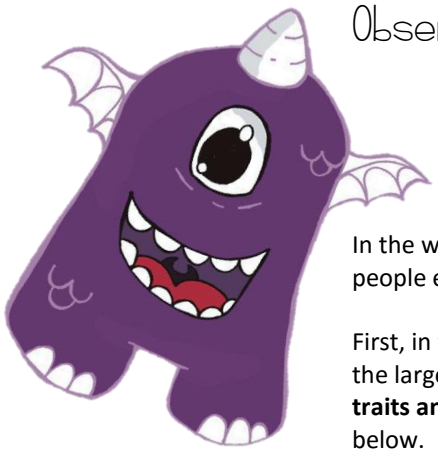
Honors Biology
Unit 5: Patterns of Inheritance
Name: _____ Period: _____

Due Thursday February 16th!

Lab 16: Heredity in One-Eyed One-Horned Flying Purple People Eaters



Observing Dihybrid Crosses

You might have heard of the "one-eyed one- horned flying purple people eater", but did you know that those are genetic traits? In this simulation, we will first perform a dihybrid cross Punnett square to predict the mating results of two purple people eaters. Then, we will perform a hereditary simulation to compare our prediction.

In the world of purple people eaters, one eye (E) and one horn (H) are dominant traits. Purple people eaters can also have two eyes (e) and two horns (h), which are recessive traits.

First, in the table on the left, write out the genotypes associated with each phenotype. Then in the large Punnett square, perform a **dihybrid cross among a male who is heterozygous for both traits and a female who is heterozygous** for both traits. Use the results for your prediction below.

Tip: To determine the gamete pairs when setting up your cross you can **FOIL** each parental genotype (First of each letter, outside letters, inside letters, last of each letter. Just remember that each gamete pair must contain one of each allele. For example, (E e) (H h) **F**irst letters= EH.

Parental Cross= _____ x _____

Phenotype	Genotype
One Eye	
One Eye	
Two Eyes	
One Horn	
One Horn	
Two Horns	

DIHYBRID CROSS PUNNETT SQUARE- PREDICTION TOOL PERCENTAGES

(To get the percentage, divide the number by 16 and multiply by 100)

How many <u>possible</u> one-eyed one-horned purple people eater offspring? _____ _____

How many <u>possible</u> one-eyed two-horned purple people eater offspring? _____ _____

How many <u>possible</u> two-eyed one-horned purple people eater offspring? _____ _____

How many <u>possible</u> two-eyed two-horned purple people eater offspring? _____ _____

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HEREDITY SIMULATION

Mrs. Purple People Eater has laid **8 eggs** due to hatch any day now. Using the dihybrid cross Punnett square on the first page, ***predict*** how many babies will have the following traits:

(To figure this out divide the percentages determined on the first page by 100 and multiply the decimal by 8. You will NOT get whole numbers- that is okay!)

How many <u>possible</u> one-eyed one-horned purple people eater offspring? _____

How many <u>possible</u> one-eyed two-horned purple people eater offspring? _____

How many <u>possible</u> two-eyed one-horned purple people eater offspring? _____

How many <u>possible</u> two-eyed two-horned purple people eater offspring? _____

Putting decimals into realistic terms...

You can expect 4 or _____ one-eyed one horned babies; 1 or _____ one-eyed two horned babies, _____ or 2 two-eyed one-horned babies, and 0 or 1 two-eyed two-horned babies.

For the heredity simulation, collect the following materials:

Four popsicle sticks, two pink (female) and two blue (male) (These will act as chromosomes)

Popsicle sticks are marked with E (dominant eye allele) or e (recessive eye allele), and H (dominant horn allele) and h (recessive horn allele)

*Note that when doing this simulation, you will simulate the inheritance for ONE GENE AT A TIME (first eye gene, then horn gene) because you must still follow the **Law of Independent Assortment**! Each gene must be accounted for separately!

Two paper bags, one marked F (female) and one marked M (male) (These will act as the parents)

Instructions for heredity simulation:

- Starting with the male eye gene, put the two blue-labeled popsicle sticks in the bag and shake it.
- Choose one stick (no peeking because this must be random!) and note in the data table on the next page whether you picked out the dominant allele (E) or the recessive allele (e).
- Repeat this 8 times, noting the allele in the data table each time.
- Repeat this 8 times for the male horn gene (H or h).
- Once you have recorded all the male alleles for both genes, repeat the process for the female alleles for both the eye and horn genes recording your results in the data table.
- **The new genotype of the offspring is simply the two alleles that they have gained from each parent.**

**Note: every time you pull out a popsicle stick, the stick represents either a sperm or egg cell! When you combine the male popsicle stick with the female popsicle stick for a particular gene (such as Ee or EE or ee) then this represents the allelic combination found in the zygote!

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Offspring Data Table					
Offspring/ Egg	**Male Eye Allele (from sperm cell)**	**Female Eye Allele (from egg cell)**	**Male Horn Allele (from sperm cell**	**Female Horn Allele (from egg cell)**	**Genotype of Offspring Zygote** (e.g. EeHh)
#1					
#2					
#3					
#4					
#5					
#6					
#7					
#8					

RESULTS: PERCENTAGES:

How many one-eyed one-horned purple people eater offspring? _____ _____

How many one-eyed two-horned purple people eater offspring? _____ _____

How many two-eyed one-horned purple people eater offspring? _____ _____

How many two-eyed two-horned purple people eater offspring? _____ _____

(Formulate your percentages the same way you did using the Punnett square, except divide by 8 to represent the 8 eggs/offspring formed)

ANALYSIS:

1. Compare your prediction (dihybrid cross) to your results (heredity simulation). How was the simulation similar to the prediction? How was it different?

_____

_____

_____

_____.

2. Explain why there may have been some differences among your prediction vs. your results.

_____

_____

_____

_____.

3. Do you think the number of offspring affects how close your prediction is to the actual results? Example, if there had been 5 eggs instead of 8 eggs would that have made a huge difference? What if there had been 100 eggs instead of 8?

_____

_____

_____

_____.

DIHYBRID CROSS PRACTICE:

Complete the Punnett square with the following parents:

EEHh x Eehh

RESULTS:

Offspring Phenotypes	# of Possible Offspring with Phenotype	Percentages (divide # by 16 and multiply by 100)
One Eyed One Horned		
One Eyed Two Horned		
Two Eyed One Horned		
Two Eyed Two Horned		