

Science 9 Review: Answers

1. Ecosystem diversity refers to the number of different ecosystems that fall within an area. The Yellowstone to Yukon conservation area has many ecosystems such as mountains, boreal forests, and rivers. Each ecosystem has a community of different species. For example, an alpine meadow community may include populations of grasses, flowers, grizzlies, and eagles. But a boreal forest community has a different mix of species populations such as black bears, moose, lodgepole pines, and crows. Genetic diversity refers to the variations between members of a single species that are caused by variations at the cellular level. For example, individual grizzlies can vary in coat length and colour.
2. Genetic diversity helps contribute to the survival of living things by producing populations that have a lot of variation. In Y2Y, if there is a particularly long cold winter, perhaps only those grizzlies with especially thick coats would survive the winter, but those with thinner coats might not. So the grizzly population's genetic diversity would allow at least some of the individuals of the grizzly population to survive changing environmental conditions.
3. Responses will vary, but should reflect an understanding of what biological diversity is and its importance to the quality of life and survival of many species. Students should use information from section 1.0 to support their answer. An example might include:
 - Maintaining a healthy wolf population in the Rockies preserves biological diversity because the species is an important carnivore that culls deer and elk populations, enabling only the fittest and healthiest of these herbivores to reproduce and pass along their genetic information.
4. Heritable characteristics are those that can be passed from one generation of a species to the next, such as eye colour or hair colour. Non-heritable characteristics are acquired and cannot be passed on; for example, the ability to play the piano. Discrete variations are defined, that is they are "either/or" characteristics. For example, eyes are blue or they are not blue. Continuous variations exist within a range. Human height is an example of a trait that shows continuous variation.
5. Answers will vary but students' diagrams should show the fusion of the male gamete (sperm) and female gamete (ova or egg cell) to create a zygote. The diagram may resemble the diagram of the flower (Figure 2.11) on page 33 of the student book.
6. Charts should be similar to the example below.

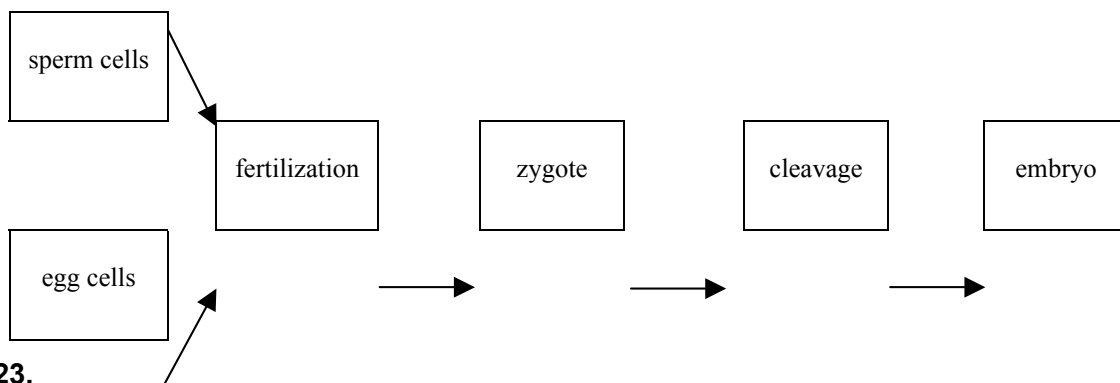
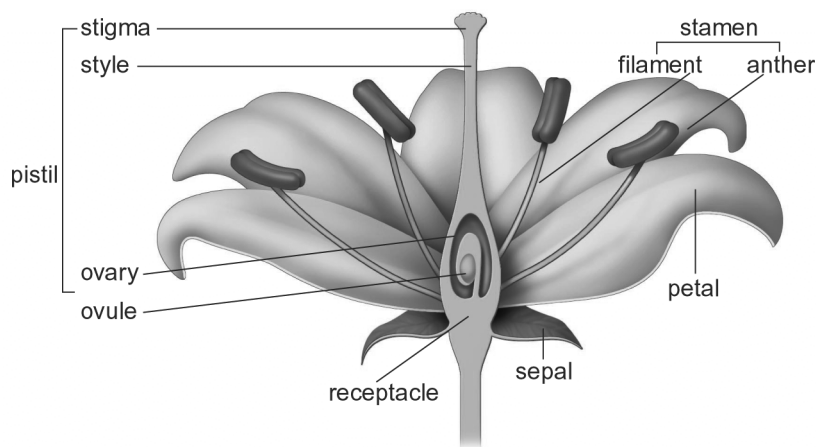
	Disadvantages	Advantages
Sexual Reproduction	-requires more energy -limited number of offspring	-greater variation helps species survive environmental changes
Asexual Reproduction	-limited variation decreases ability to survive environmental change	-does not require specialized cells -can reproduce large numbers of offspring quickly

7. Responses will vary, but should reflect understanding that reproduction is key to species' survival. Without the ability to pass on characteristics to future generations continuity would not exist. This would have a negative impact on biological diversity.
8. DNA is found in a cell's nucleus and contains the genetic code for an individual. Genes contain the instructions for a particular trait and are written in the genetic code of the DNA molecule. The DNA of many organisms is packaged in chromosomes.
9. When a form of a trait is recessive, an offspring must receive that form from both parents if it is to show the trait. This means each parent must either show that form of the trait or be a hybrid for that form of the trait. An example would be coat colour in cats as discussed in the student book, where to produce a white kitten requires one white-coat allele from the mother and one white-coat allele from the father.
10. Key differences between mitosis and meiosis are:
 - a) in mitosis an exact copy of the parent cell is formed while in meiosis cells with half the DNA of the parent cell are formed;
 - b) mitosis involves one division while meiosis involves two divisions;
 - c) mitosis produces body cells in multicellular organisms while meiosis produces sex cells only.
11. Answers will vary, but should reflect students' understanding of genetics. Through the use of genetics, we can establish such things as breeding programs to help re-establish populations of species while still maintaining variation within species.
12. Natural selection refers to the interaction of a species with its environment. The environment "selects" the characteristics that make the species well suited to live there, such as the ability to withstand cold temperatures. Those individuals with the selected characteristics produce more offspring; this means that having these characteristics aids species survival. With artificial selection humans choose the characteristics they find desirable. Natural selection may maintain variation within a species while artificial selection may decrease variation.
13. Artificial selection, creating plant clones, artificial reproductive technology and genetic engineering are ways in which technology is used to select and change characteristics in species. Students should demonstrate an understanding of the three examples of technology that they choose.
14. Responses will vary, but will likely focus on one of the following strategies: protected areas, restoration of ecosystems and species, resource use policies, controlling the spread of non-native species, or the conservation of genetic resources.
15. Responses will vary, but should be logical, relevant to the topic, and supported by facts and/or examples. Students should also strive to provide responses that are

thoughtful and insightful. Answers could reflect political, economic, and social issues.

16. Both animals belong to the same genus, but they are different species.
17. Mutualism benefits both living things. For example, in lichen, the algae produce food and the fungus protects the algae from dehydration. Parasitism benefits only one organism. For example, a tapeworm robs its host of nutrients.
18. Resource partitioning occurs when similar species share different parts of a resource. For example, warblers share different parts of a tree to ensure the food source—spruce bud worms—is shared.
19. Variability in a species describes the differences among various individuals of the same species. Diversity of communities refers to the number of different species in an ecosystem.
20. Antibiotic resistance is an example of the importance of variability to the survival of bacteria under different conditions. Bacteria reproduce very quickly. For this reason, a small number of bacteria that are resistant to a particular antibiotic in an original population, can rapidly give rise to a large population of resistant cells.
21. Diagrams should show binary fission as division into two equal parts and budding as a smaller version growing off an adult.

22.



23.

- 24.** Meiosis reduces the number of chromosomes by half to produce sex cells. These cells combine to form a zygote that has a full set of chromosomes.
- 25.** Environmental factors that could influence the action of genes include poor nutrition and drug use.
- 26.** Extinction is the disappearance of species from the planet, such as dinosaurs or the passenger pigeon. Extirpation is extinction in a local area, such as grizzly bears on the Prairies.
- 27.** Answers will vary but look for a viewpoint that is supported by examples and relevant data from the text, research projects, and class discussions. This question could be used as a take home test or assignment.

28. Answers will vary, but a variety of strategies are suggested in section 4.3. Students should select one or a combination of strategies as a method to conserve biological diversity. They should describe why they think this is an important strategy and state one action they could do to promote the strategy. The suggestion should be “doable” by the student or a group of students