

Lesson 6.5

Dragon genetics, pt. III: Dihybrid crosses

Name _____

Date _____

Period _____

Key Term: Dihybrid Cross

Explore I

BACKGROUND: After looking at our family of dragons we are now going to look at the possibility of what the children of the dragon family will look like with two traits at a time. This is known as a dihybrid cross. We will still use the terms **heterozygous and homozygous and you still need to understand which traits or dominant and recessive.** You will use the information from lesson 6.12.

EXAMPLE:

Cross a heterozygous chin spike, visible ear hole dragon with a homozygous no chin spike, homozygous no visible ear hole dragonette.

step 1: Look and find what the genotypes are of each parent. Because there are two traits, and each trait has two alleles, each parent will have four letters (alleles)

1. Genotype for heterozygous chin spike, visible ear hole dragon: _____
2. Genotype for homozygous no chin spike, homozygous no visible ear hole dragon: _____

step 2: There is a long way to solve this using a 4 x 4 punnett square which results in 16 offspring. An easier way is to solve each trait individually with individual monohybrid crosses.

6. Complete a Punnett square below to determine the possible genotypes and phenotypes of your offspring in regards to chin spikes.

7. Complete a Punnett square below to determine the possible genotypes and phenotypes of your offspring in regards to visible ear holes.

Explain I

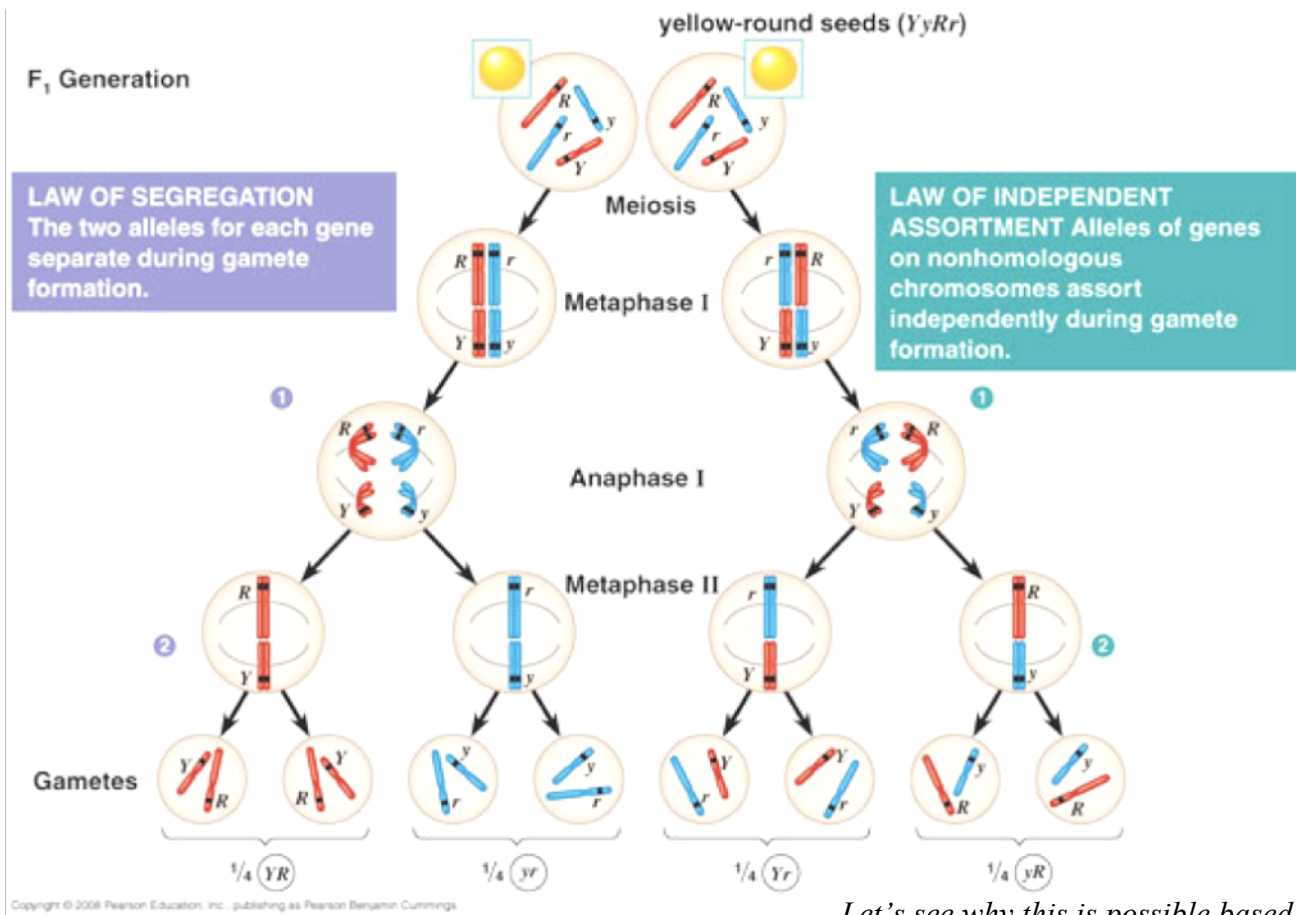
8. According the Punnett squares you just completed, what is the probability that your child will have a chin spikes? ____/4

9. What is the probability that your child will have visible ear holes? ____/4

10. What is the probability that your child will have a chin spikes AND visible ear holes? (Hint: Try multiplying your answers for #8 and #9) $\text{---}/4 \times \text{---}/4 = \text{---}/16$

You just completed a dihybrid cross! A dihybrid cross is simply a cross with two different genes with two different alleles.

Law of Segregation and Law of Independent Assortment Review:



Let's see why this is possible based on Mendel's Law of Independent Assortment. In order to do this, follow these possible alleles as they sort during meiosis in the diagram on the left. This illustrates his **law of independent assortment**, where each pair of alleles segregated independently during gamete formation. In problems #1 and #2, we looked at two traits independently and

11. If you have a green and round pea and a yellow and wrinkled pea, what are the possible offspring phenotypes? *Both parents are homozygous for each of these traits.* Hint: It may be helpful to determine cross first:

_____ X _____

Now, what are all the combinations possible of the two traits, color and shape?

As previously mentioned, there is also a way to solve dihybrid crosses using a 16-square grid. We will start by using two 4-square grids, but for your reference, an example demonstrated at:

<http://www.youtube.com/watch?v=Y1PCwxUDTl8> (search *A Beginner's Guide to Punnett Squares*):

R = round, r = wrinkled
Y = yellow, y = green

Dihybrid Cross

	RY	Ry	rY	ry
RY	RRYY	RRYy	RrYY	RrYy
Ry	RRYy	RRyy	RrYy	Rryy
rY	RrYY	RrYy	rrYY	rrYy
ry	RrYy	Rryy	rrYy	rryy

• $RrYy \times RrYy$

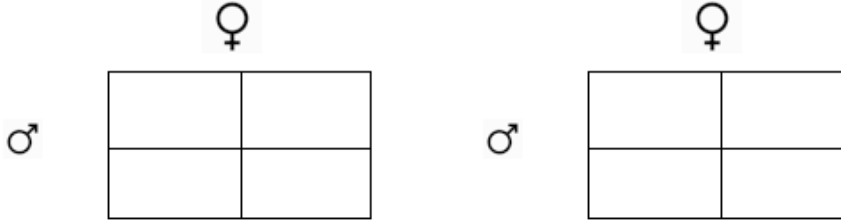
10:50 / 12:15

 **Explore II**

12. Fango is homozygous for having a long neck and for having a long tail. Dragona has a short neck and a short tail. (Express all possible genotypes and phenotypes as ratios. Show work!!

A. Write down the letters for the cross

B. $\underline{\quad} \underline{\quad} \underline{\quad} \underline{\quad} \times \underline{\quad} \underline{\quad} \underline{\quad} \underline{\quad}$ Create and complete Two Punnett Squares (one for each trait)



C. What are the predicted genotypic ratios of their offspring?

D. What are the predicted phenotypic ratios?

13. Flamo is heterozygous for long neck and homozygous dominant for a chest plate. His wife Wiza as you remember has a short neck and has no chest plate.

A. Write down the letters for the cross

B. Create and complete Two Punnett Squares (one for each trait)

C. What are the predicted genotypic ratios of their offspring?

A. What are the predicted phenotypic ratios?

14. Elizardbeth and Davik are both heterozygous long necked and have a large comb.

A. Write down the letters for the cross

B. Create and complete Two Punnett Squares (one for each trait)

C. What are the predicted genotypic ratios of their offspring?

D. What are the predicted phenotypic ratios?