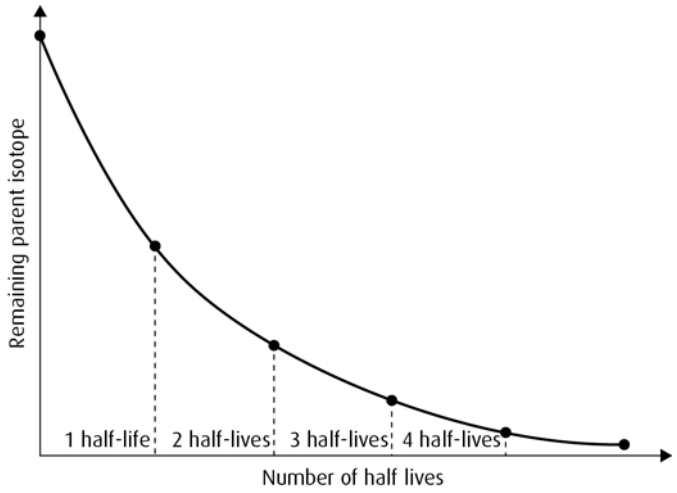
Support worksheet – Option D

1 The graph below shows the decay curve for a radioisotope.

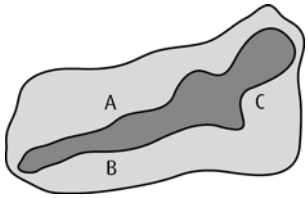


a The half-life of ^{40}K is 1250 million years. What percentage of ^{40}K atoms will remain in a sample that is 2500 million years old? (1)

b What fraction of the original atoms will survive after 4 half-lives? (1)

c The half-life of ^{14}C is 5700 years. Why is this isotope used instead of ^{40}K to date fossils that are 10 000 years old? (1)

2 Three populations of banded lizards became separated on their island home by a range of mountains with steep slopes that the lizards cannot climb.



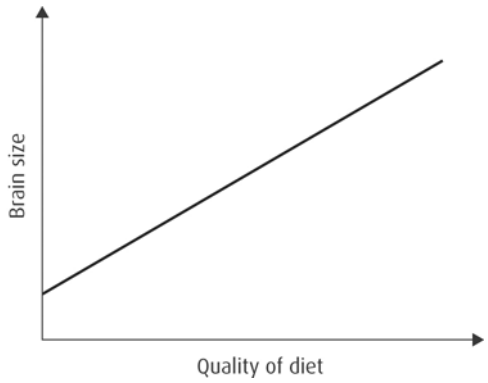
A study of the lizards revealed that the populations have different diploid numbers of chromosomes.

a Define the term ‘speciation’. (1)

b What type of speciation might be taking place on this island and why? (2)

c What would you expect to happen if individuals from the different populations were captured and mated? Explain your answer. (2)

3 The graph shows the relationship between the relative brain size and diet quality of primates and humans.



a What is the term used to describe such a relationship? (1)

b As brain size increased in hominid species, the proportion of energy used to maintain brain function also increased. Suggest a reason for this. (1)

c Fossil evidence suggests that hominids increased their consumption of meat over a period of time. What type of evidence would reveal this change? (2)

d How could this change of diet affect the evolutionary progress of humans? (2)

4 Compare the cultural and genetic evolution of *Homo sapiens*. (3)