Province of the

EASTERN CAPE

EDUCATION

DIRECTORATE SENIOR CURRICULUM MANAGEMENT

(SEN-FET)

GR 12 LIFE SCIENCES HOME SCHOOLING SELF-STUDY WORKSHEET

| SUBJECT	LIFE SCIENCES	GRADE	12	DATE	14/04/2020
TOPIC	PEDIGREE DIAGRAMS	TERM 1 REVISION		TERM 2 CONTENT	✓
TIME ALLOCATION	45 MIN	**TIPS TO KEEP HEALTHY**			
INSTRUCTIONS	Use the following resources to answer the worksheet: • Textbook • Mind The Gap Study Guide pg. 38-39 • Mindset learn website • https://learn.mindset.africa/resources/lifesciences/grade-12	1. **WASH YOUR HANDS** thoroughly with soap and water for at least 20 seconds. Alternatively, use hand sanitizer with an alcohol content of at least 60%. 2. **PRACTICE SOCIAL DISTANCING** – keep a distance of 1m away from other people. 3. **PRACTISE GOOD RESPIRATORY HYGIENE**: cough or sneeze into your elbow or tissue and dispose of the tissue immediately after use. 4. **TRY NOT TO TOUCH YOUR FACE.** The virus can be transferred from your hands to your nose, mouth and eyes. It can then enter your body and make you sick. 5. **STAY AT HOME.**			

1.1   Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question number (1.1.1–1.1.2) in the ANSWER BOOK, for example 1.1.3 D.

   1.1.1   A pedigree diagram shows …

        A   how organisms evolve.
        B   the inheritance of characteristics over many generations.
        C   sex-linked characteristics only.
        D   the number of children in a family only.

QUESTION 1.1.2 IS BASED ON THE PEDIGREE DIAGRAM BELOW

The pedigree diagram shows inheritance of a certain characteristic.
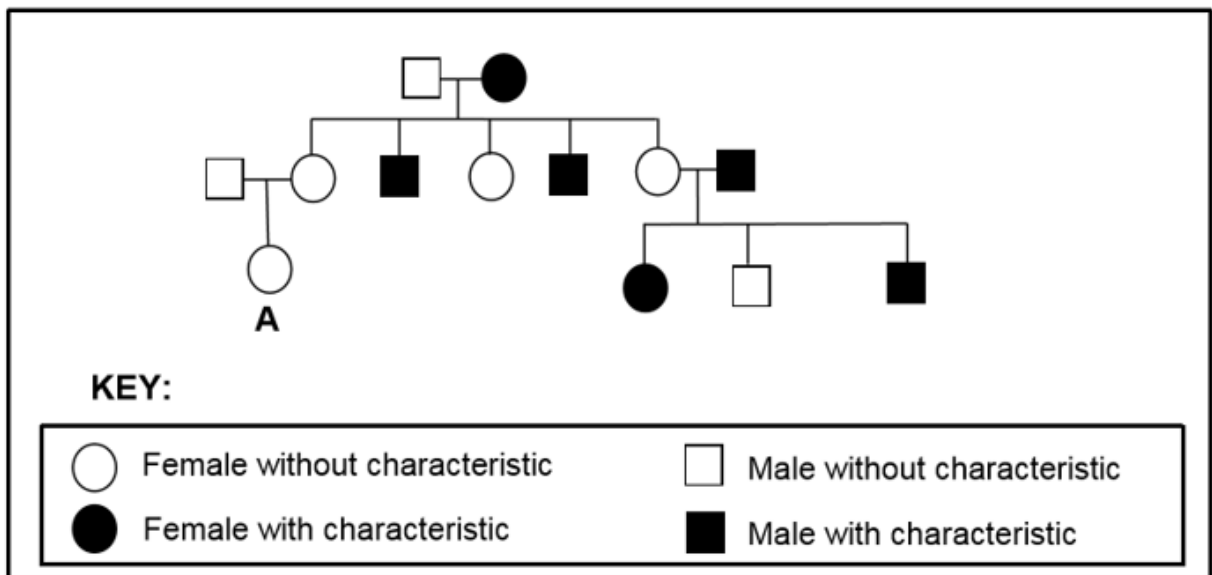
   1.1.2   Use X^N and X^n to represent the relevant alleles of the characteristic.
   The possible genotypes (s) of individual **A** will be …

        A   XNXn only.
        B $X^N X^N$ only.
        C $X^N X^N$ and $X^N X^n$.
        D $X^N X^N$ and $X^n X^n$.   (2 X 2)   **(4)**

2.1   Haemophilia is a genetic disorder resulting in the abnormal clotting of blood. It is caused by a recessive allele that is carried on the **X-** chromosome. The allele for normal clotting is X^H and the allele for haemophilia is X^h.

The inheritance of haemophilia in a family is shown in the diagram below.
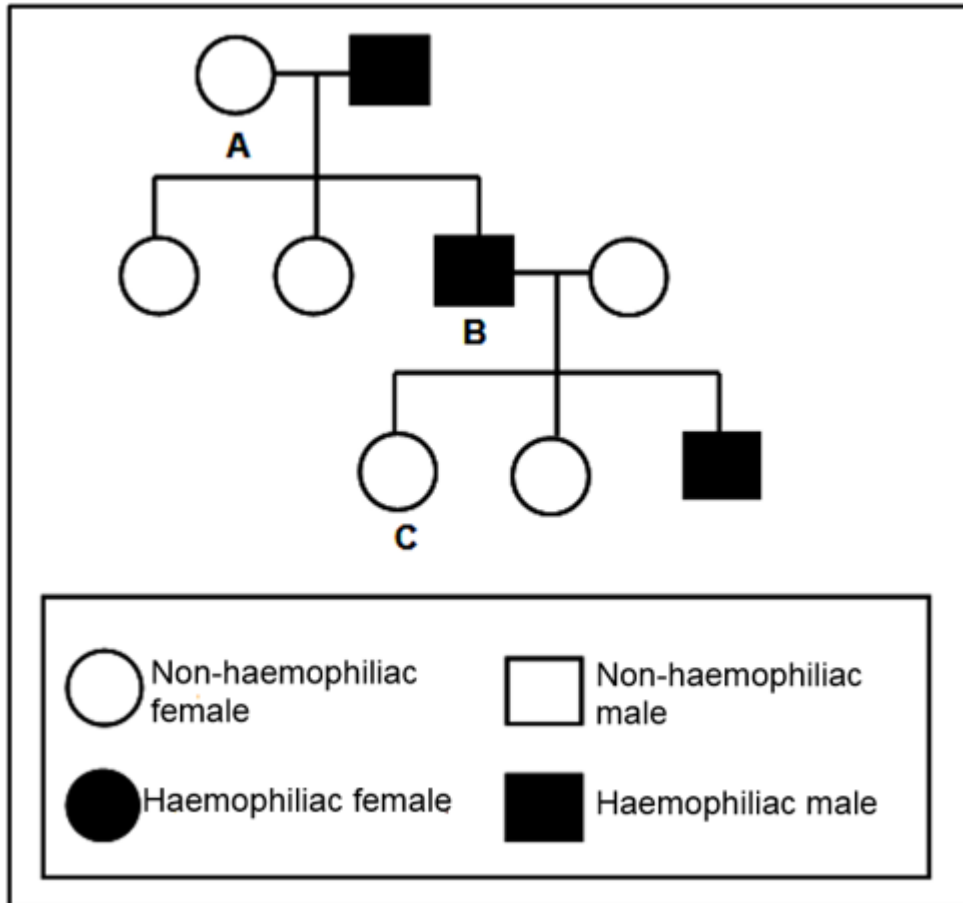
2.1.1   Give the percentage of the males with haemophilia in this family.   (1)

2.1.2   Give the phenotype for individual **A.**   (1)

2.1.3   Give the genotype for individual:

(a) **B**   (1)

(b) **C**   (2)
                                                                                                        (5)

2.2   A lack of immunity to infections (agammaglobulinemia) is a sex-linked recessive disorder in humans. The dominant allele is represented by X^A and the recessive allele is represented by X^a.

An individual with the disorder is described as affected and an individual without is described as unaffected. The pedigree diagram below illustrates inheritance of this disorder.
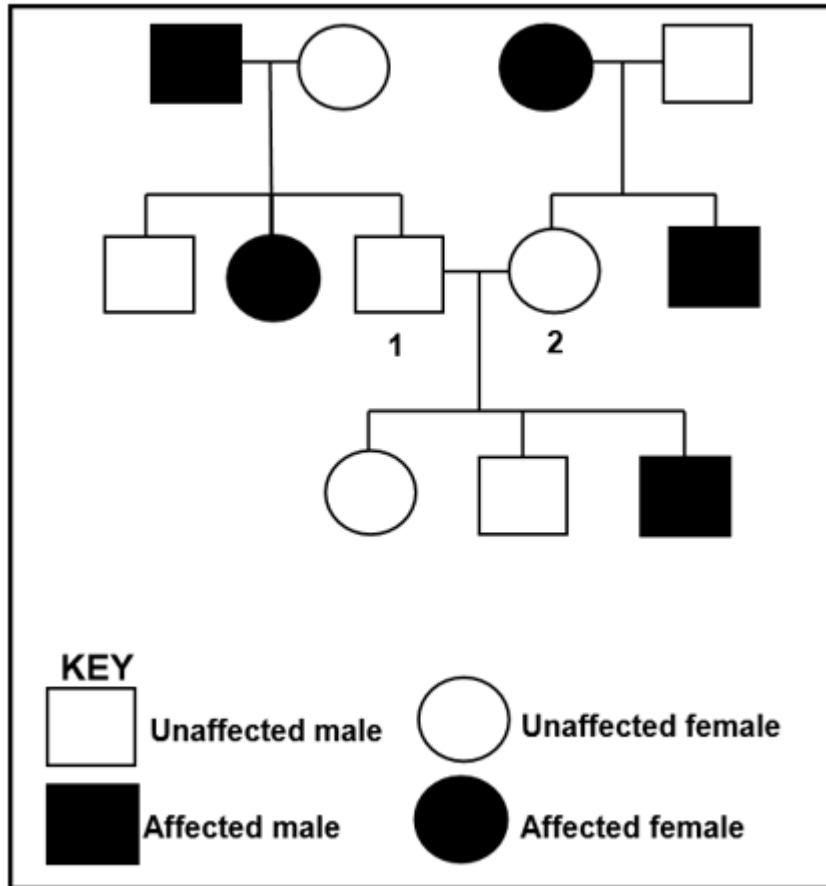
2.2.1   Name the genotypes of individuals:

(a)   **1**   (2)

(b)   **2**   (2)

2.2.2   What percentage of the males in this pedigree diagram is affected? Show ALL working.   (2)

2.2.3

Explain why any son of an affected female will always have this disorder   (3)

   **(9)**

2.3   Colour-blindness (Daltonism) is a sex-linked disorder caused by a recessive allele (X^d).

The diagram below shows the inheritance of this disorder in a family.
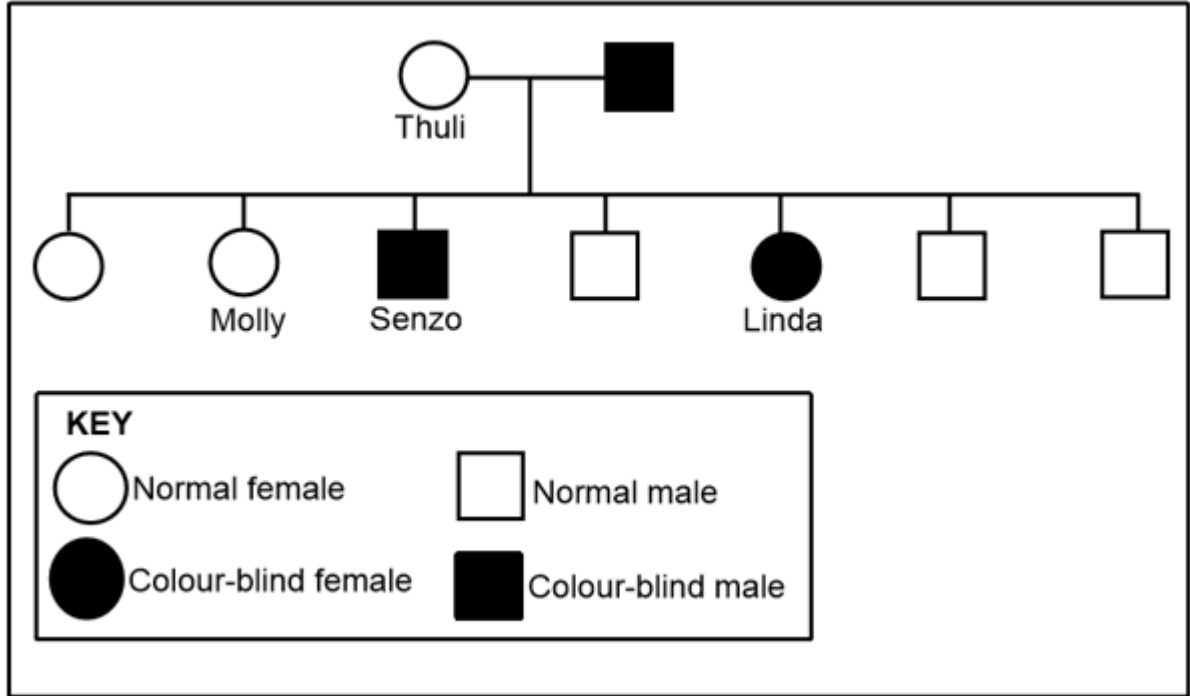
2.3.1   Give the:

(a)   Phenotype of Senzo   (1)

(b)   Genotype of Thuli   (1)

2.3.2   Describe how Linda inherited colour-blindness   (2)

2.3.3   Explain why there are generally more males than females with colour-blindness in a population.   (4)

2.3.4   Molly married a 'normal male'. Use a genetic cross to show the possible genotypes and phenotypes of the children   (6)

(14)

2.4   Huntington's chorea is a disease caused by a gene mutation that results in the degeneration of brain tissue. It is caused by the dominant allele (**H**).

The pedigree diagram below shows the inheritance of this disorder in a family.
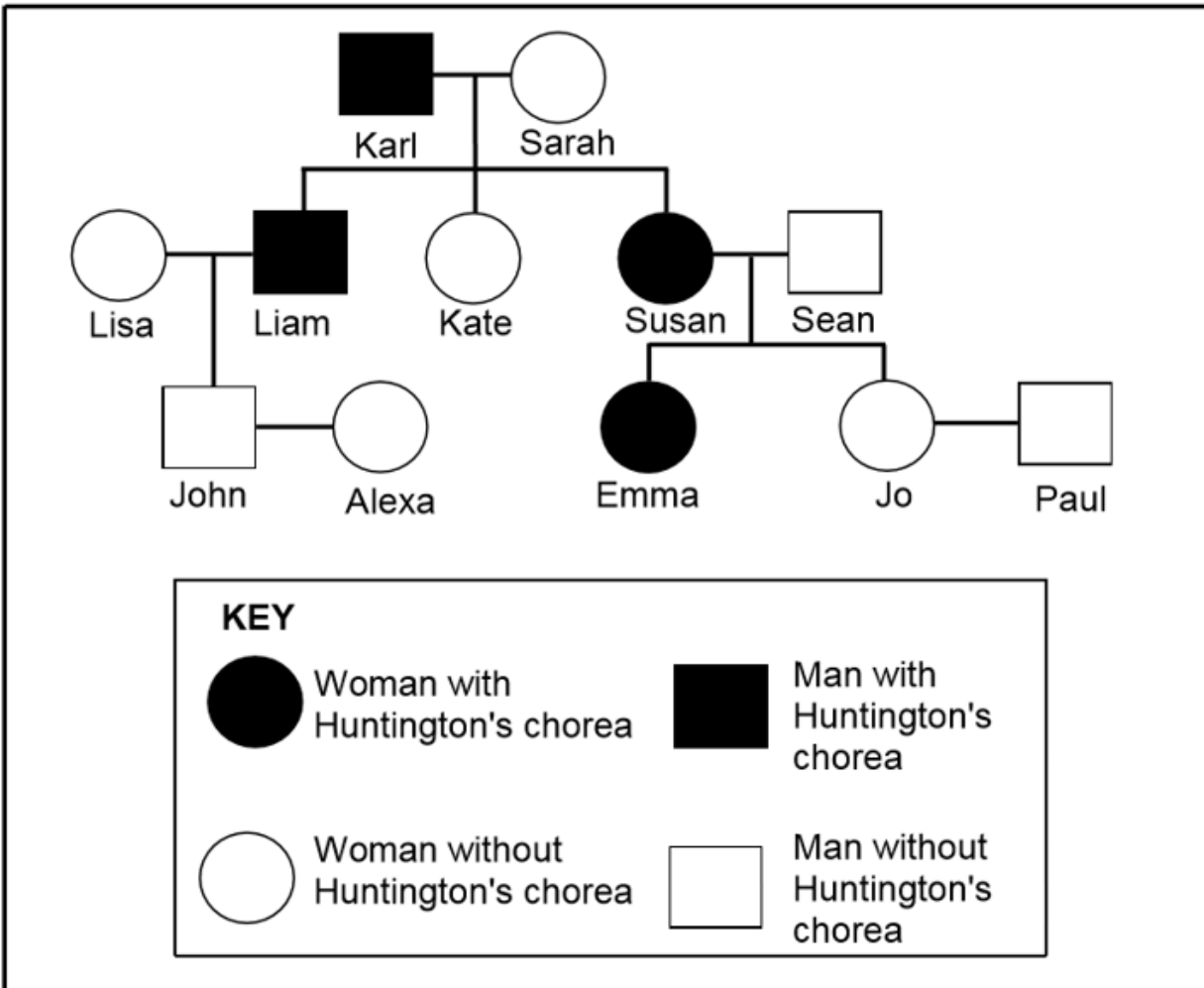
2.4.1   What is:

(a)   Susan's phenotype   (1)

(b)   Sarah's genotype   (1)

2.4.2   Emma plans to have a baby. What must the father's genotype be so there is a 50% chance that their chid will not have Huntington's chorea?   (1)

2.4.3   Explain your answer to QUESTION 2.4.2

(3)
(6)
[34]