# Science 9 - Unit A Review Sheet

## Learning Outcomes

Can you?

- ❏ describe the relative abundance of species on Earth and in different environments
- ❏ describe examples of variation among species and within species
- ❏ explain the role variation plays in survival
- ❏ identify examples of niches and describe how closely related living things can survive in the same ecosystem
- ❏ explain how the survival of one species may be dependent of another species
- ❏ identify examples of natural selection
- ❏ distinguish between asexual and sexual reproduction and describe examples of each type of reproduction
- ❏ describe types of variations found within a species and determine whether they are discrete or continuous
- ❏ distinguish between heritable and non-heritable characteristics
- ❏ describe the relationship among chromosomes, genes, and DNA, and their role in storing genetic information
- ❏ distinguish between cell division during asexual reproduction and cell division during sexual reproduction
- ❏ investigate the transmission of characteristics from parents to offspring, and identify examples of different patterns of inheritance
- ❏ identify examples of dominant and recessive characteristics
- ❏ distinguish between artificial and natural selection
- ❏ describe the effects of extinction and extirpation on biological diversity
- ❏ evaluate the success and limitations of local and global strategies in minimizing loss of species diversity
- ❏ describe new technologies for recombining genetic material
- ❏ describe the use of biotechnology in various fields

## Unit at a Glance

- All groups of living things show variation. There are variations between species and within species.
- Biological diversity is the number and variety of organisms in an area.
- Organisms show a wide variety of structural and behavioural adaptations.
- Competition within or between species may force groups of organisms to adopt different niches.
- Generalists can survive through the changing seasons of northern climates and spread over large areas. Specialist are well adapted to specific environments and narrow niches.
- Traits that are passed on from one generation to the next are said to be inherited or heritable.
- Clones, or copies of one parent organism, are produced by asexual reproduction. Types of asexual reproduction include binary fission, asexual spores, budding, and, in plants, vegetative growth.
- In sexual reproduction, the genetic information from two parents is inherited. In plants and animals, a sperm fertilizes an egg to form a zygote.
- Some organisms, such as the mould, Rhizopus, can reproduce both sexually and asexually.
- Flowers are the reproductive structures of angiosperms. Angiosperms also reproduce vegetatively from the roots or special root, leaf, or stem structures.
- Inherited characteristics that show a limited number of variations, such as tongue-rolling, show discrete variation. Characteristics with a range of possibilities, such as human heights, show continuous variation.
- Some inherited characteristics are dominant to other, recessive traits.
- Not all characteristics are inherited: The environment can influence a person’s characteristics. Mutagens alter the genetic information itself.
- DNA is the genetic material and controls the function of cells. Chromosomes, which are found in the nucleus, are made up of coiled strands of DNA. A section of DNA that codes for a specific protein and function is called a gene.
- Sexual reproduction increases variation within a species. Each zygote has a random combination of chromosomes from both parents.
- Transgenic animals and genetically modified crops are important in medicine and food production.
- People have used artificial selection to develop many varieties of domestic animals. Selective breeding is also used to develop new plant varieties.
- Natural selection results in species that are well adapted to specific locales or niches.
- Although Earth has great biological diversity, the current rate of extinction is about one species per day, and possibly many more. As a result, Earth’s biological diversity is declining.
- Zoos and seed banks are two ways in which people try to maintain biological diversity. Protected areas and global treaties have also been set up to protect endangered plants and animals.

# Unit A: Biological Diversity

## Science 9 Review

Wherever necessary, answer questions on a separate sheet of paper. All questions will be marked.

**1.** Using examples from the Yellowstone to Yukon Conservation Initiative wherever possible, explain the difference between ecosystem diversity, community diversity, and genetic diversity.

**2.** How does genetic diversity help to contribute to the survival of living things? Use examples from the Yellowstone to Yukon Conservation Initiative, if possible, to help explain your answer.

**3.** How important is it for us to be aware of and conserve biological diversity? Provide facts or examples to support your answer.

**4.** What is the difference between heritable and non-heritable characteristics? What is the difference between discrete and continuous variations? Use examples to explain your answer.

**5.** Using a diagram, illustrate how a zygote is formed during sexual reproduction in plants.

**6.** Fill in the chart below to show advantages and disadvantages of sexual and asexual reproduction.

| | Disadvantages | Advantages |
|---|---|---|
| Sexual Reproduction | | |
| Asexual Reproduction | | |

**7.** How important is it that species be able to pass their characteristics on to future generations? Why? Support your response with examples and facts.

**8.** How are DNA, genes, and chromosomes related to each other?

**9.** Why does the recessive form of a trait not always appear in offspring? Use an example to explain your answer.

**10.** What is the key difference between mitosis and meiosis?

**11.** How might our understanding of genetic inheritance assist us in maintaining biological diversity? How important is it for us to use our knowledge for this purpose?

**12.** What is the difference between natural and artificial selection? Describe the impact of each process on variation within a species.

**13.** In your own words, describe three ways in which technology can be used to select and change characteristics within species.

**14.** What is one strategy used to conserve biological diversity? Use an example to explain your answer.

**15.** The destruction of habitat worldwide is of particular concern to scientists and environmentalists, but experts also say we need to maintain biological diversity in all countries, including Canada. When should these concerns be addressed only by the citizens of each country, and when should they be addressed globally? Support your answer with facts and/or examples.

**16.** The scientific name for a red wolf is *Canis rufus* and for a dog is *Canis familiaris*. What do the scientific names tell you about the similarities and differences between these two animals?

**17.** Use an example to show the difference between mutualism and parasitism.

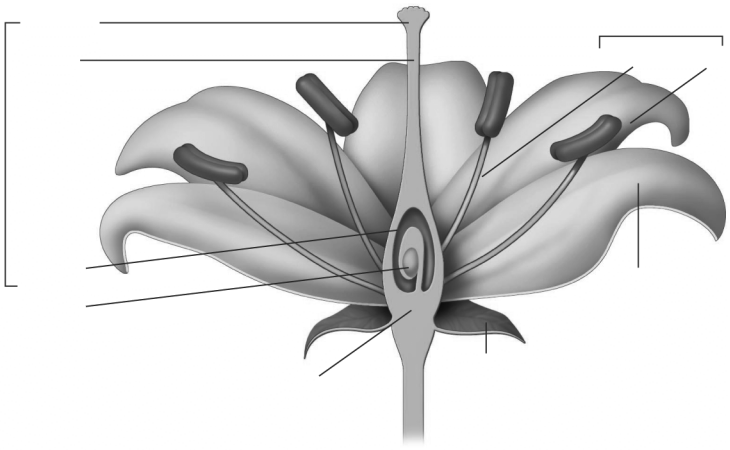
**18.** What is resource partitioning and why is it used by living things in the same species?

**19.** What is the difference between variability in a species and diversity of communities in an ecosystem?

**20.** Famous scientist and author Stephen Jay Gould has stated that the most successful living thing on Earth is bacteria. Give an example of how the variability of a type of bacteria allows it to survive in a variety of environmental conditions.

**21.** Use diagrams to explain the difference between budding and binary fission.

**22.** Label the reproductive structures in the flower below.



**23.** Create a flowchart using the following terms to illustrate the process of sexual reproduction: cleavage, embryo, egg cell, fertilization, sperm cell and zygote.

**24.** If there are 46 chromosomes in the human body cell, why don't the body cells of the next generation of humans have 92 chromosomes?

**25.** Describe two environmental factors that can influence the action of genes.

**26.** Use examples to demonstrate the difference between extinction and extirpation.

**27.** Do you support cloning and genetic engineering of plants and animals? Write a persuasive paragraph stating your views. Remember to support your views with examples and relevant data.

28.**In a short paragraph, describe different strategies humans can follow to conserve biological diversity.**