Geneticists _____ Hour_____

Dragon Genetics Project

In this activity you will study the patterns of inheritance of multiple genes in (imaginary) dragons. These dragons have two pairs of homologous chromosomes in each cell. You will see that, since genes are carried on chromosomes, the patterns of inheritance are determined by the behavior of chromosomes during meiosis and fertilization.

PROCEDURE

1. You will be given a partner for this lab. You and your partner will share the grade for this project, but you will both evaluate your partner. This project MUST be completed on time. You will have three days to complete this project. **PROJECT DUE DATE: NO LATER THAN WEDNESDAY, MARCH 19.**

2. Each partner will get a bag containing 5 popsicles, **one bag in your team needs to be male and the other needs to be female**. These popsicle sticks (yellow, green, red, orange) represent autosomes, while the purple represents female sex chromosomes and the blue represents the male sex. Each side of a stick represents a chromosome, and the two sides together represent a pair of homologous chromosomes.

3. Record the Alleles for each parent on the tables provided. Be sure to write it in the correct form! Remember autosomes use capital and lower case letters. Sex chromosomes use X & Y and then either a capital or lower case as a exponent.

4. For each color autosome and then for the sex chromosomes, each parent will randomly drop his or her stick on the table. The side of the stick that is up represents the chromosome that is passed on to the baby.

5. Record the alleles from each pair of chromosomes in the data chart.

6. The decoding chart indicates the phenotypic effect of each gene. The trait produced by each pair of alleles should be recorded in the data chart. Remember that a CAPITAL letter is dominant over a small letter [recessive] unless the decoding chart indicates those traits are codominance or incomplete dominance.

7. Looking at the traits for you new offspring you will draw or trace the traits to produce their baby's picture.

8. Then you will add the baby's colors to your pictures.

9. You will assemble all this information in Dragon Photo Album, which will be the final project you turn in. **Details on what should be included in the photo album are listed on the rubric sheet.**

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DRAGON GENOME - *DECODING* OF THE GENES

Chromosome Dominant genes Recessive genes

Green Autosome

A. no chin spike a. chin spike B. nose spike b. no nose spike C. three head flaps c. four head flaps D. no visible ear hole d. visible ear hole E. [see below]	a. chin spike b. no nose spike c. four head flaps d. visible ear hole

Red Autosome

F. long neck G. no back hump H. no back spikes I. long tail J. flat feet	f. short neck g. back hump h. back spikes i. short tail j. arched feet

Orange Autosome

K. (See below) L. spots on neck M. wings N. no fang O. spots on back	l. no spots on neck m. no wings n. fang o. no spots on back

Yellow Autosome

P. no spots on thigh Q. (See below) R small comb on head S. [See below] T. no elbow spike	p. spots on thigh r. large comb on head t. elbow spike

Sex Chromosomes (Blue = male & Purple = female)

Other traits on both X&Y chromosomes	U. regular thigh V. four toes	u. pointed thigh v. three toes
Only on the X Chromosome Only	W. no chest plate X. no tail spike Z. long arm + non-fire breather	w. chest plate x. tail spike z. short arms - fire breather
Only on the Y Chromosome Only	Y. male sex	

Codominant traits

E. eye pointed at each end S. Red spots	Ee. eye round at front only Ss. Red & Yellow Spots	e. round eye s. yellow spots

Incomplete Dominant Traits

K. red eyes Q. blue body	Kk. orange eyes Qq. purple body	k. yellow eyes q. red body

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Baby Dragon – Data Tables

Green Autosomes

Genotypes			Alleles in		Traits		
MOM	DAD		EGG	SPERM	Phenotype of Baby	Phenotype of Mom	Phenotype of Dad

Red Autosomes

Genotypes			Alleles in		Traits		
MOM	DAD		EGG	SPERM	Phenotype of Baby	Phenotype of Mom	Phenotype of Dad

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Orange Autosomes

Genotypes			Alleles in		Traits		
MOM	DAD		EGG	SPERM	Phenotype of Baby	Phenotype of Mom	Phenotype of Dad

Yellow Autosomes

Genotypes			Alleles in		Traits		
MOM	DAD		EGG	SPERM	Phenotype of Baby	Phenotype of Mom	Phenotype of Dad

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Sex Chromosomes (Purple = Female, Blue = Male)

Genotypes			Alleles in		Traits		
MOM	DAD		EGG	SPERM	Phenotype of Baby	Phenotype of Mom	Phenotype of Dad

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Analysis Questions (Answer here and then transform your best answer to the photo album)

1. Draw a Punnett square to show how your baby dragon inherited the genes that resulted in this trait. (Pick one trait to compelte a punnett square on). **In the Punnett square, circle the genotype of your baby dragon.**

2. How does dropping the stick on the table and transcribing the letters on the sides facing up follow Mendel's **Law of Segregation**?

3. Explain how dropping the green, orange, and red sticks illustrates Mendel's Law of ***Independent* Assortment**?

4. What is the sex of your baby dragon?

5. What traits are **co-dominant**? What traits are a result of **incomplete dominance**? Explain the difference between co-dominance and incomplete dominance.

6. Are there any traits that appear on the sex chromosomes of your baby dragon? If so, what are they?

Reflection Questions

1. What did you think of this project? Did you like it or dislike it? Why?

2. Did this project help you learn about genetics and allow you to apply what you have learned so far in this unit?

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