Quiz Key

Name:_____ Date:_____

Genetics ~~Unit 3 Quiz~~ Pop Quiz!

1. The father of modern genetics, Gregor Mendel, proposed the Law of Segregation that states that alleles separate independently of one another during gamete formation, giving each gamete one randomly selected allele for each gene. each gamete receives just one gene copy (allele) from the parent organism, which is selected randomly.
   a. True
   b. False

2. In genetics research, what is the purpose of a test cross?
   a. To determine the phenotypes of the parents
   b. To determine the genotypes of the parents
   c. To determine whether or not two parents could produce viable offspring
   d. To determine how many offspring can be produced by two parents

   usually phenotypes of parents are given!

3. The genes controlling traits with a wide variety of expressions (like skin and hair color) display:
   a. Incomplete dominance
   b. Co-dominance
   c. Polygenic inheritance → ex. AaBbCc
   d. Multiple allele inheritance ← this is like blood type: I^A, I^B, or i alleles

4. Two heterozygous tall plants are crossed, what are the expected phenotypic results?
   a. 100% tall
   b. 75% tall, 25% short
   c. 50% tall, 50% short
   d. 25% tall, 75% short

   this is true but it asks for the phenotype

	T	t
T	TT	Tt
t	Tt	tt

→ tall, tall, tall, short

3/4 = 75% tall

5. In humans, dimples are a dominant trait passed on by simple inheritance. What would be the phenotypic results in a cross between a father who is homozygous recessive and a mother who is heterozygous?
   a. 100% dimples
   b. 50% heterozygous, 50% homozygous recessive
   c. 50% dimples, 50% without dimples
   d. 100% without dimples

	d	d
D	Dd	Dd
d	dd	dd

2/4 dimples
2/4 no dimples

6. Two parents who do not have cystic fibrosis have a child that is diagnosed with the disorder. What are the parental genotypes?
   a. FF, ff
   b. Ff, FF
   c. ff, ff
   d. Ff,Ff

think about pedigrees:

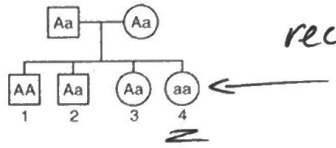
a child showing a trait with 2 parents that do not display the trait
Indicates a recessive trait

do not display recessive trait

	F	f
F	FF	Ff
f	Ff	ff

must be able to produce homozygous recessive child

7. Allele A is dominant in mice and allele a is recessive. Two mice with the gene combination Aa breed and produce four offspring as show below:



a = recessive
recessive phenotype only shows if child has 2 recessive alleles

Which offspring has the recessive phenotype?
   a. 1
   b. 2
   c. 3
   d. 4

8. Every version of a ***gene*** comes in the form of a(n):
   a. Trait
   b. Allele
   c. Chromosome
   d. Chromatid

9. What is the probability of a father with blood type O (ii) and a mother with blood type AB (I^AI^B) producing a child with blood type O (ii)?
   a. 0%
   b. 25%
   c. 75%
   d. 100%

	i	i
I^A	I^Ai	I^Ai
I^B	I^Bi	I^Bi

0% of child having alleles ii

10. A litter of puppies has black, white, and grey fur colorations. If the trait for fur color in this breed is controlled by incomplete dominance, what would be the probable genotypes for the parents?
    a. Both parents are homozygous for black fur
    b. One parent is homozygous for grey and the other heterozygous for white
    c. One parent is homozygous for white fur and the other is homozygous for black fur
    d. One parent is homozygous for black fur and the other is heterozygous for fur color.
    * NONE OF THESE *

alleles blend

explanation on next page

11. A Snapdragon plant with red flowers (RR) is crossed with a snapdragon plant with white flowers (WW). Snapdragon flowers show incomplete dominance. A Punnett square of the cross is show below:

The cross produces four offspring. What is the **phenotypic** ratio of the offspring?
    a. 4:0:0
    b. 1:2:1
    c. 2:2:0
    d. 3:1

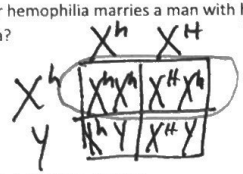
	R	R
W	RW	RW
W	RW	RW

4/4 flowers →
RW genotype; so 4/4 same phenotype
R & W alleles incompletely dominant
RW = pink (most likely)

12. A cross between a white chicken and a brown chicken produces offspring that are white with brown spots. This is an example of?
    a. Incomplete dominance
    b. Co-dominance
    c. Polygenic inheritance
    d. Multiple allele inheritance

both traits displayed at the same time

13. Hemophilia is a sex-linked trait, if a woman who is a carrier for hemophilia marries a man with hemophilia, what is the percent chance that their daughter will have hemophilia?
    a. 0%
    b. 25%
    c. 50%
    d. 100%

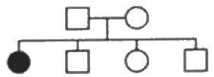


1/2 daughters will be X^hX^h & have hemophilia

14. Which of the following is true about person represented by the karyotype below?
    a. Male with down syndrome
    b. Male with Klienfelter syndrome
    c. Female with down syndrome
    d. Female with Turner syndrome.

only 1 X & no Y chromosome

15. Autosomal disorders are inherited when two mutated genes are passed on by both carriers (parents). In the pedigree below a particular trait,sickle cell anemia, has been passed to 1 of 4 offspring. What is the mode of inheritance?



if dominant, @ least 1 parent would have to display the trait

Based on this pedigree, what is the mode of inheritance of the trait?
    a. Autosomal dominant
    b. Autosomal recessive

16. What would you like more practice with before the test Friday?
    a. Reading Pedigrees
    b. Reading Karyotypes
    c. Punnett Squares and Test-Crosses
    d. Modes of Inheritance (complete dominance, co-dominance, incomplete dominance)

Thanks for your input, we will plan review around this data!

#10 black allele = B, white allele = W — incompletely dominant genes

BB = black phenotype
WW = white phenotype
BW = grey phenotype

(a) 2 parents homozygous black fur

	B	B
B	BB	BB
B	BB	BB

← does not produce any white or grey offspring

(b) homozygous grey & heterozygous white

not possible — white can only be homozygous, grey can only be heterozygous

(c) homozygous white & homozygous black

	W	W
B	BW	BW
B	BW	BW

← does not produce any black or white offspring

(d) homozygous black & heterozygous genotype

	B	B
B	BB	BB
W	BW	BW

* would need 2 heterozygous parents *

	B	W
B	BB	BW
W	BW	WW

← offspring can be black, white, or grey