

**YEAR: 10**

**2017**

**ASSIGNMENT: Genetics**

**SUBJECT: Science**

**DUE DATE: Monday 1st May (Term 2, Week 2)**

**NAME:**

**TEACHER:** **DATE SUBMITTED:**

Section 1 Section 2 Section 3 Total

**/70**

**/44**

**/24**

**/10**

**/18**

**/24**

**/28**

**/10**

**SECTION ONE: Genotypes and Phenotypes (24 marks)**

Answer the questions in the spaces provided.

1. For each genotype below, indicate whether it is heterozygous (**He**) or homozygous (**Ho**): (6 marks)
   1. AA
   2. Bb
   3. Cc
   4. DD
   5. Ee
   6. ff
2. For each of the ***genotypes*** below, determine what ***phenotypes*** would be possible: (12 marks)
   1. Purple flowers are dominant to white flowers

PP

Pp

pp

* 1. Brown eyes are dominant to blue eyes

BB

Bb

bb

* 1. Round seeds are dominant to wrinkled seeds

RR

Rr

rr

* 1. Bobtails in cats are recessive

TT

Tt

tt

1. For each ***phenotype*** below, list the ***genotypes:*** (6 marks)

(HINT: remember to use the letter of the dominant trait)

* 1. Straight hair is dominant to curly hair

straight

straight

curly

* 1. Pointed heads are dominant round heads

pointed

pointed

round

**SECTION TWO: Simple Inheritance (18 marks)**

Answer the questions in the spaces provided.

1. Set up the Punnett squares for each of the crosses listed below, then answer the relevant questions:
   1. A tall (TT) plant is crossed with a short (tt) plant. (3 marks)

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|  |  |

* + 1. What percentage of the offspring will be tall? % (1 mark)
  1. A tall (Tt) plant is crossed with a tall (Tt) plant. (3 marks)

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| --- | --- |
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* + 1. What percentage of the offspring will be short? % (1 mark)
  1. A heterozygous round seeded plant (Rr) is crossed with a homozygous round seeded plant (RR). (3 marks)

|  |  |
| --- | --- |
|  |  |
|  |  |

* + 1. What percentage of the offspring will be homozygous (RR)? % (1 mark)
  1. A homozygous round seeded plant is crossed with a homozygous wrinkled seeded plant. (3 marks)

|  |  |
| --- | --- |
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|  |  |

* + 1. What are the genotypes of the parents? X (2 marks)
    2. What percentage of the offspring will also be homozygous? % (1 mark)

**SECTION THREE: Dominant and Recessive Crosses (28 marks)**

Answer the questions in the spaces provided.

1. In pea plants, purple flowers are dominant to white flowers.
   1. Two white flowered plants are crossed. *(Show your working below)*  (4 marks)
      1. What percentage of their offspring will be white flowered? % (1 mark)
   2. Two plants, both heterozygous for the gene that controls flower colour, are crossed. *(Show your working below)*  (4 marks)
      1. What percentage of their offspring will have purple flowers? % (1 mark)
      2. What percentage of their offspring will have white flowers? % (1 mark)
2. In guinea pigs, the allele for short hair is dominant.
   1. Write the ***genotypes*** for the following ***phenotypes***: (3 marks)
      1. Heterozygous short haired
      2. Homozygous short haired
      3. Long haired

* 1. Show the cross for a homozygous short haired guinea pig and a long haired guinea pig. *(Show your working below)* (3 marks)
     1. What percentage of the offspring will have short hair? % (1 mark)
  2. Show the cross for two heterozygous guinea pigs. *(Show your working below)* (3 marks)
     1. What percentage of the offspring will have short hair? % (1 mark)
     2. What percentage of the offspring will have long hair? % (1 mark)
  3. Two short haired guinea pigs are mated several times. Out of 100 offspring, 25 of them have long hair. What are the probable genotypes of the parents? (5 marks)

***Show the cross to prove it!***