Name(s): _____Period: _____ Date: _____

Genetics Basics

Introduction

Heredity is the characteristics that are transmitted from 2 parents to their offspring. Depending on the **alleles** that are passed on by the parents, the offspring's **genes** will express certain **traits**. In this activity, you will work with your group to explore the basics of heredity.

Model 1: Genetics

Gronckles: Gronckles are gigantic dragons. Gronckles have a gene that controls the trait of size. There are 2 variations of that gene: the B allele and the b allele. The B allele expresses the trait of big wing. The b allele expresses the trait of little wing.

1. What is the gene in the paragraph above in charge of? _____
2. How do you represent the 2 alleles that control the size of the Gronckle's wings? _____ and _____
3. What are the two variations of this trait that can be expressed? _____ and _____

Monstrous Nightmares: Monstrous Nightmares are dragons that are known for their fire breathing ability, but not all Nightmares can breathe fire. This dragon has a gene which controls the trait of fire breathing ability. There are 2 variations of that gene, the F allele and the f allele. The F allele expresses the trait of fire breathing ability. The f allele expresses the trait of not being able to breathe fire.

4. What is the gene in the paragraph above in charge of? _____
5. How do you represent the 2 alleles that control fire breathing ability? _____ and _____
6. What are the two variations of this trait that can be expressed? _____ and _____
7. Based on the information above, come up with a definition for a **GENE**. _____
   _____
8. Based on the information above, come up with a definition for an **ALLELE**. _____
   _____
9. Based on the information above, come up with a definition for a **TRAIT**. _____
   _____

Model 2: Dominant and Recessive

Dragon Genetics Key	
Capital letters represent **dominant** alleles; lowercase letters represent **recessive** alleles	
N = LONG NECK n = short neck	E = RED EYE e = white eye
H = HORN PRESENT h = horn absent	F = FIRE BREATHING f = not fire breathing
G = GREEN BODY g = grey body	L = LONG TAIL l = short tail
S = SPIKES ON END OF TAIL s = no spikes on end of tail	B = BIG WINGS b = little wings
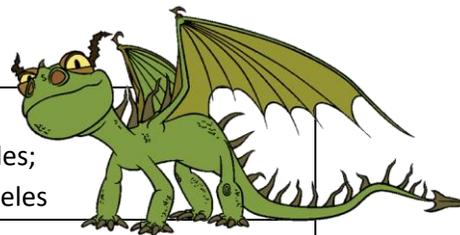
1. Dominant alleles are represented by _____ letters.
2. Recessive alleles are represented by _____ letters.

3. Which letters are used to represent the gene for body color? _____

4. Which letters are used to represent the gene for neck length? _____

5. Which letters are used to represent the gene for fire breathing ability? _____

6. List 2 dominant dragon traits: _____ & _____

7. List 2 recessive dragon traits: _____ & _____

Model 3: Heterozygous and Homozygous

Offspring get 1 copy of each chromosome from their parents. This also means that they get 1 copy of every gene from their parents (because genes are found on the chromosomes); the combination of allelles that an offspring get from its parents represents the offspring's **genotype**. Sometimes, the alleles that the offspring get are the same and sometimes they are different. When the two alleles are the same, they are called **homozygous** or **purebred**. When the two alleles are different, they are called **heterozygous** or **hybrid**. Label the following pairs of alleles are either homozygous (HO) or heterozygous (HE).

SS _____   ff _____   Hh _____   EE _____   Gg _____
Ll _____   hh _____   NN _____   ee _____   RR _____

1. Which genotypes would be considered purebred? _____

2. Which genotypes would be considered hybrid? _____

Model 4: Genotype and Phenotype

Gene A	
Genotype	Phenotype
NN	long neck
Nn	long neck
nn	short neck

Gene B	
Genotype	Phenotype
EE	red eye
Ee	red eye
ee	white eye

1. What do the two genes in the table above control? _____ & _____

2. What are the 2 alleles that control neck length? _____ & _____

3. What are the 2 alleles that control eye color? _____ & _____

4. What is a genotype? (Use the terms: dominant, recessive, heterozygous, and homozygous) _____
_____
_____

5. What is a phenotype? _____
_____

6. What determines phenotype? _____
_____

Model Wrap-up: Answer the following questions based on your work with all four models

7. Based on the information above, what is the definition for a **DOMINANT TRAIT**? _____
_____
_____

8. Based on the information above, what is the definition for a **RECESSIVE TRAIT**? _____
_____
_____