

Genetics Webquest

Name _____ Date _____ Period _____

Link 1: http://www.glencoe.com/sites/common_assets/science/virtual_labs/E09/E09.html

- Read through the paragraphs under “How are traits passed from parent to offspring?” in order to answer the following questions.
 - o What is a **trait**?

 - o Define **genotype**:

 - o Each “letter” of a gene represents one form of the trait, also known as an _____.

 - o How are **dominant** alleles represented? **Recessive** alleles?

 - o Define **phenotype**:

- Read through the directions and perform your genetic crosses for each of your creature’s traits. Fill in the following **punnett squares** and list the possible **phenotypes**.

- If you have headphones, you may click and watch the video found on this website.

Link 2: http://pbskids.org/dragonflytv/games/game_dogbreeding.html

If you do not have headphones, turn off your computer's sound.

- Click "Why" at the bottom of the webpage.
 - o Breeders want to breed puppies with the most desirable traits. How is this accomplished?

 - o What are **genes**?

 - o Explain what happens if a puppy gets the allele for black hair from one parent and the allele for brown hair from the other parent.

- Click "How to Play" and read through the directions.

- Click on "Level One" and begin playing by choosing a male and female border collie in order to breed a puppy that has black fur.

- If black fur is the dominant trait, use the letter **B** or **b** to identify the genotypes of your parent collies.
 - o Genotype of *father*: _____
 - o Genotype of *mother*: _____
 - o How many trials did it take for you to breed a puppy with black fur? _____

- Continue to Level 2.
 - o Based on the genotypes of your parent collies, what was your probability of producing a puppy with long hair? _____ %
 - o How many trials did it take for you to breed a puppy with long hair? _____

- Continue to Level 3.
 - o The trait for ears is slightly different than hair color and length. How do you end up with a puppy that has medium floppy ears? What genes must the puppy have?
 - o You have a 100% probability of having a puppy with floppy ears if you select a father with _____ ears and a mother with _____ ears.
 - o How many trials did it take for you to breed a puppy with medium floppy ears? _____

- Continue to Level 4.
 - In this level, you are trying to selectively breed a puppy with _____ specific traits.
 - Why do you think it might be more difficult to achieve the goal puppy?
 - How many trials did it take for you to breed a puppy with brown, long hair? _____
- Continue to Level 5.
 - In this level, you are trying to selectively breed a puppy with _____ specific traits.
 - Why do you think it might be more difficult to achieve the goal puppy?
 - How many trials did it take to breed a puppy with black, long hair and straight ears? _____
- Continue to Level 6.
 - In this level, you are trying to selectively breed a puppy with _____ specific traits.
 - Why do you think it might be more difficult to achieve the goal puppy?
 - How many trials did it take to breed a puppy with brown, long hair and floppy ears? _____
 - Try this level again, but this time use one of your recently bred puppies to see if you can breed the goal puppy in less spins. How many trials did your second effort take? _____
- Complete the following punnett square illustrating the possible offspring outcomes if you have two parents that are both HETEROZYGOUS for brown hair. Remember, brown hair is dominant.

Possible **Genotypes** and **Probabilities**:

Possible **Phenotypes** and **Probabilities**:

Link 3: <http://www2.edc.org/weblabs/Punnett/punnettsquares.html>

- Read the text and follow the directions on each page.
 - o Why do scientists use **punnett squares**?

- Two chickens mate, both are heterozygous for brown fur (Bb).
 - o What is the **ratio** of possible genotypes resulting from this cross?

 - o What does each number in the ratio signify?

 - o Remembering that B is the dominant allele for brown feather color and b is recessive, how often would we expect to see brown chicks if your friend breeds these two chickens?

- Perform the cross of the two lemmings on the next page by filling in the punnett square.
 - o Suppose the gene of the lemmings you just crossed is the gene that causes albino offspring. Albinism is a condition in which the normal pigment of the skin, fur, and even eyes is absent. This is a recessive trait. Based on your punnett square, what is the probability of producing lemmings which are “**carriers**” for albinism? _____ %

 - o Based on your punnett square, what is the probability of producing an albino lemming? _____ %

 - o What were the **genotypes** of the lemmings you chose in order to produce albino offspring?
 - _____ x _____

- Read the text on the following slide regarding the selection of TWO traits.
 - o What is a **dihybrid cross**?

- Select two lemmings to breed in order to produce an albino lemming with a long tail.
 - o What was the result of your choice?