

Key

Science 9: Biological Diversity Final Exam Review

1. What are the main components of biological diversity?

The variety of species and ecosystems on Earth.

1. Diversity between ecosystems
2. Diversity within ecosystems.
3. Diversity within species.
4. Species Distribution

2. Explain the difference between structural and behavioural adaptations with examples of each.

Structural adaptations are physical traits that aid an organisms survival.

e.g. Pitcher Plants can digest insects.

Behavioural adaptations are a learned / inherited habit / behaviour that aids an organisms survival.

e.g. Bears will hibernate during winter.

3. What is the value of variation?

An area with many species with a number of variations has a better chance of staying healthy, surviving disease etc.

4. Describe how biological diversity is measure within a specific area.

~~Biologists~~ Biologists use a diversity index.

$$\text{diversity index} = \frac{\text{diversity of species in area (num)}}{\text{total organisms (\# specimens)}}$$

\* Closer to 1 the more diverse the area.

5. Explain what is included in an organism's niche.

Where an organism lives (habitat) and what the organism does (role).

6. Why is there little diversity and large populations in Northern Canada and high diversity with small populations in Central and South America?

Northern Canada has large temperature and habitat differences so its species must fill a broad niche and most are generalists.

Central and South America maintains a similar temperature year-round and its habitat is consistent in small areas so its species can fill only a narrow niche and are specialists.

7. Give an example of each type of symbiotic relationship.

**Commensalism** - one organism benefits the other does not. Clown fish anemone.

**Mutualism** - both organisms benefit. Hummingbird : flower.

**Parasitism** - one benefits and one is harmed. Tape worms : humans.

**Interspecies competition** - organisms from different species compete for the same resource.  
↳ cheetah's and lions for food.

8. Briefly describe the different reproductive processes that can occur asexually.

**Binary Fission**

- The 1<sup>st</sup> cell duplicates itself (all organelles) and then divides itself. Each cell is a genetic copy of the original.

**Asexual Spore Production**

- only one parent supplies genetic material in the form of spores or zoospores.

**Cuttings**

A cell near the base of the organism produces a group of cells (bud). When it is fully developed it detaches itself.

**Budding**

↳ Also cloning root

The stem or a part of a source plant is cut and planted producing a new identical plant.

Switch definitions

9. Explain the process of sexual reproduction in animals.

Both male & female gametes arrive in the same place at the same time. The zygote requires nutrients and moisture and with internal fertilization warmth & protection.

A liquid environment is important in order for the sperm to swim through and to prevent the eggs from drying out.

10. Explain the process of conjugation in bacteria.

A bacterium transfers genetic material from one of its cells to another/second bacterium.

The second bacterium is now genetically different from both parent bacteria.

11. Explain the difference between the two different kinds of inherited variation.

Continuous variations - many possibilities for the trait are possible. Height, Skin colour etc.

Discrete Variation - a limited number of possibilities for a trait. tongue curling, Earlobe etc.

12. Give two examples of dominant traits and two examples of recessive traits.

Dominant - Brown eyes, Brown hair, Six fingers

Recessive - Blue eyes, Blonde hair, five fingers.

13. Explain what mutations are and what can cause them.

Mutations are changes to DNA (genetic material).

They can be caused by X-rays, ultra-violet rays, cosmic rays and chemical (mutagens).



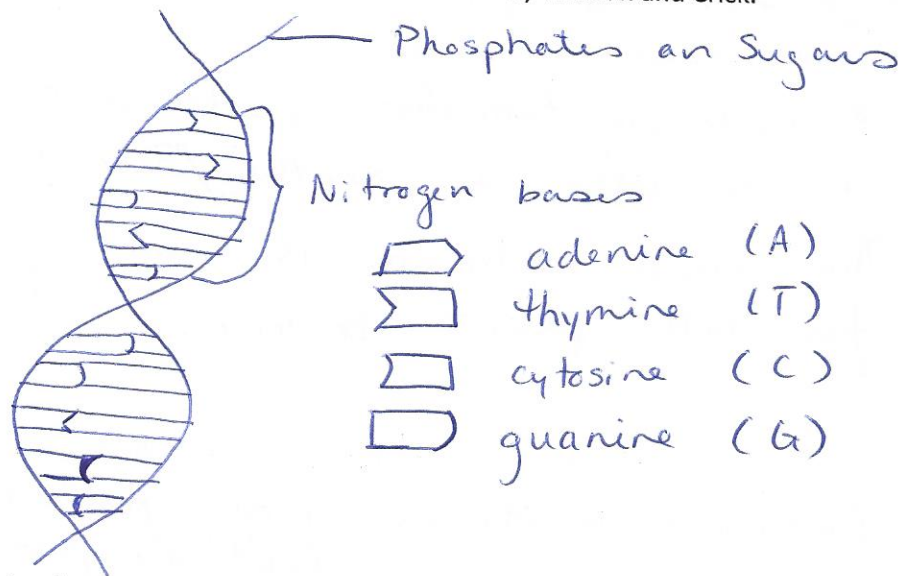
14. Outline how DNA was discovered.

Miescher collected DNA from the nucleus of cells. He could not explain its function.

Watson and Crick modelled the accepted structure of DNA and explained how the molecule ~~was~~ carried out all the functions of the organisms genetic material.

15. Illustrate the chemical structure of DNA that was modeled by Watson and Crick.

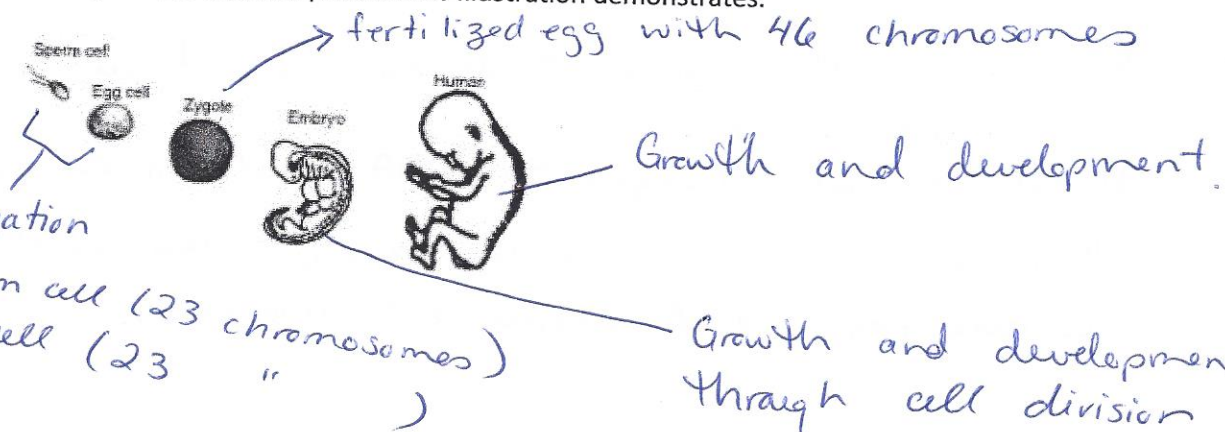
"Ladder"



16. What enables DNA to have so many variations with only 4 chemicals.

DNA is made of thousands of nucleotides, (ladder structure). Strands of DNA combine to form a chromosome. Chromosomes "partner" up to form pairs which are contained in the nucleus of cells.

17. Explain the detailed process this illustration demonstrates.



18. Some organisms can reproduce sexually and asexually. Explain the advantages and disadvantages of each process.

- Asexual
- Adv.
- Quick population increases.
  - Less energy required
  - daughter offspring have identical genetic material
- Disadv.
- population may go extinct if dramatic changes in environment

- Sexual
- allows for genetic variation
  - less population growth
  - slower process
  - requires more energy.

19. Describe some positive and negative consequences of biotechnology.

Positive: new medicines, aid lowering food declines, larger crops, resistant to herbicides, species more tolerant to change.

Negative: unknown harms to environment, people or other organisms.

20. A homozygous dominant male with brown eyes and a heterozygous female with brown eyes reproduce. Show a Punnett square that outlines the possibilities of eye colours in their offspring.

X - brown  
x - blue

Male  
X X

	X	XX	XX	
Female	x	Xx	Xx	

Brown -  $\frac{4}{4}$   
Blue -  $\frac{0}{4}$

21. What are the drawbacks of artificial selection?

Can be considered inhumane.

Can cause mutations

Decreases biological diversity.

Decreases variation amongst the species.

22. Darwin explained his theory of natural selection, which could be summed up in four statements:

1. All organisms produce more offspring than can possibly survive.
2. There is incredible variation within each species.
3. Some variations increase chance of survival.
4. Variations that are passed on lead to changes in genetics.

23. Explain what occurs during the process of each type of artificial selection technique below.

**Cloning** - creating copies of DNA fragments or cells or organisms

**Artificial insemination** - ~~inserting~~ inserting semen into female organism artificially (without male present)

**In vitro fertilization** an egg is fertilized by sperm outside the body and then inserted into the female body.

**Genetic engineering** - direct manipulation of an organism's genome.

24. Explain the difference between extinction and extirpation.

**Extinction** - A species does not exist anywhere on Earth.

**Extirpation** - The extinction of a species in certain locales.

25. What human activities can have an impact on species populations?

1. Increasing human Populations
2. Agriculture
3. Housing
4. Consumer Products (increase logging, mining etc.)
5. Clear Cutting
6. Plantations.



26. How do zoos preserve biodiversity?

- By exchanging animals between zoos to increase genetic diversity.
- Providing safe havens for endangered species

27. What are some organizations doing to preserve plant species and avoid species extinction?

Seed banks - gathering and storing seeds from plants that are threatened.

Planting trees grown from seeds that have been collected from the forest floor.

28. What strategies are used to preserve biological diversity in Canada?

Global treaties

Canadian Wildlife Federation

Canadian Nature Federation

Dear Sir,  
I have the honor to acknowledge the receipt of your letter of the 10th inst.

in relation to the above mentioned matter. I am sorry to hear that you are  
unable to attend to the same at present. I will endeavor to do all in my  
power to expedite the same as soon as possible.

I am, Sir, very respectfully,  
Your obedient servant,  
J. H. [Name]

Enclosed for you are the documents mentioned in your letter of the 10th inst.