

MINISTRY OF EDUCATION, HERITAGE AND ARTS

YEAR 12 BIOLOGY

REVISION WORKSHEET 4

Write the answers to the following questions in your exercise/activity books.

Genetics/Variability

1. Write definitions for the following terms giving examples where possible. **(7 marks)**
 - Crossing over
 - Recombination of genes
 - Incomplete dominance
 - Codominance
 - Multiple alleles
 - Sex linked genes
 - Back or test cross

2. Solve the following mono-hybrid problems: **(9 marks)**
 - a. A pure black male cat mates with a white female. Black coat colour is the product of a dominant allele. Show the genotypes and phenotypes of the parental, F1 and F2 generations. Indicate the phenotypic and genotypic ratios of the F2 generation.

 - b. In humans, six fingers (F) is the dominant trait and five fingers (f) is the recessive trait. Both parents are heterozygous for six-fingers. Indicate the genotypes and phenotypes of the parents and their possible offspring. What is the probability of producing a five-fingered child?

 - c. In a certain species of plant, one purebred variety has hairy leaves and another purebred variety has smooth leaves. A cross of the two varieties produces offspring that all have smooth leaves. Predict the phenotypic and genotypic ratio of the F2 generation.

3. Solve the following di-hybrid problem:

In pea plants, seed shape is determined by two alleles: S is the allele for the dominant, spherical shape characteristic; s is the allele for the recessive, dented shape characteristic. Seed colour is also determined by two alleles: Y is the allele for the dominant, yellow colour characteristic; y is the allele for the recessive, green color characteristic.

A pure bred plant with green, spherical shaped seeds is crossed with a pure bred plant with yellow dented shaped seeds.

 - a. State the phenotype and genotype for the parent plants, P1 and P2. **(2 marks)**
 - b. Write the gametes produced by both parent plants. **(1 mark)**
 - c. Give the genotype and phenotype of the F1 generation when P1 and P2 are crossed. **(2 marks)**
 - d. Write the four types of gametes that the F1 generation will produce. **(2 marks)**
 - e. Using a punnet square, show the cross between 2 F1 individuals. **(4 marks)**
 - f. In a population of 320 plants, calculate the number of plants that would have yellow, spherical shaped seeds. **(2 marks)**

The End