

KEY

Name: _____

Date: _____

Chapter 4.3: Exceptions to Mendel's Rules / Meiosis / Sex-linked Inheritance Quiz

Multiple Choice: Write the CAPITAL letter of the correct answer in the space provided (2 pts each)

A 1. Sex-linked disorders are caused by males' having
A. only one X chromosome B. two Y chromosomes
C. two X chromosomes D. one X and two Y chromosomes

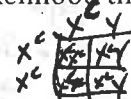
C 2. When there is incomplete dominance,
A. one allele has more influence on phenotype than the other B. the alleles have no influence on phenotype
C. each allele has some influence on phenotype D. there are no alleles present

D 3. Which of the following is NOT an example of a human trait that is influenced by multiple genes?
A. hair color B. eye color C. height D. albinism

A 4. There is one gene for coat color in cows. When you cross a white cow with a black cow, you get a black and white spotted cow. What is the most likely reason for this?
A. codominance B. incomplete dominance
C. polygenic inheritance D. environmental influence on gene expression

C 5. During which of the following phases of meiosis do homologous pairs align along the middle of the cell?
A. anaphase I B. metaphase II C. metaphase I D. prophase II

A 6. In humans, colorblindness is a sex-linked gene. Normal vision (C) is dominant to colorblindness (c). If a colorblind woman and normal-visioned male reproduce, what is the likelihood that their female offspring will be colorblind?
A. 0% B. 50% C. 100% D. 75%



C 7. If a colorblind woman and normal-visioned male reproduce, what is the likelihood that their male offspring will be colorblind?
A. 0% B. 50% C. 100% D. 75%

C 8. Which of the following is NOT an example of asexual reproduction?
A. A sponge, when cut in half, will become 2 sponges.
B. Over time, a potato will form roots and shoots and develop into a new potato plant.
C. A bee transfers pollen from one flower to another flower.
D. A bacteria divides using binary fission.

A 9. How many chromosomes are there in a human sex cell?
A. 23 B. 46 C. 92 D. it varies

B 10. In humans, hemophilia is a sex-linked disorder (H = normal, h=hemophilia) that causes excessive bleeding due to an inability to clot the blood. If two normal parents have a hemophiliac son, what are the genotypes of the two parents?
A. X^hX^h and X^hY b. X^HX^h and X^hY c. X^HX^h and X^HY D. X^HX^H and X^hY

Genetics Problems (30 points – 6 each): Use a punnett square to support your answer for each question. Make sure your lower case and capital letters are distinct from each other. Use the following information to answer questions 11-13:

Blood type is a codominant trait, with I^A and I^B being codominant and i recessive to both. There are four possible phenotypes (Type A, B, AB and O).

11. Is it possible for a woman with type A blood and a man with type B blood to have a child with type O blood? Use a punnett square to support your answer.

YES

$I^A i \times I^B i$

	I^A	i
I^B	$I^A I^B$	$I^B i$
i	$I^A i$	ii

25% chance

12. A woman with type A blood and a man with type O blood have a child with type AB blood. The man accuses the woman of being unfaithful. Could this child belong to this couple? Use a punnett square to support your answer.

woman - A - $I^A I^A$ or $I^A i$

man - O - ii

child AB - $I^A I^B$

	i	i
I^A	$I^A i$	$I^A i$
I^A	$I^A i$	$I^A i$

	i	i
I^A	$I^A i$	$I^A i$
i	ii	ii

- NO B blood type allele - NO, the child could NOT belong.

13. A woman with type A blood has a child with type O blood. Which of the following men could NOT be the father? Support your answer with a punnett square.

- Sammy the player - type O ii
- The pool guy - type AB $I^A I^B$
- Mr. Fabulous - type B $I^B I^B$ or $I^B i$
- The waiter - type A $I^A I^A$ or $I^A i$

woman - A - $I^A I^A$ or $I^A i$

child - O - ii

The pool guy could not be the father - no I^B allele for O blood type

	I^A	I^B
I^A	$I^A I^A$	$I^A I^B$
I^A	$I^A I^A$	$I^A I^B$

or

	I^A	I^B
i	$I^A i$	$I^B i$
i	$I^A i$	$I^B i$

14. Flower color in snapdragons (R= red, W=white) is inherited in an incompletely dominant manner. If a red (RR) and pink (RW) snapdragon are crossed, what are the genotypic and phenotypic ratios in their offspring?

	R	W
R	RR	RW
R	RR	RW

genotypic 1:1
RR:RW

phenotypic red: pink
1:1

15. Colorblindness is a sex-linked trait. Is it possible for a colorblind man and normal-visioned woman to have a colorblind daughter? Support your answer with a punnett square.

man $X^c Y$

woman $X^C X^C$ or $X^C X^c$

daughter $X^c X^c$

	X^c	Y
X^C	$X^C X^c$	$X^C Y$
X^c	$X^c X^c$	$X^c Y$

	X^c	Y
X^C	$X^C X^c$	$X^C Y$
X^c	$X^c X^c$	$X^c Y$

NO

YES - 25% chance