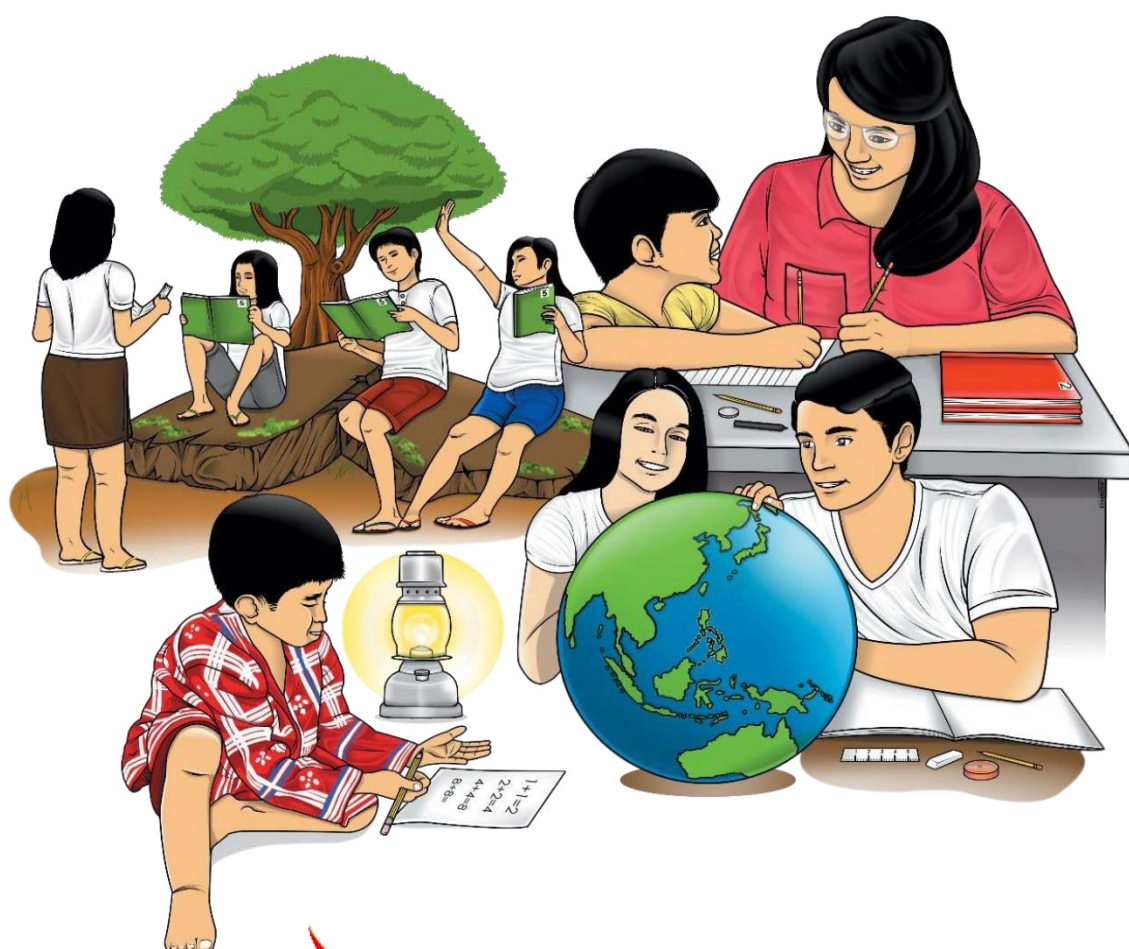


Senior High School



Earth and Life Science

Quarter 2 – Module 8: The Process of Evolution



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Earth and Life Science

Alternative Delivery Mode Quarter 2 – Module 7: Organ Systems of Representative Animals

First Edition, 2021

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What I Need to Know

This module was designed and written with you in mind. It is here to help you master the nature of Biology. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

The module covers:

- Lesson 8 – The Process of Evolution

After going through this module, you are expected to:

1. Explain how populations of organisms have changed and continue to change over time showing patterns of descent with modification from common ancestors to produce the organismal diversity observed today;
2. Explain the process of evolution.
3. Identify some scientists who contributed to the historical developments of evolutionary thoughts.
4. Compare Lamarckian and Darwinian Evolution;
5. Design a poster tracing the evolutionary changes in a crop plant (e.g., rice or corn) that occurred through domestication.

Lesson

1

The Process of Evolution

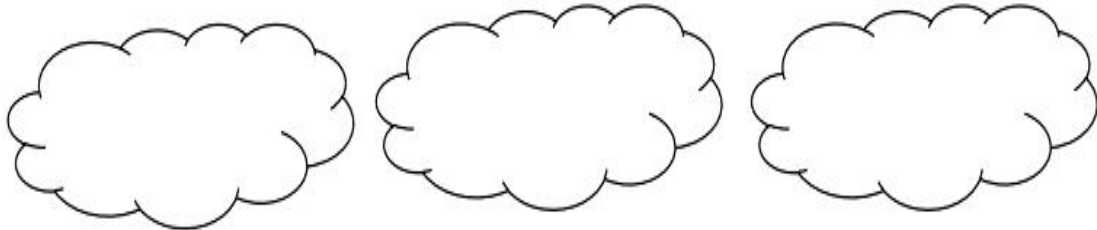
Charles Darwin formulated the theory of evolution by natural selection in his book “On the Origin of Species” in 1859. According to Darwin, Theory of Evolution refers to a change over time and the process by which modern organisms have descended from ancient organisms.



What's In

Activity 1

Inside the clouds, write your own thoughts about Darwin's Theory of Evolution.



What's New

The basis for the modern theory of evolution was laid during 1700s and 1800s. Charles Darwin sets sail on the H.M.S. Beagle, a voyage that would provide him with vast amounts of evidence that led to his theory of evolution. Alfred Wallace writes Darwin, speculating on evolution by natural selection, based on his studies of the distribution of plants and animals. The French naturalist Jean-Baptiste Lamarck was among the first scientists to recognize that living things have changed over time and that all species were descended from other species.

Other scientists who contributed to evolutionary thought were Carolus Linnaeus who formalized the binomial nomenclature and Thomas Malthus who believed that populations grow geometrically while resources slowly decrease, leading to competition.

Activity 2 The Who?

Identify the scientists who contributed to the historical developments of evolutionary thoughts by arranging the letters inside the box.

A	H	M	U	T	L	S
---	---	---	---	---	---	---

1. _____ Believed that populations grow geometrically while resources slowly increase or not at all, leading to competition

A	N	D	W	R	I
---	---	---	---	---	---

2. _____ Thought the idea of descent modification

N	I	L	E	N	A	S	U
---	---	---	---	---	---	---	---

3. _____ Father of Taxonomy

W	L	E	L	C	A	A
---	---	---	---	---	---	---

4. _____ Realized that species evolved because fittest individuals survived and reproduced passing their advantageous characters

A	A	C	R	L	K	M
---	---	---	---	---	---	---

5. _____ Proposed the Theory of Inheritance of Acquired Traits and Theory of Use and Disuse



What is It

Mechanisms of Evolutionary Changes

Mechanisms of evolutionary changes include genetic drift, migration or gene flow, mutation, natural selection, and nonrandom mating.

Genetic drift is a change in the gene pool of a population due to chance. Examples of genetic drift are bottleneck effect and founder effect. Bottleneck effect takes place when population decreases due to various environmental factors such as fires, earthquakes, and floods. The **founder effect** happens when a small population of organisms separates from the larger group to invade a new area.

Gene flow is described as the movement of genes from one population to another. When this happens, there is a tendency to increase the gene diversity in the populations.

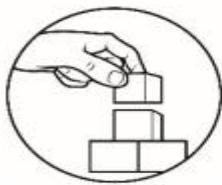
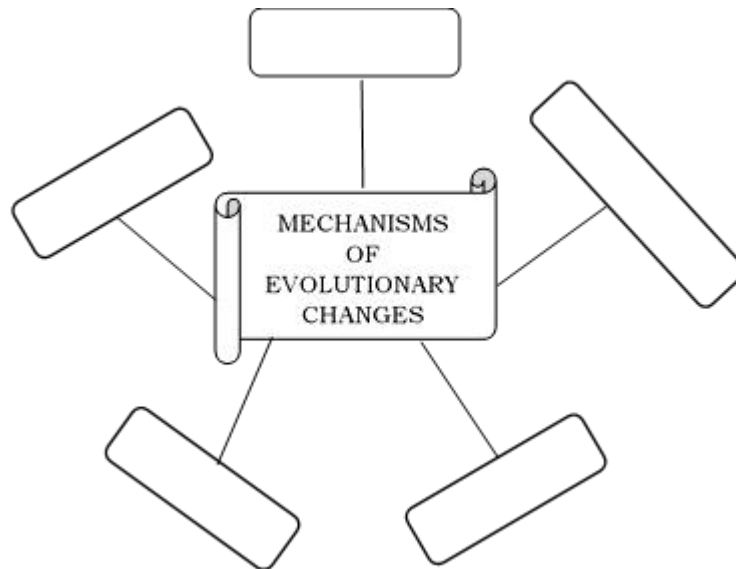
Mutation occurs when there is a change in the genetic makeup caused by environmental stressors. This process expands the diversity of organisms.

Natural selection explains the difference in survival of an individual and reproduction in a particular environment.

Nonrandom mating increases the frequency of animals with desirable traits. It causes evolution because it intrudes the natural pool of gene variations.

Activity 3

On a sheet of paper, copy and complete the concept map by supplying the mechanism of evolutionary changes.



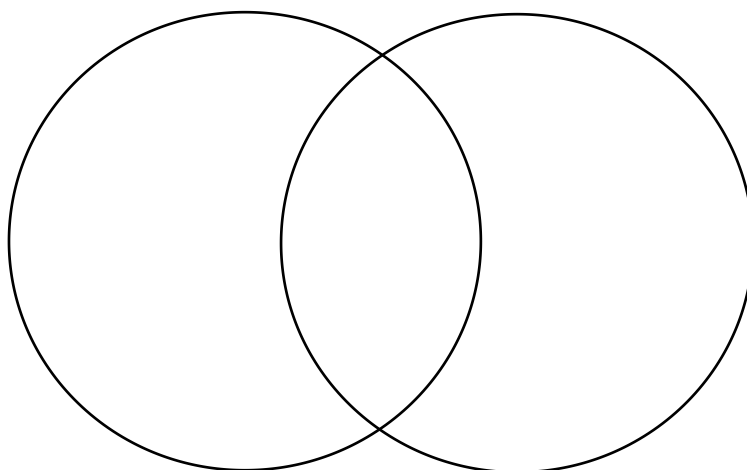
What's More

Lamarckian vs. Darwinian Evolution

According to Lamarck's Theory of Evolution, organisms change during their lifetime to survive then pass these changes to their offspring. On the other hand, Darwin's theory involves natural selection and struggle for existence. When an organism is fit and can adapt to its environment, it has a better chance to survive and more chance to reproduce.

Activity 4

Compare Lamarckian vs. Darwinian Evolution through Venn Diagram.



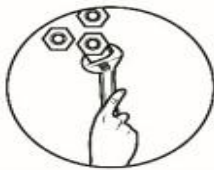


What I Have Learned

Activity 5

Complete the sentences.

- _____ refers to a change over time.
- _____ is the Father of Evolution.
- _____ is considered the Father of Taxonomy.
- Thomas Malthus believed that populations grow geometrically while resources slowly increase leading to _____.
- _____ proposed the Theory of Use and Disuse.
- _____ explains the difference in survival of individuals and how they reproduce in a particular environment.
- Gene flow is the movement of _____ from one population to another.
- _____ occurs when there is a change in the genetic makeup caused by environmental stressors.
- The _____ happens when a small population of organisms separates from the larger group to invade a new area.
- _____ takes place when population decreases due to various environmental factors such as fires, earthquakes and floods.



What I Can Do

Look at the picture below. This illustrates the evolution of phone. Describe each stage and tell the changes that occur in every phase. Write your answer on a sheet of paper.

PHONE EVOLUTION



Activity 7

Arrange the following pictures from ancient to modern based on your understanding about the Theory of Evolution. (Use numbers 1 to 5)





Additional Activities

Activity 8

Read the article of Sue Ann Zollinger posted last June 23, 2009 in Moment of Science. Then design a poster tracing the evolutionary changes occurred in domestic corn.

Have you ever wondered how corn evolved? After all, the seeds are all crammed together on the cob and wrapped tightly inside the thick husks. Seems impossible for the seeds to disperse without a human to peel the husks and separate the kernels.

Come to find out, corn, or maize, only exists in its modern form because of humans. Evidence from archaeological and genetic studies suggests that maize was bred and cultivated by early inhabitants of Mexico as early as ten thousand years ago. The early Mesoamericans managed to develop corn from its grassy ancestor by selective breeding. Maize was bred from a wild grain called teosinte.

Teosinte is so unlike modern corn that originally botanists didn't think the two were even related. An ear of teosinte is only about three inches long, with just five to twelve kernels. Compare that to the corn we eat today, which can have over five-hundred kernels!

Teosinte kernels also have a "tooth-crackingly" hard shell. But through many generations, ancient Americans selectively bred plants with larger and larger ears, and softer and softer kernels. Now all that is left of that hard shell is the thin tissue that gets stuck between your teeth when munching a cob of corn.

RUBRICS

Criteria	5 EXCELLENT	3 GOOD	2 NEED IMPROVEMENT	1 LOW PERFORMANCE
Correctness	Work is complete, well organized, has no errors and is done on time or early.	Work is generally complete, meets the requirements of the task, and is mostly done on time.	Work tends to be disorderly, incomplete, not accurate, and is usually late.	Work is generally sloppy and incomplete, has excessive errors and is mostly late or not at all.
Organization	Extremely well organized. Order and structure of information is compelling and flows smoothly.	Organized. Structure allows reader to move through content without confusion. Flows smoothly.	Somewhat organized. Structure allows reader to move through content without confusion. Flow is sometimes interrupted.	Poorly organized. A clear sense of direction is not evident.
Creativity	Enthusiastically uses materials and ideas for enhancements.	Uses materials and ideas for enhancements.	Show some use of materials and ideas.	Shows minimal effort for enhancement of materials and ideas.

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