Practice Problems Set 2
(Will NOT be evaluated)

1. In corn, rough sheath (rs) is recessive to smooth sheath (Rs), midrib absent (mrl) is recessive to midrib present (Mrl), and crinkled leaf (cr) is recessive to smooth leaf (Cr). (Alleles are named for the mutants, which are all recessive.) What are the results of testcrossing a trihybrid?

2. Summer squash come in three shapes: disk, spherical, and elongate. In one experiment, researchers crossed two squash plants with disk-shaped fruits. The first 160 seeds planted from this cross produced plants with fruit shapes as follows: 89 disk, 61 sphere, and 10 elongate. What is the mode of inheritance of fruit shape in summer squash?

3. A geneticist studying the pathway of synthesis of phenylalanine in Neurospora isolated several mutants that require phenylalanine to grow. She tested whether each mutant would grow when provided additives that she believed were in the pathway of phenylalanine synthesis (see table); a plus indicates growth and minus indicates the lack of growth in the three mutants tested.

Where in the pathway to phenylalanine synthesis does each of the additives belong, if at all?

	Additive			
	Phenyl Pyruvate	Prephenate	Chorismate	Phenyl Alanine
Wild Type	+	+	+	+
Mutant 1	-	-	-	+
Mutant 2	+	+	-	+
Mutant 3	+	-	-	+

4. Two short-eared pigs are mated. In the progeny, three have no ears, seven have short ears, and four have long ears. Explain these results by diagramming the cross.

5. Four o'clock plants have a gene for color and a gene for height with the following phenotypes:
RR: red flower
Rr: pink flower
rr: white flower
TT: tall plant
Tt: medium height plant
tt: dwarf plant
Give the proportions of genotypes and phenotypes produced if a dihybrid plant is self-fertilized.

6. In a variety of onions, three bulb colors segregate: red, yellow, and white. A plant with a red bulb is crossed to a plant with a white bulb, and all the offspring have red bulbs. When these are selfed, the following plants are obtained:
Red-bulbed 119
Yellow-bulbed 32
White-bulbed 9
What is the mode of inheritance of bulb color, and how do you account for the ratio?

7. A Female fruit fly with a yellow body is discovered in a wild-type culture.The female is crossed with a wild-type male. In the F 1 generation, the males are yellow-bodied and the females are wild-type. When these flies are crossed among themselves, the F 2 produced are both yellow-bodied and wild-type, equally split among males and females. Explain the genetic control of this trait.

8. A female fly with orange eyes is crossed with a male fly with short wings. The F 1 females have wild-type (red) eyes and long wings; the F 1 males have orange eyes and long wings.The F 1 flies are crossed to yield
47 long wings, red eyes
45 long wings, orange eyes
17 short wings, red eyes
14 short wings, orange eyes
with no differences between the sexes. What is the genetic basis of each trait?

9. How many Barr bodies would you see in the nuclei of persons with the following sex chromosomes?
a. X0
b. XXX
c. XX
d. XXXXX
e. XY
f. XXY

10. Sex linkage was originally detected in 1906 in moths with a ZW sex-determining mechanism. In the currant moth, a pale color (p) is recessive to the wild-type and located on the Z chromosome. Diagram reciprocal crosses to the F 2 generation in these moths.