

Science Nine

Module One:

Biological Diversity

Name:

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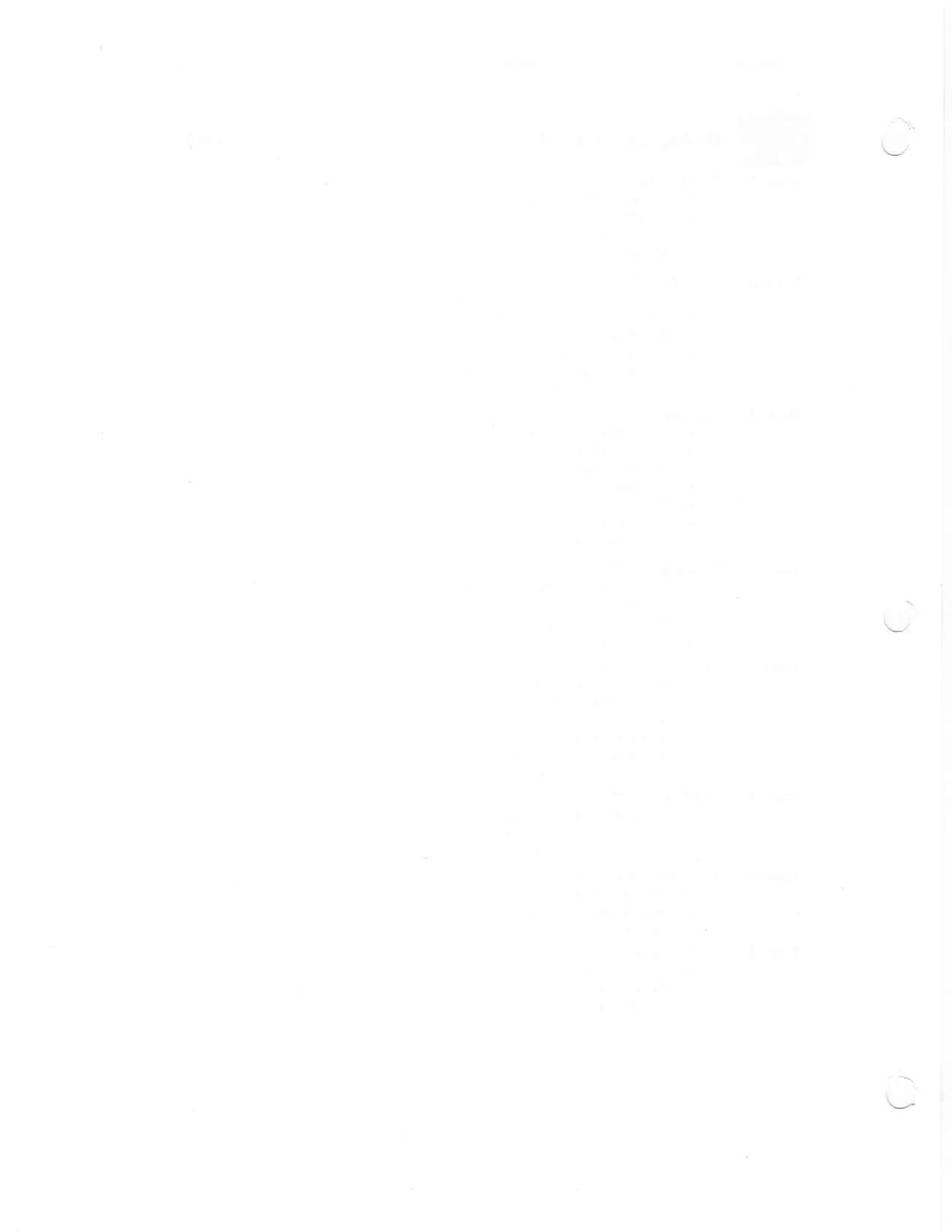
Grade:



Biological Diversity

Unit A

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 - The Value of Variation
 - Measuring Biological Diversity
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Topic 1 - Biological Diversity and Survival

What does the term **biological diversity** refer to?

What are the main **components** of biological diversity?

Explain the difference between **structural and behavioral adaptations** with examples of each.

Explain why it is important to preserve the species of the **Pacific Yew Tree**.




What is the value of **variation**?

Describe how biological diversity is **measured** within a specific area (ecosystem).

Topic 1 - Biological Diversity and Survival

1. The number and variety of species and ecosystems on the Earth and the ecological processes of they are a part of refers to ...
 - A. genetics
 - B. variability
 - C. biological diversity
 - D. ecosystem speciation

2. The most successful life form seems to be the insect. It is a **species** - a particular group of organisms that have the same structure and can...
 - A. have the same predators
 - B. consume the same food supply
 - C. live in the same area
 - D. reproduce with each other

3. There are many different species that can potentially help other species, like  the Pacific Yew tree, by producing cancer treatment medicine which is extracted from its bark, called ...
 - A. Taxol
 - B. Aspirin
 - C. Tylenol
 - D. Motrin

4. The main components of biodiversity occurring within organisms at a cellular level, as it describes the variety of life producing material carrying the variation information in all living things is called ...
 - A. Ecosystem diversity
 - B. Community diversity
 - C. Species diversity
 - D. Genetic diversity

5. Every organism needs to adapt in order to survive in its environment. There are two types of adaptations -structural and behavioral. Which of the following is a structural adaptation?
 - A. feathers
 - B. predation
 - C. migration
 - D. hibernation

6. Foresters might decide to burn one part of a forest because...
 - A. disease is likely to kill off all the trees in the forest, so they give nature a helping hand
 - B. sacrificing one part of the ecosystem to save the main parts is also necessary sometimes
 - C. habitat is increasing to such an extent that some forest species have to be displaced
 - D. interspecies reproduction might destroy the natural forest ecosystem balance

7. This compares kinds of species in a certain area with the total number of organisms in that same area, or ecosystem. It is primarily used to check on the health of an ecosystem – a healthy ecosystem has a
 - A. low diversity index
 - B. high diversity index
 - C. high variation level
 - D. low variation level

Topic 2 - Habitat and Lifestyle

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

Illustrate **resource partitioning** in the spruce tree illustration and briefly explain what warbler populations would be affected directly, if lightning hit the top part of the tree. (p. 18)



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

Explain the difference between the **type of niche** specialists and generalists have.

Specialists _____

Generalists _____

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

Commensalism _____

Mutualism _____

Parasitism _____

Interspecies competition _____

Explain how different species can survive in each of the **extreme environment** samples below.

Ocean Floor

High Arctic

Desert

Topic 2 - Habitat and Lifestyle

1. What it eats, its habitat, nesting site, range and habits, what effect it has on the other populations and what effect it has on the environment is the role that an organism has within a particular ecosystem called a ...
 - A. niche
 - B. species
 - C. variation
 - D. adaptation

2. Adaptations play an important role when competition occurs, because the species that is best suited to survive will. Competition occurs between different species when this is not plentiful ...
 - A. habitat diversity
 - B. basic need resources
 - C. species interactions
 - D. adequate protection


3. Some bird species, like warblers, share resources by accessing these resources in different ways. They avoid direct competition for the same resource, by practicing a technique called ...
 - A. food supply sharing
 - B. nutrient cooperation
 - C. resource partitioning
 - D. interspecies sharing

4. Canada supports large populations, with little diversity is the extreme environment and seasonal variations. The reason this restricts species' diversity is because of the limited ...
 - A. habitats
 - B. diseases
 - C. competition
 - D. food supply

5. Specialists in the tropics efficiently survive in their environment, because they have relatively narrow niches with adaptations directed toward competing for ...
 - A. more than one food supply or niche they can occupy.
 - B. one dependable food source, type of soil or level of light.
 - C. alternate habitats with speciation and resource partitioning
 - D. multiple food sources and fewer competitors for resources

6. Different types of ongoing relationships between and among all the organisms, within a particular environment, are represented by ...
 - A. food chains and food webs
 - B. niches and speciation
 - C. competition and predation
 - D. adaptation and habitation

7. A different type of interdependence is an association, within a certain population, between members of different species happens when two or more species need the same resource. This type of relationship which helps to limit the size of populations, of the competing species is called
 - A. mutualism
 - B. parasitism
 - C. commensalism
 - D. interspecies competition

8. Living in an extreme environment is rare, but possible because of adaptations organisms have to live in these extremes. Antarctic springtail  live in extreme cold, by producing in their tissues, a kind of...
 - A. blood thinner
 - B. antibiotic
 - C. antifreeze
 - D. blocking agent

Topic 3 - Passing It On

Briefly describe the difference reproductive processes that can occur asexually.

Binary Fission

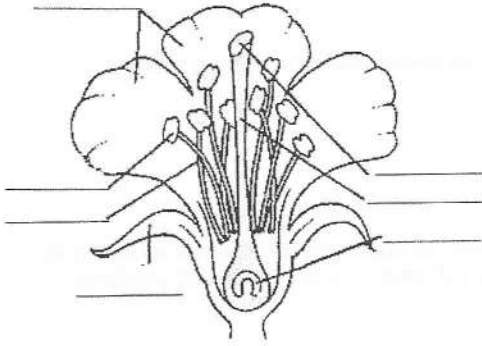
Asexual Spore Production

Cuttings

Budding

In what other ways can asexual reproduction occur?

Explain the process of **sexual reproduction** in plants and label the **parts of the flower**.



Explain the process of **sexual reproduction** in animals.

Explain the process of **conjugation** in bacteria.

Topic 3 - Passing it On

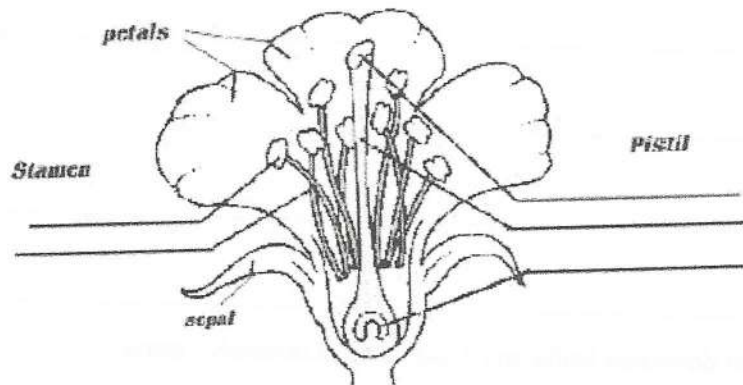
1. Characteristics are passed on from generation to generation through the reproductive process. Some characteristics, or traits, are inherited through ...
 - A. waste matter
 - B. genetic material
 - C. cellular respiration
 - D. learned behavior
2. There are different types of asexual reproduction: When the cell duplicates its contents, including its nucleus and other organelles and then splits into two cells with each one being identical (bacteria, amoeba, algae)



- only single-celled organisms reproduce in this way – it is called ...

- A. budding
 - B. tuber formation
 - C. binary fission
 - D. spore production
3. Spores are similar to seeds, but are produced by the division of cells on the parent, not by the union of two cells. Many spores are produced to ensure that at least some of the individual organisms will survive. Some fungi and green algae can also produce types of spores that move using tail-like flagella and are called ...
 - A. paramecium
 - B. flagella spores
 - C. pseudopods
 - D. zoospores
 4. Plants continue to grow throughout their lives. The rapidly growing tips of roots and stems contain specialized cells called meristems that function in the process of ...
 - A. reproduction
 - B. transportation
 - C. photosynthesis
 - D. respiration
 5. Coral reproduces (a smaller version of itself), a self-sufficient individual - identical to the parent, but do not detach themselves in the same way as other organisms do. This asexual reproductive process is called ...
 - A. cuttings
 - B. tubers
 - C. budding
 - D. grafting
 6. Many organisms are capable of both sexual and asexual reproduction, like some moulds, such as *Rhizopus*, which produce spores. To reproduce sexually as well, they can also produce ...
 - A. angiosperms
 - B. zoospores
 - C. zygo spores
 - D. gametes
 7. A primitive form of sexual reproduction in which bacteria are able to transfer genetic material directly from one cell to another is called bacterial conjugation. Because there is no increase in the number of cells, it does result in genetic...
 - A. redistribution
 - B. recombination
 - C. reconstitution
 - D. recovery

Sexual reproduction in plants involves male gametes and female gametes joining, during fertilization, to produce a zygote and then an embryo.



8. The stamen part of the flower is the ...
 - A. male gamete
 - B. female gamete
 - C. zygote
 - D. embryo
9. Plants which are not identical to either parent are produced as a result of ...
 - A. zygote growth
 - B. cross-fertilization
 - C. embryo development
 - D. self-pollination
10. The pistil is composed of the following flower parts ...
 - A. ovary, filament, stigma
 - B. stamen, stigma, ovary
 - C. anther, ovary, stigma
 - D. stigma, style, ovary
11. Most plants that produce seeds can also reproduce asexually. Mosses produce egg and sperm cells in the later part of the life cycle and in the early part of the same life cycle produce asexual
 - A. gametes
 - B. cuttings
 - C. spores
 - D. buds
12. During mating, the male gamete cell and the female gamete cell unite to form a fertilized combination of cells which are the first of many cells of a new individual called a ...
 - A. zygote
 - B. embryo
 - C. sperm
 - D. egg

Topic 4 - Wearing Your Genes

Explain the difference between the 2 different kinds of inherited variation.

Give 2 examples of **dominant traits** and 2 examples of **recessive traits**.

Certain characteristics are **non-inherited** and depend on factors other than genetics. Explain how these characteristics can be identified in a particular population of organisms living in the same environment.

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

Topic 4 - Wearing Your Genes

1. The branch of science that deals with the study of heredity is called ...
 - A. Biodiversity
 - B. Genetics
 - C. Variation
 - D. Speciation

2. Inherited (heritable) characteristics are those traits that are passed on to offspring directly from their parents. Heritable traits include, structural and distinguishing characteristics. All of the following are heritable traits, except ...
 - A. earlobes
 - B. skin color
 - C. eye color
 - D. artistic ability

3. Continuous variations are differences in characteristics that have a range of possible variations. Discrete variations are differences in characteristics that have a definite form, with a limited number of possibilities. The only discrete variation included here is ...
 - A. hair color
 - B. blood groups
 - C. earlobe attachment
 - D. tongue rolling ability

4. Two different types of traits are passed on from parents to offspring during sexual reproduction. When these trait types are mixed, the one that will show up in the offspring is the ...
 - A. continuous trait
 - B. recessive trait
 - C. dominant trait
 - D. discrete trait

5. Having six fingers on one hand is relatively rare in the general population. The following is the only true statement about this unique trait, "It is an inherited trait that is ..."
 - A. recessive with a low frequency
 - B. recessive with a high frequency
 - C. dominant with a low frequency
 - D. dominant with a high frequency

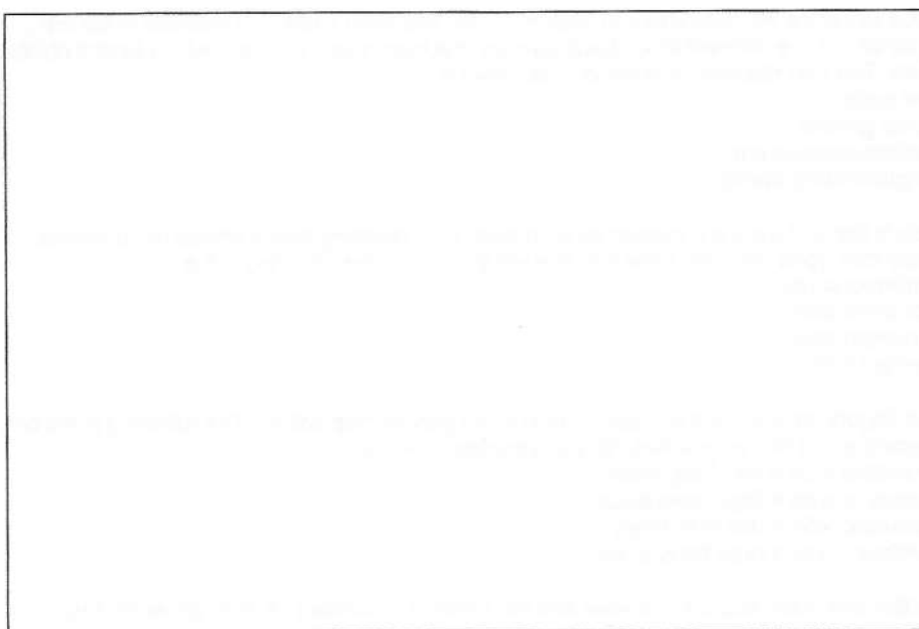
6. Non-inherited characteristics are acquired and not necessarily passed on from generation to generation. Some variations may be influenced by interactions with the...
 - A. parents
 - B. scientists
 - C. engineers
 - D. environment

7. Mutations can cause changes in the structure of organisms, including people. Mutagens, cause mutations to occur – some that have little visible effects and some that have dramatic effects. The mutagen that would have the most dramatic effect in a person would likely be ...
 - A. x-rays
 - B. gamma rays
 - C. microwaves
 - D. ultraviolet rays

Topic 5 - When Plans Change

Outline how **DNA** was discovered.

Illustrate the **chemical structure of DNA** that was modeled by James Watson and Francis Crick.



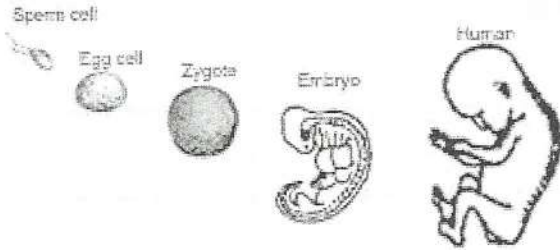
What is the **genetic code**?

What enables **DNA** to have so many variations with only 4 chemicals?

Different human cells (**somatic cells**) have different life spans – fill in the table.

	Brain cells	
	Red blood cells	
	Stomach lining cells	
	Liver cells	
	Intestine lining cells	
	Skin cells	

Explain the detailed process this illustration demonstrates



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

	<i>Advantages</i>	<i>Disadvantages</i>
Asexual Reproduction	<hr/> <hr/>	<hr/> <hr/>
Sexual Reproduction	<hr/> <hr/>	<hr/> <hr/>

Explain how **biotechnology** can increase or decrease variation.

Describe some of the **positive effects** of biotechnology.

Describe some of the **negative consequences** of biotechnology.

Illustrate a **Punnitt Square** (outlines possibilities in offspring)

Identify the **Classification system** used by biologists to identify specific organisms.

K _____

P _____

C _____

O _____

F _____

G _____

S _____

How did Carolus Linnaeus determine a **naming system** that would enable scientists around the world identify specific organisms?

Topic 5 - When Plans Change

1. The chemical blueprint passed on from the parents to the offspring is found in a molecule of the cell nuclei. This molecule is the inherited material responsible for variation. The chemical name for DNA is ...
 - A. dinitrogen oxide
 - B. double helix model
 - C. deoxyribonucleic acid
 - D. dual nitric acetone

2. The DNA molecule is like a ladder twisted into a spiral. The sides of the ladder are the same in all DNA molecules, but the rungs are what make the variations. Each rung pairs up two of the following chemicals: guanine (G), cystosine (C), adenine (A) and thiamine (T). The arrangement of these four chemicals creates the code that the cells are able to interpret. This code is called the ...
 - A. Genetic code
 - B. Mutagen code
 - C. Variation code
 - D. Chromosome code

3. A section of the DNA molecule for a specific protein that makes up much of the structure of cells and tissues in plants and animals is called ...
 - A. an atom
 - B. a gene
 - C. a nucleus
 - D. a code

4. 46 tightly coiled strands of DNA in humans represent the full compliment of ...
 - A. gametes
 - B. sperm cells
 - C. egg cells
 - D. chromosomes

5. Genes are located in the chromosomes and come in pairs. Each chromosome has numerous gene locations. Both genes in a pair carry DNA instructions for the same thing. Specific characteristic genes occupy matching locations on the two chromosomes. DNA code may not be exactly the same in both locations. Offspring inherit genes from both parents. The genes exist in an array of possible forms that differ as to their exact DNA sequence. These variations in forms are called ...
 - A. mutations
 - B. genetics
 - C. alleles
 - D. alternates

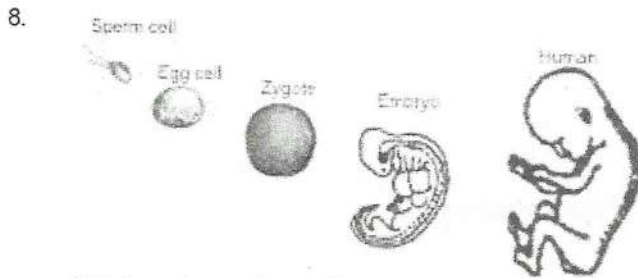
6. Different human cells (*somatic cells*) have different life spans.

●	Brain cells	30-50 years	
●	Red blood cells	120 days	
●	Stomach lining cells	2 days	
●	Liver cells	200 days	
●	Intestine lining cells	3 days	
●	Skin cells	20 days	

Replication of the contents of each cell occurs when the cell reproduces.

- When a cell divides, each cell ends up with a complete set of chromosomes, identical to each other and identical to the original cell. This process of Mitosis occurs most frequently in ...
 - A. skin cells
 - B. liver cells
 - C. intestine lining cells
 - D. stomach lining cells

7. The process of forming gametes occurs in the same way as somatic cells and is called ...
 - A. Mitosis
 - B. Meiosis
 - C. Fertilization
 - D. Conjugation



This type of sexual reproduction within a species increases ...

- A. **variation**
 - B. **mutations**
 - C. **vulnerability**
 - D. **specialization**
9. Moving pieces of one strand of DNA to other cells is a relatively new technique that has emerged. In the science of genetics, this technique has enabled scientists to create individuals within a species with desirable traits and is called ...
- A. **biodiversity**
 - B. **biomagnification**
 - C. **genetic diversity**
 - D. **genetic engineering**
10. One of the first uses of modern biotechnology was to move a human gene into bacteria. By doing this, bacteria were able to produce as a waste product, large quantities of a drug, used by diabetes patients, called ...
- A. **Aspirin**
 - B. **Insulin**
 - C. **Tylenol**
 - D. **Quinine**
11. Aquaculture is becoming an increasingly important method of mass production fish farming, however, if these 'special' fish make it out into the open ocean, what organisms be negatively affected?
- A. **fishermen and biologists**
 - B. **predator populations**
 - C. **natural fish population**
 - D. **large mammal population**
12. To produce purebred organisms, a breeder would choose purebred parents, those parents whose ancestors have produced only the desired characteristic. If a breeder chooses two different 'true-breeds', then the offspring produced would be a ...
- A. **domestic**
 - B. **mutant**
 - C. **gamete**
 - D. **hybrid**

Topic 6 - The Best Selection

Explain the drawbacks of the process of Artificial Selection.

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

cloning _____

artificial insemination _____

in vitro fertilization _____

genetic engineering _____

Identify the purpose for the **selective breeding** of the following ...

Western Red Spring Wheat _____

Canadian Western Durum _____

Canola _____

What did Charles Darwin observe on the Galapagos Islands?

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

Topic 6 - The Best Selection

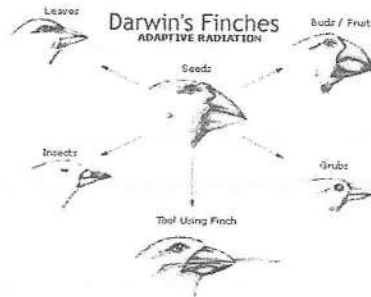
1. Long before the science of genetics started, people tried to reproduce organisms with only the most preferred traits, by allowing only those organisms with the desirable traits to reproduce. This method was not always successful, but it provided scientists with information to help them determine which alleles were responsible for specific traits through ...
 - A. organization
 - B. trial and error
 - C. scientific research
 - D. opinion and thought

2. The process of intervention to produce more desirable organisms takes a long time to see results - usually many generations. Speeding up the artificial selection process by using cells to make new cells is called ...
 - A. cloning
 - B. in vitro fertilization
 - C. genetic engineering
 - D. artificial insemination

3. Agricultural selective breeding programs bring positive characteristics of two different varieties together to create a new variety that has more desirable characteristics, such as the type created to produce flour that is good for making pasta, called ...
 - A. Canada Prairie Spring Wheat
 - B. Hard White Spring Wheat
 - C. Canadian Western Amber Durum
 - D. Western Red Spring Wheat

4. The specimens and observations made by Charles Darwin about the diversity of life on the Galapagos Islands is detailed in his most famous book, *Origin of the Species*. Darwin was the first scientist to explain that selection process occurred ...
 - A. automatically
 - B. instinctively
 - C. artificially
 - D. naturally

5. The Galapagos finches provide the best example of this theory - how the fittest, or best-adapted, organisms for a specific environment survive.



The diversity of life in the Galapagos Islands helped Darwin explain his theory.

His theory includes all of the following statements, **Except**

- ...
- A. There is incredible variation within each species.
 - B. All organisms produce more offspring than can possibly survive.
 - C. Some of the variations increase the chances of an organism surviving to reproduce.
 - D. Eventually, over time, variations stop being passed on through offspring.
-
6. Other examples that can be explained using Darwin's theory include what happened to this insect in industrialized England. The change in coloration enabled this species of moth to survive. The species is known as the ...
 - A. Salted Moth
 - B. Sugared Moth
 - C. Peppered Moth
 - D. Black and White Moth

Topic 7 - The Sixth Extinction

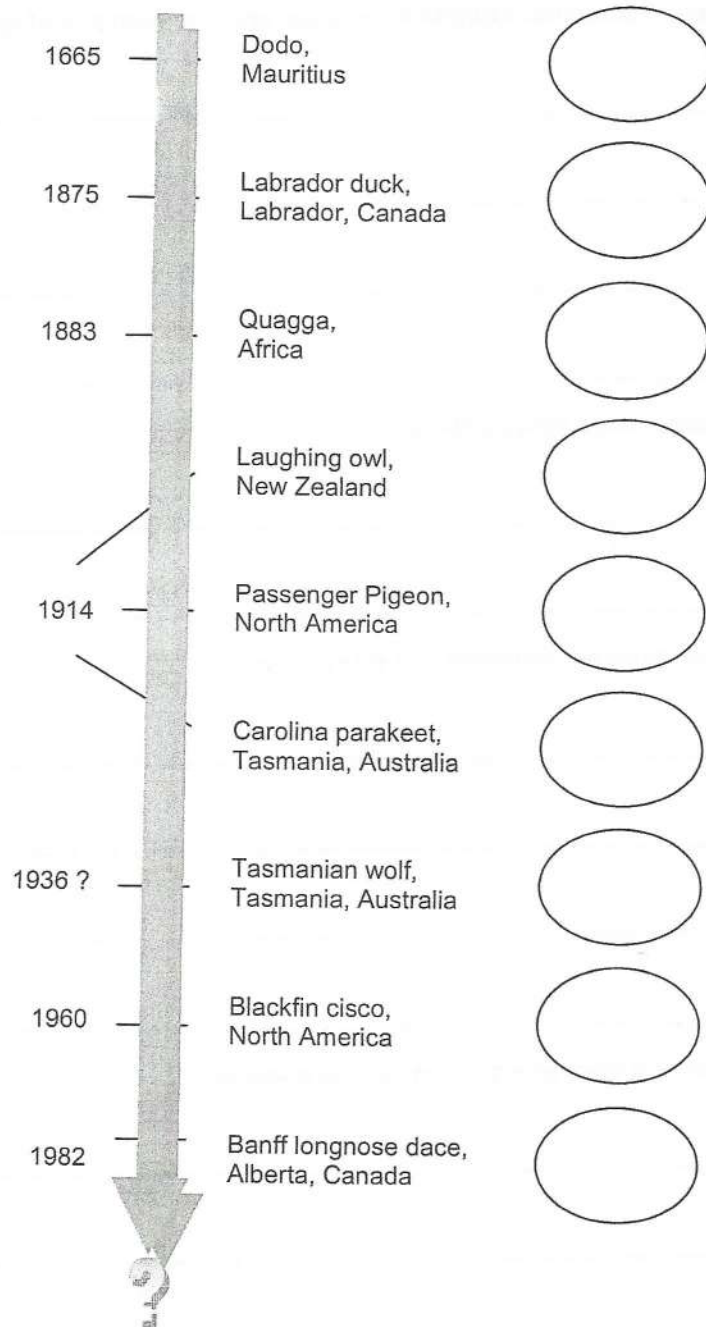
Identify different ways that **natural extinction** can occur and give examples of species lost as a result.

How does **overspecialization** cause extinction?

Explain the difference between **extinction** and **extirpation**.

What human activities can have an impact on species populations?

Illustrate Some Recent Species Extinctions



What is the most recent species that has become extinct?

What caused it to become extinct?

Topic 7 - The Sixth Extinction

1. The rate of extinction is thought to be 1 species per day over the age of life on the planet. Natural extinction can occur as a result of all of the following, **Except** ...
 - A. **disease**
 - B. **pollution**
 - C. **volcanoes**
 - D. **earthquakes**
2. Diseases and natural events occur all the time and when they do, the loss of an entire species, within a particular area, causes that species to be ...
 - A. **extinct**
 - B. **extirpated**
 - C. **threatened**
 - D. **Endangered**
3. Scientists estimate that 99% of all species that have ever existed on the Earth are now ...
 - A. **extinct**
 - B. **extirpated**
 - C. **threatened**
 - D. **Endangered**
4. The stresses of urbanization and habitat intrusion, by farming and industry, have resulted in extinction, population decreases and degradation of ecosystems, all of which reduce ...
 - A. **variation**
 - B. **genetic selection**
 - C. **biological diversity**
 - D. **ecological renewal**
5. The Grizzly Bear helps us to determine the human impact on an ecosystem. This large carnivore's ability to survive or disappear is historically a sign that human interference in an ecosystem is occurring or not. Grizzly Bears are considered to be ...
 - A. **Bioaccumulated species**
 - B. **Biomagnified species**
 - C. **Biodiverse species**
 - D. **Biindicator species**
6. Tropical rainforest are being clear-cut to make way for farmland, cattle ranches, pineapple and coffee plantations, and fuel. Loss of rainforests, mean the extinction of specialized organisms depending on the forests for food and protection. The impact of population is not shared equally around the globe. The hardest hit, where diversity is most threatened, are in ...
 - A. **developing regions**
 - B. **undeveloped territory**
 - C. **remote regions**
 - D.
7. The major cause of the decline and eventual extirpation of the plains Bison, as well as the extinction of the passenger pigeon and the black-tailed prairie dogs was ...
 - A. **disease**
 - B. **loss of habitat**
 - C. **over-hunting**
 - D. **loss of food supply**
8. Using the chart on the next page, identify which extinct group of species is represented the most ...
 - A. **fish**
 - B. **birds**
 - C. **carnivores**
 - D. **herbivores**

Topic 8 - Pains and Gains

How do **zoos** preserve biodiversity?

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

Explain the difference between **ex-situ** and **in-situ conservation programs** to preserve biological diversity around the world. (Give examples)

What **strategies** are used to preserve biological diversity in Canada?

Topic 8 - Pains and Gains

1. Zoos didn't become public until the early 1800's – in London. They were not originally started to preserve diversity. They were ...
 - A. exotic collections for private collectors
 - B. specialized keepsakes for royalty
 - C. black market species for criminals
 - D. formed to prevent species over-population

2. Preserving global biological diversity is a challenge that is receiving much attention. Conservation of components of biodiversity, like zoos, outside of a natural habitat, are called ...
 - A. In-situ
 - B. Ex-situ
 - C. Out-situ
 - D. Un-situ

3. The preservation of biological diversity depends on local efforts and global efforts. The **Canadian Biodiversity Strategy** was created to preserve biodiversity in Canada in ...
 - A. 1850
 - B. 1905
 - C. 1950
 - D. 1995

4. The Calgary Zoo, besides being home to a diverse group of animals and plants, is an educational institution that runs school programs for K-12 students. It is also part of a worldwide network that is attempting to protect and preserve ...
 - A. exotic species
 - B. native species
 - C. domestic species
 - D. endangered species

5. Global Treaties: 1975 Convention on International Trade of Endangered Species (CITES) is aimed at preventing endangered plants and animals from being imported or exported. It is...
 - A. harmful to the health of participating individuals and their families
 - B. illegal to buy or sell animals or animal parts identified for protection
 - C. unethical to take advantage of animals that are endangered or threatened
 - D. immoral to kill animals without the proper licenses or certificates

10/10/2010

1. The first step in the process of identifying a problem is to define the problem.

- a. Identify the symptoms of the problem.
- b. Determine the cause of the problem.
- c. Develop a plan to solve the problem.
- d. Implement the plan.

2. The second step in the process of identifying a problem is to analyze the problem.

- a. Gather information about the problem.
- b. Identify the stakeholders involved in the problem.
- c. Determine the resources available to solve the problem.
- d. Develop a plan to solve the problem.

3. The third step in the process of identifying a problem is to generate solutions.

- a. Brainstorm ideas for solving the problem.
- b. Evaluate the ideas for their feasibility.
- c. Select the best idea for solving the problem.
- d. Develop a plan to solve the problem.

4. The fourth step in the process of identifying a problem is to implement the solution.

- a. Develop a plan to solve the problem.
- b. Assign responsibilities for solving the problem.
- c. Monitor progress and adjust the plan as needed.
- d. Evaluate the results of the solution.

5. The fifth step in the process of identifying a problem is to evaluate the solution.

- a. Determine if the solution has solved the problem.
- b. Identify any unintended consequences of the solution.
- c. Determine if the solution is sustainable.
- d. All of the above.

Unit A: Biological Diversity

Outcome #1-Observe differences of organisms that are the same species and differences between organisms of different species. How do these differences help a species survive?

Essential Outcomes (Ideas I must understand)	My Understanding			
<ul style="list-style-type: none"> Describe variations in living things and give examples of differences within a species and between different species. 	1	2	3	4
<ul style="list-style-type: none"> What is a niche? How does variation help closely related species survive in the same ecosystem? ie. warblers 	1	2	3	4
<ul style="list-style-type: none"> How does variation help members of a species survive a changing environment? 	1	2	3	4
<ul style="list-style-type: none"> How does the survival of one species affect the survival of other species? 	1	2	3	4

Outcome # 2- Investigate the many ways of reproduction and how they pass on characteristics to offspring.

Essential Outcomes (Ideas I must understand)	My Understanding			
<ul style="list-style-type: none"> Tell the difference between asexual and sexual reproduction <ul style="list-style-type: none"> Describe and give examples of asexual reproduction Describe and give examples of sexual reproduction Give examples of organisms that have both sexual and asexual reproduction Explain how a zygote and embryo develop in both plants and animal species 	1	2	3	4
<ul style="list-style-type: none"> Describe examples of different characteristics within a species, and define and give examples of discrete and continuous variation 	1	2	3	4
<ul style="list-style-type: none"> Discover how characteristics are passed on from parents to offspring and identify examples of characteristics that are: <ul style="list-style-type: none"> The same as characteristics of both parents. The same as characteristics of one parent. A combination of the characteristics of both parents. Different from both parents 	1	2	3	4
<ul style="list-style-type: none"> Give examples of characteristics that are heritable and those that are not heritable. As well, identify characteristics which are affected by both heredity and environment 	1	2	3	4

Outcome # 3- Describe how genetic materials contribute to characteristics of organisms, including characteristics that are the same and those that are different. Investigate technology used to change the genetics of organisms.

Essential Outcomes (Ideas I must understand)	My Understanding
<ul style="list-style-type: none"> Organize DNA, genes and chromosomes from simple to complex and how they contribute to genetic information 	1 2 3 4
<ul style="list-style-type: none"> What is the difference between meiosis and mitosis: <ul style="list-style-type: none"> ➤ What types of cells are produced? ➤ How do the cells compare genetically? ➤ How many times does cell division occur? ➤ How is genetic material combined during fertilization? 	1 2 3 4
<ul style="list-style-type: none"> Compare sexual and asexual reproduction in terms of genetics, what are the advantages and disadvantages of each. 	1 2 3 4
<ul style="list-style-type: none"> Define and tell the difference between artificial selection and natural selection. Give examples of each. 	1 2 3 4
Important Outcomes (Ideas that are important to know and be able to do)	My Understanding
<ul style="list-style-type: none"> Be familiar with technology that allows humans to change the genetics of organisms. What can these used for? What are advantages and disadvantages of these technologies? 	1 2 3 4

Outcome # 4- How do humans affect the survival of species and variation within species? Discuss issues related to human impact on species.

Essential Outcomes (Ideas I must understand)	My Understanding
<ul style="list-style-type: none"> Describe the number of different species and types of species on Earth and in different environments 	1 2 3 4
<ul style="list-style-type: none"> Describe the terms extirpation and extinction. How are these terms related to biological diversity? How do changes in the environment and human impacts change biological diversity? 	1 2 3 4
Important Outcomes (Ideas that are important to know and be able to do)	My Understanding
<ul style="list-style-type: none"> Look at strategies used throughout the world to maintain biological diversity and evaluate their success. 	1 2 3 4
<ul style="list-style-type: none"> How can biotechnology be used to change agriculture, forestry or environmental problems? Look at possible benefits and problems. 	1 2 3 4