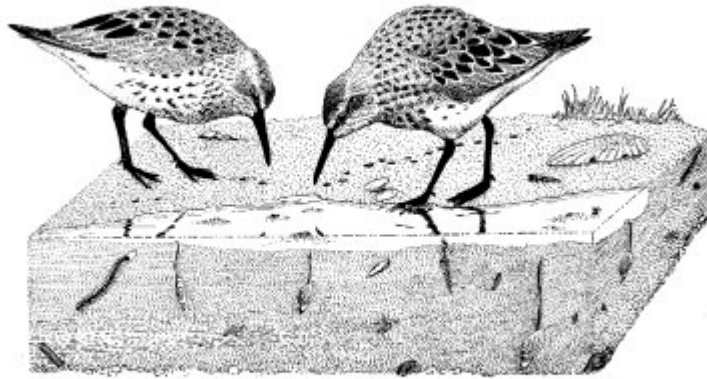


Activity 3 – Biology

Paper 1B, Q3c

(c) The diagram shows sandpipers feeding.

Sandpipers have long beaks so that they can dig for worms in the mud.



(Source: © Birchside www.fotosearch.com)

Explain how sandpipers evolved to have long beaks.

(4)

Question Number	Answer	Additional guidance	Mark
3 (c)	<p>An answer that makes reference to four of the following points:</p> <ul style="list-style-type: none"> • <u>variation</u> / <u>variety</u> / <u>varied</u> (1) • mutation (1) • longer beak means more worms/food / longer beak can reach deeper for worms/food (1) • <u>survival</u> and reproduction / breeding / offspring (1) • pass on gene / allele / DNA (1) 	<p>Allow converse for Mps 3, 4 and 5</p> <p>mutation passed on = 1</p>	4

(b) Nicotine is a chemical found in cigarettes.

A scientist investigates how nicotine affects sperm cells.

The scientist gives male rats different concentrations of nicotine.

He then calculates the percentage of damaged sperm cells in the semen produced by each rat.

The table shows his results.

Concentration of nicotine in mg per kg of rat	Percentage of damaged sperm cells (%)
0.0	6.4
0.5	16.8
1.0	24.8

(ii) The scientist concludes that cigarette smoking could make male humans infertile.

Discuss this conclusion.

(5)

Question Number	Answer	Mark
6(b)(ii)	<p>An explanation that makes reference to five of the following points:</p> <p><u>Arguments for:</u></p> <ul style="list-style-type: none"> • nicotine reduces normal/undamaged cells / nicotine increases damaged cells (1) • less (chance of) fertilisation / eq (1) • rats are similar to humans / rats are mammals / eq (1) <p><u>Arguments against:</u></p> <ul style="list-style-type: none"> • there are normal/undamaged sperm cells in nicotine samples / there are damaged cells with no nicotine (1) • investigation on rats (not humans) / eq (1) • rats were not smoking / small range(of concentrations) / no idea of nicotine concentration in cigarettes / eq (1) • not repeated / no idea of number of rats / not reliable (1) 	5