Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Due in class – Tues, September 25th

Note that you can check the answers to ‘Concept Check’ questions on page 66 of your text.

1. (Concept Check 1 on pg 49 of text) Gregor Mendel put forth the basic principles of inheritance, publishing his findings in 1866. Much of Mendel’s success can be attributed to the seven characteristics of pea plants that he studied.

Which of the following factors did not contribute to Mendel’s success in his study of heredity?

A) His use of the pea plant

B) His study of plant chromosomes

C) His adoption of an experimental approach

D) His use of mathematics

2. (Concept Check 3 on pg. 49) The principle of segregation states that each individual organism possesses two alleles that can encode a characteristic. These alleles segregate when gametes are formed, and one allele goes into each gamete. The concept of dominance states that when the two alleles of a genotype are different, only the trait encoded by one of them—the “dominant” allele—is observed.

How did Mendel know that each of his pea plants carried two alleles encoding a characteristic?

3. (Concept Check 6 pg 57) The principle of independent assortment states that genes encoding different characteristics separate independently of one another when gametes are formed, owing to the independent separation of homologous pairs of chromosomes in meiosis. Genes located close together on the same chromosome, however, do not assort independently.

How are the principles of segregation and independent assortment related, and how are they different?"

4. What is a punnet square (see pg 51)?

5. What is a testcross (pg. 53)?

6. In peas, tall (T) plants are are dominant to short (t).

What is the character being looked at?

What are the traits/alleles for the character?

What genotypes can produce a tall plant?

If a short plant is **(test)** crossed with a tall plant, and half of the offspring are tall and half are short. What is the genotype of the original tall parent plant?

7. What is Mendel's concept of dominance (pg 49)?

8. In Labrador retrievers, black coat color is dominant to brown. Suppose that a black Lab is mated with a brown one and the offspring are four black puppies and one brown puppy. What can you conclude about the genotype of the black parent?

A) The genotype must be BB.

B) The genotype must be bb.

C) The genotype must be Bb.

D) The genotype could be either BB or Bb.

E) The genotype cannot be determined from these data.

9. In Mendel's peas, purple (P) flower color is dominant to white (p). What are the genotypes of the of the individuals below? Remember that you can you a dash '\_' if you can't figure out the geneotype of the individual. For example, you can us 'T\_' for a tall plant when you don't know if the individual is a heterzygote or a homozygote dominant.

A) heterozygous (ex Pp)

B) white

C) pure-breeding purple

D) pure-breeding white

E) purple

10. Which of the following was NOT one of Mendel's conclusions based on his monohybrid crosses?

A) Genes are carried on chromosomes.

B) Alleles exist in pairs.

C) Alleles segregate equally into gametes.

D) Alleles behave as particles during inheritance.

E) One allele can mask the expression of the other allele.

11. In poodles, black fur is dominant to white fur. A black poodle is crossed with a white poodle. In a litter of four, all of the puppies are black. What is the BEST conclusion?

A) The black poodle is definitely homozygous.

B) The black poodle is probably homozygous.

C) The black poodle is definitely heterozygous.

D) The black poodle is probably heterozygous.

E) The white poodle is probably heterozygous.

12. A couple has six daughters and is expecting a seventh child. What is the probability that this child will be a boy?

A) 1/2

B) 1/4

C) 1/16

D) 1/64

E) 1/128

13. If an organism of genotype *Aa* was used for a testcross, what was the genotype of the other individual used in the cross?

A) AA

B) Aa

C) aa

D) Either Aa or aa

E) Either AA or Aa

14. Which of the following crosses would produce a 1:1 ratio of phenotypes in the next generation?

A) AA x AA

B) AA x aa

C) Aa x Aa

D) Aa x aa

E) aa x aa

15. Which of the following crosses would produce a 3:1 ratio of phenotypes in the next generation?

A) *AA* x *AA*

B) *AA* x *aa*

C) *Aa* x *Aa*

D) *Aa* x *aa*

E) *aa* x *aa*

16. In peas, tall (*T*) is dominant to short (*t*). A homozygous tall plant is crossed with a short plant. The F1 plants are self-fertilized to produce the F2. Both tall and short plants appear in the F2. If the short F2 plants are self-fertilized, what types of offspring and proportions will be produced?

17. For a particular plant, red flowers (*A*) are dominant over yellow flowers (*a*). An initial cross was made between a plant that was true-breeding for red flowers and another plant true-breeding for yellow flowers. F1 progeny, all having red flowers, were allowed to self- pollinate and form seeds, which were then planted to generate F2 progeny. Pollen from all the resulting F2 plants was pooled and used to fertilize true-breeding yellow plants. What proportion of the progeny resulting from this cross would be expected to have yellow flowers?