Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

IBANGA 12

SEPTEMBA 2023

LIFE SCIENCES P2

AMANQAKU: **150**

IXESHA: **2½ iiyure**

Eli phepha linamaphepha ali 16.

IMIYALELO NENGCACISO

Funda le miyalelo ilandelayo ngononophelo phambi kokuba uphendule imibuzo.

1. Phendula YONKE imibuzo.
2. Bhala ZONKE iimpendulo kwiNCWADI YEEMPENDULO yakho.
3. Qala impendulo yombuzo NGAMNYE ekuqaleni kwephepha ELITSHA.
4. Sebenzisa inombolo mpendulo ngokwenkqubo yokubhala amanani esetyenzisiweyo kwiphepha lemibuzo.
5. Bhala iimpendulo zakho ngokwemiyalelo yombuzo ngamnye.
6. Yenza YONKE imizobo ngepensile uze ulabhelishe nge inki eblu okanye emnyama.
7. Zoba imizobo, iitayble okanye iiflow tshats kuphela xa kuceliwe.
8. Imizobo yeli phephe AYIZOTYWANGA ngokwe sikeyli.
9. UNGAYISEBENZISI igraf pheypha.
10. Ungayisebenzisa ikhatyhulayitha engaprogranywanga, iprotrekta nekhampus apho kukho imfuneko.
11. Zonke iikhalityhuleyishini mazi roundwe ukuya kwii decimali EZIMBINI.
12. Bhala ngocoselelo nangokucacileyo.

ICANDELO A

UMBUZO 1

1.1 Iindlela ezahlukileyo zinikwe njengeempendulo ezinokuchaneka kwimibuzo elandelayo. Khetha impendulo echanekileyo ze ubhale unobumba kuphela ecaleni kwenombolo yombuzo (A–D) ecaleni kwenombolo yemibuzo (1.1.1–1.10) kwiNCWADI YOKUPHENDULELA, umzekelo 1.11 D.

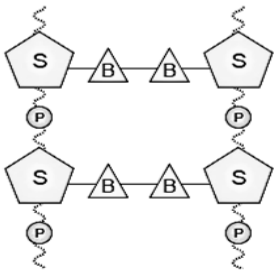
1.1.1 Isikhokelo esingezantsi sibonisa ezona khomponenti zeDND moletyhuli kunye nokomelela kweebhondi ezizidibanisileyo.

ISIKHOKELO

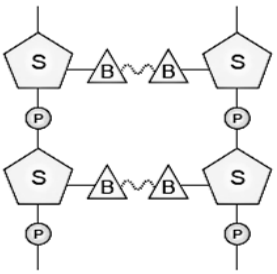
Iibhond engomelelanga	iibhond ezomeleleyo	shuga	fosifeyiti group	nitrogenous base

Yeyiphi kwiidayagram ezilandelayo ebonisa indibanisela yeekhomponenti yeDNA moletyhuli echanekileyo?

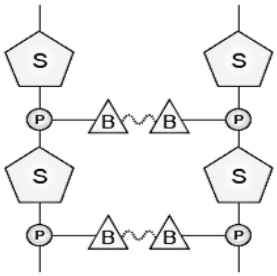
A



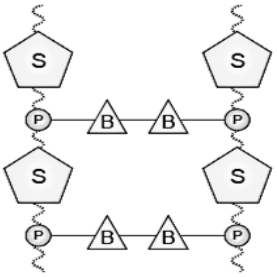
B



C



D



1.1.2 Umthetho' kaLarmark of use ne disuse ne inheritance of acquired characteristics waa …

A gatywa, kuba ziimpawu ezinceda inzala kuphela ezinokufunyanwa njengemfuza.
B awugatywanga, kuba ubungqina bubonisa ukuba iimpawu ezifunyenweyo zinokufunyanwa njengemfuza.
C gatywa, kuba ziimpawu kuphela ezikhowudwe kwiDNA ezinokufunyanwa njengemfuza.
D ayigatywanga, kuba ithiyori kaDarwin ixhasa izimvo zikaLamarck.

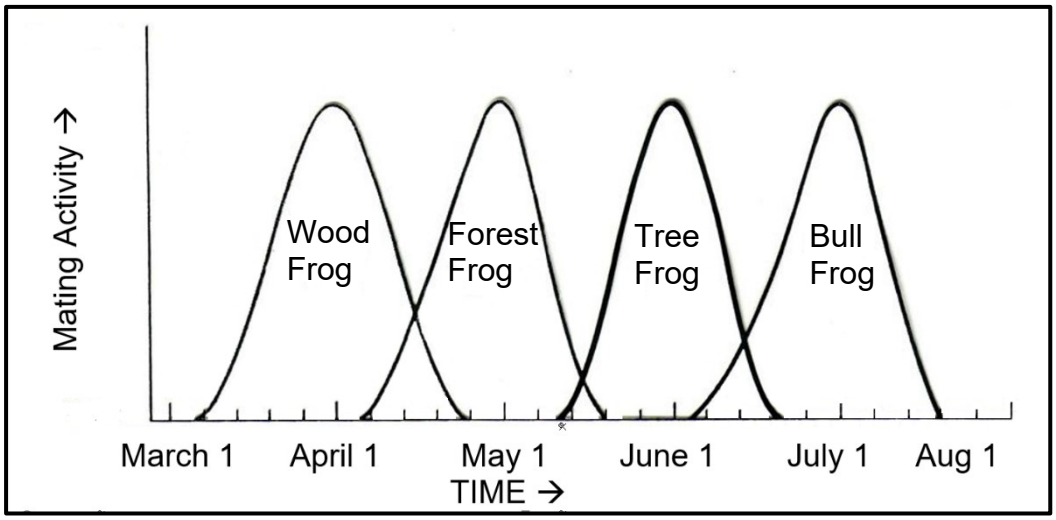
1.1.3 Uphawu olunoluhlu lweephenotype ngumzekelo we ...

A continuous variation continuous variation
B discontinuous variation. discontinuous variation.
C complete dominance. complete dominance.
D codominance. codominance.

1.1.4 IDown Syndrome sisiphumo se(e):

A gamete engenakhromozom 21 edibanisa kunye negamete eqhelekileyo
B gamete eqhelekileyo edibanisa negamete enekhromozom 21 eyongezelelweyo
C gamete ezimbini, inye inechromosome 21 eyongezelelweyo ezidibana kunye.
D kukho iikhromozom 21 ezi3 kwigamete

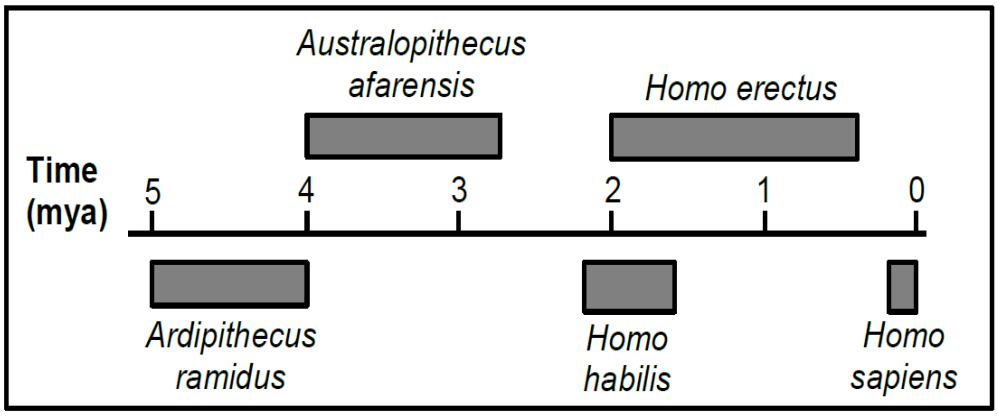
1.1.5 Igrafu engezantsi ibonisa amaxesha okuzala kweentlobo ezahlukileyo zamasele.



Igrafu engentla ibonisa umzekelo we ...

A biogeography.
B natural selection.
C speciation.
D reproductive isolation.

1.1.6 Loluphi uhlobo lwehominin oluchithe elona xesha lide Emhlabeni ngokwe timeline engezantsi?



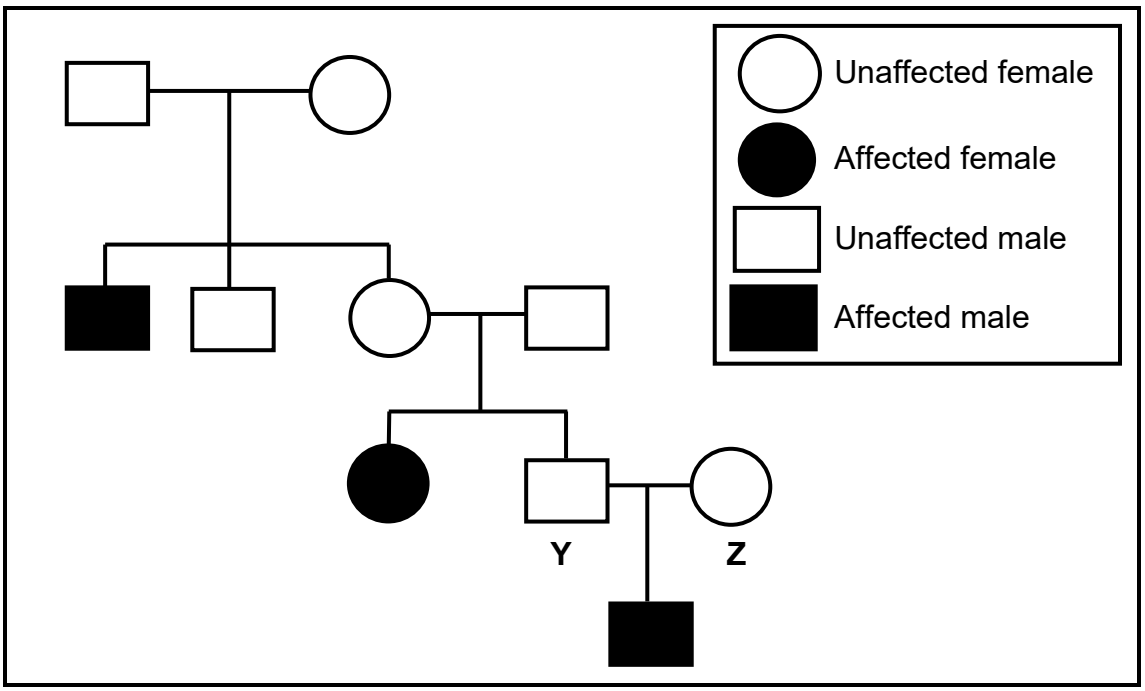
A *Homo erectus*
B *Ardipithecus ramidus*
C *Australopithecus afarensis*
D *Homo sapiens*

1.1.7 Kwiimpuku umbala woboya obrown ubalasele kumbala woboya omhlophe. Ukuba impuku eheterozygous brown idityaniswa izihlandlo ezininzi nempuku emhlophe kwaye iimpuku eziyi 80 zizalwe, zingaphi ezilindeleke ukuba zibemhlophe?

A 80
B 40
C 0
D 20

IMIBUZO 1.1.8 KUNYE 1.1.9 BABHEKISELELA KWIPEDIGREE DAYAGRAM ILANDELAYO.

I-Albinism sisifo seskin esibangelwa yirecessive allele kwiautosome.
Ipedigree dayagram engezantsi imele ukufuzwa kwealbinism kwifemeli.



1.1.8 Zingaphi izizukulwana ezimelwe yidayagram engentla?

A 1
B 2
C 3
D 4

1.1.9 Iprobhabilithi yabantu u**Y** no**Z** babenomntwana onealbinism ngu …

A 25%
B 50%
C 75%
D 100%

1.1.10 Iihomologous straktsha zibonakalisa ukuba ii …

A zitraktsha zifunyanwa kuzo zombini iikhromathidi
B oganizim zifumana iiallel ezifanayo kubazali bobabini.
C oganizim zine ancestor enye
D oganizim zisebenzisa istraktsha kumsebenzi ofanayo.

(10 x 2) (20)

1.2 Nika **ithem yebhayoloji** echanekileyo ngenkcaza NGANYE kwezilandelayo. Bhala ithem kuphela ecaleni kweenombolo zemibuzo (1.2.1 ukuya ku1.2.8) KWINCWADI YOKUPHENDULELA.

1.2.1 Izitraktsha ezifumaneka kwinucleus ezenziwe yiDNA moletyhuli kunye neeproteni

1.2.2 Icandelo leDNA moletyhuli ekhowudela uphawu oluthile

1.2.3 Usosayensi owacebisa ngeprinsipli yeindependent assortment

1.2.4 Ibhondi eyenzeka phakathi kweeamino asidi ezimbini

1.2.5 Iibuilding block (monomers) zeDNA

1.2.6 Iiundifferentiated seli zezilwanyana ezikwaziyo ukutshintsha naluphi na uhlobo lweseli

1.2.7 Ukuba nomhlathi ongasentla okanye osezantsi ophumele ngaphambili ngokungaqhelekanga

1.2.8 Inkcazo yokuba iintlobo zezilwanyana zifumana ixesha elide ngaphandle kokutshintsha, elandelwa lixesha elifutshane lokutshintsha ngokukhawuleza

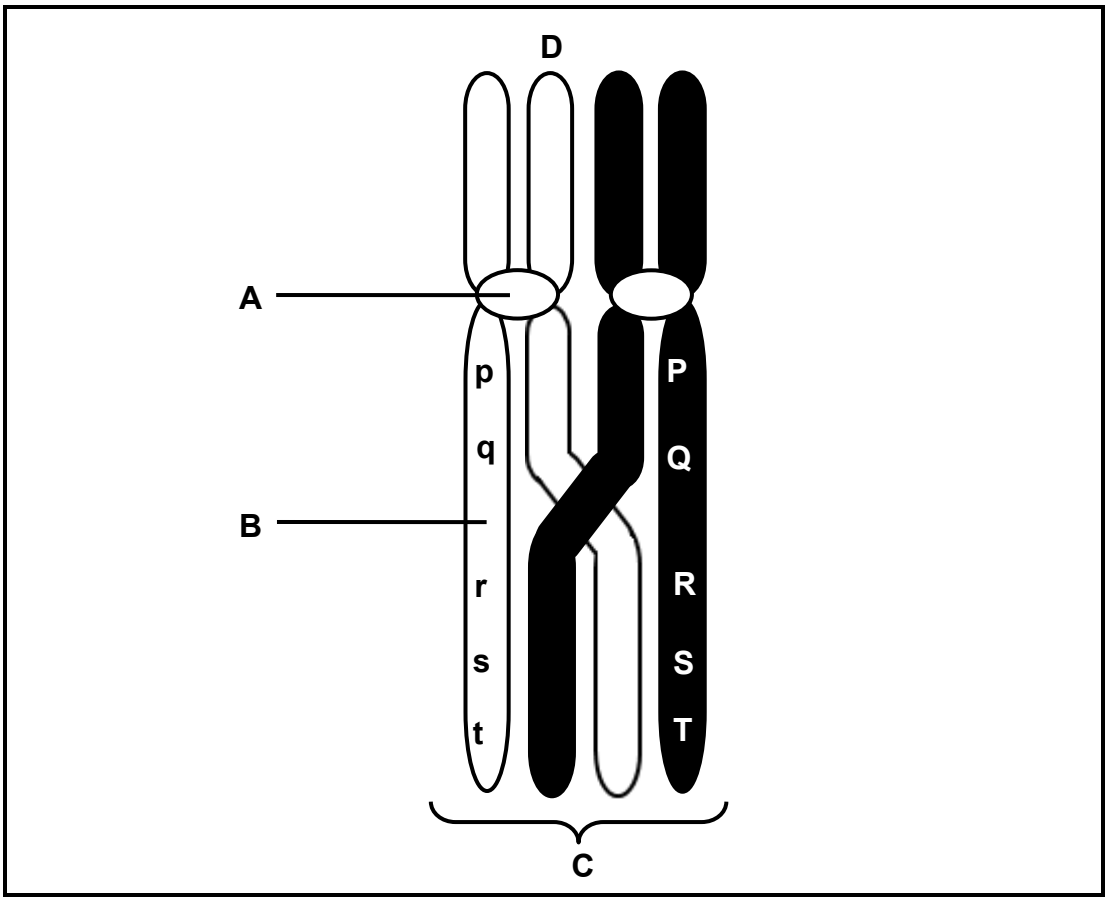
(8 x 1) (8)

1.3 Bonisa ukuba inkcazo nganye ekuKHOLAMN I, isebenza ku**A KUPHELA**, ku**B KUPHELA**, **BOBABINI** u**A noB**, okanye **AKUKHO** nanye ithem kuKHOLAM II. Bhala **A kuphela**, **B kuphela**, **bobabini** u**A noB**, okanye **akukho nanye** ecaleni kweenombolo zemibuzo (1.3.1 ukuya ku1.3.3) KWINCWADI YOKUPHENDULELA.

KHOLAM 1		KHOLAMN II	
1.3.1	Ibangelwa yigene mutation	A:	Haemophilia
		B:	Down Syndrome
1.3.2	Somatic cell	A:	Haploid
		B:	Skin cell
1.3.3	Iialleles ezibonakaliswa kuphela xa kukho iikopi ezimbini	A:	Recessive
		B:	Heterozygous

(3 x 2) (6)

1.4 Qwalasela idayagram yeekhromozom ezimbini ezingezantsi.



1.4.1 Xela iprosesi eyenzekayo kwidayagram engentla. (1)

1.4.2 Kungesiphi isigaba semeiosis ekwenzeka ngaso le prosesi? (1)

1.4.3 Nika iileyibheli zendawo:

(a) **A** (1)

(b) **B** (1)

(c) **C** (1)

1.4.4 Zoba ichromatid **D** ekupheleni kwemeiosis. (3)

1.5 Kwimivundla ufuzo lweempawu ezimbini lwaaqwalaselwa, umbala weenwele kunye nombala wamehlo. Nganye kwezi mpawu zinokwahluka okukabini.

Iinwele zinokuba ngwevu okanye zibemhlophe kwaye amehlo abemnyama okanye abebomvu ngombala. Iisimboli u**G** no **g** zisetyenziselwa ukwahluka kubini kombala weenwele ze iisimboli **B no b** zisetyenziselwe ukwahluka kubini kombala wamehlo.

Xa imivundla emibini eyayi-heterozygous kumbala weenwele kunye nombala wamehlo yakhroswayo, ezi ziphumo zilandelayo zafunyanwa:

Inani labantwana	**Iimpawu**
Iinwele eziNgwevu kunye namehlo aMnyama	9
Iinwele eziNgwevu kunye namehlo aBomvu	3
Iinwele eziMhlophe kunye namehlo aMnyama	3
Iinwele eziMhlophe kunye namehlo aBomvu	1

1.5.1 Xela ithem yegenetic cross obandakanya iimpawu ezimbini. (1)

1.5.2 Nika zonke iigametes ezinokubakho zabazali? (2)

1.5.3 Nika ii:

(a) Allele ebalaseleyo yombala weenwele (1)

(b) Genotype yomvundla onwele zimhlophe, amehlo abomvu (2)

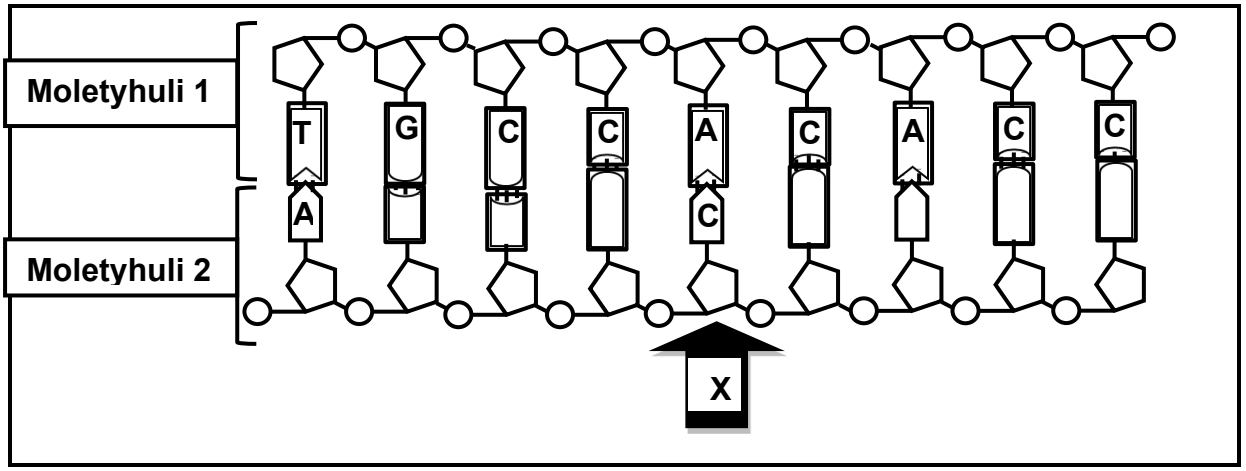
(c) Phenotype yomvundla oheterozygous kumbala weenwele nohomozygous dominent kumbala wamehlo (2)

LILONKE ICANDELO A: 50

ICANDELO B

UMBUZO 2

2.1 Idayagram engezantsi ibonisa inxalenye yeprosesi ebandakanyekayo ekwenzeni iprotheni.



2.1.1 Nika igama le:

(a) Moletyhuli 1 (1)

(b) Moletyhuli 2 (1)

2.1.2 Xela iprosesi eboniswe kwidayagram engentla. (1)

2.1.3 Kukweyiphi iorganelle kwiseli iprosesi ekhankanywe kuMBUZO 2.1.2 yenzeka khona? (1)

2.1.4 Nika ulandelelwano lwenucleotide kwimolethyuli 2. Bhala ulandelelwano olupheleleyo ukusuka ekhohlo ukuya ekunene (qala ngesiseko esinikiweyo **A**). (3)

Itheyibhile engezantsi ibonisa iiamino asidi ezikhowudelwe yianticodon yetRNA nganye.

tRNA anticodon	Amino Asidi
GAA	Leucine
CUU	Lycine
GGA	Glycine
UGC	Cystine
CGC	Alanine
UAC	Tyrosine
AGG	Arginine
CAC	Valine
ACC	Threonine

2.1.5 Sebenzisa itheyibhile ukufumana ulandelelwano lwe-amino asidi, ukusuka ekhohlo ukuya ekunene, ekhowudelwe **yimoletyhuli 1**. (3)

2.1.6 Cacisa ukuba impazamo kupoyinti **X kwimolethyuli 2** iyakuyitshintsha njani iprotein eyenzekayo. (4)

2.2 Funda isicatshulwa esingezantsi.

Icongenital night blindness yisex-linked disorder. Ibangelwa yijini erecessive kwi-X-khromozom. Abantu abana le disoder bayasokola ukubona ngokucacileyo ebusuku kwaye bafumane ezinye iingxaki zokubona njengokubona kufutshane kunye nokulahlekelwa kokubona kabukhali. Sebenzisa (N) ukubona okuqhelekileyo ebusuku kunye (n) kwicongenital night blindness.

2.2.1 Xela oku:

(a) Igenotype yeallele ebangela icongenital night blindness (1)

(b) Igenotype yomfazi onecongenital night blindness (2)

2.2.2 Nika izizathu eziBINI ezibangela ukuba abantu abana le disoder bangakwazi ukufumana iphephamvume lokuqhuba? (2)

2.2.3 Indoda enecongenital night blindness inonyana nomfazi ongathwali iallele yecongenital night blindness.

(a) Nika iphenotype yonyana wabo. (1)

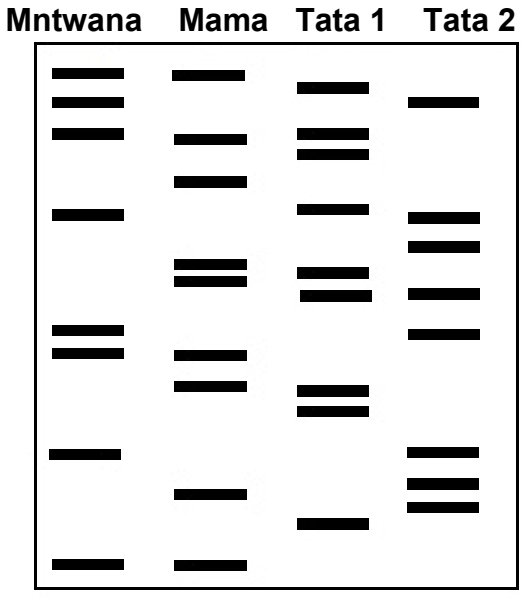
(b) Cacisa impendulo yakho ku2.2.3 (a). (3)

2.3 Umfazi othile wachaza amadoda amabini anokuba ngootata womntwana wakhe. Ngezantsi kukho iziphumo zovavanyo lweDNA profayili paternity kunye novavanyo lweblood paternity.

Iziphumo zovavanyo lwegazi

	Uhlobo lwegazi
Mntwana	O
Mama	B
Tata 1	AB
Tata 2	A

Iziphumo zovavanyo lweDNA



2.3.1 Usebenzisa iziphumo zeDNA, cacisa ukuba kutheni **uTata 2** engutata womntwana. (3)

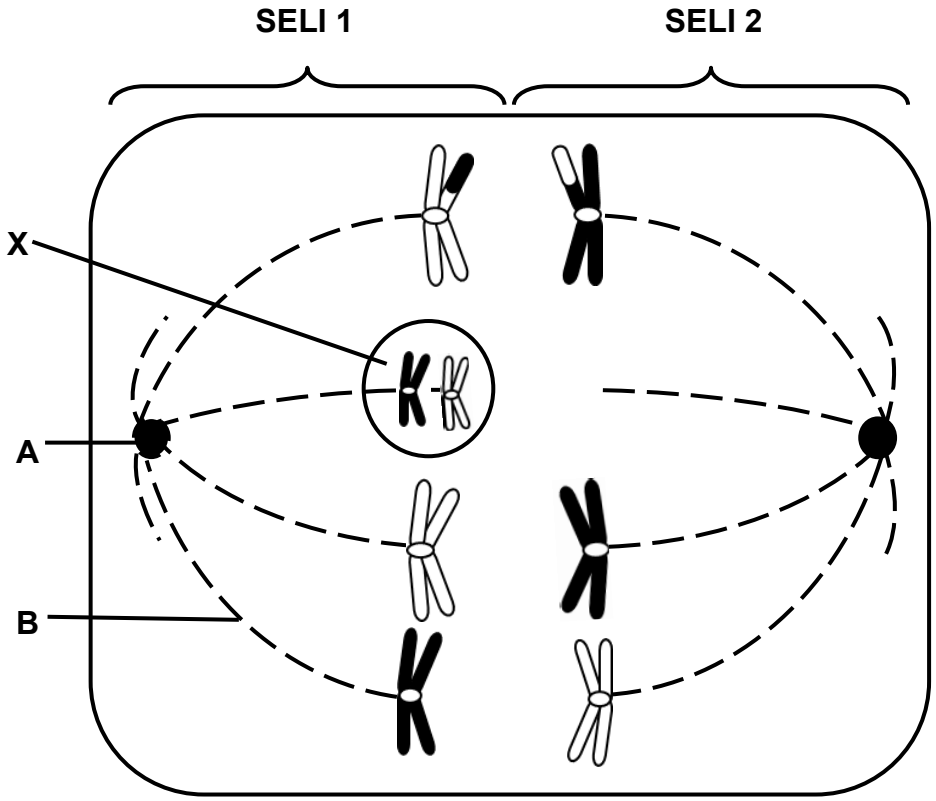
2.3.2 Cacisa ukuba kutheni **uTata 1** engenakuba ngutata womntwana usebenzisa iziphumo zovavanyo lwegazi. (3)

2.3.3 Sebenzisa igenetic cross ukubonisa ithuba lepesenteyiji kamama **notata 2**, ukuba babe nomntwana onodidi lwegazi O. (6)

2.3.4 Cacisa ukuba kutheni iziphumo zovavanyo lwegazi zingathembekanga ukufumana utata onguye. (2)

2.3.5 Xela ezinye iindlela eziZIMBINI zokusetyenziswa kweDNA profayili ngaphandle kovavanyo lotata onguye. (2)

2.4 Idayagram engezantsi ubonisa iseli ekwenzeka kuyo imeiosis.



2.4.1 Nika inqanaba lemeiosis eliboniswe kwidayagram engasentla. (1)

2.4.2 Nika isizathu sibesiNYE ngempendulo yakho kuMBUZO 2.4.1. (1)

2.4.3 Nika imisebenzi yeendawo ezilandelayo kwimeiosis:

(a) **A** (1)

(b) **B** (1)

2.4.4 Xela uhlobo lwekhromozomal mutation olwenzeka ku**X**. (1)

2.4.5 Cacisa iiprosesi EZIMBINI eziboniswe kwidayagram ezikhokelela kukwahluka kwenzala. (4)

2.4.6 Zingaphi iikhromozom eziya kufumaneka kwiSELI 2 ekupheleni kwemeiosis? (2)

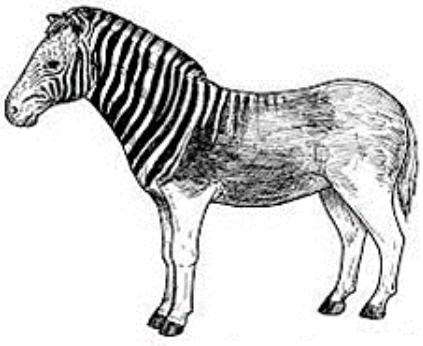
[50]

UMBUZO 3

3.1 Funda isicatshulwa esingezantsi.

Iqwarha yayiluhlobo oluthile lwezebra yasethafeni. Zazingelwa de zaphela ngenkulungwane ye19. Zazinemizimba emifutshane kwaye ebanzi kunezebra yasethafeni kwaye zinoboya obumdaka obunamabala amnyama. Izebra yasemathafeni inoboya obumhlophe obunamabala amnyama emzimbeni wonke. Iqwarha lalinemigca kuphela kwindawo engaphambili yomizimba walo. Oososayensi bezikhwelanisa iizebra zasethafeni ezineempawu ezifana nezo zeqwarha, ngoku sele zivelise izilwanyana ezimalunga nama200 ezifana neqwarha elingasekhoyo eMzantsi Afrika.

Izebra yasetafeni



Iqwarha

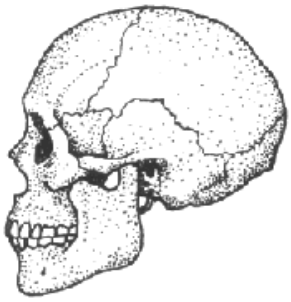
3.1.1 Xela iprosesi esetyenziswa ngoososayensi ukuzalwa kweqwarha. (1)

3.1.2 Kwisicatshulwa, nika iimpawu EZIMBINI ezifunwa ngoososayensi kwizebra yethafa xa zikhwelaniswa. (2)

3.1.3 Oososayensi bangafumanisa njani ukuba iqwarha iseluhlobo olunye nezebra yasemathafeni? (2)

3.1.4 Cacisa indlela ukuphela kwezinto okubaneziphumo ezihle ngayo kwizinto eziphilayo. (2)

3.2 Ngo2012, uNjingalwazi Lee Berger wafumanisa uhlobo olutsha lwehominin, eyathiywa igama *Australopithecus sediba*. Kwiminyaka emithathu kamva, ngo2015, kwafunyanwa olunye uhlobo olutsha lwehominin.
Olu didi lutsha lwathiywa igama *Homo naledi*. Iifosili zazo zombini ezi ntlobo zehominin zafunyanwa kwindawo yoMzantsi Afrika eyaziwa njenge 'Cradle of Humankind'.

		
Australopithecus sediba	*Homo naledi*	*Homo sapiens*

3.2.1 Yeyiphi kwezi fosili zimbini (*iAustralopithecus sediba* okanye *iHomo naledi*) ekucingelwa ukuba ihlobene kakhulu nabantu bale mihla? (1)

3.2.2 Nika isizathu sibesiNYE ngempendulo yakho kuMBUZO 3.2.1. (1)

3.2.3 Chaza iianatomical feature EZINTATHU engewayezijongile uNjingalwazi Berger xa wayephononononga iifosili, ukufumanisa ukuba *iAustralopithecus sediba* yayi bipedal. (3)

3.2.4 Nika igama eliscientific lolunye uhlobo lwehominin eNYE apho iifosili zafunyanwa kwiCradle of Humankind. (1)

3.2.5 Kutheni le ndawo ibizwa ngokuba yi'Cradle of Humankind'? (2)

3.2.6 Cacisa indlela imitochondrial DNA esetyenziswa ngayo ukubonisa ukuba abantu bale mihla bavela eAfrika. (4)

3.3 Itheory ye evolution isekelwe kubungqina obuninzi.

3.3.1 Chaza *ibiological evolution.* (2)

3.3.2 Kutheni iTheory ye-Evolution isaziwa njengescientific theory? (2)

3.3.3 Thabhuleytha umahluko omNYE phakathi kwetheory nehypoyhesis. (3)

3.3.4 Chaza imithombo emiBINI apho oososayensi bafumana ubungqina be-evolution. (2)

3.4 Izityalo zombona zichatshazelwa yiEuropean corn borer engumbungu omncinci otya isityalo sombona kwaye ubangele ukutshatyalaliswa kwezityalo ngokupheleleyo kumafama.
IBt gene efumaneka kwibhakthiriya ivelisa ityhefu ebulala iEuropean corn borer ngaphandle kokwenzakalisa abantu. Oososayensi bakwazile ukukhupha le gene kwibhaktheriya ze bayifaka kwiDNA yezityalo zombona. Xa iEuropean corn borer isitya isityalo sombona, iyakufa ngokukhawuleza.

3.4.1 Xela iprosesi apho igenetic makeup yeoganizim iguqulwayo ukuze ibandakanye uphawu olutsha. (1)

3.4.2 Nika ithem ebhekiselele kwiDNA apho igene yongezelelwa khona. (1)

3.4.3 Cacisa indlela ENYE apho umbona oneBt gene unokunceda amafama ngokwezoqoqosho. (2)

3.4.4 Cacisa isizathu sibesiNYE sokuba kutheni ukusebenzisa iBt gene kwizityalo zombona kunokuba nefuthe elibi kokusingqongileyo. (2)

3.5 EMzantsi Afrika ibhakthiriya yesifo sephepha iye yaxhathisa kunyango oluninzi lwesiqhelo lweTB. I-Rifampicin okwangoku lelona chiza lisebenzayo ekunyangeni iTB. Noxa kunjalo kukho inani leentlobo zebhaktiriya zesifo sephepha ezithe zaxhathisa kweli chiza. Ibhaktiriya ekwaziyo ukuxhathisa kwiRifampicin inokunyangwa ngebedaquiline.

Iintlobo ezimbini zonyango lwe-bedaquiline eziyafumaneka:

- Iipilisi ezinokuthathwa ekhaya yonke imihla.
- Isitofu apho isigulane kufuneka sibuyele eklinikhi rhoqo ngeveki ukuze sitofwe.

Oososayensi bafuna ukwazi ukuba loluphi unyango olunokuba nelona zinga liphezulu lokusindisa emva kweenyanga eziyi24.

- Iqela labathathinxaxheba abangama200 abanerifampicin resistant TB bakhethwa.
- Bonke abathathinxaxheba bebeneminyaka engama18 nangaphezulu.
- Izigulane ezili100 zanikwa unyango lwepilisi iinyanga ezili9.
- Izigulane ezili100 zanikwa unyango lwesitofu iinyanga ezili9.
- Isimo sempilo sabo sajongwa kwiinyanga ezingama24 emva kokuba beqale unyango.

Itheyibhile engezantsi ibonisa izinga lempumelelo yonyango ngeendlela ezimbini.

Unyango	**Inani labatha-thinxaxheba abaphindaphindwe yiTB**	**Inani labatha-thinxaxheba abangalugqibanga unyango**	**Inani labatha-thinxaxheba abafayo yiTB**	**Inani labatha-thi nxaxheba abanyangwayo kwiTB**
Iipilisi	1	4	24	71
Isitofu	2	12	28	**X**

3.5.1 Nika i-independent variable. (1)

3.5.2 Nika isizathu sibesiNYE esibangela ukuba olu phononongo luthathwe njengolunokuthenjwa? (1)

3.5.3 Khaltyhuleyitha inani labathathinxaxheba abathathe unyango lokutofa, abaye banyangwa kwiTB. (3)

3.5.4 Cacisa isizathu sibesiNYE esinokubangela abantu abaninzi bengalugqibi unyango lwesitofu. (2)

3.5.5 Cacisa ukuba iibhaktiriya zesifo sephepha zinokukhula njani ukuxhathisa i-rifampicin ngokweTheory kaDarwin yeNatural Selection. (5)

3.5.6 Nika iindlela EZIMBINI apho oososayensi banokuphucula ukunyaniseka kolu phononongo. (2)

3.5.7 Cacisa ukuba kutheni imeko yempilo yabathathinxaxheba yarekhodwa emva kweenyanga eziyi24 kuphela zokuthatha unyango? (2)

[50]

LILONKE ICANDELO B: 100
EWONKE AMANQAKU 150