

1. (a) Polygenic/several genes involved/multiple alleles; 1  
 [Allow: 'more than one gene' involved] [Reject: "more than 1 allele"]
- (b) Graph symmetrical/mean and mode identical/not skewed/even distribution 1  
 around middle;  
 [Accept: 'bell-shaped curve'/'more in middle of range & few at extremes']  
 [Reject: 'the graph shows a normal distribution']  
 [Ignore: drawing]
- (c) Mean – no change; [Accept: "7"] 3  
 Standard deviation – decreases;  
 Reason – selects against/removes (both) extremes/extremes die/better  
 survival of middle nos.;
- [5]**
2. (a) phylum, class, family, genus; 1
- (b) (i) presence of a nucleus / membrane bound organelles / 1  
 named organelles only 80S ribosomes / lacks a cell wall;
- (ii) lacks a cell wall / no chitin / is motile / has one nucleus / no hyphae; 1  
 (do not credit it has a nucleus)
- (credit only one answer relating to a lack of cell wall; if more than  
 one answer is given in (i) and / or (ii), incorrect answers negate)
- (c) (i) more recent common ancestor / DNA in common; 1
- (ii) mutation; 4 max  
 there is variation;  
 genes (coding) for protein / cytochrome c with different structures;  
 EITHER  
 individuals with a modified cytochrome c have a selective  
 advantage / are selected for;  
 these individuals are more likely to survive to have offspring /  
 have more offspring;  
 (must link a comparison of survival to reproduction)  
 gene / allele frequency changes over generations / time;  
 OR  
 changed structure does not affect protein function;  
 these structural differences accumulate over time;
3. (a) sections of chromatids exchanged; 3  
 sections have different alleles;  
 new combinations of (linked) alleles;  
 (allow 1 mark for idea that 'genes' are exchanged, if no other marks gained)
- [8]**  
**QWC 1**

- (b) (i) length controlled by many genes /polygenes;  
each gene may have different alleles / idea of additive effects;  
OR  
environmental factors / or named factor;  
how named factor may affect growth of seeds;

2 max

- (ii) 1. selection of large seeds for sowing;  
2. higher proportion of alleles for long length;  
3. loss of alleles for short seeds from population;  
4. reference to distribution curves, e.g lower end 'cut off';  
5. (possible appearance of) new alleles through mutation;  
6. process repeated over many generations;  
(G - allow 1 mark idea for that 'largeness' selected, survives  
and inherited)

4

[9]  
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