

## STUDY GUIDE FOR GENETICS UNIT TEST

1. Know the terms on your Genetics Vocabulary list
2. **Punnett Squares:**
  - Be able to fill one in and interpret what it means
  - Be able to describe the phenotype and genotype of offspring from a Punnett square
3. **DNA – Deoxyribonucleic Acid**
  - Be able to correctly label a diagram of DNA molecule including the sugar, the phosphate group and the nitrogen bases (A-T and G-C)
4. **Pedigree Chart:**
  - Be able to create a pedigree chart including the correct shading of the symbols and the correct gene pairs for each person in the chart
5. **Genetic Disorders:**
  - Down Syndrome – caused by having an extra chromosome on the 21<sup>st</sup> pair
  - Sickle cell anemia – disease where red blood cells are shaped like sickles instead of round
  - Cystic fibrosis- disease usually affecting the respiratory system due to excess mucus being produced
  - Hemophilia – inherited disease where the blood does not clot properly  
(example of a sex-linked trait) .
  - Color blindness – when a person cannot see the difference between certain colors  
(example of a sex-linked trait)
6. **Sex Chromosomes:**
  - Male – XY
  - Female – XX
  - Female Carrier of color blindness or hemophilia -  $X^B X^b$ ,  $X^H X^h$
  - Male with color blindness or hemophilia –  $X^b Y$ ,  $X^h Y$

NOTE: It is the male or the father that determines the child's gender

7. **Mitosis vs. Meiosis:**
  - Be able to state what type of cell each process makes
  - Be able to state the purpose of each type of cell
  - Be able to state whether end product is identical or not identical
  - Be able to state what happens to the chromosome number in the cells during both processes

## Genetics Review Worksheet

Name \_\_\_\_\_

Date \_\_\_\_\_ Per. \_\_\_\_\_

Punnett square  
pedigree chart  
100%  
males  
females

pure gene pair  
two  
co-dominance  
sixteen  
meiosis

twenty-three  
25%  
gene  
forty-six

1. A region of a chromosome that controls a specific characteristic is a \_\_\_\_\_.
2. How many chromosomes are found in human body cells? \_\_\_\_\_
3. How many chromosomes are found in human reproductive cells? \_\_\_\_\_
4. A record of marriages and births over several generations of a family following a single trait through those generations is called a \_\_\_\_\_.
5. At a minimum, how many genes does a person have for each trait? \_\_\_\_\_
6. If a cell with 16 chromosomes undergoes mitosis, each new cell that forms will have how many chromosomes? \_\_\_\_\_
7. Another name for a homozygous gene pair is \_\_\_\_\_.
8. A method used to show the possible ways genes are combined when passed from parent to offspring is the \_\_\_\_\_.
9. A reduction by half in the number of chromosomes in a cell is called \_\_\_\_\_.
10. XX represents the chromosomes for \_\_\_\_\_.
11. In humans, the gender of the organism is determined by \_\_\_\_\_.
12. In a cross between two hybrid parents, what percent of their offspring will be pure dominant? \_\_\_\_\_
13. In a cross between a pure dominant trait and a pure recessive trait, what percent of the offspring will show the dominant trait? \_\_\_\_\_
14. When two *different* genes for a trait *both show* as dominant, this is called \_\_\_\_\_.

## Genetics Review Worksheet

### Short Answer:

1. Describe an example of incomplete dominance. \_\_\_\_\_

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2. What is the gene pair for a recessive trait that shows in an organism? \_\_\_\_\_

3. Tt: a hybrid plant. Does this describe the phenotype or genotype? \_\_\_\_\_

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4. Red eyes are dominant and white eyes are recessive in fruit flies.  
Cross a hybrid red-eyed fly with a white-eyed fly.  
State the phenotype and genotype of all offspring.


Phenotypes of offspring:

Genotypes of offspring:

SAMPLE QUESTIONS:

1. \_\_\_\_\_ In males, sex chromosomes are:
  - A. XX
  - B. XY
  - C. YY
  
2. \_\_\_\_\_ The homozygous recessive trait is represented by:
  - A. TT
  - B. Tt
  - C. tt
  
3. \_\_\_\_\_ Genotype describes:
  - A. the physical appearance of a trait
  - B. genetic make-up of a trait
  - C. a genetic disease
  
4. \_\_\_\_\_ Color blindness is called a sex-linked trait because it is inherited on the:
  - A. X chromosome
  - B. XY chromosome pair
  - C. Y chromosome
  
5. \_\_\_\_\_ A genetic disease in which red blood cells change shape is called:
  - A. hemophilia
  - B. sickle cell anemia
  - C. Down syndrome
  
6. \_\_\_\_\_ The father of genetics is
  - A. Darwin
  - B. Mendel
  - C. Watson
  
7. \_\_\_\_\_ Gene combination in which traits of both genes show at the same time is called:
  - A. incomplete dominance
  - B. codominance
  - C. grouping

## Punnett Square Practice

R = tongue roller

r = non-tongue roller

Cross a hybrid tongue roller with a non-tongue roller.


1. What fraction of offspring will be tongue rollers? \_\_\_\_\_
  2. What fraction of offspring will be non-tongue rollers? \_\_\_\_\_
  3. What percent of offspring will be hybrid? \_\_\_\_\_
  4. What percent of offspring will be pure tongue rollers? \_\_\_\_\_
  5. Will any of the offspring be hybrid non-tongue rollers? \_\_\_\_\_
- 

BB = black fur

WW = white fur

BW = gray fur

Cross a black mouse with a gray mouse.


1. What fraction of the offspring will be black? \_\_\_\_\_
2. What fraction of the offspring will be white? \_\_\_\_\_
3. What fraction of the offspring will be gray? \_\_\_\_\_
4. This is an example of \_\_\_\_\_

## Pedigree Chart Practice

1. Draw two pedigree charts for the family's three generations.
2. Label the names and the gene pairs for each family member.

- Pedigree Chart 1 - Track pigmented skin, the dominant trait.
- Pedigree Chart 2 - Track albinism, the recessive trait.

A = Pigmented Skin      a = Albino

Joe and Lisa, were married. They had normal pigmentation.  
They had a son and a daughter - Steve and Karen.  
Steve had normal pigmentation. Karen had albinism.

Steve married Ellen who also had normal pigmentation.  
They had one daughter named Holly who had albinism.

Karen married Jacob who had normal pigmentation.  
They had two sons and one daughter - Scott, Tucker, and Audra  
Of the three children, only Scott had albinism.

DOMINANT TRAIT

RECESSIVE TRAIT

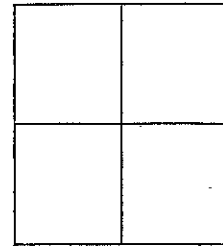
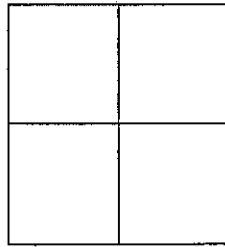
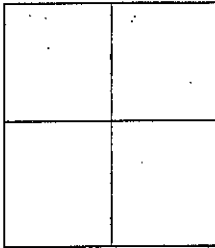
Allison has muscular dystrophy, a recessive sex-linked trait, so it is a rare condition for women. She is married to Jonah who does not have muscular dystrophy. They have two children, Darren and Linda.

Darren marries Wanda who does not have muscular dystrophy and she is not a carrier either. Darren and Wanda have two children, one boy and one girl.

Linda marries Randy who does not have muscular dystrophy. They have two boys.

**DIRECTIONS:**

1. Draw Punnett Squares for each couple.



2. Construct a pedigree chart for the trait muscular dystrophy.

Will Darren or his sister, Linda, need to worry about their children having muscular dystrophy?

**Explain** your answer. (4 pts)

**True or False**

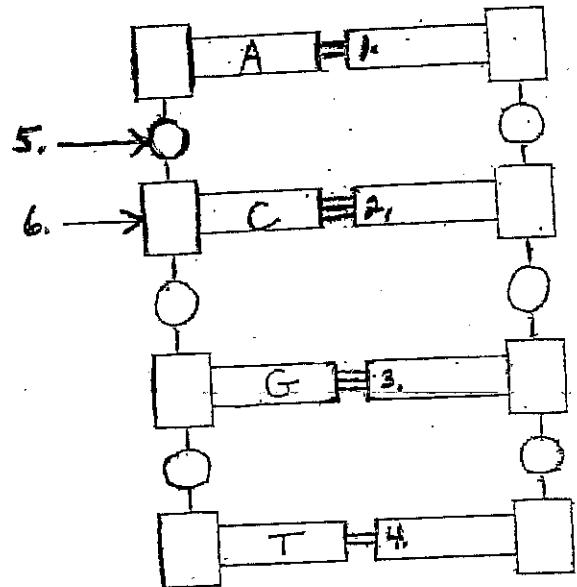
1. \_\_\_\_\_ Genes are larger than chromosomes.
2. \_\_\_\_\_  $X^hY$  : This person will have hemophilia.
3. \_\_\_\_\_ In Down syndrome, it is the 23<sup>rd</sup> chromosome pair that is affected.

**DNA – Deoxyribonucleic Acid**

-Be able to correctly label a diagram of DNA molecule including the sugar, the phosphate group and the nitrogen bases (A-T and G-C)

**Word Bank**

- Sugar molecule
- Phosphate group
- A
- T
- G
- C





Name \_\_\_\_\_  
Date \_\_\_\_\_ Per. \_\_\_\_\_

## Mitosis vs. Meiosis

A. Describe the purpose of each process.

Mitosis:

1. What type of cell does mitosis create? \_\_\_\_\_

2. What does the body use these types of cells for? \_\_\_\_\_  
\_\_\_\_\_

Meiosis:

3. What type of cell does meiosis create? \_\_\_\_\_

4. What does the body use these types of cells for? \_\_\_\_\_  
\_\_\_\_\_

B. Describe the difference between the end products of each process.

Mitosis:

5. Are the cells at the end of mitosis identical? \_\_\_\_\_

6. How many chromosomes do these cells have at the end of mitosis? \_\_\_\_\_  
\_\_\_\_\_

Meiosis:

7. Are the cells at the end of meiosis identical? \_\_\_\_\_

8. How many chromosomes do these cells have at the end of meiosis? \_\_\_\_\_  
\_\_\_\_\_