Biology 1
Monohybrid & Dihybrid Crosses with a Twist

Name:
Date:
Hour:

Complete the following monohybrid crosses: draw a Punnett square, list the ratio and describe the offspring IF INSTRUCTED TO DO SO. Be sure to remember that the **capital letter is dominant.**

The Set-up:

A snapdragon plant with red flowers is homozygous dominant (RR). A snapdragon plant with white flowers is homozygous recessive (rr). Heterozygous snapdragons (Rr) produce pink flowers.

1) A red plant is crossed with a white plant.

What color will the offspring be?

2) A white plant is crossed with a white plant.

What color will the offspring be?

3) A red plant is crossed with a red plant.

What color will the offspring be?

4) Pink plant is crossed with a pink plant.

List the genotype ratios:

List the phenotype ratios:

5) A red plant is crossed with a pink plant.

List the genotype ratios:

List the phenotype ratios:

6) **IMPORTANT: What type of inheritance pattern is exhibited by snapdragon flower color?** _____

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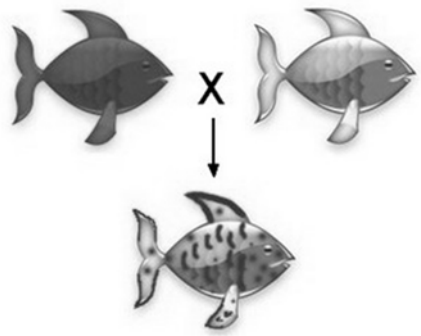
The Set-up:

In a certain fish, blue scales (B) and red (R) scales. Homozygous fish have either red or blue scales only. When a fish has a heterozygous genotype, it has a patchwork of blue and red scales.



B R = patchwork fish

B B = blue fish

R R = red fish

7) Cross a two red fish.

What is the likelihood of patchwork offspring?

8) Cross a red fish with a blue fish.

What is the likelihood of blue offspring?

9) Cross two patchwork colored fish.

List the genotype ratios:

List the phenotype ratios:

10) IMPORTANT: What type of inheritance pattern is exhibited by fish scale color? _____

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The Set-up:

In horses, chestnut (brown) is dominant (B) to white/gray (b) coat color. Heterozygous horses have an intermediate phenotype appearing as a golden tan color. Such heterozygous horses are known as palominos (like Mr. Ed).

11) A chestnut male is crossed with a gray female.

What is the likelihood of palomino offspring?

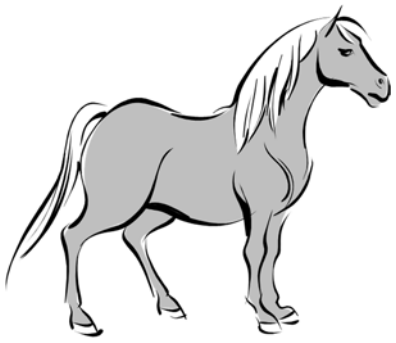
12) Cross two chestnut horses.

What is the likelihood of gray offspring?

13) Cross two palominos.

List the genotype ratios:

List the phenotype ratios:



14) IMPORTANT: What type of inheritance pattern is exhibited by palomino horse coat color? _____

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Name:
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The Set-up:

In humans, blood type A (I^A) and blood type B (I^B) are both dominant. This means that an individual that receives alleles for both type A and type B blood ($I^A I^B$) will have blood type AB. Individuals with type O blood are homozygous recessive (ii).

15) A heterozygous type A male is crossed with a type O female.

What blood type will the offspring have?

16) A type O male is crossed with a heterozygous type B female.

What blood type will the offspring have?

17) Two type O individuals are crossed.

What is the likelihood that this couple could have a child with type A or type B blood?

18) A type AB male is crossed with a type AB female.

List the genotype ratios:

List the phenotype ratios:

19) A heterozygous type A male is crossed with a heterozygous type B female.

List the genotype ratios:

List the phenotype ratios:

20) IMPORTANT: What type of inheritance pattern is exhibited by human ABO blood type? _____

Biology 1
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Name:
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Hour:

The Set-up:

In humans, the trait for normal color vision is located on the X-chromosome (X^N). A mutated copy of this gene (X^n) leads to condition called color-blindness. This is characterized by an inability to perceive differences in colors. The Y-chromosome does not contain this gene. Therefore, females get two copies of the gene and can have normal vision, but carry the mutated gene (X^NX^n) have no copies of the mutated gene (X^NX^N) or be color blind (X^nX^n). Males are either normal (X^NY^-) or colorblind (X^nY^-).

21) Cross a normal male with a normal female.

What is the probability of having offspring who are colorblind?

22) Cross a normal male with a female carrier.

What is the probability of a male offspring being colorblind?

What is the probability of a female offspring being is colorblind?

23) Cross a normal male with a colorblind female.

What is the probability of a male offspring being colorblind?

What is the probability of a female offspring being colorblind?

24) Cross a colorblind male with a normal female.

List the genotype ratios:

List the phenotype ratios:

25) IMPORTANT: What type of inheritance pattern is exhibited by color vision? _____

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Name:
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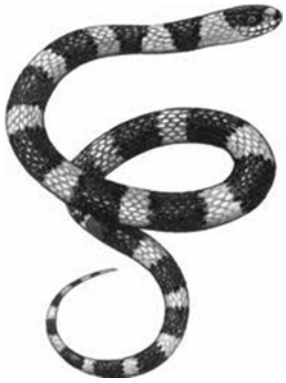
In corn snakes, two distinct pigments appear. The first, a reddish orange color, is controlled by a dominant allele (R). Homozygous recessive snakes (rr) will appear white in the same areas. The second is black and is controlled by a dominant allele (B). Homozygous recessive snakes (bb) will appear white in the same areas.

Perform the following cross:

a heterozygous orange and black snake X a heterozygous orange and black snake

26) Parent Genotypes: ____ ____ ____ ____ X ____ ____ ____ ____

27) Do the cross:



28) Phenotype ratios/percentages:

Orange and Black

White and Black

Orange and White

Totally White

29) **IMPORTANT: What type of inheritance pattern is exhibited by corn snake color?** _____

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In humans, blood type A (I^A) and blood type B (I^B) are both dominant. This means that an individual that receives alleles for both type A and type B blood ($I^A I^B$) will have blood type AB. Individuals with type O blood are homozygous recessive (ii).
There is also a second aspect to blood type associated with the "+" or "-" often seen after the letters given for one's blood type. It is called the Rh factor which involves the presence or absence of the Rh protein (named after the Rhesus monkey). The presence of this protein is controlled by a dominant allele (R). Individuals who are homozygous recessive (rr) will not have the Rh protein on their blood cells.

30) Perform a dihybrid cross between the following individuals: $I^A I^B$ R r X i i r r

31) What are the phenotypes of the parents?
32) What are the chances of the offspring being positive or negative (for Rh factor)?
33) What are the chances of the offspring having type A blood?
34) What are the chances of the offspring having type B blood?
35) Do any of the children have the same blood type (phenotype) as either of their parents? Why/Why not?

36) What is the genotypic ratio?

37) What is the phenotypic ratio?

38) **IMPORTANT: What type of inheritance pattern is exhibited by blood type?** _____

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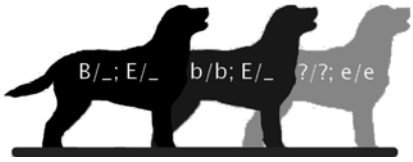
There are three basic colors (phenotypes) in Labrador retrievers. They are black, yellow and chocolate. These traits are controlled by two genes. One gene controls the amount of dark pigment produced in a dog's coat. The dominant allele (B) leads to the black phenotype and the recessive allele (b) leads to the chocolate phenotype. The other gene involved in this determines a dog's ability to deposit the dark pigment in their hairs. The dominant form (E) allows for the proper production and deposition of the pigment. The recessive form of the gene (e) causes an inability to make and deposit the pigment leading to any homozygous (ee) dog to exhibit the yellow phenotype regardless of their genes for the black/brown trait.

39) Start the cross:

Parents: B b E e X b b E e

Gametes:	___ ___	___ ___
	___ ___	___ ___
	___ ___	___ ___
	___ ___	___ ___



40) Do the cross:

41) What are the PHENOTYPES of the parents?
42) What are the chances of having any offspring with a GENOTYPE for the black trait (BB or Bb)?
43) What are the chances of having any offspring with a GENOTYPE for the chocolate trait (bb)?
44) Phenotype Ratios:

Black Labs Chocolate Labs Yellow Labs

45) **IMPORTANT: What type of inheritance pattern is exhibited by coat color in labs?** _____