

Assessment Schedule – 2008**Biology: Describe processes and patterns of evolution (90717)****Evidence Statement**

Q.	Achievement	Achievement with Merit	Achievement with Excellence
ONE (a)	Describes what is likely to happen to the fish population due to this pattern of selection eg: <ul style="list-style-type: none"> • Fish populations will come to be made up of smaller individuals. • Fish that reproduce / mature earlier will become more common. • Smaller fish are more likely to survive / reproduce. 	Explains what is likely to happen to the fish population due to this pattern of selection eg: <ul style="list-style-type: none"> • Fish populations will come to be made up of smaller individuals because the genes / alleles for larger fish are constantly and selectively removed from the breeding population / gene pool. • Fish populations will come to be made up of smaller individuals as they survive to reproduce more frequently than the larger fish. 	
(b)	Identifies the pattern of evolution ie Divergent evolution.		
(c)	Identifies the type of speciation ie Sympatric speciation.		
(d)	Describes ONE way these species are reproductively isolated, eg: <ul style="list-style-type: none"> • flowering at different times / seasons • Gamete incompatibility • Hybrid infertility / breakdown • Temporal isolation of flowering • Polyploidy gives different numbers of chromosomes / non-homologous chromosomes. 	Explains how these species are reproductively isolated, eg: <ul style="list-style-type: none"> • If they flower at different times of the year they cannot pollinate each other. • There is gamete incompatibility so if the pollen reached the egg the gametes cannot fertilise / develop into a new plant. • Hybrid infertility due to odd number of chromosomes / can't go through meiosis / cannot make gametes. • Polyploidy gives different numbers of chromosomes so even if gametes fuse / pollen fertilises other species the embryo cannot develop to maturity. 	
(e)	Describes the pattern of evolution shown, eg: Divergence / Adaptive radiation.		

(f)	<p>Describes how this group of species could have evolved considering a geological event OR a selection pressures, eg:</p> <ul style="list-style-type: none"> • The southern alps being formed created new habitats / niches. • Isolated populations have different selection pressures. • During formation of the southern alps groups of <i>Pachycladon</i> may have been geographically isolated. 	<p>Explains how this group of species could have evolved considering geological events and a specific selection pressure, eg:</p> <p>The southern alps being formed created new habitats / niches. These had their own selection pressures such as different soil types which acted on the populations causing them to adapt to their specific niches causing genetic / phenotypic differences sufficient that the two populations can no longer interbreed.</p>	<p>Discusses how this <i>Pachycladon</i> group of species could have evolved considering TWO geological events and specific selection pressures, eg:</p> <p>An ancestral <i>Pachycladon</i> population originally in Australia was able to disperse to NZ. The southern alps being formed and lowered sea levels during an ice age created many new cooler / wetter habitats / niches. The new niches had different selection pressures such as different rock substrate acting on the populations. Adaptation to these different niches caused genetic / phenotypic differences sufficient that the two populations can no longer interbreed. As there is reproductive isolation between the populations speciation has occurred.</p>
TWO (a)	<p>Identify the form of selection operating in these populations e.g. Sexual (mate) selection / disruptive selection / non-random mating.</p>		
(b)	<p>Describes the implications of the female's mate preferences for the future evolution of the yellowthroats, eg:</p> <ul style="list-style-type: none"> • The populations will continue to become more different from each other genetically / in allele frequencies / phenotypically. • The different preferences by females will cause reproductive isolation between the populations. • Female choice of mate may act as a behavioural / reproductive isolating mechanism. • Females mate choice differences may lead to speciation / divergent evolution. 	<p>Explains the implications of the female's mate preferences for the future evolution of the yellowthroats, eg:</p> <ul style="list-style-type: none"> • The populations will continue to become more different from each other phenotypically due to different mate selection leading to speciation as there is no gene flow and the populations develop reproductive isolating mechanisms. • Different mating preferences could lead to reproductive isolation between the two populations due to an accumulation of genetic differences between the populations. 	<p>Discusses the implications of the female's mate preferences for the future evolution of the yellowthroats, eg:</p> <ul style="list-style-type: none"> • Due to the different (mate) selection pressures of yellow throats in New York and black masks in Wisconsin populations will continue to become more different from each other. This changes allele frequency between the populations. Over time the accumulation of genetic differences between the populations will lead to reproductive isolation so speciation has occurred.
(c)	<p>Identifies the form of speciation ie Allopatric speciation.</p>		

(d)	<p>Describes the evolution of the <i>Hoplodactylus</i> geckos in NZ (in relation to the impact of the geographical isolating mechanisms OR the evolution of reproductive isolating mechanisms) , eg:</p> <ul style="list-style-type: none"> • Populations were isolated on low-lying islands which caused allele frequencies to change. • Mountain building formed new habitats with new selection pressures. • NZ populations were separated for long periods of time enabling reproductive / behavioural isolation. 	<p>Explains the evolution of the <i>Hoplodactylus</i> geckos in NZ (in relation to the impact of the geographical isolating mechanisms AND the evolution of reproductive isolating mechanisms) , eg:</p> <ul style="list-style-type: none"> • Populations were isolated on low-lying islands during interglacial periods which caused allele frequencies to change leading to gecko speciation. • NZ gecko populations separated for long periods of time when NZ was a series of low-lying islands subject to different selection pressures. Due to the populations adapting to the different environments reproductive isolation mechanisms have developed. 	<p>Discusses the evolution of the <i>Hoplodactylus</i> geckos in NZ by considering how at least TWO geographical isolating mechanisms led to the evolution of reproductive isolating mechanisms, eg:</p> <p>When NZ was a series of low-lying islands the gecko population was isolated and subjected to different selection pressures. These populations accumulated genetic differences and developed reproductive isolating mechanisms (such as post/pre-zygotic). Sea levels dropped / mountain building / volcanic activity created new habitats / into which gecko populations could disperse. Different selection pressures in each would have caused further reproductive isolation between populations.</p>
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Judgement Statement

Achievement	Achievement with Merit	Achievement with Excellence
Total of SIX opportunities answered at Achievement level or higher. $6 \times A$	Total of at least SEVEN opportunities answered with THREE at Merit level or higher. $3 \times M + 4 \times A$	Total of at least SEVEN opportunities answered with TWO at Excellence level and ONE at Merit level or higher. $2 \times E + 1 \times M + 4 \times A$