

HALLOWEEN GENETICS REVIEW PROBLEMS

1. Red candies are dominant and white candies are recessive. Cross a homozygous dominant red candy with a heterozygous red candy. Show the cross and Punnett square and give phenotype and genotype ratios.
2. Frankenstein was always self-conscious about the bolts in his neck (caused by an autosomal dominant gene, B). When he fell in love with Florenstein, she didn't have bolts but when they had children, 1/2 of them had bolts.
 - a) Write the cross and Punnett square showing complete genotypes.
 - b) What is the probability of them having a heterozygous child?
3. Spiderman's powers are fading and he needs a blood transfusion quick after his latest battle. The only blood type available is type A. Discuss the conditions relevant for Spidey to be able to accept type A blood and what could happen if it wasn't compatible.
4. Three pumpkins are sitting around a campfire roasting marshmallows and discussing the fact that the female pumpkin is about to have a baby. The two males have blood type A and blood type AB, respectively. The female has blood type B. If the baby is born with type A, could either be the father? Is one more likely?
5. Batman has blue eyes and blonde hair (bbhh) and Batwoman has brown eyes and black hair (BbHh). If these two caped crusaders were to have children together, determine the phenotype ratio of the little ones. Show your work.
6. Draculosis is a sex-linked recessive disorder. It causes extreme sensitivity to sunlight which can be fatal and a host of Dracula behaviours.
 - a) Use a cross and Punnett square to determine the probability (of all offspring) that a Draculosis male and homozygous normal woman will produce a carrier daughter.
 - b) Write the phenotype ratio for the scary offspring.
7. A male ghost and a female witch have four ghastly children: two girls (one is a known heterozygote) and two boys (one suffers from hemophilia and the other doesn't).
 - a) Draw the cross and Punnett square and determine the genotypes for all individuals.
 - b) Draw a pedigree for this question.
8. Merlin the magician is trying to impress his girlfriend by crossing homozygous blue flowers with homozygous green flowers and producing brown flowers. Merlin's girlfriend is a geneticist, however, and is not impressed so she confronts him and explains it is not magic at all.
 - a) What kind of dominance would the girlfriend say this is?
 - b) Draw a cross and Punnett square to show the inheritance (use the format shown in the text).