

Name: _____

Superhero Genetics

Background: Everyone knows the superheroes and the origins of their powers, but it is a little known fact that some of these powers are permanent genetic alterations that can be passed from generation to generation. For instance, the X Men Mutants are the result of mistakes in their DNA that may also exist in their gametes. If this is true, Meiosis would produce sperm and ova that would pass these traits to their offspring. Here are a few notable examples...

Wolverine:

The Wolverines bone claws were the result of a recessive allele (h). The normal skeletal hand bone arrangement that most of us have is dominant (H). Cross the Wolverine, who is homozygous for bone claws with a normal woman who is homozygous for normal hand bones (HH). Predict the phenotypic and genotypic ratio of their offspring.

1. Phenotypic ratio: _____ 2. Genotypic ratio: _____

What could Wolverine's grandchildren look like if one of his children had a child with a heterozygous (Hh) normal hand boned partner? What percentage of the offspring could be wolverines (have bone claws)?

3. Percent of offspring with bone claws: _____



Spiderman:

The radioactive spider that bit Peter Parker created a change in his DNA that caused an incomplete dominant allele leading to his ability to sense danger (**Spidey-sense**) all the time. The heterozygous cross (RS) creates the ability to sense mild danger all of the time. Those that have **no sense** (SS) never know when danger is near. Cross Spiderman, who has a homozygous (RR) pairing for Spidey-sense with Mary Jane who, being a typical female, is heterozygous, and can sense mild trouble all of the time (**mild-sense**). Predict the genotypes and phenotypes of their offspring.



4. Phenotypes of offspring: _____ 5. Genotypes of offspring: _____

The Hulk:

The accident that exposed Bruce Banner to gamma radiation mutated his DNA to produce an allele that causes him to be very large and green (GG). This “hulk” trait shows incomplete dominance with the gene for normal human size and color (NN). The heterozygous pairing (GN) produces people, who when enraged, get a little bigger and turn yellow. Cross Bruce Banner, who is obviously homozygous for the hulk allele with Black Widow, who is homozygous for the normal allele.



6. What is the phenotype of the offspring? _____

7. What genotype would their offspring have to mate with to have a 50% chance of a normal baby? _____

Mystique:



The mutation that left the X Men’s Mystique with the ability to shape shift and look like other people is the result of a recessive sex-linked allele. It is on the X chromosome. What would happen if Mystique (X^mX^m) had children with a normal skinned man (X^MY)? What percent of their girls would be shape shifters? What percent of their boys would be shape shifters?

8. Percent shape shifter girls: _____

9. Percent shape shifter boys: _____

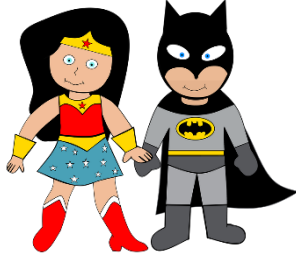
Cross one of their sons with a female carrier. What are the phenotypes of the offspring (be sure you include boy or girl)?

10. Phenotypes of offspring: _____

Superhero Multiple Alleles:

Wonder Woman (SB) is a combination of Superman's power (S) and Batman's fighting skills (B). Super Girl, however, has much less power (OO). That's right, this is due to a multiple allele situation! Supermen/Superwomen are SS or SO, Batmen/Batwomen are BB or BO, Wonder women/men are SB and Super Girls/Boys are OO. Got that?

If Wonder Woman and a heterozygous Batman have a baby, what are the possible superhero babies they could have?



If Super Girl and Super Man have a child, what are the possible superhero babies they could have?

If the dad is a heterozygous Superman, what must the mom be for Super Girl to be born? List all possibilities!



Now make up your own scenario for superhero genetics. Pick your favorite superhero power, determine its gene interaction, and write a cross that would demonstrate how it is passed down.