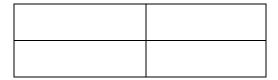
Genetics Practice Problems

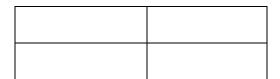
On the following pages are several problems. With each new type of problem, we will complete the first one together. Use this as a sample to look back on while working on your homework problems.

Mono	hy	bric	l Cross

- When we study the inheritance of a single gene it is called a monohybrid cross.
- 1) A heterozygous, smooth (S) pea pod, plant is crossed with a wrinkled (s) pea pod plant. Predict the offspring from this cross.
 - a. What is the genotype of the parents?
 - b. Set up a Punnett square with possible gametes.



- c. Fill in the Punnett square for the resultant offspring.
- d. What is the predicted genotypic ratio for the offspring?
- e. What is the predicted phenotypic ration for the offspring?
- f. If this cross produced 50 seeds how many would you predict to have a wrinkled pod?
- 2) In humans, acondroplasia "dwarfism" (D) is dominant over normal (d). A homozygous dominant (DD) person dies before the age of one. A heterozygous (Dd) person is dwarfed. A homozygous recessive (dd) individual is normal. A heterozygous dwarf man marries a heterozygous dwarf woman....



- a. What is the probability of having a normal child?
- b. What is the probability that the next child will also be normal?
- c. What is the probability of having a child is a dwarf?
- d. What is the probability of having a child that dies at one from this disorder?
- 3) In humans, free earlobes (F) is dominant over attached earlobes (f). If one parent is homozygous dominant for free earlobes, while the other has attached earlobes can they produce a child with attached earlobes?

Dihybrid Cross

When we study two traits on different chromosomes, at one time, we call this a dihybrid cross. You still follow
the same process for monohybrid crosses, but now there will be four times as many possibilities because we are
studying two traits.

		•		n they produce? Dark e smooth coat (r) is rec	
llele is domina rossed with a p	nt over the green (y	r) seed allele. A plan d and heterozygous	t is heterozygous fo	eed allele, and the yel or seed texture and se	
b. What is	the expected phen	otypic ratio for the o	ffspring?		
allele have a de mental retardat galactose intote allele for galato neterozygous fo	fective enzyme and ion or death. Let "I rance or galactoser se digestion. In bot	cannot break down E" represent the norm in a land is also cauth diseases, normal down what are the chance	the amino acid phe mal enzyme. Also i used by a recessive ominates over reco	I by a recessive allele. enylalanine. This diseanin humans a condition allele. Let "G" represessive. If two adults we that is completely no	ase can resu s called ent the nor vere

Incomplete Dominance

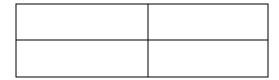
• One allele is not completely dominant over the other. This creates a blending effect.

7)	heterozygote, then i		erozygous purple pe	s is recessive (p). If a purple people eater is a ople eaters are about to have a baby. What are
8)		_		 sive in white (r). A pure red snapdragon is crossed henotypes of this cross?
9)		sive female is bred to white. What would th		I e. Color is incomplete dominance in these gerbils. s be?
Codom		te to the phenotype e	ogually	
10)) In cows, fur color is o	codominant. Red fur coe is crossed with a mal	olor (C ^R C ^R). Roan fur	r color (C ^R C ^W). White fur color (C ^W C ^W). A is white. What is the genotypic ratio and
11)	_	lor again complete thi What is the genotypic		ie homozygous red female is crossed with a ic ratio for this cross?
	•			
12)	a curly hair female was a. Complete a	nair (H ^s H ^s) and curly havith a wavy haired mal Punnett square for thi e chances of having a c	e. s cross.	inant traits, that results in wavy hair (H ^S H ^C) Cross
	ĺ			

Multiple Allele

- Some traits are coded for by more than two alleles.
- 13) In humans that are four types of blood: Type A, Type B, Type AB, and Type O. The alleles A and B are codominant to each other and the O is recessive to both A and B alleles. So a person with genotype AA or AO will have A type of blood.
 - a. What possible genotypes will produce B type of blood?
 - b. What is the only possible genotype that will produce O type of blood?
 - c. What is the only possible genotype that will produce AB type of blood?
 - d. You are blood type O and you marry a person with blood type AB.
 - i. Complete a Punnett square for this cross.

- ii. List the possible blood types (phenotypes) of your offspring.
- 14) In the 1950s, a young woman sued film star/director Charlie Chaplin for parental support of her illegitimate child. Charlie Chaplin's blood type was already on record as type AB. The mother of the child is type A and her some had type O blood.
 - a. Complete a Punnett square for the possible cross of Charlie and the mother.



- b. The judge ruled in favor of the mother and ordered Charlie Chaplin to pay child support or the costs of the child. Was the judge correct in his dicision based on blood typing evidence.
- c. Explain your answer.
- 15) Suppose a newborn baby was accidentally mixed up in the hospital. In an effort to determin the parents of the baby, the blood types of the baby and two sets of parents were determined.

Baby 1 had type O Mrs. Brown had type B Mr. Brown had type AB Mrs. Smith had type B Mr. Smith had type B

a. Complete a Punnett square for each couple (you may need to do more than 1 square/couple)

b. To which parents does baby #1 belong? Why?