

Name _____ Hour _____

Section II-4 Meiosis (pages 275–278)

Introduction (pages 275)

1. List the two things that Mendel's principles of genetics required in order to be true.

a. _____

b. _____

Chromosome Number (page 275)

2. What does it mean when two sets of chromosomes are homologous? _____

3. Circle the letter of each way to describe a diploid cell.

a. $2N$

b. Contains two sets of homologous chromosomes.

c. Contains a single set of homologous chromosomes

d. A gamete

4. Circle the letter of the number of chromosomes in a haploid *Drosophila* cell.

a. 8

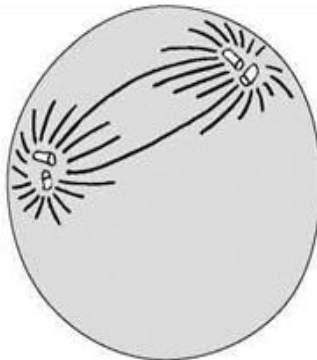
b. 4

c. 2

d. 0

Phases of Meiosis (pages 275-277)

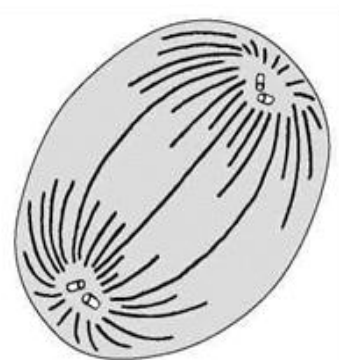
5. Draw the chromosomes in the diagram below to show the correct phase of meiosis.



Prophase I

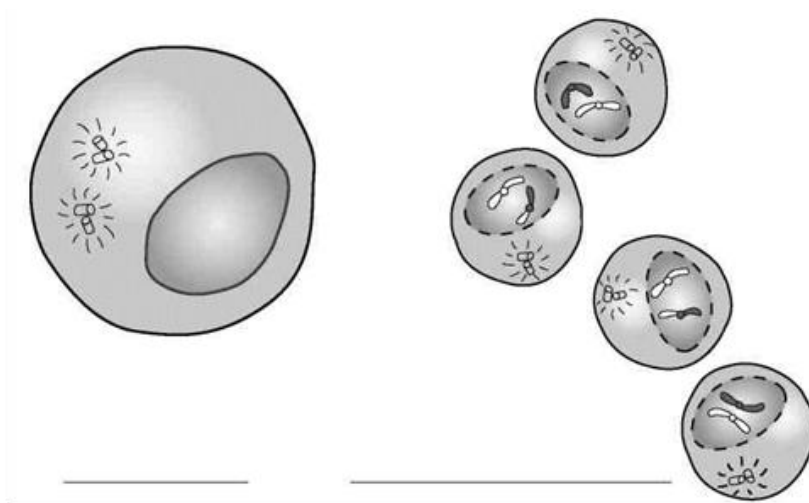


Metaphase I



Anaphase II

6. Identify which phase of meiosis is shown in the diagrams below.



7. Why is meiosis described as a process of reduction division? _____

8. What are the two distinct divisions of meiosis?

a. _____

b. _____

9. Is the following sentence true or false? The diploid cell that enters meiosis becomes 4 haploid cells at the end of meiosis. _____

10. How does a tetrad form in prophase I of meiosis? _____

11. Circle the number of chromatids in a tetrad.

a. 8

b. 6

c. 4

d. 2

12. What results from the process of crossing-over during prophase I? _____

13. Circle the letter of each sentence that is true about meiosis.
- a. During meiosis I, homologous chromosomes separate.
 - b. The two daughter cells produced by meiosis I still have the two complete sets of chromosomes, as does a diploid cell.
 - c. During anaphase II, the paired chromatids separate.
 - d. After meiosis II, the four daughter cells contain the diploid number of chromosomes.

Gamete Formation (page 278)

Product of Meiosis	Description
___ 14. eggs	a. Haploid gametes produced in males.
___ 15. sperm	b. Haploid gametes produced in females.
___ 16. polar bodies	c. Cells produced in females that do not participate in reproduction.

Comparing Mitosis and Meiosis (page 278)

17. Circle the letter of each sentence that is true about mitosis and meiosis.
- a. Mitosis produces four genetically different haploid cells.
 - b. Meiosis produces two genetically identical diploid cells.
 - c. Mitosis begins with a diploid cell.
 - d. Meiosis begins with a diploid cell.

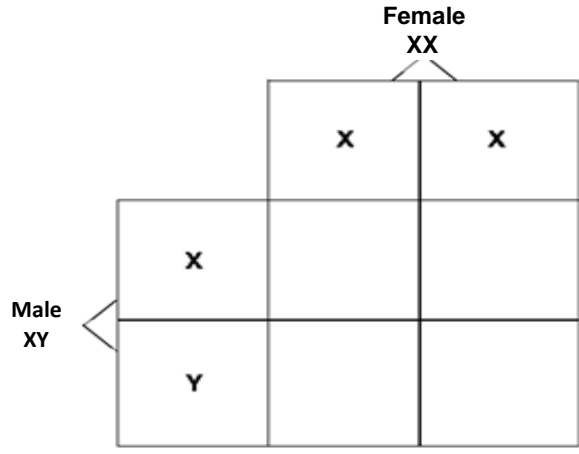
Section 14-1 Human Heredity (pages 341-348)

Human Chromosomes (pages 341-342)

1. How do biologists make a karyotype? _____

2. Circle the letter of each sentence that is true about human chromosomes.
- a. The X and Y chromosomes are known as sex chromosomes because they determine an individual's sex.
 - b. Males have two X chromosomes.
 - c. All the chromosomes except the sex chromosomes are autosomes.
 - d. Biologists would write 46, XY to indicate a human female.

3. Complete the Punnett square below to show how sex chromosomes segregate during meiosis.

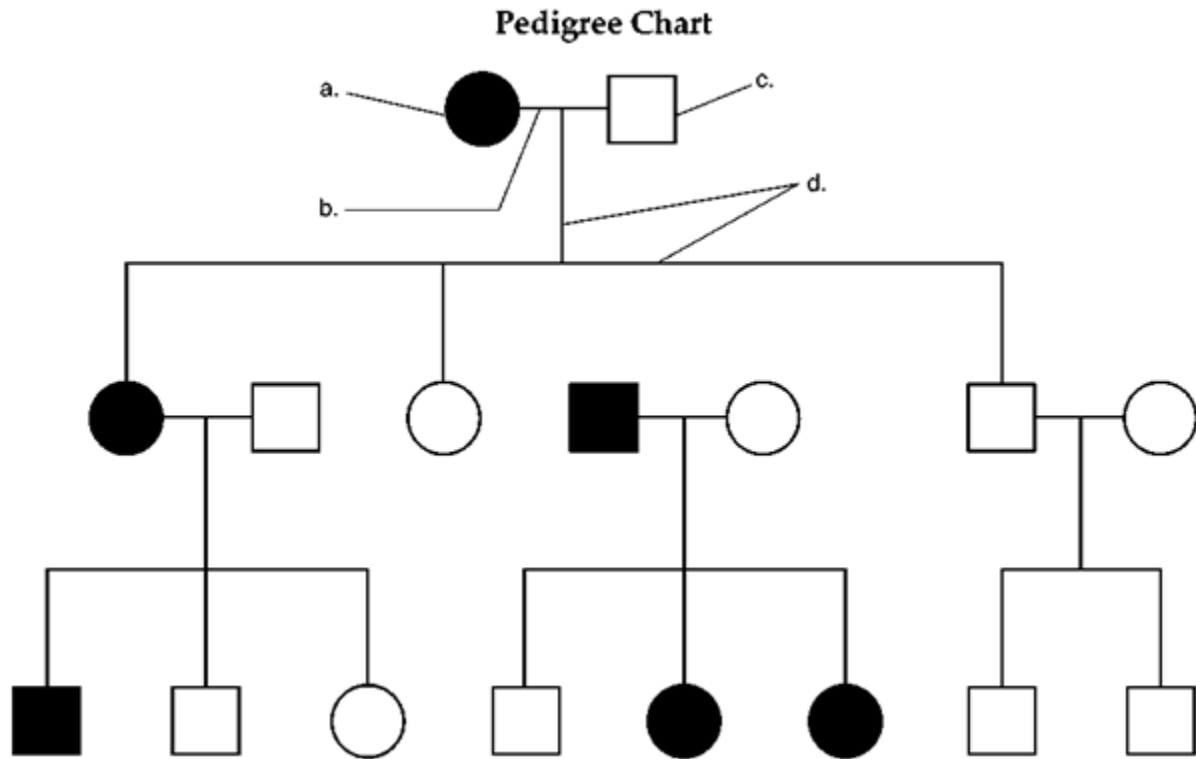


4. Why is there the chance that half of the zygotes will be female and half will be male? _____

Human Traits (pages 342-343)

5. What does a pedigree chart show? _____

Match the labels of the pedigree chart shown below. Some of the parts of the pedigree chart may be used more than once.



_____ 6. A person who expresses the trait

_____ 7. A male

_____ 8. A person who does not express the trait

_____ 9. Represents a marriage

_____ 10. A female

_____ 11. Connects parents to their children

12. Give two reasons why it is impossible to associate some of the most obvious human traits with single genes.

a. _____

b. _____

Human Genes (pages 344-346)

13. Why is it difficult to study the genetics of humans? _____

14. Circle the letter of each sentence that is true about human blood group genes.
- a. The Rh blood group is determined by a single gene.
 - b. The negative allele (Rh⁻) is the dominant allele.
 - c. All of the alleles for the ABO blood group gene are codominant.
 - d. Individuals with type O blood are homozygous for the I allele (ii) and produce no antigen on the surface of the red blood cells.
15. Is the following sentence true or false? Many human genes have become known through the study of genetic disorders. _____

Match the genetic disorder with its description.

Genetic Disorder	Description
_____ 16. Phenylketonuric (PKU)	a. Nervous system breakdown caused by an autosomal recessive allele.
_____ 17. Tay-Sachs disease	b. A form of dwarfism caused by an autosomal dominant allele.
_____ 18. Achondroplasia	c. A buildup of phenylalanine caused by an autosomal recessive allele.
_____ 19. Huntington disease	d. A progressive loss of muscle control and mental function caused by an autosomal dominant allele.

From Gene to Molecule (pages 346-348)

20. What is the normal function of the protein that is affected in cystic fibrosis?

21. A change in just one DNA base for the gene that codes for the protein

_____ causes sickle-shaped red blood cells.

22. What is the advantage of being heterozygous for the sickle cell allele?

23. What makes an allele dominant, recessive, or codominant? _____

Section 14-2 Human Chromosomes (pages 349-353)

Human Genes and Chromosomes (page 349)

1. Circle the letter of each sentence that is true about human genes and chromosomes.
 - a. Chromosomes 21 and 22 are the largest human chromosomes.
 - b. Chromosome 22 contains long stretches of repetitive DNA that do not code for proteins.
 - c. Biologists know everything about how the arrangements of genes on chromosomes affect gene expression.
 - d. Human genes located close together on the same chromosome tend to be inherited together.

Sex-Linked Genes (pages 350-351)

2. What are sex-linked genes? _____

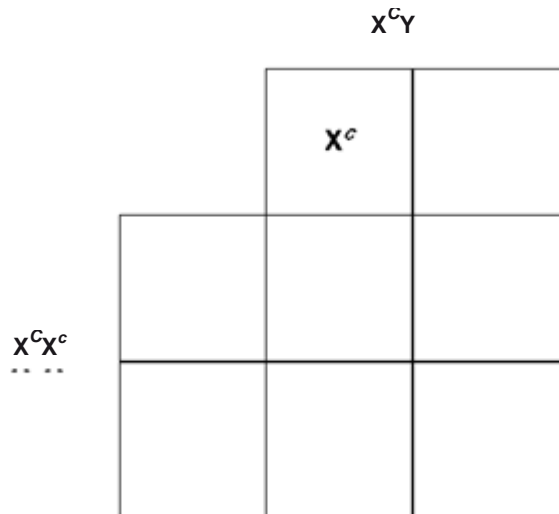
3. Is the following sentence true or false? The Y chromosome does not contain any genes at all. _____
4. Complete the table describing sex-linked disorders.

SEX-LINKED DISORDERS IN HUMANS

Disorder	Description	Cause
Colorblindness		
		A recessive allele in either of two genes resulting in a missing protein required for normal blood clotting
		A defective version of the gene that codes for a muscle protein

5. Is the following sentence true or false? All X-linked alleles are expressed in males, even if they are recessive. _____

6. Complete the Punnett square to show how colorblindness is inherited.



X-Chromosome Inactivation (page 352)

7. How does the cell “adjust” to the extra X chromosome in female cells? _____

8. What is a Barr body? _____

9. Is the following sentence true or false? Barr bodies are found only in males.

10. If you see a white cat with orange and black spots, is it most likely a male or female? Explain. _____

Chromosome Disorders (pages 352-353)

11. What occurs during nondisjunction? _____

12. Is the following sentence true or false? If nondisjunction occurs, gametes may have abnormal numbers of chromosomes. _____

13. The condition in which an individual has three copies of a chromosome is known as _____, which means “three bodies”.

14. Is the following sentence true or false? Down syndrome occurs when an individual has two copies of chromosome 21. _____

15. Circle the letter of the characteristic of Down syndrome.

a. dwarfism

c. colorblindness

b. mental retardation

d. muscle loss

16. Why does an extra copy of one chromosome cause so much trouble? _____

17. Circle the letter of each sentence that is true about sex chromosome disorders.

a. A female with a karyotype 45,X has inherited only one X chromosome and is sterile.

b. Females with the karyotype 47,XXY has Klinefelter's syndrome.

c. Babies have been born without an X chromosome.

d. The Y chromosome contains a sex-determining region that is necessary for male sexual development.