

Storybook Genetics

Answer ALL questions on a separate sheet of paper.

Vocabulary Review – Explain the differences between following methods of inheritance:

1. Dominance/recessive and sex-linked. _____
2. Incomplete dominance and codominance. _____
3. Multiple alleles and polygenic traits. _____

Dihybrid Problems

In dragons, green scales are dominant to red scales. Also, in dragon, black eyes are dominant to red eyes.

GG=green scales	BB=Black eyes
Gg= green scales	Bb=black eyes
gg= red scales	bb=red eyes

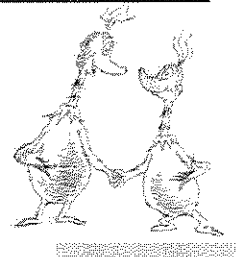
4. What are the phenotypes of dragons that have the following genotypes: Ggbb, ggBB, ggbb, GgBb.
5. A male dragon with the genotype Ggbb is crossed with a female dragon with the genotype ggBb. Create a punnett square showing the possible combinations for their offspring. Determine the resulting genotypes and phenotypes. Include percentages for each possible genotype and phenotype.

Incomplete Dominance

Sneeches can have a stars, squares, or circles on their bellies. In sneeches this trait is incompletely dominant. See the key to the right.

BB= star-bellied
Bb= square- bellied
bb= circle- bellied

6. A star-bellied sneech marries a square-bellied sneech. What are the chances that they could have a circle-bellied sneech? Create a punnett square to support your answer.
7. A circle-bellied sneech wants to marry a star-bellied sneech. But the circle-bellied sneech hates square-bellied sneeches. The circle-bellied sneech is worried that some of their children could be square-bellied sneeches. Create a punnett square showing what their children will probably look like.



Co-Dominance Problems

In grouches, fur colored is a co-dominant trait. Grouches can be green, purple or green and purple striped.

FF=green fur,
FP= green and purple striped
PP= purple fur

8. A green Oscar the grouch falls in love with a purple grouch. The two decide to have a Grouch Family. In grouches fur color is co-dominant. Using the key showing grouch colors, create a punnett square and determine the genotypes and phenotypes of their grouchy offspring.
 - a. Create a punnett square
 - b. Determine the possible genotypes of their offspring
 - c. Determine the possible phenotypes of their offspring
9. One of Oscar the Grouch's children marries another green and purple striped grouch. What will Oscar's grandchildren look like?
 - a. Create a punnett square
 - b. Determine the possible genotypes of their offspring
 - c. Determine the possible phenotypes of their offspring



Sex-linked

There are many Oompa Loompas in Willy Wonka's Factory. Some of these Oompa Loompas have a disorder that causes them to dance and sing uncontrollably. This trait appears to occur in males more than females.

10. An Oompa Loompa gal falls in love with an Oompa Loompa guy. The Oompa Loompa gal is worried about the strange dancing-singing disorder since her father had it. She wants to make sure that her son will not have this disease. Her Oompa Loompa guy tells her not to worry because he doesn't have the disease. Should she worry? What are the chances that their son could have this uncontrollable dancing-singing disorder? Create a punnett square to show your answer.
11. An Oompa Loompa guy has the uncontrollable dancing-singing disorder. He has fallen in love and wants to marry a sweet Oompa Loompa girl. He is worried that his children could inherit the disorder from him. The Oompa Loompa girl does not have any relatives with this disorder. What are the chances that their child could have the disorder? Create a punnett square to show your answer.

Key

X^{SD} – does not have disorder
 X^{sd} – has disorder

Multiple Alleles

Ogres can have blond hair, red hair or no hair. This is a multiple alleles trait, each person will have only one pair of alleles but there are three possible alleles. red hair and blond hair are co-dominant, no hair is recessive. See the key to the right.

12. Complete the following chart showing genotypes and phenotypes.

(copy the chart on to your paper)

Genotypes	Phenotypes
$H^R H^R$	
$H^R H^b$	
	homozygous yellow hair
	heterozygous yellow hair
$X^b X^b$	bald

Key

H^R – red hair
 H^Y – yellow hair
 H^b – no hair (bald)

13. Fiona is heterozygous for her red hair while Shrek has no hair. Create a punnett square showing their offspring. Record the genotypes and phenotypes of their children.
14. Shrek has a cousin, Dreck, who he has not seen since they were young ogrelings. Dreck, a female ogre) has red and yellow striped hair. Dreck marries an ogre with no hair. Predict the genotypes and phenotypes of their children. Include percentages for each genotype and phenotype. Show your punnett square.