

Concept Development 1B - Part 1: PREDICTING THE INHERITANCE OF 1 TRAIT

*(see Bb version for introductory explanations for certain sections -
this version contains just the problems you were asked to work)*

1. The Jones family has 8 children, all of whom are girls. What is the chance that their next child will be a boy? Explain.

2. The Smiths plan to have children some day. They would like to have 3 boys. What is the chance that they have 3 children, all boys? Provide an explanation with your answer.

3. In summer squash, white (A) fruit color is dominant. Yellow (a) is recessive. A squash plant that is homozygous for white is crossed with a homozygous yellow one. Predict the appearance of :

a. the F₁ generation

GENOTYPIC RATIOS/PERCENTAGES
PHENOTYPIC RATIOS/PERCENTAGES

b. the F₂ generation (Parents of the F₂ generation are children of the F₁ generation.....that's right- inbreeding!)

GENOTYPIC RATIOS/PERCENTAGES
PHENOTYPIC RATIOS/PERCENTAGES

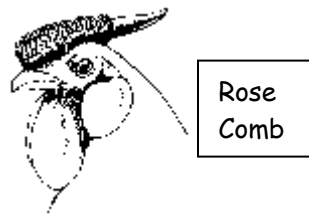
4. The polled (hornless) trait in cattle is dominant. The horned trait is recessive. A certain polled bull is mated to 3 cows. Cow A, which is horned, gives birth to a polled calf. Cow B, also horned produces a horned calf. Cow C, which is polled, produces a horned calf. What are the genotypes of the parents? Provide an explanation!

BULL	COW B
COW A	COW C

5. In poultry, rose comb is a dominant trait, single comb is recessive. A rose-combed male is mated with 2 rose-combed females. Female A produces 14 chicks, all rose combed. Female B produces 9 chicks, 7 rose-combed and 2 single combed. What are the genotypes of the 3 parent birds? Provide an explanation!

6.

Rose-Combed Male	Female B
Female A	



7. How can two healthy parents produce a child with a genetic disease? This question can be an agonizing one for parents who find themselves in such a situation. An understanding of genetics can explain how this happens and remove some of the unnecessary guilt they may feel. Friedich's Ataxia is a hereditary defect characterized by deformity of the feet, degeneration of the spinal cord, and an early death (usually by the age of 30). It is caused by a recessive allele.

a. Suppose a man with no history of this disease in his family marries a 32 year old woman who's father died at the age of 28 from Friedich's Ataxia. What are the chances that a child of theirs will develop this condition?

CHANCE OF THIS COUPLE
HAVING A CHILD WITH
FRIEDICH'S ATAXIA?

b. Now suppose that a couple who are both normal but each have one parent with the disease have children. What are the chances that the first child will develop Friedich's Ataxia? What about two children with Friedich's Ataxia?

CHANCE OF THIS COUPLE
HAVING A CHILD WITH
FRIEDICH'S ATAXIA?

CHANCE OF THIS COUPLE
HAVING TWO CHILDREN
CONSECUTIVELY WITH
FRIEDICH'S ATAXIA?

8. Certain chickens display incomplete dominance with respect to feather color. There are black, splashed, or andalusian(blue) feather colors. Andalusian is the intermediate phenotype. Answer the following questions with this information in mind.

- a. What are the genotypes of the parents if the following number of offspring are produced:
 29- Splashed feather offspring
 45- Andalusian feather offspring
 26- Black feather offspring

Provide evidence to accompany your answer by using a punnet square!!

- b. An individual with pure black feather blood line mates with an individual who has one black feather and one splashed feather parent. What are the genotypic and phenotypic ratios for the offspring of these two parents? Use a punnet square to defend your answer!!

GENOTYPIC RATIOS/PERCENTAGES
PHENOTYPIC RATIOS/PERCENTAGES

8. In some cats the gene for tail length shows incomplete dominance. Cats with long tails and cats with no tails are homozygous for their respective alleles. Cats with one long tail allele and one no tail allele have short tails. Cross two short tail cats in order to get the genotypic and phenotypic ratios for the offspring. Use a punnet square to defend your answer!!

GENOTYPIC RATIOS/PERCENTAGES
PHENOTYPIC RATIOS/PERCENTAGES