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Memo Prelim Paper II September 2019

Section A

Section A

Question 1

1.1. (a) hybrid (b) diploid (c) endemic (3)

1.2. To determine whether the Cape gerbil and Highveld gerbil ✓were reproductively isolated / able to breed and produce fertile offspring / are separate species✓ (2)

1.3. Allow random mating between males of one species and females of the other rather than pairing specific individuals /more pairs of gerbils. More offspring mating with different individuals (2) OR

Have control groups of individuals mating within their own species.for comparison to see if hybrids are less vigorous or if 50% mortality is "normal" survival rate of offspring

1.4. sympatric speciation when individuals are **not geographically separated** but gene flow is prevented and reproductive isolation results because of other means. ✓(for example: occupying different different niches)

Bushveld and Highveld possibly✓ evolved by sympatric speciation because there is no geographic barrier and the the area that they exist in overlaps. However, their diets are different and they are adapted for different climates✓

Allopatric speciation when **individuals are geographically separated**.✓ This results in a prevention of gene flow and therefore they become reproductively isolated.

Highveld and Bushveld vs Cape is ✓Allopatric speciation because they are separated by a large portion of south Africa/karoo/cape mountain ranges. ✓ (6)

1.5. Isolating mechanisms prevents gene flow✓ between groups of organisms.

Genetic changes occur due to mutations/different environments ✓

Changes accumulate✓ but not being shared/transferred between groups which leads to genetically different individuals. Eventually organisms not able to breed together and produce fertile offspring.✓ (4)

1.6. (No) in captivity they are still able to reproduce together ✓and produce offspring ✓which are still fertile ✓

OR

(Yes), many hybrids died,✓ only females were fertile ✓ and only one of the females was able to breed/decrease in repro success✓ (3)

Many pupils did not use data from investigation as specified by the question

1.7. the gerbils potentially share a common ancestor and diverged 3 to 7 million years ago ✓They are grouped into geographically defined areas, with gerbils who they share chromosomal characteristics✓. They have adapted✓ to different climatic conditions and by having different diets. (no detail of common ancestor accepted)

(3)

- 1.8. *G. leucogaster* (Bushveld) and *G. afra* (Cape) (2)
- 1.9. they all share a common ancestor ✓ and have radiated from there with differences resulting in species adapted to different environments. (1)
- 1.10. DNA/genes chromosomes ✓ the more similar they are the more closely related ✓ fossil record ✓ similarities / differences in physical. ✓ (2)
- 1.11. B, 8 million years ago (2)

Question 2

- 2.1. (a) false (b) true (c) true (3)

2.2. It would be able to identify how closely related individuals ✓ are and therefore prevent inbreeding ✓. This is when very closely related individuals breed together ✓, resulting in a decrease in the gene pool ✓ and an increased gene frequency of recessive/disease causing genes/mutations. ✓ (4)

2.3.1. genome analysis ✓ – identify what genes are causing diseases. ✓

Crispr ✓ – edit harmful genes out and assist in gene therapy of inserting a healthy gene ✓ (2)

2.3.2. only if it takes place at germ line, because otherwise not passed on/inherited by future generation. (2)

*Question was answered poorly across the board. Girls did not address that the change needs to occur at germ line.

2.4. they do not believe in: **genetic testing/pre marital testing** ✓ – prevent disorders passing on or continuation of **inbreeding** ✓; **marrying outside of their community** ✓ – outbreeding or introducing different genes ✓. God determines their lives and whether they live or die. (any 1 x2 =2)

2.5. Homo erectus ✓ left Africa ✓ and spread to Europe and Asia. Homo erectus that remained behind ✓ in Africa evolved into Homo Sapiens ✓ separately and then spread into Asia and Europe ✓ taking over (replaced) from Homo erectus (because it was more advanced) (5)

*Question was answered poorly. Girls left out the first wave and did not realise that it was *Homo erectus* who left Africa.

2.6.

- Homo sapiens evolved 100 000 ✓ early - not 195 000 years ago but actually 300 000 years ago ✓
- Homo sapiens potentially left Africa earlier than 80 000 ✓ years ago because they evolved earlier. ✓
- Earliest Homo sapiens not found in Ethiopia ✓ but actually Morocco. ✓

- No garden of eden or cradle of mankind✓ but actually spread all over✓
- That Homo sapiens existed in Africa with a number of their ancestors✓ not on their own ✓– evolution less linear pathway as previously understood. (Any 2 explanation = 4)

2.7. cradle of mankind indicates that Homo Sapiens originated in one place in Africa – a birth place (1)

* Must show understanding of “cradle” as birth place. Did not accept “most fossils found here”

2.8. sahara desert/mountains/great lakes (1)

* Question clearly asked for geographical/physical feature. Also please consider time period. References to passports, not being able to afford to travel were made. This question required girls to look at all sources provided.

2.9. yes or no

Yes, skull very similar – can comment on certain structures for evidence. Facial features similar

Jaw – similar teeth structure and arrangement / palate similar shape for tongue to fit into for speech

OR

BUT brain case different shape and could possibly mean different organisation – this is unique defining characteristic of our population.

Should have possibly compared to H antecessor

Any 4 explanations (4)

2.10. H. Naledi and H. heidelbergensis NOT H. Neanderthelensis. Accept H. erectus (2)

*Question poorly answered for a variety of reasons. Notice that mark allocation was 2, please give 2 answers. Battled to read the diagram. Worth going through and discussin why the answer is not *H. neanderthelensis*.

Section B

Question 3

	Yes different outcomes – NS survival and mating and an advantage / AS – human gain not advantageous		No same/similar outcomes (NS disadvantageous or AS advantageous or a combo)	
Advantages	NS – survival and mating 1. resistance to DDT- mosquito survived, not necessarily for human good because allows more resistant mosquitos to survive;	A	AS – Human gain 1. polyploidy – (certain plants bred together to create polyploidy)– bigger fruit, larger yield, economy No seeds – greater consumer choice	O B

			(could also be disadvantageous- effects on enviro and other species, less variety)	
	2.Other meds/antibiotics	O	2. cabbage – great varieties	O
	3.Peppered moth Other examples	O	3. New breeds can be formed from selective breeding which leads to animals better suited – Bonsmara cattle	O
	4. sickle cell anaemia and malaria – harmful gene increases in frequency because of advantage to survive malaria	F	Disad NS – continuation of weaker gene – sickle cell anaemia (but adv against disease)	F
Disadvantages – human gain	AS - pedigree pets – traits not selected for in nature/disadvantageous bulldogs and large heads – caesarian (reliant on humans or could die) Dobermans and narcolepsy (Not a concern because raised by humans and fitness not a concern) Own examples explained Reduce natural variation	C O O		
	AS- domestic animals Cows with large udders – selecting for traits detrimental to health – udder heavy and increased chance of mastitis	C O		
Disad- inbreeding	AS of who families members marry– results in inbreeding – 1.royal lineages and Haemophilia – decreased variation	C O	NS- cheetah- faster cheetah selected for (NS adv) but leads to increase in leg length – which are hazardous (disad)	H
			Small population of Cheetah regardless leads to inbreeding so does not have to do with NS being disadvantageous.(must use this correctly- cannot just be a statement) Decreased variation	C O
Disadvantages to NS			Inadvertently selecting for stronger mosquitos- selection pressure of DDT... NS? Antibiotic resistance	A O
			NS -Widow bird – female selects mail with longer tail - but leads to loss of balance, useless for survival	D –

Additional Own info:

What they are – natural and artificial

Nature selects for fitness

But both result in certain genes increasing in the gene pool – less variety

What is inbreeding and effect on variety

Explanation of polyploidy- meiosis gone wrong

Key used:

A+ or A- good argument for or against. This will require good explanation and relevance to question and decision clear.

+ or – facts given

O own info

D decision

Q quality of sources commented on

IR irrelevant

GenI – generalisation

^ need more information/explanation or **^A** – argument is weak.

Comments:

Planning:

Must show decision in planning. Highlight or circle it.

Overall planning was very good. Must ensure you develop your points adequately. Sometimes this was too vague

You must include sufficient own information. This was lacking at times.

Introductions: these were very poor. This should include your point of view, explanation of both sides and necessary background or context recovered.

Decision must be CLEAR – do not sit on the fence. This question had two parts many of you left out one of the parts.

do not just say some believe in this But I believe in this or others believe in..... That is not adequate for explaining both sides and leads to your decision being unclear.

Conclusions: these were poor as well. You do not only restate your opinion/decision. You must review the important information as well.

If you run out of time you must try and just get a conclusion down please.

General:

Statements without evidence/explanation/examples are vague and do not assist your argument. These lead to irrelevant arguments. Statements like... 'inbreeding can also occur in natural selection, particularly when populations are small' are irrelevant to the actual question unless you explain exactly how it relates. How is polyploidy and example of AS?

Must explain facts to show relevance in regards to the question- bull dogs need caesarean sections must be explained other wise it is not clear why this is a disadvantage.

Grose generalisations Using words like always or it is proven or it is believed by many etc also lead to loss of relevance and detract from your argument.

DO NOT make up facts

Source D was an unreliable source and should have been discarded.

OWN info can only be used for the SUPPORTING ARGUMENT

Some inaccuracies:

Definition or explanation of Natural selection. Ensure you use correct terminology and are not 'loose' with your explanations.

You need to explain how inbreeding in royal families could be considered an example of artificial selection gone wrong. This essay was not on inbreeding but on Artificial and Natural selection- so how does this relate. Understanding of Inbreeding was poor.

Polyploidy – does not necessarily result in drought resistance and pesticide resistance. More often than not on larger fruit with no seeds... do not generalise.

Commenting on quality of sources:

This must be integrated. Not just the last paragraph of the essay before the conclusion. Try and use it when you are using those actual facts in the essay.

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