Name: _____ Period: ____ **Heredity II Review**

Show the results of the following crosses using Punnett squares and the information accompany the figure.

SELECTED TRAITS IN CATS		
Trait	**Dominant Allele**	**Recessive Allele**
Coat Length	Short Hair (H) 	Long Hair (h) 
Tabby Stripes	Tabby (T) 	Stripeless (t) 
Colorpoint (markings on nose, ears, paws and tail)	Normal (no colorpoint) (N) 	Colorpoint (n) 

1. Heterozygous short-hair x heterozygous short-hair
   Genotypic ratio: _____
   Phenotypic ratio: _____

2. Heterozygous tabby x stripeless
   Genotypic ratio: _____
   Phenotypic ratio: _____

3. Colorpoint x homozygous normal
   Genotypic ratio: _____
   Phenotypic ratio: _____

4. Homozygous short, homozygous colorpoint x homozygous long, homozygous normal
   Phenotypic ratio: _____

5. Heterozygous short, heterozygous normal x heterozygous short, heterozygous normal
   Phenotypic ratio: _____

6. Heterozygous tabby, heterozygous normal x stripeless colorpoint
   Phenotypic ratio: _____

7. Long-hair, heterozygous normal x longhair, heterozygous normal
   Phenotypic ratio: _____

MATCHING TERMS: *In the space provided, write the term that best fits the description using the word bank that follows.*

_____ 1. Characteristic that is inherited.
_____ 2. **All** of an organism's genetic material.
_____ 3. Allele that is expressed when two different alleles are present in an organism's genotype.
_____ 4. Allele that is not expressed unless two copies are present in an organism's genotype.
_____ 5. Any of the alternative forms of a gene that occurs at a specific place on a chromosome.
_____ 6. Characteristic of having two **different** alleles that appear at the same locus of sister chromatids.
_____ 7. Characteristic of having two of the **same** alleles at the same locus of sister chromatids.
_____ 8. Collection of all an organism's genetic information that codes for traits (genetic make-up).
_____ 9. Collection of all an organism's physical characteristics (physical characteristics)
_____ 10. Cross between an organism with an unknown genotype and an organism with a recessive phenotype.
_____ 11. Cross, or mating, between organisms that involves only one pair of contrasting traits.
_____ 12. Cross, or mating, between organisms that involves two pairs of contrasting traits.
_____ 13. Exchange of chromosome segments between homologous chromosomes during meiosis I.
_____ 14. Gene that is located on a sex chromosome.
_____ 15. Heterozygous genotype that equally expresses the traits from both alleles.
_____ 16. Heterozygous phenotype that is a blend of the two homozygous phenotypes.

_____ 17.Likelihood that a particular event will happen.
_____ 18.Mating of two organisms.
_____ 19.Mendel's first law, stating that (1) organisms inherit two copies of genes, one from each parent, and (2) organisms donate only one copy of each gene to their gametes.
_____ 20.Mendel's second law, stating that allele pairs separate from one another during gamete formation.
_____ 21.Model for predicting all possible genotypes resulting from a cross, or mating.
_____ 22.Specific region of DNA that codes for a particular protein.
_____ 23.Study of the heredity patterns and variation of organisms.
_____ 24.Trait that is produced by two or more genes.
_____ 25.Type of organism whose ancestors are genetically uniform.
_____ 26.Contains 2 copies of the chromosomes.
_____ 27. Contains 1 copy of the chromosomes.
_____ 28.Describes corresponding chromosomes that carry alleles from the same traits.
_____ 29.These separate during Meiosis II.
_____ 30.Process that produces 4 unique, haploid cells from 1 diploid cell in 2 cell divisions.
_____ 31.Small cell resulting from meiosis in female animals, which usually does not participate in reproduction.
_____ 32.Process involved in growth/repair in multicellular organisms and reproduction in single-celled organisms where 1 diploid cell divides to form 2 identical, diploid cells.
_____ 33.Male gamete in higher plants.
_____ 34. Configuration of homologous chromosomes pairs as seen in Metaphase I.

trait	**genome**	**Law of independent**	**diploid**
genetics	**genotype**	**assortment**	**haploid**
purebred	**phenotype**	**probability**	**homologous**
cross	**dominant**	**crossing over**	**sister chromatids**
law of segregation	**recessive**	**sex-linked gene**	**polar body**
gene	**Punnett square**	**incomplete**	**pollen**
allele	**monohybrid cross**	**dominance**	**meiosis**
homozygous	**test cross**	**codominance**	**mitosis**
heterozygous	**dihybrid cross**	**polygenic trait**	**tetrad**

MEIOSIS:

1. If an organism reproduces asexually, will its cells undergo mitosis or meiosis? _____
2. Fill out the blanks in the Mitosis vs. Meiosis Comparison Chart Below:

Mitosis	Meiosis
One nuclear division	
	Results in 4 new genetically different cells
Produces diploid cells	
	Produces gametes
In multi cellular organisms mitosis is used for growth and development	

3. What is crossing-over and at what phase during meiosis does crossing over occur?

4. What is a tetrad (this is in your written notes, not the book)?

5. Do chromosomes line up as tetrads during meiosis I or meiosis II? _____
6. Are the cells that are formed after the first cell division of meiosis I haploid or diploid? _____
7. What is the difference between metaphase I and metaphase II of meiosis?

8. What is the difference between anaphase I and anaphase II of meiosis?

9. Be able to identify pictures of meiosis and mitosis and know what each phase is in each type of cell division.

MENDEL, PUNNETT SQUARES, ETC.:

1. Mendel is known as the _____ of genetics.
2. What organism did Mendel experiment with? _____
3. What is the scientific study of heredity?

4. If an organism is heterozygous for being hairy, what would its genotype be? _____
5. If you cross a parent with a genotype of Tt with a parent that has a genotype of tt, what is the probability of their offspring being homozygous recessive? _____
6. What does the F1 generation refer to in a genetic cross?

7. A dominant allele is one that _____ the effect of a recessive allele.
8. What are the units of inheritance? _____
9. Alleles for recessive traits are represented by a _____ _____letter.
10. What is probability?

11. If there is ¾ chance that a cross between two individuals will yield offspring that are heterozygous, what is the percentage of heterozygous offspring that can be produced? (3/4 = _____ %)
12. What is Mendel's Law of Independent Assortment?

13. What is the principal of dominance?

14. When one allele for a gene is not completely dominant over another for that gene it is called _____ _____.
15. What is the law of segregation?

16. Are X-linked, recessive traits more likely to be passed on to women or men? Why?

17. Define and give an example of codominance.

18. Hemophilia and colorblindness are known as _____-_____ traits. Why?

19. Give an example of incomplete dominance:

20. Frank and Elizabeth are phenotypically normal, but their son, Ralph, is colorblind. Colorblindness is a sex-linked, recessive disorder. What percent of Frank and Elizabeth's children will be normal (not colorblind)? _____
21. Mendel discovered that the phenotypes of F_2 offspring followed the ratio of 9:3:3:1 when a <u>monohybrid</u> or <u>dihybrid</u> cross for <u>2 linked</u> or <u>2 unlinked</u> traits was performed. (Circle the correct choices)
22. Are sex cells haploid or diploid? _____
23. Why did Mendel cut the male reproductive parts off of the flowers on the pea plants he was experimenting with?

24. What are homologous chromosomes and when do they line up in meiosis?

25. What does it mean to be a carrier for a genetic disorder?

26. What types of organisms can reproduce asexually?

27. What are the advantages of sexual reproduction?