Oompah Loompah Genetics

(Monohybrid Crosses, Codominance, and Dihybrid crosses)

Read and answer each question in the space provided. Use a Punnet square to solve problems.

1. Oompahs generally have orange faces which are caused by a dominant gene. The recessive condition results in a blue face. Develop a "key" to show <u>all</u> the possible genotypes and phenotypes for the Oompah's face colors.

Genotype	Phenotype

2. Two heterozygous Oompahs are crossed. What is the probability that the offspring will have orange faces?

Probability of Orange face _____

3. An orange-faced Oompah (homozygous) is married to a blue-faced Oompah. They have 8 Oompah children. How many of these children will have blue faces? How many will have orange faces?

Probability of blue faces _____
Probability of orange faces _____

4. Otis Oompah has a blue face and is married to Ona Oompah who has an orange face. They have 60 Oompah children, 30 of those children have blue faces. What are Ona and Otis Oompah's genotypes?

Otis Oompah's genotype _____ Ona Oompah's genotype _____

5. Odie Oompah has an orange face; in fact everyone in Odie's family likes to brag that they are a "pure" line. Much to his family's horror, he married Ondi Oompah who (gasp!) has a blue face. List the phenotypes and genotypes of Ondi and Odie's children? Is Odie's line still pure?

Genotypes of children _____
Genotypic Ratio _____
Is Odie's line still pure? YES NO

6. Ona Oompah (from #4) divorces Otis and marries Otto. Otto has a blue face. What is the probability that Ona and Otto's children will have blue faces?

Ona Oompah's genotype ____ Otto Oompah's genotype ____
Probability of having children with blue faces _____

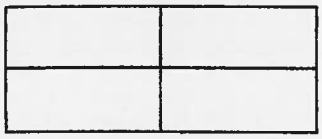
7. Orville Oompah is heterozygous for orange face and his wife Olga Oompah is heterozygous for orange face. They have 200 little Oompahs. Show the genotypes, genotypic ratios, phenotypes, and phenotypic ratios for this cross.

Homozygous Blue face _____ Heterozygous Blue face _____
Homozygous Orange face _____ Heterozygous Orange face _____
Genotypes _____ genotypic ratio _____
Phenotypes _____ phenotypic ratio _____
What is the probability of having orange-faced Oompahs? _____
What is the probability of having blue-faced Oompahs? _____

8. Oompahs can have red, blue, or purple hair. Red is the dominant hair color, while blue is recessive for hair color. The heterozygous condition shows the third phenotype --- purple hair. The allele that controls this trait is **incompletely dominant**, and purple hair is caused by the heterozygous condition. Show a "key" for <u>all</u> the genotypes and phenotypes for hair color in Oompahs. Remember that there is only one trait (2 alleles) involved here...that means that you get to use one alphabet letter (upper and lower case) only.

Genotype	Phenotype

9. Orville Oompah has purple hair and is married to Opal Oompah who brags that she has the bluest blue hair in the valley. What percentage of Opal's children will be able to brag about their blue hair also?



Percentage of little Oompahs with blue hair? _____

10. One of Opal's children is born with shocking red hair. Orville insists that he is the father of her child. But wait, Opal swears that she has been faithful. She claims the hospital goofed and got her baby mixed with someone else's. Based on the genetics, is this a likely story? Why or why not?

11. Olga Oompah has red hair and marries Oliver Oompah who has blue hair. They have 32 children. Show the genotypic ratio and phenotypic ratio for the hair color of the children.

Genotypes _____ genotypic ratio _____
Phenotypes _____ phenotypic ratio _____

12. Olivia Oompah is married to Oscar Oompah. Both of them have purple hair. They have 100 children. Show the genotypic ratio and phenotypic ratio for the hair color of the children.

Genotypes _____ genotypic ratio _____
Phenotypes _____ phenotypic ratio _____

13. In the land of Oompah, blue hair is highly valued. Blue haired Oompahs get special benefits. Opine Oompah has purple hair, but he wants a wife that will give him children with blue hair. What color hair should he look for in a wife? If he can't find this type of Oompah, what should his second choice be?

14. Ozzie Oompah has 7 sisters and brothers. Ozzie has purple hair and an orange face. In fact, all of his siblings have orange faces, but their hair color ranges from blue to purple to red. Given this information, determine the genotypes and phenotypes of Ozzie's parents.

15. A male and female Oompah are both heterozygous for the traits: blue face (Bb) and big feet (Ff). Create a dihybrid Punnett square (16 boxes) to determine the phenotypic ratio and the genotypic ratio for all children. List these under your square.

genotypes: genotypic ratios: phenotypes: phenotypic ratio: