WLHS / Biology / Oppelt

Name_____
Date_____Per_____

Chapter 11 and 14 Study Guide: Genetics

1. **In meiosis:**

a) What is the purpose of meiosis?:_____

b) When does crossing over occur? _____

c) Describe what happens during crossing over _____

d) What is the end result of meiosis I? _____

e) When do the sister chromatids separate in meiosis? _____

f) If a cell with a diploid number of 30 chromosomes undergoes meiosis, how many chromosomes will be in each gamete? _____

g) What is the SYMBOL used to show a diploid organism? _____ Haploid? _____

h) be able to identify all steps to meiosis and describe what is going on in each step of meiosis.

2. Compare mitosis and meiosis (where/when do each occur, final outcome of each, purpose, etc….)

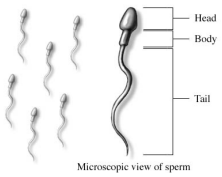
3) DEFINITIONS:

- multiple alleles:_____
- polygenic traits:_____
- codominance:_____
- incomplete dominance:_____
- gene:_____
- allele:_____
- homozygous:_____
- heterozygous:_____
- autosomal:_____
- sex-linked:_____

5) a) What is the chromosome number of a normal diploid human somatic (body) cell?_____

b) What is the haploid number for human cells?_____

c) How many chromosomes should a normal human sperm cell carry?_____



Microscopic view of sperm

GENETICS PROBLEMS:

1) In pea plants, pod color is an **AUTOSOMAL** trait. Green pods are dominant to yellow pods. A homozygous green pod plant is crossed with a homozygous yellow pod plant. Show the cross in the Punnett Square below.

CROSS:_____ X _____.

What percentage of the offspring are green?_____

What is the **GENOTYPE** ratio of the offspring?

_____

2) Now cross 2 of the offspring from the previous problem. Show the cross and complete the Punnett Square.

CROSS:_____ X _____.

Circle the square(s) which will be the YELLOW pod pea plant.

What is the **PHENOTYPE** ratio of the offspring?

_____

3) You are continuing your study of pea plants and will now conduct a DIHYBRID cross. In addition to the pod color trait in the previous problems (green is dominant to yellow), you also know that tall plants are dominant over short plants. Cross 2 plants, both of which are heterozygous green pod color and heterozygous tall.

CROSS:_____ X _____.

List the 4 gamete combinations possible in each parent: _____ _____ _____ _____

What is the phenotypic ratio of the offspring? (list below):

4) You've isolated 2 PUREBRED marigold flowers: a red marigold, and a yellow marigold. You conduct a cross between these two flowers, and find the hybrid (heterozygous) offspring are all ORANGE!

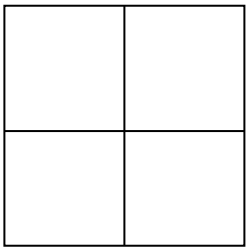
A) Why are they all orange?_____

B) List the genotypes and phenotypes of all 3 flower types (both parents and the offspring) described in this cross.

	GENOTYPE:	**PHENOTYPE**:
Parent 1:	_____	_____
Parent 2:	_____	_____
Offspring:	_____	_____

C) Now cross 2 orange marigolds. Show the cross and complete the Punnett Square below.

CROSS:_____ X _____.



What is the **GENOTYPE** ratio of the offspring?

_____

What is the **PHENOTYPE** ratio of the offspring?

_____

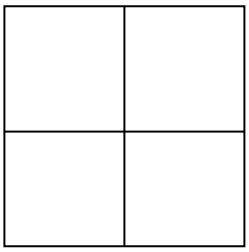
5) If marigolds had phenotypes of RED flowers, YELLOW flowers, and RED & YELLOW flowers:

➔ what type of inheritance is this?_____

➔ what are the genotypes of each? _____ _____ _____

6) Human Blood Groups (MULTIPLE ALLELES): David, who has type O blood, is married to Mary, who has type AB blood. Show the cross and Punnett Square:

CROSS:_____ X _____.



What blood types can their children have?

_____

Their fourth child is born with type AB blood. David accuses Mary of being unfaithful! Is he right? Explain.

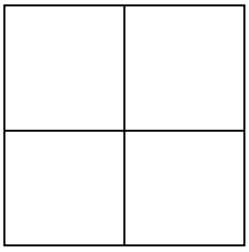
_____

7) A cross between a blue bird and a yellow bird produces what appears to be all green offspring. **Upon closer inspection, the green offspring actually have individual blue and yellow feathers.**

A) What pattern of heredity is being exhibited***? (read the problem CAREFULLY!)***_____

B) Cross a "green" bird with a yellow bird. Give all possible genotypes and phenotypes of the offspring.

CROSS:_____ X _____.



What if the **GENOTYPE** ratio of the offspring??

_____

What is the **PHENOTYPE** ratio of the offspring?

_____

8) In fruit flies, eye color is a sex linked trait located on the X chromosome. Red eye color is dominant over white color. Cross a red-eyed male with a heterozygous red-eyed female fly.

CROSS:_____ X _____.

What is the probability that a male will be white eyed?_____

What is the probability that a female will be white eyed?_____

What is the probability that a female will be a carrier?_____

9) Freckles are dominant to plain skin and the freckle gene is on an autosomal; hemophilia (a disease in which blood doesn't clot properly) is a sex-linked, recessive trait. A woman with plain skin and normal blood clotting (long family history of plain skin, but her dad was a hemophiliac) marries a man with freckles and hemophilia. **They have a hemophiliac son with plain skin.**

A) What is the son's genotype?_____

B) What are the parents' genotypes? MOM:_____ DAD:_____

C) What gametes can the parents make?

- ➔ MOM: _____ _____ _____ _____
- ➔ DAD: _____ _____ _____ _____

D) Do a Punnett Square showing a cross between these 2 parents.

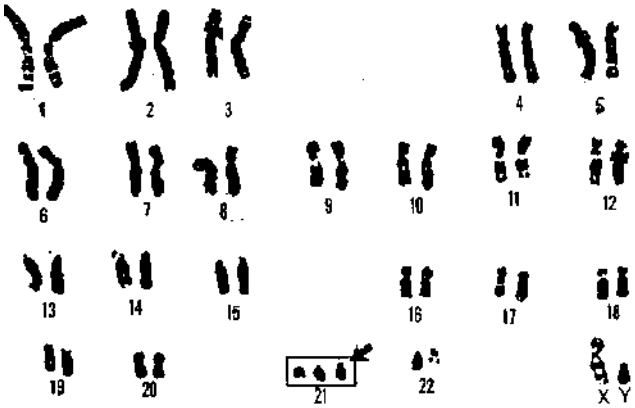
What is the chance they will have a DAUGHTER who has hemophilia AND has freckles?

_____

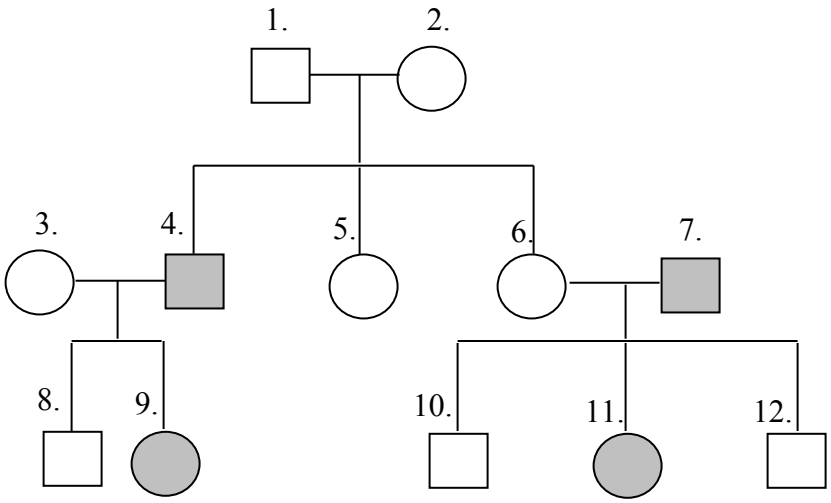
10) What is this picture called?_____
Identify whether or not this individual is male or female, and whether or not there are any chromosomal abnormalities.

SEX:_____

PROBLEMS?_____



11) The pedigree below shows the inheritance of ALBINISM. Shaded in circles or squares indicate affected individuals.



a) Is this trait sex-linked or autosomal? Is it inherited in a dominant or recessive fashion? ***How do you know?***

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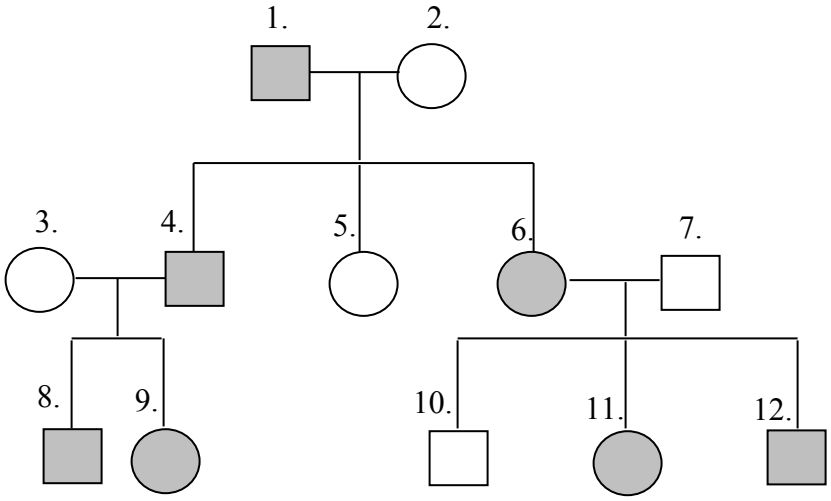
b) Next to each circle / square, list the genotypes for all of the individuals in the family (if there is more than one possible genotype, write all possibilities)

12) The pedigree below shows the inheritance of **HUNTINGTON'S DISEASE**. Individuals with this trait will suffer from a deterioration of their nervous system. The typical age of onset is age 35-45 (so, most people by this age will have had children). Shaded in circles or squares indicate affected individuals.



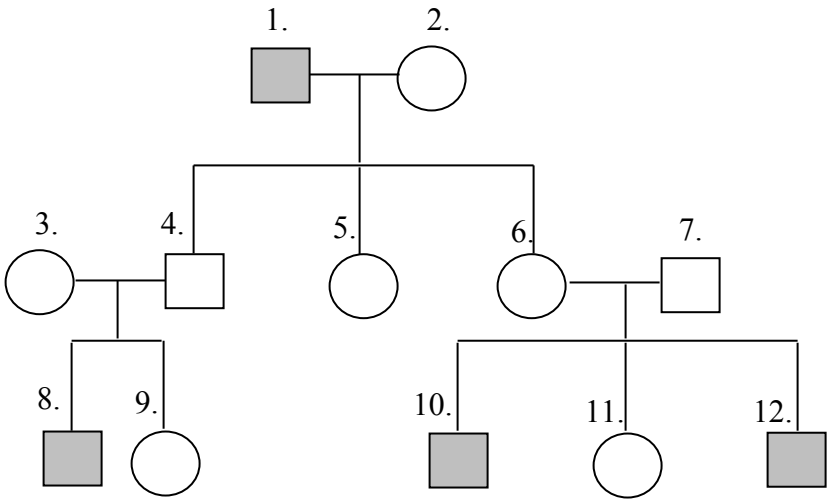
a) Is this trait sex-linked or autosomal? Is it inherited in a dominant or recessive fashion? ***How do you know?***

---

b) Next to each circle / square, list the genotypes for all of the individuals in the family (if there is more than one possible genotype, write **all** possibilities)

(one more pedigree problem on the next page!)

13) The pedigree below shows the inheritance of **HEMOPHILIA**. Individuals with this produce an abnormal blood clotting factor, resulting in blood that does not clot properly. Shaded in circles or squares indicate affected individuals.



a) Is this trait sex-linked or autosomal? Is it inherited in a dominant or recessive fashion? ***How do you know?***

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b) Next to each circle / square, list the genotypes for all of the individuals in the family (if there is more than one possible genotype, write **all** possibilities)

Ways to Study/Review

1. Review all **lecture notes** and readings.
2. Answer the questions at the end of EACH section AND chapter.
3. Study with a friend (not just socialize).
4. Look over old study guides.
5. Flashcards
6. Putting lecture notes into your own words
7. Make yourself a test and take it. Also, have a friend make a test too and exchange tests.
8. Come into class with questions!
9. Review a little each day…. Do not cram the night before!

My child has studied this study guide for at least 20 minutes (2 bonus points)

_____

(Parent/guardian signature)