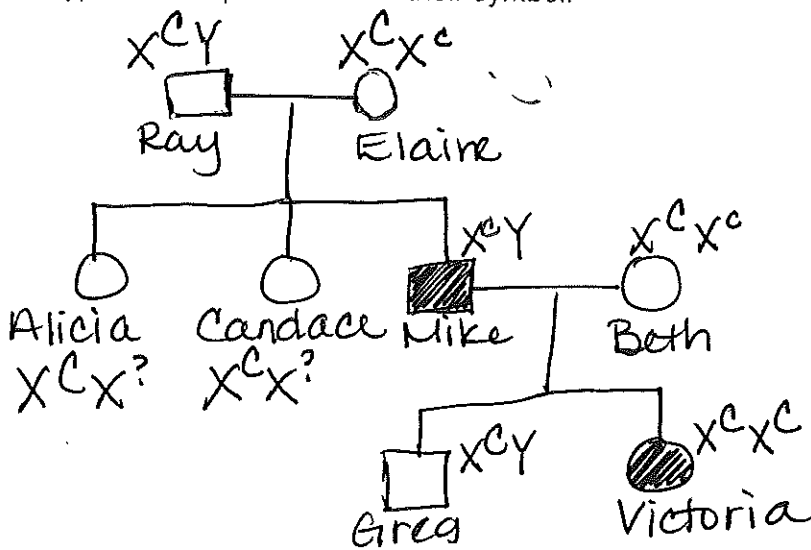
17. Duchenne muscular dystrophy is a sex-linked recessive disorder that results in the progressive weakening and loss of skeletal muscle. A young couple is worried about their family's history of this disorder and would like to know their chances of having children with muscular dystrophy. What would you tell them if the woman is heterozygous for the disorder and the man does not have it? List the genotype for both parents and explain your findings. Show all steps.



Pedigrees

Create a pedigree for the following scenario:

Ray and Elaine were married in 1970. They both had normal vision. They had 2 daughters and then a son. Both daughters, Alicia and Candace, had normal vision and never had any children of their own. The son, Mike, was colorblind. The son married Beth who also had normal vision and they had 2 children of their own, first Greg then Victoria. Victoria was colorblind, but Greg was not. Colorblindness is a sex-linked recessive trait. Label the genotype of each person below their symbol.



4. A tomato plant in a greenhouse was found to be infected with tobacco mosaic virus. A few weeks later, nearby plants were also found to be infected with the virus.

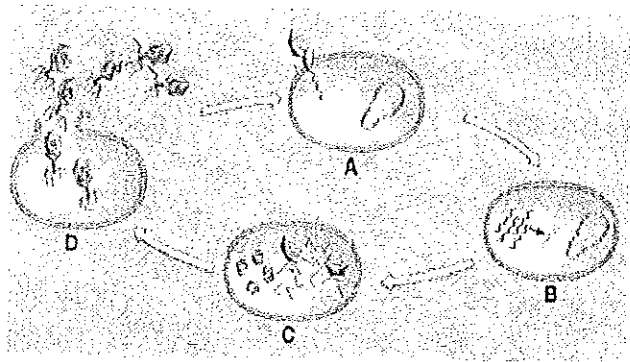
Which of the following best describes how the virus reproduced?

- A. The virus made its own spores.
- B. The virus produced seeds in the tomatoes.
- C. The virus used the host plant's resources and machinery to reproduce.
- D. The virus immediately killed the host plant and was free to reproduce.

5. The above picture shows a step from the lytic cycle of virus replication

6. In which phase of this cycle is the viral DNA replicated?

B



7. Describe what the bacteriophages will do after phase D?

The bacteriophages lyse the cell & will go to infect/reproduce in other cells.

8. The cell in which a virus can reproduce is called the

- a) mother cell
- b) parent cell
- c) daughter cell
- d) host cell

9. A virus that infects bacteria is a(n)

- a) E. Coli virus
- b) bacteriophage
- c) mosaic virus
- d) provirus

10. The nucleic acid core of a virus contains

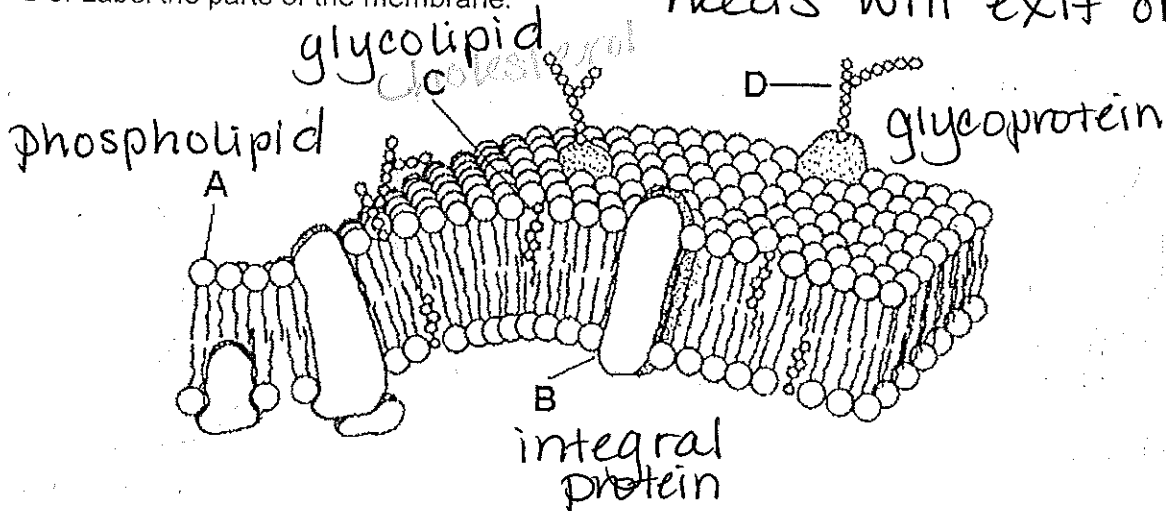
- a) only DNA
- b) only RNA
- c) both DNA and RNA
- d) either RNA or DNA

CELL TRANSPORT

1. Cell membranes are selectively permeable. Explain the importance of selective permeability to cell function.

Selective permeability means that only certain molecules can enter & leave the cell. This means only the molecules the cells needs will exit or enter.

2-5. Label the parts of the membrane:



7. What is the function of the cell membrane?

Cell membrane controls what enters/leaves
- protects cell - makes waterproof

8. Compare and contrast diffusion and osmosis.

Diffusion & osmosis both are the movement of molecules from high concentration to low. Passive.
osmosis = diffusion of H_2O specifically.

9. What does it mean when a cell is in equilibrium?

The molecules & water are equal on both sides of the membrane.

10. Diffusion always causes particles to move from a region of high concentration to a region of low concentration.

11. What type of organic molecule found in the cell membrane is needed for active transport?

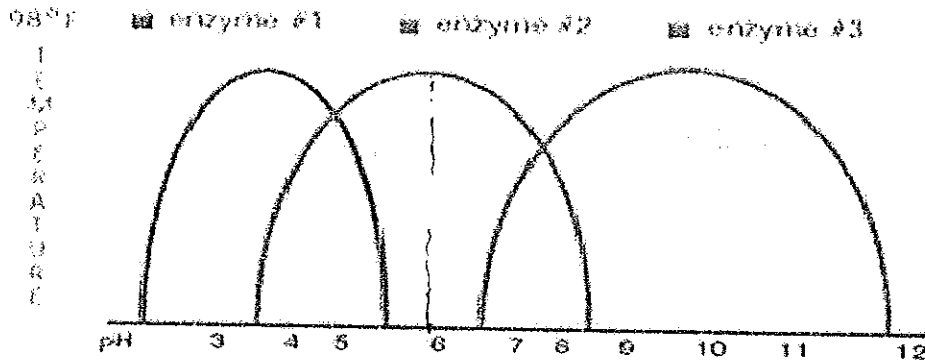
protein

12. Endocytosis and exocytosis are forms of transport in cells. Explain the difference between

the two types of transport. Is this a form of active or passive transport? Explain.

endocytosis = engulfing into the cell
exocytosis = releasing from the cell

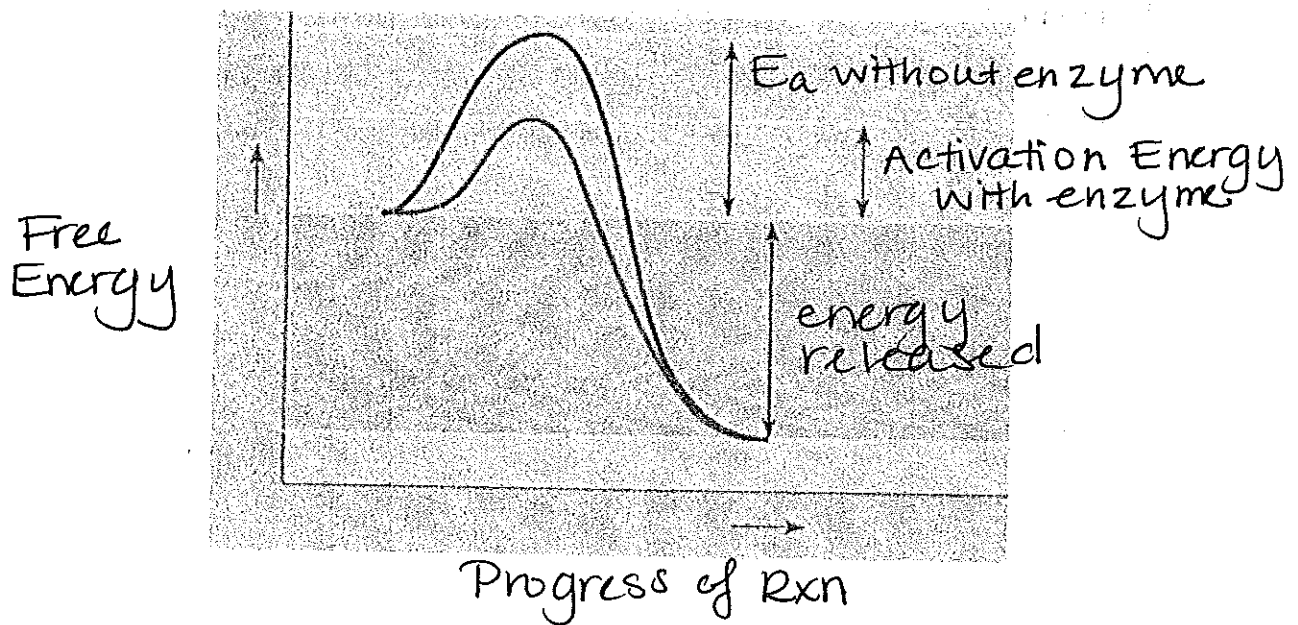
both are active & require energy



12. Use the graphs above to answer the questions:

- a. Does enzyme number one function at a pH of 5.5? NO
- b. What is the best pH for enzyme number two? 6
- c. Which enzyme has the broadest pH range? 3

13. On the graph, label the x-axis "Progress of the reaction" and the y-axis "Free Energy." Label the activation energy on this sketch, both with and without enzyme.



14. Explain two factors that affect enzyme function.

pH & temperature
(& inhibitors)

