

## Genetics Packet

The answers to the following questions and problems should be **neatly** written on a **separate** paper (**in order**). Each definition is worth 1 point and each problem is worth 4 points.

**100 Points Total**

### Vocabulary

1. Chapter 11 Vocabulary – Sections 1, 2, 3, 5
2. Chapter 14 Vocabulary – Sections 1 & 2

### Genetics Problems

#### I. Monohybrid Crosses

Directions For each problem:

1. Give the genotype, phenotype, and type of genotype of  $F_1$  and  $F_2$ .
2. Give the genotypic and phenotypic ratios of  $F_2$ .

##### A. Complete Dominance

1. **Cross a homozygous red-flowered plant with a white-flowered plant.**  
**R = red flowers, r = white flowers**
2. Cross a homozygous brown-haired male with a homozygous blonde female.  
B = brown hair, b = blonde hair
3. Cross a homozygous blue-eyed male with a homozygous brown-eyed female.  
E = brown eyes, e = blue eyes

##### B. Incomplete Dominance

4. **Cross a homozygous red-flowered plant with a white-flowered plant.**  
**R = red flowers, r = white flowers**
5. Cross a blue-eyed male with a homozygous brown-eyed female.  
E = brown eyes, e = blue eyes
6. Cross a homozygous curly-haired male with a straight-haired female.  
C = curly hair, c = straight hair

##### C. Codominance

7. **Cross a red petunia with a white petunia.**  
**R = red flowers, W = white flowers**

#### II. Dihybrid Crosses

Directions For each problem:

1. Give the genotype, phenotype, and type of genotype of  $F_1$ .
2. Give the genotype and phenotype of  $F_2$ .
3. Give the phenotypic ratio of  $F_2$ .

##### A. Complete Dominance

8. **Cross a green, wrinkled seed pea plant with a homozygous yellow, round seed pea plant.** **Y = yellow seeds, y = green seeds, R = round seeds, r = wrinkled seeds**
9. Cross a blond, blue-eyed male with a homozygous brown-haired, brown-eyed female. E = brown eyes, e = blue eyes, B = brown hair, b = blond hair
10. Cross a short, non-freckled male with a homozygous tall, freckled female.  
T = tall, t = short, F = freckled, f = non-freckled

### III. Sex Determination

11. Cross a male with a female and determine the possible sexes of the offspring. Give an appropriate ratio.

### IV. Sex Linkage

Directions For each problem: Give the genotype, phenotype, sex, and type of genotype of  $F_1$ .

12. **Cross a normal blood-clotting male with a normal blood-clotting female who is a carrier for hemophilia. H = normal blood clotting, h = hemophilia**
13. Cross a normal blood-clotting female with a hemophiliac male.  
H = normal blood clotting, h = hemophilia
14. Cross a normal color-vision female with a colorblind male.  
C = normal, c = colorblind

### V. ABO Blood Typing

Directions For each problem: Give the genotype, phenotype (blood type), and phenotypic ratio of  $F_1$ .

#### A. Multiple Alleles

15. **Cross a male heterozygous for A blood with a female heterozygous for B blood.**
16. Cross a male with blood type A with a female with blood type B.
17. Cross a male with blood type O with a female with blood type AB.

### VI. Pedigrees

18. Given what you have learned about genetic crosses and sex linkage, draw a pedigree based on the following information:  
You are a color blind male. You have one brother who is not colorblind. You have two sisters who are normal. However, one of your sisters is known to be a carrier. Your mother and father were normal. Your grandmother (on your mother's side of the family) was not colorblind (homozygous), but your grandfather was. You also have an uncle on your mother's side who is not colorblind.

### VII. Chromosome Mapping

19. In a series of breeding experiments, a linkage group composed of genes A, B, C, D, and E was found to show approximately the recombination frequencies in the chart below. Using Sturtevant's standard unit of measure, "map" the chromosome.

		Gene					
		A	B	C	D	E	
Gene	A	-	8	12	4	1	Recombinations per 100 fertilized eggs
	B	8	-	4	12	9	
	C	12	4	-	16	13	
	D	4	12	16	-	3	
	E	1	9	13	3	-	