KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

CURRICULUM GRADE 10-12 DIRECTORATE NCS (CAPS)

LIFE SCIENCES

TEACHER SUPPORT DOCUMENT

GRADE 12

FINAL PUSH

EASY TO PASS

2026

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Activity 1

1

1.1 A ✓✓

1.2 B ✓✓

1.3 A ✓✓

1.4 B ✓✓

1.5 C ✓✓

1.6 C ✓✓

1.7 C ✓✓

1.8 B ✓✓

1.9 A ✓✓

1.10 A ✓✓

1.11 D ✓✓

1.12 C ✓✓

1.13 A ✓✓

1.14 C ✓✓

1.15 D ✓✓

1.16 B ✓✓

1.17 D ✓✓

1.18 B ✓✓

1.19 D ✓✓

1.20 C ✓✓

1.21 D ✓✓

1.22 C ✓✓

1.23 B ✓✓

1.24 C ✓✓

1.25 A ✓✓

1.26 A ✓✓

1.27 D ✓✓

1.28 C ✓✓

1.29 B ✓✓

1.30 B ✓✓

1.31 C ✓✓

1.32 B ✓✓

1.33 C✓✓

1.34 D✓✓

1.35 A✓✓

1.36 A✓✓

1.37 D✓✓

1.38 B✓✓

1.39 C✓✓

1.40 B✓✓

1.41 C✓✓

1.42 A✓✓

1.43 C✓✓

1.44 D✓✓

(88)

Activity 2

No.	Description	Biological Term
2.1	A reproductive strategy where the foetus develops inside the uterus	**Vivipary**
2.2	The membrane in the amniotic egg that collects nitrogenous waste	**Allantois**
2.3	The inner lining of the uterus	**Endometrium**
2.4	The structure in males that secretes testosterone	**Testis**
2.5	A hormone that stimulates the production of milk in humans	**Prolactin**
2.6	The part of a sperm cell that contains enzymes which dissolve the ovum membrane	**Acrosome**
2.7	A mature follicle inside the ovary that contains the ovum	**Graafian follicle**
2.8	The ovarian hormone that is secreted by the corpus luteum	**Progesterone**
2.9	The production of ova by meiosis	**Oogenesis**
2.10	The release of an ovum from the ovary	**Ovulation**
2.11	The extra-embryonic membrane that plays a role in the formation of the placenta	**Chorion**
2.12	The structure that connects the foetus to the placenta	**Umbilical cord**
2.13	The part in the male that stores sperm cells until maturation	**Epididymis**
2.14	The structure that develops from the remains of the Graafian follicle in the ovary	**Corpus luteum**
2.15	The process where the change in the level of one hormone brings about an opposite response in the level of another hormone	**Negative feedback mechanism**
2.16	A brain disorder that results in confusion and memory loss	**Alzheimer's disease**
2.17	The type of vision in which both eyes are used to see one image	**Binocular vision**
2.18	The part of the brain that joins the left and the right hemispheres of the cerebrum	**Corpus callosum**
2.19	The part of the ear that receives sound waves from the auditory canal	**Tympanic membrane**
2.20	A visual defect caused by the uneven curvature of the cornea	**Astigmatism**
2.21	Receptors in the inner ear that are stimulated by a change in the position of the head	**Maculae**
2.22	The branch of the nervous system that comprises spinal and cranial nerves	**Peripheral nervous system**
2.23	The part of the nervous system that consists of sympathetic and parasympathetic sections	**Autonomic nervous system**
2.24	Receptors in the ear that detect changes in speed and direction of movement of the head	**Cristae**

2.25	The part in the inner ear where the organ of corti is located	**Cochlea**
2.26	The eye defect that is characterised by a cloudy lens	**Cataract**
2.27	The part of the retina that contains no rods and cones	**Blind spot**
2.28	Photoreceptors that react to low light intensity and are responsible for black and white vision	**Rods**
2.29	The plant hormone that plays a role in the falling of leaves from trees	**Abscisic acid**
2.30	The plant hormone used to control the growth of weeds	**Auxins**
2.31	The growth reaction of a plant in response to gravity	**Geotropism**
2.32	A plant hormone that stimulates the germination of seeds	**Gibberellins**
2.33	A plant hormone responsible for seed dormancy	**Abscisic acid**
2.34	Sharp, pointy structures found in plants that protect them from herbivores	**Thorns**
2.35	The inhibition of the growth of lateral buds by auxins present in apical buds.	**Apical dominance**
2.36	The maintenance of a constant internal environment within narrow limits	**Homeostasis**
2.37	The blood vessel in the neck that contains receptors which are sensitive to carbon dioxide levels in the blood	**Carotid Artery**
2.38	The group of cells in the pancreas that perform an endocrine function	**Islets of Langerhans**
		38x1 **(38)**

Activity 3

3

3.1	B only ✓✓	(2)
3.2	A only ✓✓	(2)
3.3	B only ✓✓	(2)
3.4	B only ✓✓	(2)
3.5	A only ✓✓	(2)
3.6	Both A and B ✓✓	(2)
3.7	Both A and B ✓✓	(2)
3.8	A only ✓✓	(2)
3.9	B only ✓✓	(2)
3.10	A only ✓✓	(2)
3.11	A only ✓✓	(2)
3.12	B only ✓✓	(2)
3.13	None ✓✓	(2)
3.14	A only ✓✓	(2)
3.15	Both A and B ✓✓	(2)
3.16	B only ✓✓	(2)
3.17	B only ✓✓	(2)
3.18	B only ✓✓	(2)
3.19	A only ✓✓	(2)
3.20	B only ✓✓	(2)
3.21	A only ✓✓	(2)
3.22	A only ✓✓	(2)

3.23	B only ✓✓	(2)
3.24	A only ✓✓	(2)
3.25	None ✓✓	(2)
3.26	B only ✓✓	(2)
3.27	B only ✓✓	(2)
3.28	B only ✓✓	(2)
3.29	A only ✓✓	(2)
3.30	A only ✓✓	(2)
3.31	B only ✓✓	(2)
3.32	B only ✓✓	(2)
3.33	B only ✓✓	(2)
3.34	Both A and B ✓✓	(2)
3.35	B only ✓✓	(2)
3.36	A only ✓✓	(2)
3.37	A only ✓✓	(2)
3.38	A only ✓✓	(2)
		[76]

Activity 4

4

4.1 Internal✓ fertilization (1)

4.2 Oviparity✓/Ovipary (1)

4.3 Altricial✓ (1)

4.4
- Protects the foetus against shock✓/mechanical injuries
- Keeps the foetus moist✓/Protects the foetus from drying out
- Protects the foetus from temperature changes✓
- Allows the foetus to move freely✓/Supports the body of the foetus during development

Mark first TWO only (Any 2) (2)

(5)

Activity 5

5.

5.1 (a) C✓ - Urethra✓ **OR** D✓ - Penis✓ (2)

(b) B✓ - Epididymis✓ (2)

(c) E✓ - Testis✓ (2)

5.2

(a) Prostate gland✓ (1)

(b) Spermatogenesis✓ (1)

(8)

Activity 6

6

6.1 Acrosome✓ (1)

6.2 Haploid✓ (1)

6.3 **The haploid nucleus of the sperm:**
- It is formed through meiosis✓
- to half the chromosome number✓
- to prevent doubling of chromosome number during fertilisation✓

Any (2)

6.4 For movement✓/swimming of the sperm (1)

6.5
- Under the influence of testosterone✓
- Diploid (germinal epithelium) cells✓ in the seminiferous tubules of the testis✓
- Undergo meiosis✓
- To form four haploid sperm cells✓ (5)

(10)

Activity 7

7

7.1 Endometrium✓ (1)

7.2 Fertilisation✓ (1)

7.3 The haploid nucleus of the sperm fuses ✓ with the haploid nucleus of the ovum✓ to form a diploid zygote✓. (3)

7.4
- Zygote divides by mitosis✓
- to form a (solid) ball of cells✓
- called the morula✓
- which develops into a hollow ball of cells✓
- called the blastula✓/blastocyst

Any (4)

7.5 Diploid cells in the ovary undergo mitosis✓
to form numerous follicles✓
At the onset of puberty✓
under the influence of FSH✓
one cell inside a follicle (enlarges and) undergoes meiosis✓
Of the four cells that are produced, only one survives to form a (mature), haploid ovum✓

Any (5)

(14)

Activity 8

8

8.1 Urethra✓ (1)

8.2 - The uterus has (thick) muscular✓ walls
- The uterus can change
- the inner lining (endometrium) thickens✓/becomes more vascular/glandular Any (2)

(Mark first TWO only)

8.3 (a) D✓ - testis✓ (2)

(b) G✓ - ovary✓ (2)

8.4 (a) Epididymis✓ (1)

(b) Fallopian tube✓ (1)

(c) (Graafian) follicle✓ (1)

(d) Prostate gland✓/seminal vesicle/Cowper's gland (1)

(11)

Activity 9

9

9.1 Ovarian cycle✓ (1)

9.2 (a) Graafian follicle✓ (1)

(b) Ovum✓ (1)

(c) Corpus luteum✓ (1)

9.3 (a) FSH✓ /Follicle stimulating hormone (1)

(b) Oestrogen✓ (1)

(c) LH✓ /Luteinising hormone (1)

(7)

Activity 10

10

10.1 (a) Morula✓ (1)

(b) Blastula✓/Blastocyst (1)

10.2 Mitosis✓ (1)

10.3 C✓ (1)

10.4 B → A → C✓✓ (In the correct order) (2)

(6)

Activity 11

11.

11.1 (a) Amniotic✓fluid (1)

(b) Placenta✓ (1)

11.2 (a) Umbilical vein✓ (1)

(b) - Chorionic villi✓/chorion
- Endometrium✓

(Mark first TWO only) (2)

(5)

Activity 12

12

12.1 Air sac✓ (1)

12.2 R✓ ; S✓; T✓; Q✓

Any (2)

12.3 - Vivipary✓
- Internal fertilisation✓
- Parental care✓
- Altricial✓ development

Any (2)

(Mark first TWO only)

(5)

Activity 13

13

13.1 (a) Peripheral✓ nervous system (1)

(b) Autonomic nervous system✓ (1)

13.2 Spinal✓ nerves (1)

13.3 E✓- Parasympathetic nervous system✓ (2)

13.4 Neurons✓ (1)

13.5
- Meninges✓
- Cranium✓/bone tissue
- Cerebrospinal fluid✓

(Mark first TWO only) (2)

(8)

Activity 14

14

14.1 - Brain✓
-Spinal cord✓

(Mark first TWO only) (2)

14.2 (a) Corpus callosum✓ (1)

(b) Cerebellum✓ (1)

14.3 (a) C✓ Medulla oblongata✓ (1)

(b) A✓ Cerebrum✓ (2)

(8)

Activity 15

15

15.1 Sensory✓ neuron (2)

15.2 (a) Axon✓ (1)

(b) Cell body✓ (1)

(c) Dendrite✓ (1)

15.3 (2)

(a) C✓ (1)

(b) F✓

(c) A✓

15.4 Multiple sclerosis✓

(8)

Activity 16

16.

16.1 (a) Semi-circular canals✓ (1)

(b) Round window✓ (1)

16.2 (a) D✓ Eustachian tube✓ (2)

(b) C✓ Cochlea✓ (2)

16.3 (a) F✓ (1)

(b) A✓ (1)

(8)

Activity 17

17.

17.1 (a) B✓ - Iris✓ (2)

(b) A✓ - Sclera✓ (2)

17.2 (a) 2✓ (1)

(b) 3✓ (1)

17.3 (a) Circular✓ muscles (1)

(b) Circular✓ muscles (1)
(8)

Activity 18

18

18.1 (a) Blind spot✓ (1)

(b) Cornea✓ (1)

(c) Sclera✓ (1)

18.2
- Radial muscles contract✓ and
- circular muscles relax✓
- The pupil widens✓/dilates
- More light enters the eye✓ (2)

18.3 Accommodation✓ (1)

18.4
- The ciliary muscle contracts✓
- The ciliary body moves closer to the lens✓
- The suspensory ligaments slacken✓
- Tension on the lens decreases✓
- The lens becomes more convex✓/rounded
- Light rays are refracted more✓
- To focus the light on the retina✓ Any (2)

(5)

(13)

Activity 19

19.

19.1 (a) cornea✓ (1)

(b) optic nerve✓ (1)

19.2 (a) C ✓ (1)

(b) A ✓ (1)

19.3 Cones✓ (1)

19.4 Ciliary muscle/body✓
Suspensory ligaments✓
Lens✓ (3)

19.5 astigmatism✓ (1)

(9)

Activity 20

20

20.1 Semi-circular canals✓ (1)

20.2 Ossicles✓
(1)

20.3 (a) D✓ - Eustachian tube✓ (2)

(b) C✓ - Oval window✓ (2)

20.4 (a) Maculae✓ (1)

(b) Cristae✓ (1)

(8)

Activity 21

21

21.1 (a) Semi-circular canals✓ (1)

(b) Auditory nerve✓ (1)

21.2 (a) F✓ - Oval window✓ (2)

(b) C✓ - Cochlea✓ (2)

(6)

Activity 22

22.

22.1 A✓

F✓ (2)

22.2 B✓ - Capillaries✓/blood vessel

C✓ - Sweat gland✓ (4)

22.3 (a) ADH✓/Antidiuretic hormone (1)

(b) Kidney✓ (1)

(8)

Activity 23

23.

23.1 Negative feedback✓ mechanism (1)

23.2 (a) Thyroid✓ (1)

(b) TSH✓/thyroid stimulating hormone (1)

(c) Thyroxin✓ (1)

23.3 Goitre✓ (1)

23.4 Hormone A✓ (1)

(6)

Activity 24

24

24.1 (a) Hypothalamus✓ (1)

(b) Pituitary✓ gland/hypophysis (1)

(c) ADH✓/antidiuretic hormone (1)

(d) Nephron✓/renal tubules (1)

24.2 Decrease✓

(5)

Activity 25

25

25.1 (a) C✓ (1)

(b) A✓ and B✓ (2)

(c) A✓ (1)

25.2 (a) Geotropism✓/gravitropism (1)

(b) Phototropism

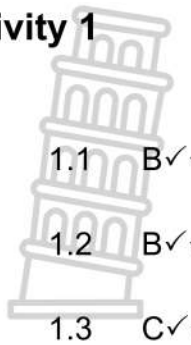
25.3 (a) X✓ (1)

(b) X✓ (1)

(8)

PAPER 2

Activity 1



1

1.1	B✓✓	(2)
1.2	B✓✓	(2)
1.3	C✓✓	(2)
1.4	A✓✓	(2)
1.5	A✓✓	(2)
1.6	C✓✓	(2)
1.7	D✓✓	(2)
1.8	C✓✓	(2)
1.9	D✓✓	(2)
1.10	D✓✓	(2)
1.11	A✓✓	(2)
1.12	B✓✓	(2)
1.13	A✓✓	(2)
1.14	B✓✓	(2)
1.15	C✓✓	(2)
1.16	D✓✓	(2)
1.17	B✓✓	(2)
1.18	C✓✓	(2)
1.19	C✓✓	(2)

1.20 C✓✓ (2)

1.21 D✓✓ (2)

1.22 C✓✓ (2)

1.23 C✓✓ (2)

1.24 A✓✓ (2)

1.25 C✓✓ (2)

1.26 C✓✓ (2)

1.27 B✓✓ (2)

1.28 B✓✓ (2)

1.29 B✓✓ (2)

1.30 B✓✓ (2)

1.31 C✓✓ (2)

1.32 B✓✓ (2)

1.33 B✓✓ (2)

1.34 A✓✓ (2)

1.35 C✓✓ (2)

1.36 B✓✓ (2)

1.37 A✓✓ (2)

1.38 B✓✓ (2)

1.39 D✓✓ (2)

1.40 D✓✓ (2)

1.41 B✓✓ (2)

1.42 D✓✓ (2)

1.43 D✓✓ (2)

1.44 A✓✓ (2)

1.45 C✓✓ (2)

1.46 B✓✓ (2)

1.47 C✓✓ (2)

1.48 A✓✓ (2)

(96)

Activity 2

No.	Description	Biological Term
2.1	Section of a DNA molecule that codes for a specific characteristic	**Gene /allele**
2.2	A pattern of black bars resulting from DNA analysis	**DNA profile**
2.3	The DNA-containing cell organelle found only in plants	**Chloroplast**
2.4	The natural shape of a DNA molecule	**Double helix**
2.5	The bond that connects the two strands of DNA	**Weak hydrogen bond**
2.6	A nucleic acid that carries hereditary information	**Deoxyribonucleic acid**
2.7	The type of RNA that carries specific amino acids to the site of protein synthesis	**Transfer RNA**
2.8	The analysis of DNA samples to identify individuals or relationships between individuals	**DNA profiling**
2.9	The bond formed between two amino acids during protein synthesis	**Peptide bond**
2.10	A change in the sequence of nitrogenous bases resulting in the formation of a different protein	**(Gene) mutation**
2.11	An allele that is expressed in a phenotype in the heterozygous condition	**Dominant allele**
2.12	The structure that joins two chromatids together	**Centromere**
2.13	The chromosome pairs 1 to 22 in a human somatic cell	**Autosomes**
2.14	The division of the nucleus during meiosis	**karyokinesis**
2.15	The structure that joins two chromatids together	**Centromere**
2.16	The chromosome condition of a cell that has a single set of chromosomes	**Haploid**
2.17	The structure that holds the two chromatids of a chromosome together	**Centromere**
2.18	A representation of the number and structure of all the chromosomes that occur in the nucleus of a somatic cell	**Karyotype / karyogram**
2.19	The phase of meiosis where paired chromosomes are arranged at the equator	**Metaphase I /1**
2.20	Section of a DNA molecule that codes for a specific characteristic	**Gene /allele**
2.21	The production of a genetically identical copy of an organism using biotechnology	**Cloning**
2.22	Undifferentiated cells in animals that have the potential to become any type of tissue	**Stem cells**
2.23	A genetic disorder that results in a person who cannot distinguish between the colours red and green	**Colour blindness**
2.24	A genetic disorder characterised by the absence of a blood-clotting factor	**Haemophilia**

2.25	An allele that is masked in the phenotype when found in the heterozygous condition	**Recessive allele**
2.26	The position of a gene on a chromosome	**Locus**
2.27	The biotechnological process that produces genetically identical organisms	**Cloning**
2.28	Undifferentiated cells in animals that have the potential to become any type of tissue	**Stem cells**
2.29	The position of an allele on a chromosome	**Locus**
2.30	Evolution characterised by long periods of no change alternating with short periods of rapid change	**Punctuated equilibrium**
2.31	A group of organisms of the same species in a specific habitat at a particular time	**Population**
2.32	The permanent disappearance of a species from Earth	**Extinction**
2.33	A group of similar organisms that are able to interbreed to produce fertile offspring	**Species**
2.34	An organelle that contains DNA which is used in tracing female ancestry	**Mitochondrion**
2.35	A type of variation with a range of intermediate phenotypes	**Continuous variation**
		35 x1 **(35)**

Activity 3

3

3.1	B only ✓✓	(2)
3.2	Both A and B✓✓	(2)
3.3	A only ✓✓	(2)
3.4	None✓✓	(2)
3.5	Both A and B✓✓	(2)
3.6	Both A and B✓✓	(2)
3.7	B only✓✓	(2)
3.8	A only ✓✓	(2)
3.9	None✓✓	(2)
3.10	A only ✓✓	(2)
3.11	None✓✓	(2)
3.12	None ✓✓	(2)
3.13	Both A and B✓✓	(2)
3.14	A only✓✓	(2)
3.15	Both A and B ✓✓	(2)
		[30]

Activity 4

4.

4.1 Nucleotide✓ (1)

4.2 (a) Phosphate✓ (1)

(b) Nitrogenous base✓ (1)

4.3 (a) Deoxyribose✓ (1)

(b) Ribose✓ (1)

4.4 Thymine✓ (1)

4.5 - Nucleus✓

- Mitochondrion✓ (2)
(Mark first TWO only)

(8)

Activity 5

5.

5.1 DNA✓/Deoxyribonucleic acid (1)

5.2 (a) Hydrogen bond✓ (1)

(b) Phosphate✓ (1)

5.3 Ribose✓ (1)

5.4 (a) 1✓ (1)

(b) 1✓ (1)
(6)

Activity 6

6

6.1 (a) (DNA) replication✓ (1)

(b) Hydrogen✓bond (1)

6.2 (a) Nucleotide✓ (1)

(b) Thymine✓ (1)

6.3 Interphase✓ (1)

6.4 Nucleus✓ (1)

6.5
- The DNA double helix unwinds✓ and
- (the double strand) unzips✓/(weak) hydrogen bonds break
- to form two separate strands✓
- Both DNA strand are used as a template✓
- to form a new complementary DNA strand✓/A pairs with T and C - G
- using free DNA nucleotides✓ from the nucleoplasm
- two identical DNA molecules are formed✓

Any (6)

(12)

Activity 7

7.

7.1 mRNA✓/messenger RNA (1)

7.2
- The DNA double helix unwinds✓ and
- (the double strand) unzips✓/(weak) hydrogen bonds break
- to form two separate strands✓
- One strand is used as a template✓
- to form mRNA✓
- using free RNA nucleotides✓ from the nucleoplasm
- The mRNA is complementary to the DNA✓/ A complements U, G complements C

Any 6 (6)

(7)

Activity 8

8.

8.1	(a)	Translation✓		(1)
	(b)	tRNA✓/transfer RNA		(1)
	(c)	Ribosome		(1)
8.2	(a)	CGT✓		(1)
	(b)	CTA✓✓		(2)
8.3	P✓			(1)
8.4	- Each tRNA carries a specific amino acid.✓ - When the anticodon on the tRNA✓ - matches the codon on the mRNA✓ - then tRNA brings the required amino acid to the ribosome. ✓ - Amino acids become attached to each other by peptide bonds✓ - to form the required protein.✓		Any	(5) **(12)**

Activity 9

9.

9.1	(a)	Transcription✓		(1)
	(b)	DNA Replication✓		(1)
9.2	mRNA✓			(1)
9.3	(a)	Double helix✓		(1)
	(b)	Interphase✓		(1)
	(c)	Uracil✓		(1)
9.4	(a)	Ribose✓sugar		(1)
	(b)	Hydrogen✓bond		(1)
9.5	4✓/Four			(1) **(9)**

Activity 10

10.

10.1 (a) Cell membrane✓ (1)

(b) Spindle fibre✓ (1)

(c) centriole✓/centrosome (1)

10.2 (a) W✓ (1)

(b) Y✓ (1)

(c) V✓ (1)

10.3 (a) 6✓ (1)

(b) 3✓ (1)

(8)

Activity 11

11.

11.1 Anaphase II✓ (1)

11.2 (a) Centriole✓/centrosome (1)

(b) Spindle fibre✓ (1)

11.3 - Attaches to the centromere✓ (2)

- to pull chromatids/chromosomes towards the (opposite) poles✓

OR

- it contracts✓/shortens

- to pull chromatids/chromosomes towards the (opposite) poles✓

(5)

Activity 12

12.

12.1 (a) Spindle fibre✓ (1)

(b) Nucleolus✓ (1)

(c) Ovum✓ (1)

12.2 Produces spindle fibres✓ (1)

(Mark first ONE only)

12.3 Metaphase I✓ (1)
(5)

Activity 13

13.

13.1 - Ovaries✓

-Testes✓ (1)

(Mark first ONE only)

13.2 (a) Spindle fibre✓ (1)

(b) Centriole✓ /centrosome (1)

13.3 Anaphase I✓ (1)

13.4 4✓/four (1)
(5)

Activity 14

14.

14.1 Chromosomal✓ mutation (1)

14.2 Sperm ✓ (1)

14.3 (a) 22✓ (1)

(b) 2✓ (1)

14.4 XXY✓✓/XYX (2)

(6)

Activity 15

15 - Failure of a homologous pair 21/ chromosome 21 to separate✓
- during Anaphase I/II✓
- leads to a gamete with 24 chromosome✓/ an extra chromosome
- The fertilization of this gamete with a normal gamete✓/ with 23 chromosomes
- results in a zygote with 47 chromosomes✓/ an extra chromosome/ Trisomy 21

(5)

Activity 16

16.

16.1 (a) 3✓ (1)

(b) 3✓ (1)

16.2 (a) hearing✓ (1)

(b) Hh✓ (1)

(4)

Activity 17

17.

P_1	Phenotype	Tall plant	x	Short plant✓
	Genotype	RR	X	rr✓
Meiosis				
	Gametes	R , R	X	r , r✓
Fertilisation				
F_1	Genotype	Rr Rr Rr Rr✓		
	Phenotype	All tall plant✓		

P_1 and F_1✓

Meiosis and fertilisation✓ Any **(6)**

Activity 18

18.

18.1 Dihybrid✓cross (1)

18.2 Red spots✓ and black eyes✓ (2)

(a) RRee✓✓ and Rree✓✓ (4)

(b) Red spots, black eyes✓ (1)

(c) re✓ (1)
(9)

Activity 19

19

19.1 Plant height✓

Flower colour✓ (2)

19.2 TTRr✓✓ (2)

19.3 (a) TtRr✓ (1)

(b) Tall plant, white flower✓✓ (2)

(7)

Activity 20

20

20.1 - Fossil record✓
- Homologous structures✓/modification by descent
- genetics✓
- biogeography✓

(Mark first FOUR only) (4)

20.2 - Crossing over✓
- Random arrangement of chromosomes✓
- Mutation✓
- Random fertilisation✓
- Random mating✓

(Mark first TWO only) Any (2)

20.3

NATURAL SELECTION	ARTIFICIAL SELECTION
Nature is the selective force✓	Humans are the selective force✓
Characteristics selected according to suitability to the environment✓	Characteristics selected to satisfy human needs✓
Involves only one species✓	May involve more than one species✓

1 for Table + Any (2 x 2) (5)
(11)

Activity 21

21.

21.1 **Law of use and disuse**✓
- As an organism uses a body part/organ regularly it becomes better developed or enlarged in that organism✓
- If an organism does not use the body/organ frequently it becomes less developed or reduced in size and may disappear altogether in that organism✓

The inheritance of acquired characteristics✓
Characteristics developed during the life of an individual✓can be passed on to their offsprings✓ Any (5)

21.2
- There is variation amongst the offspring in a population✓
- Some have favourable characteristics and some do not✓
- When there is a change in the environmental conditions✓ /there is competition✓
- organisms with a favourable characteristic survive✓
- whilst organisms with an unfavourable characteristic die✓
- The organisms that survive, reproduce✓
- and pass on the allele for the favourable characteristic to their offspring✓
- The next generation will therefore have a higher proportion of individuals with the favourable characteristic✓ Any (6)

21.3

LAMARKISM	DARWINISM
- Change occurs because of Law of use and disuse✓	- Individuals best suited to the environment survive✓
- Individuals in the population change✓	- The whole population changes✓
- Acquired characteristics are inherited by offspring✓	- Characteristic are passed on from generation to generation to enable individuals to survive in the environment✓

1 for Table + Any (2 x 2) (5)

(16)

Activity 22

22.

22.1
- If a population of a single species becomes separated by a geographical barrier✓ (sea, river, mountain, lake)
- then the population splits into two✓.
- There is now no gene flow between the two populations✓.
- Since each population may be exposed to different environmental conditions✓/the selection pressure may be different
- natural selection occurs independently in each of the two populations✓
- such that the individuals of the two populations become very different from each other✓
- genotypically and phenotypically✓.
- Even if the two populations were to mix again✓
- they will not be able to interbreed✓.
- The two populations are now different species✓.

Any (8)

22.2
- Breeding at different times of the year✓
- Species-specific courtship behavior✓
- Plant adaptation to different pollinators✓
- Infertile offspring✓
- Prevention of fertilisation✓

Any (3)

(Mark first THREE only)

(11)

Activity 23

23.

23.1
- upright posture✓
- eyes in front✓/binocular vision/stereoscopic vision
- large brains✓
- eyes with cones✓/colour vision
- long upper arms✓
- freely rotating arms✓
- elbow joints allowing rotation of a forearm✓
- flat nails instead of claws✓/bare finger tips
- opposable thumb✓

Any (3)

(Mark first THREE only)

23.2

AFRICAN APES	HOMO SAPIENS
- Smaller cranium✓	- Larger cranium✓
- Face sloping✓	- Flat face✓
- Foramen magnum at the backward position of the skull✓	- Foramen magnum in a more forward position of the skull✓
- Larger canines✓	- Smaller canines✓
- Larger spaces between the Teeth/diastema✓	- No spaces between the teeth/ no diastema✓
- Palate is rectangular✓	- Palate is semi-circular✓
- More protruding jaws✓/ Prognathous	- Less protruding✓ jaws/prognathous
- C shaped spine✓	- S shaped spine✓
- Poorly developed lower jaw✓	- Well-developed chin✓

1 for Table + Any (3 x 2) (7)

(10)

Activity 24

24.

24.1 Cladogram✓ (1)

24.2 (a) Ardipithecus✓ (1)

(b) C✓ (1)

24.3
- P. troglodytes✓
- G. gorilla✓
- Most recent common ancestor of H. sapiens and H. neanderthalensis

Any (2)

(Mark first TWO only)

24.4
- Mrs Ples✓
- Taung child✓
- Little foot✓

Any (1)

(Mark first ONE only)

(6)

Activity 25

25.

25.1 Phylogenetic tree✓ (1)

25.2 *Ardipithecus*✓ (1)

25.3 2✓mya (1)

25.4 *Australopithecus aferensis*✓ (1)

25.5 *Homo neanderthalensis*✓
(Mark first ONE only) (1)

25.6 *Australopithecus africanus and Homo habilis*✓✓ (2)
(Mark first TWO only)

(7)

SKILLS

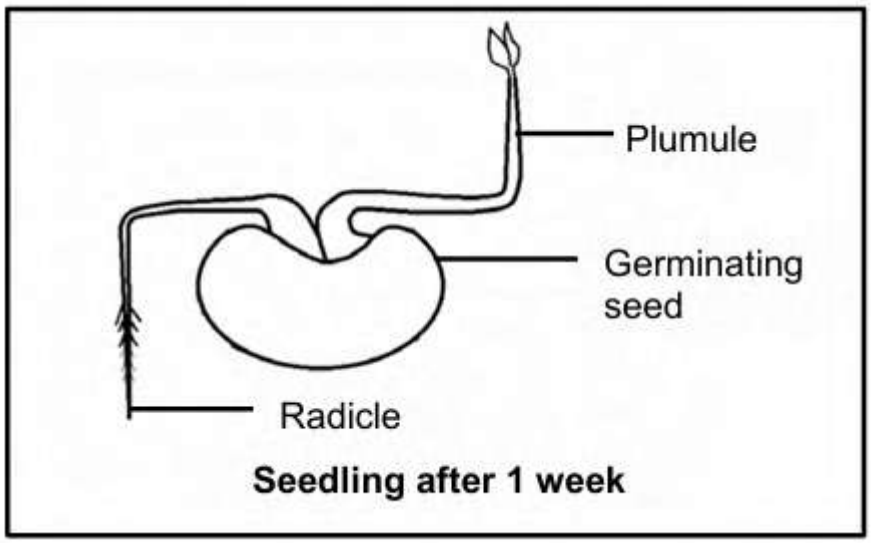
Diagrams

Activity 1

1

1.1 - The growth of a plant /part of a plant ✓
- in response to a stimulus ✓ (2)

1.2



Checklist for marking the diagram:

Caption: (**C**)	1
Correct drawing: (**D**) - Radicle growing downwards - Plumule growing upwards	 1 1
ONE correct label: (**L**) - Plumule/ radicle/ germinating seed	1

(4)

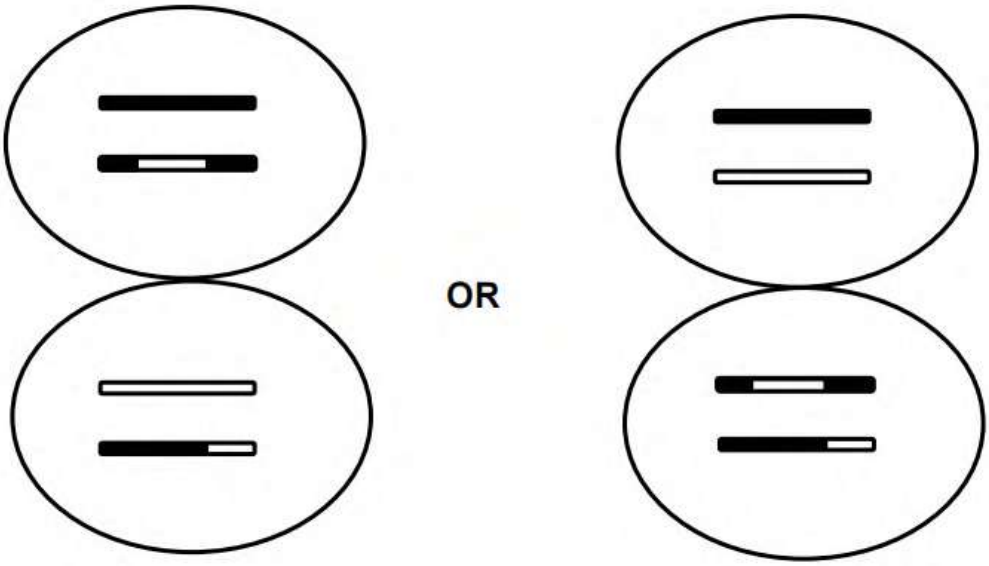
(6)

Activity 2

2

2.1 Telophase I✓ (1)

2.2



MARKING GUIDELINE

Only two gametes drawn (**G**)	1
Gamete contains 2 chromosomes (**C**)	1
The chromosomes are unreplicated (**U**)	1
Correct shading on ALL the unreplicated chromosomes (**S**)	1

(4)

2.3

T✓

Prophase I	Prophase II
The cell is diploid✓/has homologous chromosomes	The cell is haploid✓/does not have homologous chromosomes
Crossing over takes place✓	No crossing over takes place✓

(Mark first TWO only) 1 + 4

(5)

(10)

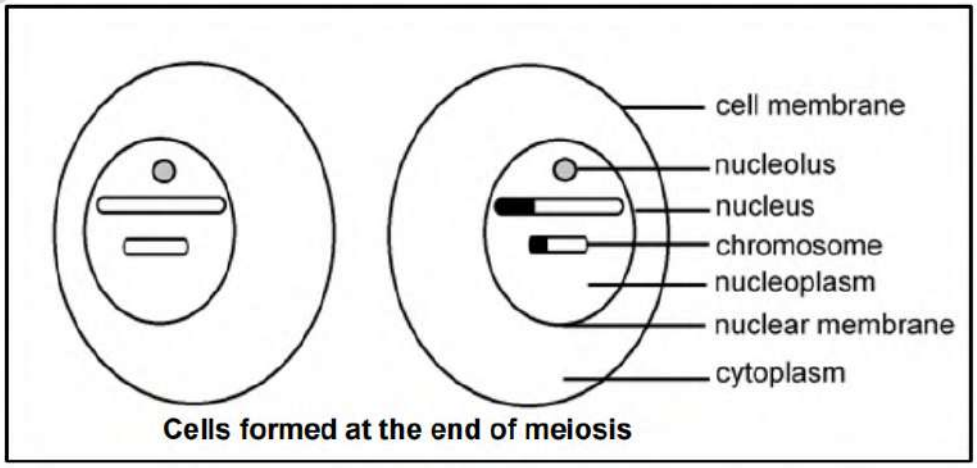
Activity 3

3

3.1 (a) Prophase I ✓ (1)

(b) Anaphase I ✓ (1)

3.2



Cells formed at the end of meiosis

Criteria for marking

Only two cells have been drawn (**D**)	1 mark
Each cell contains only two un-replicated chromosomes (**C**)	1 mark
Each chromosome is the correct size and correctly shaded (**S**)	1 mark
Any TWO correct labels	2 marks

(5)

(7)

GRAPHS

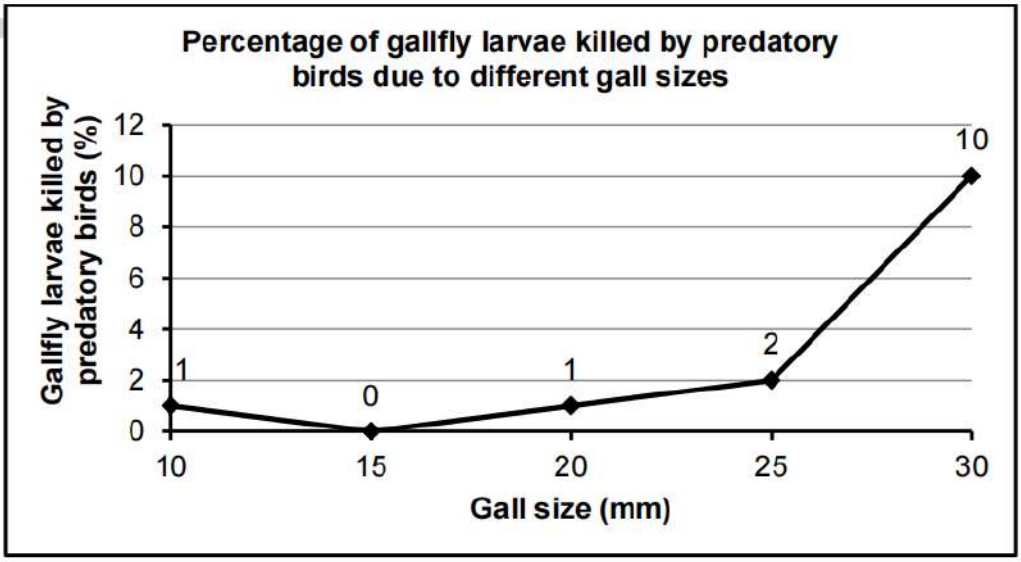
Activity 1

1

1.1 (a) Gall size ✓ (1)

(b) Percentage of gallfly larvae killed✓ (1)

1.2



Guideline for the assessing of the graph

CRITERIA	ELABORATION	MARK
Correct type of graph **(T)**	Line graph drawn	1
Caption of graph **(C)**	Both variables included	1
Axes labels **(L)**	Correct labels and units on X- and Y-axes	1
Scale for X- and Y-axes **(S)**	Equal spacing between intervals for each axis	1
Plotting of points **(P)**	1 to 4 points plotted correctly All 5 points plotted correctly	1 2

(6)

(8)

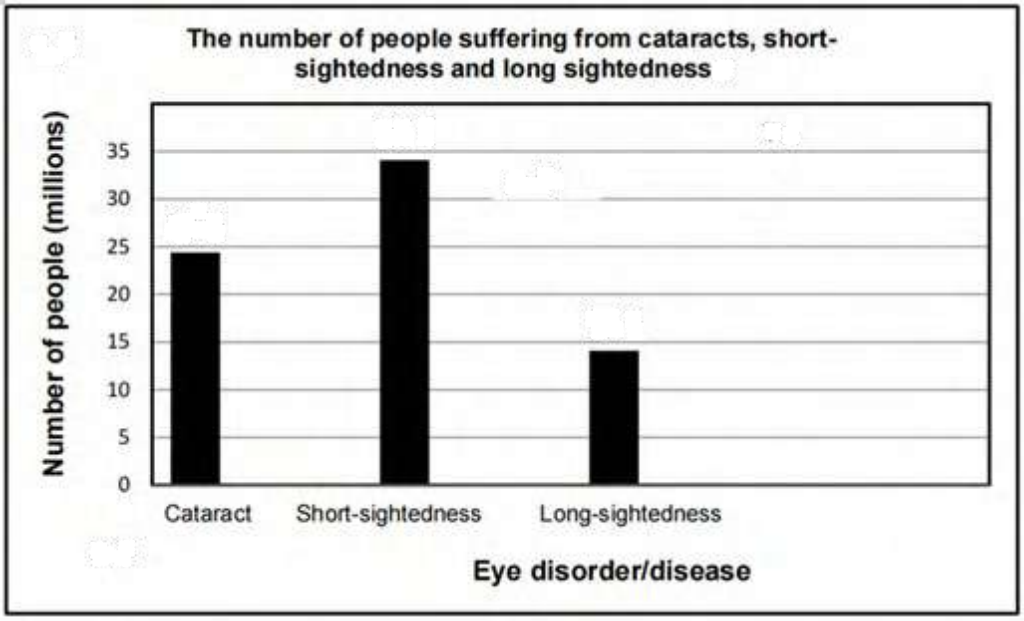
Activity 2

2

2.1 Macular degeneration✓/Retina cells die (1)

2.2 $\frac{14.1}{142}$ ✓ x 100 ✓ = 9.93 ✓% (3)
(Accept 9.9 and 10%)

2.3



Criteria for marking graph:

Criteria	Mark allocation
Type of graph: Bar graph is drawn (**T**)	1
Caption of the graph includes both variables (**C**)	1
Correct labels for X-axis and Y-axis and correct unit for Y-axis (**L**)	1
Equal space and width of bars for X-axis and correct scale for Y-axis (**S**)	1
Plotting: (**P**) 1 - 4 co-ordinates are plotted correctly All 5 co-ordinates are plotted correctly	1 2

(6)

(10)

Activity 3

3

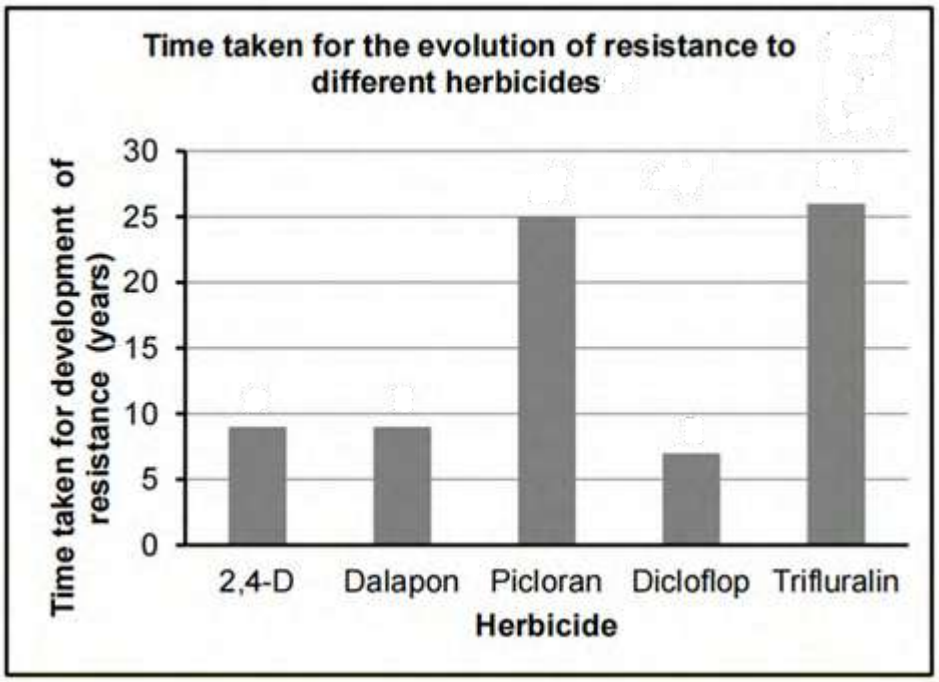
3.1 – They invade farm fields✓
– They out-compete the crop plants for space✓

Any (1)

3.2 (a) Type of herbicide ✓ (1)

(b) Time taken for development of resistance✓ (1)

3.3



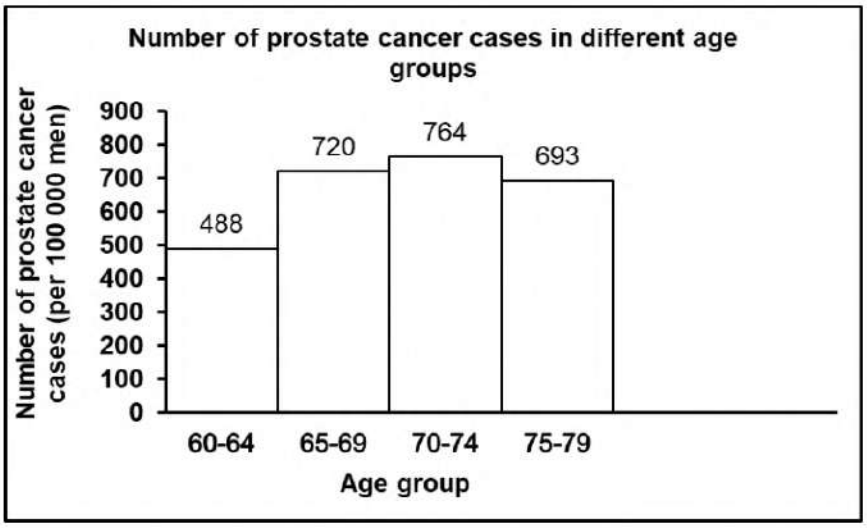
(6)
(9)

Activity 4

4

4.1 (70 – 74) ✓ (1)

4.2



Criteria for marking of the graph:

Criteria	Mark allocation
Histogram is drawn (**T**)	1
Caption of the graph includes both variables (**C**)	1
Correct labels on the X-axis and Y-axis with correct unit on the Y-axis (**L**)	1
Correct scale for Y-axis and bars of equal width with no spaces for X-axis **(S)**	1
Plotting (**P**) correctly done for: 1- 3 age groups All 4 required age groups **only**	 1 2

(7)

Activity 5

5

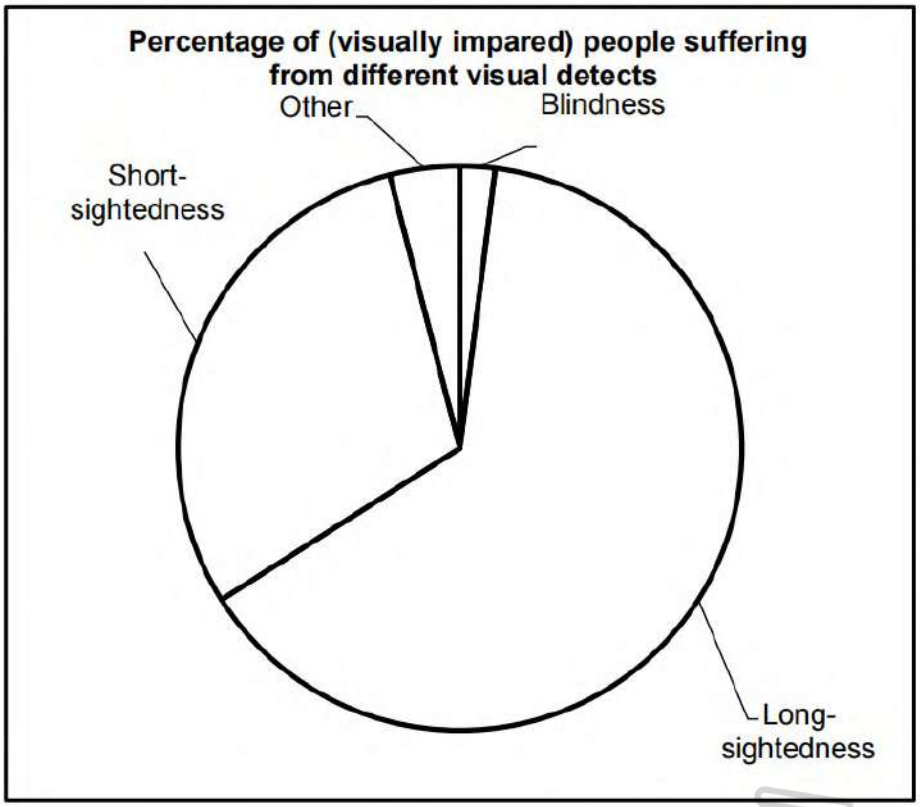
5.1 Long-sightedness✓ (1)

5.2 (a) - The lens becomes opaque✓/milky/cloudy
- and therefore does not allow the light to pass through✓ (2)

(b) Surgery✓ (1)
(Mark first ONE only)

5.3 Astigmatism✓ (1)

5.4



Calculations:

Blindness:	2/100 x 360° = 7,2°
Short-sightedness:	30/100 x 360° = 108°
Long-sightedness:	64/100 x 360° = 230,4°
Other:	4/100 x 360° = 14,4°

Criteria for assessing the graph:

Pie chart drawn (**T**)	**1**
Title of the gaph shows the relationship between the two variables (**H**)	**1**
Correct calculations to determine the proportions (**C**)	**2** : All 4 correct **1** : 1-3 correct
Correct proportions for the labelled sectors (**P**) (May be checked using prepared transparency)	**2** : All 4 correct **1**: 1-2 sectors correct

(6)
(11)

Calculations

Activity 1

1

1.1 - A change in the sequence✓
- of nitrogenous bases✓/nucleotides in DNA

(2)

1.2 $\frac{13}{20}$ ✓ x 100 ✓ = 65✓ %

OR

$\frac{7}{20}$ **x** 100 ✓ = 35 %
(100-35) ✓ = 65✓ %

(3)
(5)

Activity 2

2

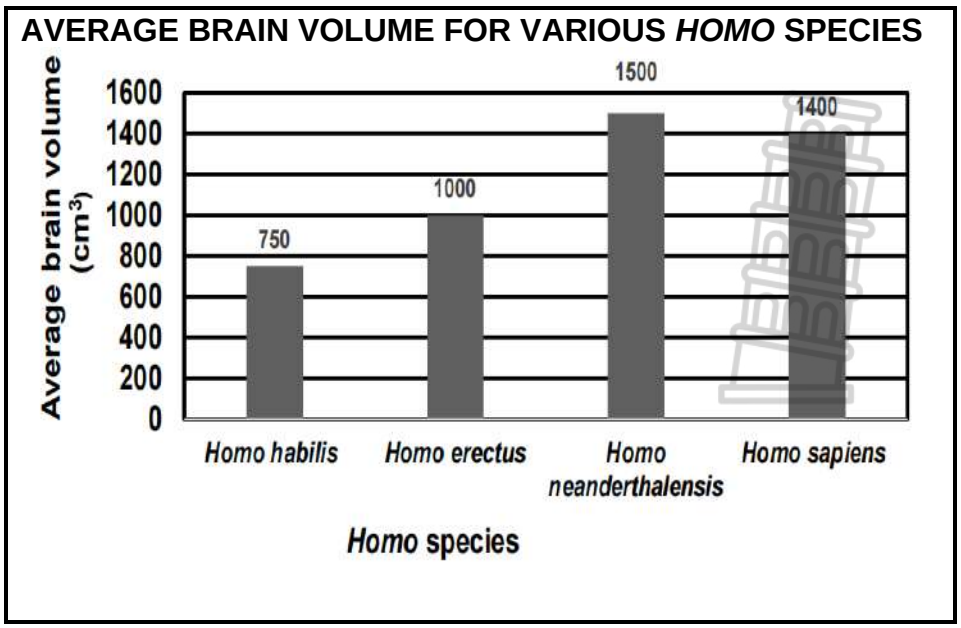
2.1 - Genetic✓/mitochondrial DNA
- Cultural✓

(2)

2.2 - *Ardipithecus ramidus* ✓ (1)
(Mark first ONE only)

2.3 (1400-500)✓ = 900 cm^3 ✓ (2)

2.4



Guideline for assessing the graph:

Criteria	Mark
Bar graph drawn (**T**)	**1**
Caption of graph includes both variables (**C**)	**1**
- Correct label for X-axis - Correct label and unit for Y-axis (cm^3) (**L**)	**1**
- Equal width and interval of bars - Correct scale for Y axis (**S**)	**1**
Plotting of bars (**P**)	**1** 1-2 bars plotted correctly **2** All 4 bars plotted correctly

(6)

(11)

Activity 3

3

3.1 (a) Thermoregulation✓ (1)

(b) Hypothalamus✓ (1)

3.2 $\frac{(37.4 - 35.4)}{37.4}$ ✓ x 100 ✓ = 5.35 ✓ % (3)

(5)

Activity 4

4

4.1 Genetic engineering✓/modification/manipulation/recombinant DNA technology (1)

4.2 Difference in yield: (70 – 45)✓ = 25✓ (2)

(3)

Activity 5

5

5.1 954 000✓ (1)

5.2 1 800 000✓ – (954 000 + 180 000 + 54 000)✓
= 612 000✓people

OR

1 800 000✓ - 1 188 000✓
= 612 000✓people

OR

$\frac{34}{100}$ ✓ x 1 800 000✓ = 612 000✓people (3)

(4)

Activity 6

6

6.1 12,8 ✓ % (Accept 12,7 - 12,9%) (1)

6.2 $\left\{\frac{20}{14}\right\}$ ✓ = 1,43 ✓ times (2)

(3)

Activity 7

7

7.1 1900✓ (1)

7.2

$\left\{\frac{80}{20}\right\}$ ✓ x 100 ✓

= 400 ✓%

OR

$\left\{\frac{(100-20)}{20}\right\}$ ✓x 100✓ = 400 ✓% (3)

7.3

T✓

Natural selection	Artificial selection
The environment or nature is the selective force✓	Humans represent the selective force✓
Selection is in response to suitability to the environment✓	Selection is in response to satisfying human needs✓
Occurs within a species✓	May involve one or more species✓ (as in cross breeding)

1 for Table + Any 2 x 2 (5)

(9)

Activity 8

8

8.1 - It is harmful✓ /prevents clotting of blood
- and leads to excessive bleeding✓ /internal bleeding/ swelling of joints/ bruising (2)

8.2

$\frac{25}{100}$ x 25 000 ✓

= 6250✓

OR

25% x 2500 ✓ / (0,25 x 25000)

= 6250 ✓

OR

$\frac{2500}{4}$ ✓

= 6250 ✓ (2)

(4)