 Province of the

EASTERN CAPE

EDUCATION

**DIRECTORATE SENIOR CURRICULUM MANAGEMENT**

**(SEN-FET)**

**HOME SCHOOLING SELF-STUDY WORKSHEET ANSWER SHEET**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SUBJECT** | LIFE SCIENCES | **GRADE** | 12 | **DATE** | 02 April 2020 |
| **TOPIC** | Monohybrid Crosses and Types of Dominance | **TERM 1****REVISION** |  | **TERM 2 CONTENT** | 🗸 |

WORKSHEET GENETICS TERMINOLOGY - Lesson 1

|  |  |  |
| --- | --- | --- |
| 1.1.1 | An allele is an alternative form of a gene found at the same locus on homologous chromosomes🗸  | (1) |
| 1.1.2 | Phenotype is the external appearance of an organism🗸determined by the genotypeGenotype is the genetic make-up of an organism🗸 | (2) |
| 1.1.3 | Brown eye colour🗸, Curly hair🗸 | (2) |
| 1.1.4 | Dd🗸 | (1) |
| 1.1.5 | bb✓ | (1) |
| 1.1.6 | * Only the characteristic✓
* controlled by dominant allele✓
* can be seen in the external appearance✓
* for an individual with a heterozygous genotype✓
* The dominant allele for curly hair✓
* masks the appearance of the characteristic✓ controlled by the recessive allele which is straight hair✓, Any 4
 | (4) |
| 1.1.7 | DD✓/ Dd  | (1) |
| 1.1.8 | * The individual inherited a recessive allele for straight hair ✓
* from each parent✓.

 **OR*** In each somatic cell of the individual the homologous chromosomes✓
* both carry the recessive allele for straight hair✓ at the same locus,
* there is no dominant allele for curly hair✓ Any 2
 | (2) |

**LEARNER ACTIVITY: MONOHYBRID CROSSES**

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| 1. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| P1 | Phenotype | Brown | x | Blue🗸 |
|  | Genotype | Bb | x | bb🗸 |
| *Meiosis* |  |  |  |  |
|  | G/gametes | B , b | x |  b, b🗸 |
| *Fertilisation* |  |  |  |  |
| F1 | Genotype |  Bb ; Bb ; bb ; bb🗸\* |
|  |  |  |
|  | Phenotype |  1 brown : 1 blue🗸\*  |
| P1 and F1🗸 |  |  |  |
| Meiosis and fertilisation🗸 | 2 Compulsory + Any 4 |

**OR**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| P1 | Phenotype | Brown | x | Brown🗸 |
|  | Genotype | Bb | x | bb🗸 |
|  |  |  |
| *Meiosis* |  |

|  |  |  |
| --- | --- | --- |
| Gametes | B | b |
| b | B b  | b b |
| b | B b | b b |

1 mark for correct gametes1 mark for correct genotypes\* |
|  |  |
| *Fertilisation* |  |
|  |  |
|  |  |  |
| F1 | Phenotype |  1brown : 1 blue🗸\*  |
| P1 and F1🗸 |  |  |  |
| Meiosis and fertilisation🗸 | 2 Compulsory + Any 4 |
|  |

 | (6)(6) |

|  |  |  |  |
| --- | --- | --- | --- |
| 2.1 | Rabbit 2 - Black🗸fur Rabbit 4 - white🗸fur |   | (2) |
| 2.2 | 1BB: 2BB: 1bb🗸  |  | (1) |
| 2.3 | 12🗸black |  | (1) |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| P1 | Phenotype | Black | x | Black🗸 |
|  | Genotype | Bb | x | Bb🗸 |
| *Meiosis* |  |  |  |  |
|  | G/gametes | B , b | x |  B, b🗸 |
| *Fertilisation* |  |  |  |  |
| F1 | Genotype |  BB ; Bb ; Bb ; bb🗸 |
|  |  |  |
|  | Phenotype |  (3) black : (1)white🗸  |
| P1 and F1🗸 |   |  |  |
| Meiosis and fertilisation🗸 |  Any 6 |

**OR**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| P1 | Phenotype | Black | x | Black🗸 |
|  | Genotype | Bb | x | Bb🗸 |
|  |  |  |
| *Meiosis* |  |

|  |  |  |
| --- | --- | --- |
| Gametes | B | b |
| B | BB | Bb |
| b | Bb | bb |

1 mark for correct gametes1 mark for correct genotypes |
|  |  |
| *Fertilisation* |  |
|  |  |
|  |  |  |
| F1 | Phenotype |  (3) brown ; (1) white🗸  |
| P1 and F1🗸 |  |  |  |
| Meiosis and fertilisation🗸 |  Any 6 |
|  |

 | (6)(6)(16) |

**TEACHER COPY: MEMORANDUM TYPES OF DOMINANCE**

1. Study the diagrams below and answer the questions:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |
| KEY: Black fish (B) x Grey fish (G)  |

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|  |  |
| --- | --- |
| **Type of dominance**  |  Co-dominance🗸 (1) |
| **Description**  |  Both grey and black appear in the phenotype of the offspring🗸, therefore both alleles/grey and black are equally dominant🗸 (2)  |
| **Crossing**  |  P1 phenotype Black fish x Grey fish🗸 Genotype BB x GG🗸 Meiosis Gametes B, B x G, G🗸 Fertilization

|  |  |  |
| --- | --- | --- |
|  | B | B |
| G | BG | BG |
| G | BG | BG |

F1 genotype BG, BG, BG, BG🗸 phenotype All Black and Grey 🗸 fish P1+ F1🗸Meiosis + Fertilization🗸 (Any 6)  |
|  |  |

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

|  |
| --- |
|  |
| KEY: Red bird (A) x Blue bird (a)  |

 |

|  |  |
| --- | --- |
| **Type of dominance**  |  Complete Dominance🗸 (1) |
| **Description**  |   Red is represented with (A) and blue is represented with (a) 🗸 indicating that red is the dominant allele and blue is the recessive allele🗸 **OR**all offspring are Aa🗸 indicating that (A) representing red is the dominant allele and (a) representing blue is the recessive allele🗸 (2)  |
| **Crossing**  | P1: Phenotype Red bird x Blue bird🗸 Genotype **AA** x **aa**🗸 Meiosis Gametes **A, A**  x **a, a** Fertilization

|  |  |  |
| --- | --- | --- |
|  |  **A** | **A** |
| **a** | **A a** | **A a** |
| **a** | **A a** | **A a** |

F1 genotype Aa🗸Phenotype all red🗸 P1 + F1🗸Meiosis + Ferilization🗸 (6)NO MARKS TO BE AWARDED FOR GAMETES AND GENOTYPE AS THEY ARE ALREADY GIVEN IN THE QUESTION**NOTE:** Homozygous dominant x homozygous recessive => all offspring are heterozygous dominant         |

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|  |
| --- |
| whitered pink |
| Key: Red flower (R)x White flower (W)  |

 |

|  |  |
| --- | --- |
| **Type of dominance**  |  Incomplete Dominance🗸 |
| **Description**  |   White flower crossed with red flower gives pink flower🗸 (an intermediate phenotype) indicating that none of the 2 alleles i.e. red and white are dominant to each other🗸   |
| **Crossing**   |  P1: Phenotype Red flower x Blue flower🗸 Genotype **RR** x **WW**🗸 Meiosis Gametes **R, R**  x **W, W**🗸 Fertilization

|  |  |  |
| --- | --- | --- |
|  | **R** | **R** |
| **W** | RW | RW |
| **w** | RW | RW |

 F1 genotype 100% RW🗸 Phenotype All Pink 🗸 (Any 6)  |

 |

**EXAM TYPE QUESTIONS**

Q 2.4 P2 NOV 2018

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 2.5 | 2.5.1 | Purple🗸 |   | (1) |
|  | 2.5.2 | * When purple- flowering plants and white-flowering plants are crossed🗸
* All the offspring have purple flowers🗸/have no white flowers
 |  | (2) |
|  | 2.5.3 | * The two alleles for a characteristic🗸
* Separate during meiosis🗸so that
* Each gamete contains one allele🗸 for that characteristic
 |  | (3) |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| 2.5.4 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| P1 | Phenotype | Purple | x | Purple🗸 |
|  | Genotype | Dd | x | Dd🗸 |
| *Meiosis* |  |  |  |  |
|  | G/gametes | D , d | x |  D, d🗸 |
| *Fertilisation* |  |  |  |  |
| F1 | Genotype |  DD ; Dd ; Dd ; dd🗸 |
|  |  |  |
|  | Phenotype |  3 purple : 1 white🗸\*  |
| P1 and F1🗸 |   |  |  |
| Meiosis and fertilisation🗸 |  Any 6 |

**OR**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| P1 | Phenotype | Purple | x | Purple🗸 |
|  | Genotype | Dd | x | Dd🗸 |
|  |  |  |
| *Meiosis* |  |

|  |  |  |
| --- | --- | --- |
| Gametes | D | d |
| D | DD | Dd |
| d | Dd | dd |

1 mark for correct gametes1 mark for correct genotypes |
|  |  |
| *Fertilisation* |  |
|  |  |
|  |  |  |
| F1 | Phenotype |  3 purple ; 1 white🗸  |
| P1 and F1🗸 |  |  |  |
| Meiosis and fertilisation🗸 |  Any 6 |
|  |

 | (6)(6)(12) |

Q1.4 P2 NOV 2017

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 1.4.1 | (a)(b) | Genes🗸/allelesMonohybrid🗸 |  | (1)(1) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 1.4.2 | Ovary🗸/gynaecium/pistil/ovule |  | (1) |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 1.4.3 | (a)(b) | 2🗸/Two4🗸/Four |  | (1)(1) |
|  | 1.4.4 | (a)(b) | Violet🗸Short🗸 |  | (1)(1) |
|  | 1.4.5 | 2🗸/Two |  | (1)**(8)** |

Q 2.3 P2 NOV 2019

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 2.3 | 2.3.1 | Spotted🗸back |   | (1) |
|  | 2.3.2 | * Spotted frogs produced offspring without spots🗸

**OR*** The spotted offspring were three times more than offspring without spots/ ratio of spotted offspring to offspring without spots is 3:1
 |  | (2) |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| 2.3.3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| P1 | Phenotype | Purple | x | Purple🗸 |
|  | Genotype | Dd | x | dd🗸 |
| *Meiosis* |  |  |  |  |
|  | G/gametes | D , d | x |  d, d🗸 |
| *Fertilisation* |  |  |  |  |
| F1 | Genotype |  DD ; Dd ; dd ; dd🗸\* |
|  |  |  |
|  | Phenotype |  (2) spotted : (2) without spots\*  |
| P1 and F1🗸 |   |  |  |
| Meiosis and fertilisation🗸 | 2 compulsory + any 4  |

**OR**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| P1 | Phenotype | Spotted | x | No spots🗸 |
|  | Genotype | Dd | x | dd🗸 |
|  |  |  |
| *Meiosis* |  |

|  |  |  |
| --- | --- | --- |
| Gametes | D | d |
| d | Dd | dd |
| d | Dd | dd |

1 mark for correct gametes1 mark for correct genotypes\* |
|  |  |
| *Fertilisation* |  |
|  |  |
|  |  |  |
| F1 | Phenotype |  (2) spotted ; (2) without spots🗸\*  |
| P1 and F1🗸 |  |  |  |
| Meiosis and fertilisation🗸 | 2 compulsory + any 4  |
|  |

 | (6)(9) |