

Activity 3 – Biology

Paper 1B, Q3c

Through natural selection. Every species of organisms show variation; this can be due to a random mutation in an organisms DNA. In some cases, this can make ^{certain} ~~some~~ organisms better suited to their environment (in this case, having long beaks). Due to their better suited and desirable characteristics, these organisms are more likely to survive, which allows them to reproduce and pass on their alleles with desirable and adapted characteristics to their offspring. This process repeats and over time the proportion of birds with long beaks will increase.

(Total for Question 3 = 11 marks)

Their beaks have evolved to increase in length so that they could dig in the mud more quickly and easily, they can reach deep down with long beaks also. Because they can reach deeper down they can get more food because they can find more worms. The beaks are also very narrow so that they can dig in the mud more efficiently compared to if they had short beaks.

This conclusion is invalid, as rats are genetically different from humans. The sperm cells of the two mammals are different, so to make this conclusion without testing on humans is incorrect. Furthermore, the results could be invalid, as he did not test on multiple rats for each concentration (only one per concentration), we are also unsure of the rats' age, mass and diet, all of which could affect ^{negatively} sperm production, so to say that nicotine is the sole reason why sperm are damaged is wrong. He also has not repeated the experiment, so his results could have anomalies present.

On one hand, this experiment does show that nicotine does increase the amount of damaged sperm cells. It shows that as nicotine increases, so does damaged sperm cells, so the assumption is that if enough nicotine is consumed all of the sperm cells will become damaged leaving the rat infertile.
However

However, this experiment is being made upon rats, who are not very close to humans, and so we don't know if we will react to nicotine in the same way. Furthermore, these rats experienced a large dose of nicotine in a small space of time, whereas smokers take in nicotine over time, rendering the experiment pretty much useless. For example, taking 20 paracetamol tablets will likely kill someone, however taken over time it will not cause any harm.