Quiz 9 - Species Concepts & Speciation

Due Apr 13 at 11:59pm **Points** 11 **Questions** 11
Available until Apr 14 at 11:59am **Time Limit** 120 Minutes
Allowed Attempts 2

Instructions

This quiz asks questions about species concepts and speciation. You have 2 attempts at this quiz, the highest mark counts. You have 60 minutes to complete each quiz.

This quiz is due on the last day of classes (Thursday, April 13th @ 11:59 pm).

Targeted Readings - Species Concepts, Speciation & Phylogenetic Trees.pdf (https://canvas.ubc.ca/courses/105572/files/25792498?wrap=1) (https://canvas.ubc.ca/courses/105572/files/25792498/download?download_frd=1)

Take the Quiz Again

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	17 minutes	11 out of 11

Correct answers will be available Apr 14 at 12pm - Apr 23 at 6pm.

Score for this attempt: **11** out of 11
Submitted Mar 29 at 10pm
This attempt took 17 minutes.

Question 1 — 1 / 1 pts

What defines a morphospecies?

- It has distinctive characteristics, such as size, shape, or colouration.

It represents a distinct branch in a phylogenetic tree.

It is reproductively isolated from other species.

It is a fossil from a distinct time in Earth's history.

Correct! A morphospecies is one that has been defined based on the morphological species concept: it is morphologically distinct from other species. Morphology = the study of something's shape or form

Question 2

1 / 1 pts

Which of the following is a disadvantage of the morphological species concept?

It cannot be used to evaluate fossils.

Individuals that are the same species may look different at various life stages.

Reliable information exists only for a small number of organisms.

Two groups may use very similar resources, but be evolutionarily independent.

Question 3

1 / 1 pts

The biological species concept can be applied to which of the following groups of organisms?

Asexual bacteria

Dinosaurs

Bird species living today

Correct! Because the biological species concept is based on evidence of whether or not a group of organisms can interbreed, it cannot be used if we have no information about interbreeding between populations (e.g., in the case of extinct organisms like dinosaurs), or if the organisms do not reproduce sexually (e.g., asexual bacteria).

Question 4

1 / 1 pts

Three populations of crickets look very similar, but the males have courtship songs that sound different. What function would this difference in song likely serve if the populations came in contact?

Postzygotic isolating mechanism

Prezygotic isolation mechanism

Both of the above

Question 5

1 / 1 pts

Which of the following evolutionary processes is not acting when two groups of organisms are identified as different species according to the Biological Species Concept?

Mutation

- Genetic drift
- (•) Gene Flow
- Natural selection
- Sexual selection

Question 6

1 / 1 pts

Which of the following does not tend to promote speciation?

- the founder effect
- polyploidy
- (•) gene flow
- natural selection

Question 7

1 / 1 pts

Which of the following describes the most likely order of events in speciation?

- genetic divergence, isolation of populations, reproductive isolation
- genetic divergence, reproductive isolation, isolation of populations
- (•) isolation of populations, genetic divergence, reproductive isolation

genetic divergence, isolation of populations, reproductive isolation

isolation of populations, reproductive isolation, genetic divergence

Question 8

1 / 1 pts

The peppered moth provides a well-known example of natural selection. The light-colored form of the moth was predominant in England before the industrial revolution. In the mid-nineteenth century, a dark-colored form appeared. The difference is produced by a dominant allele of one gene. By about 1900, approximately 90% of the moths around industrial areas were dark colored, whereas light-colored moths were still abundant elsewhere. Apparently, birds could readily find the light moths against the soot-darkened background in industrial areas and therefore were eating more light moths. Recently, use of cleaner fuels has greatly reduced soot in the landscape, and the dark-colored moths have been disappearing. Should the two forms of moths be considered separate species based on the biological species concept?

Yes, because natural selection has affected the frequency of the two different forms.

Yes, because they have completely different coloration.

No, because there is no evidence that they are reproductively isolated.

Both A and B are correct.

Question 9

1 / 1 pts

A particular type of flowering plant is native to Europe. Up until the late 1800s, populations of this plant could only be found in parts of France and Spain. In the early 1900s, however, a family of European immigrants brought some seeds from the plant with them when they came to North America. They began growing the plant in their garden, and would often share seedlings and cuttings from the plant with their neighbours. Eventually, a small, wild population of the plant became established in the area. This population still exists today. Recently, a horticulturist attempted to cross one of the wild North American plants with a plant of the same type from Europe. None of the seeds from the cross were viable (i.e., no offspring were produced). The scenario described above could be considered an example of...

- (●) Allopatric speciation by dispersal
- ( ) Allopatric speciation by vicariance
- ( ) Sympatric speciation by vicariance
- ( ) Sympatric speciation by dispersal

When people brought the European plant seeds with them to North America, they were helping to disperse the plant. The seeds grew into plants, and ancestors of those plants eventually colonized a new habitat in North America. According to the biological species concept, the fact that the North American and European plants are not able to successfully interbreed suggests that speciation has occurred (i.e., the North American and European plants populations have diverged enough that they can no longer be considered one species). We wouldn't call this an example of sympatric speciation because the divergence took place while the populations were physically isolated from one another.

Question 10

1 / 1 pts

Two beetles are unable to reproduce together because of a difference in male and female reproductive structures. What is the name of this mechanism that is keeping them from being part of the same gene pool?

- Temporal reproductive isolation
- Behavioural reproductive isolation
- Hybrid reproduction isolation
- (●) Mechanical reproductive isolation

Correct! If the reproductive structures of two organisms are incompatible (e.g., the structures don't fit together properly), we say the incompatibility is a mechanical one

Question 11

1 / 1 pts

About 3 million years ago, the Isthmus of Panama (a narrow strip of land connecting North and South America) formed, dividing marine organisms into Pacific and Caribbean populations. Researchers have examined species of snapping shrimp on both sides of the isthmus. Based on the morphospecies concept, there appeared to be seven pairs of species, with one species of each pair in the Pacific and the other in the Caribbean. The different species pairs live at somewhat different depths in the ocean. Using mitochondrial DNA sequences, the researchers estimated phylogenies and found that each of these species pairs, separated by the isthmus, were indeed each other's closest relatives. The researchers investigated mating in the lab and found that many species pairs were not very interested in courting with each other, and any that did mate almost never produced fertile offspring. Which of the following species concepts would justify classifying the individuals in each pair as separate species? (N. Knowlton, L. A. Weigt, L. A. Solorzano, D. K. Mills, and E. Bermingham. 1993. Divergence in proteins, mitochondrial DNA, and

reproductive incompatibility across the Isthmus of Panama. *Science* 260:1629-32.)

- ○ The morphospecies concept
- ○ The biological species concept
- ○ The phylogenetic species concept
- ◉ All of the above

Quiz Score: **11** out of 11