

I WANT SOME MORE . . .



PART B: TWO CHARACTERISTICS (at least)

- List the genotypes of all gametes produced by organisms having each of the following genotypes.
 - GgBB
 - AAbb
 - aaBb
 - AaBBCc
- For each of the following genotypes, indicate how many characteristics are being for and how many traits are represented:
 - Bb
 - FfGGPp
 - DdRrAa
- In a dihybrid cross, a pea plant homozygous for yellow peas and heterozygous for round peas was crossed with a pea plant that was heterozygous for yellow and round peas. Without doing Punnett squares, is it possible for these parents to produce a pea plant with:
 - green and wrinkled peas
 - green and round peas
 - yellow and wrinkled peas
- Red fruit is dominant over yellow fruit in tomatoes. Also, tallness is dominant over shortness in these plants. What phenotypic and genotypic ratios would you predict for offspring of the following parent plants: a homozygous red, homozygous tall plant and a heterozygous red, heterozygous tall plant?
- A man with brown eyes who can roll his tongue has a son with a woman who also has brown eyes, but who cannot roll her tongue. The son has blue eyes and cannot roll his tongue. This couple decide to have another child. What is the probability that their next child will:
 - have brown eyes and not be able to tongue roll
 - have blue eyes
 - have blue eyes and be able to tongue roll
- In humans, two abnormal conditions, cataracts in the eyes and excessive fragility in the bones, seen to depend on separate dominant genes on different chromosomes. A man with cataracts and normal bones, whose father had normal eyes, married a woman free from cataracts but with fragile bones. Her father had normal bones. What is the chance that their first child will
 - be free from both abnormalities
 - have cataracts but no fragile bones
 - have fragile bones but not cataracts
 - have both cataracts and fragile bones
- In chickens, the checkered pattern is dependent on a dominant gene *C* and plain exterior on the recessive allele *c*. Red colour is controlled by a dominant gene *R* and brown by the recessive allele *r*. Diagram the cross between homozygous checkered red birds and plain brown birds.
- In Jimsonweed, purple flower is dominant to white and spiny pods are dominant to smooth. In a cross between a Jimsonweed homozygous for white flowers and spiny pods and one homozygous for purple flowers and smooth pods, determine the phenotype of
 - the F_1
 - the F_2
 - the progeny of a cross of the F_1 back to the white, spiny parent

- What progeny phenotypes would you expect from the following Jimsonweed crosses:
 - Ppss x ppSS
 - PpSS x ppss
 - PpSs x ppss
 - PpSs x Ppss

PART C: INCOMPLETE DOMINANCE

- If a red four o'clock flower is crossed with a pink one, what would the offspring be like? Illustrate with a Punnett square.
- What is the difference between complete and incomplete dominance?
- Illustrate a cross between a four o'clock plant with pink flowers and a plant with white flowers. Give the phenotypic and genotypic ratios.
- In shorthorn cattle, when a red bull (RR) is crossed with a white cow (WW), the offspring are roan - they have intermingled red and white hairs.
 - If two roan cattle are mated, what proportion of the progeny will resemble their parents in coat color?
 - What progeny will a roan shorthorn have if bred to a white?
 - Would it be easier establishing a true-breeding herd of red or a herd of true-breeding herd of roans? Explain.
- The shape of the root in radishes may be long, oval or round. In a series of experiments, crosses between long and oval produced 159 long and 156 oval. Crosses between round and oval produced 199 round and 203 oval. Crosses between long and round produced 576 oval. Crosses between oval and oval produced 121 long, 243 oval and 119 round. Use Punnett squares to show how these results support incomplete dominance as the inheritance pattern.
- In the Andalusian fowl, the gene for black plumage (B) is codominant with the gene for white (W) plumage. The heterozygote has blue plumage, in which the pigmentation has an intermediate intensity. If a black fowl is mated to a blue one, what would be the expected phenotypic ratios in the offspring?
- An amateur flower fancier is trying to produce a true-breeding variety of *Mirabilis* (the four o'clock flower) with pink flowers. However, each time the plants with pink flowers are self-fertilized, only half of their progeny have pink flowers.
 - What is the most likely explanation for these results?
 - Do you think he would have better success getting true-breeding varieties with red flowers? Why/why not?
 - What would be the expected results if plants with red flowers were crossed with plants with pink flowers?
 - What strategy should be used to get maximal production of plants with pink flowers?
 - What flower colour would you buy?