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Genetics Oompah Loompah worksheet:

(modified from http://www.biologycorner.com/worksheets/oompahgenetics.html)

Oompahs generally have blue faces which is caused by a dominant gene, B. The recessive allele, b, codes for orange face.

Genotype	Phenotype
Homozygous Dominant ,BB	Blue Faces
Heterozygous, Bb	Blue Faces
Homozygous Recessive, bb	orange faces

Using this information for possible Oompah Loompah genotypes and phenotypes, answer the questions below. *Write your answer and show the punnett square you used to solve each problem.*

1.. Two heterozygous Oompahs are crossed. **What proportion of the offspring will have orange faces.**

	B	b
B	BB	Bb
b	Bb	bb

One in four (25%.) ✓

2. A blue faced Oompah (homozygous) is married to an orange faced Oompah. They have 8 children. **How many of these children would you predict to have blue faces?**

	b	b
B	Bb	Bb
B	Bb	Bb

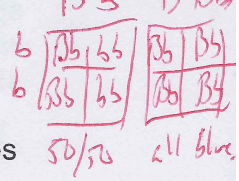
All eight of them. ✓

3. Otis Oompah has an orange face and is married to Ona Oompah who has a blue face. They have 60 children, 31 of them have orange faces. **What are the genotypes of the parents? Explain how you know.**

✓ 1/3

Otis Oompah is bb (homozygous recessive) because having an orange face is a recessive gene. Ona Oompah is Bb (heterozygous) because if she was BB (homozygous dominant) all of her children would have blue faces and her dominant gene wouldn't allow for any orange faced children.

Bb must be heterozygous to be able to have kids who are bb.



50/50 all blue

4. Odie Oompah has a blue face. In fact, everyone in Odie's family has a blue face, and the family boasts that it is a "pure" line. Much to his family's horror, he married Ondi Oompah who "gasp" has an orange face. All their children have blue faces (Phew…). **What are the gentoypes of their children? Is Odie's line still "pure"? (explain** why or why not)

The genotype of the children is Bb (heterozygous). Odie's line is no longer "pure" due to the recessive gene that their children posess, they have the ability to reproduce having an offspring with an orange face.

5. Oompahs can have red, blue or purple hair. Purple hair results from the heterozygous condition of the hair alleles, H^B and H^R. **Complete the "key"** showing the genotypes and phenotypes for hair color. **Is this an example of simple dominance, codominance or incomplete dominance?**

$H^B H^B$ = Blue
$H^B H^R$ = Purple
$H^R H^R$ = Red

This is an example of incomplete dominance.

6. Orville Oompah ($H^B H^R$) has purple hair and is married to Opal Oompah ($H^B H^B$) who brags that she has the bluest hair in the valley. **How many of Opal's children will be able to brag about their blue hair also?**

	B	B
B	BB	BB
R	BR	BR

Two out of four (50%) of their children will be able to brag about their blue hair.

7. Olga Oompah has red hair and marries Oliver Oompah who has blue hair. They have 32 children. **What color is their children's hair? (how do you know?)**

All 32 of their children have Purple hair. This is so because all of their genotypes are ($H^B H^R$) which results in purple hair.

8. Olivia Oompah is married to Odo Oompah and they both have purple hair. **What color hair and in what proportion would you expect their children to have?**

We would expect half of their children to have purple hair, one fourth (25%) to have blue hair, and one fourth (25%) to have red hair. So... if they had 4 kids, 2 would have purple, 1 would have blue, and 1 would have red.

9. In the land of Oompah, blue hair is highly valued, blue haired Oompahs even get special benefits. Oscar Oompah has purple hair but he wants to find a wife that will give him blue haired children. **What color hair should his ideal wife have? What should be his second choice? Which choice will give him no blue haired kids?**

His ideal wife should have blue hair in order to have the most blue haired children. His second choice should be a wife who also has purple for she has a 25% chance of giving him blue haired children. He should not marry a wife who has red hair, for she is unable to give him children with blue hair.