Activity Sheet

**Worksheet: Lamark versus Darwin’s Evolutionary Theory**

**FET**
**Grade 12**
**Learning area:** Life Sciences
**Strand:** Biodiversity, change and continuity
**Specific Aim 1:** Acquiring knowledge of natural sciences
**Specific Aim 2:** Investigating phenomena in natural sciences

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**Activity: Comparing evolutionary theories**

The theory of evolution emerges from different lines of evidence, such as fossil records, modification by descent, and the evidence from biogeography, genetics and other forms of evidence. Jean-Baptiste Lamarck (1744-1829) and Charles Darwin (1809-1882) had different theories about how life on earth got to be the way it is now.

**Jean-Baptiste Lamarck (1744-1829)**

Lamarck was a French biologist who is best known for his Theory of Inheritance of Acquired Characteristics, first presented in 1801.

He believed that evolution was the “acquired traits” of a species that is inherited by its offspring. His theory was that if an organism continually used a structure to carry out a certain task, the structure used would become physically modified over time to make the task easier. This modified structure would then be passed on to any offspring. For example, if a short-nosed elephant was continually stretching out its trunk to try to reach the leaves high up in trees, it’s trunk would stretch and become longer over time, and any babies that it had would be born with longer trunks.

Lamarck also believed that when body parts were not being used, such as the human appendix, they gradually disappear. Eventually, people will be born without these parts. Lamarck believed that evolution happens according to a prearranged plan and that the results have already been decided.
Charles Darwin (1809 -1882)

Charles Darwin is famous for the theory of evolution and Natural Selection, or ‘Survival of the Fittest’. He dedicated his life to studying plants and animals and believed that the desires of animals have nothing to do with how they evolve. He said that organisms, even of the same species, are different in some ways, and over time those creatures which are adaptable, survive, while those that do not adapt to changing conditions, such as climatic and environmental change, do not live to breed and pass on their genes. He came to the conclusion that there was a variation of physical and behavioural features within a species. Organisms which had features that helped them to adapt to their environment and circumstances had a better chance of survival than individuals who lacked these features. These adaptable organisms survived to breed and produce offspring which generally inherited the ‘successful’ features of their parents. He called this process ‘natural selection’.

Darwin knew that organisms evolved and changed from generation to generation, but did not know how traits were passed on from one generation to another. Only after more was understood about genetics, was this explained. Darwin also suggested that each species evolves over time and adapts to the environment in which they live. Thus, the same species living in different environments will evolve differently and become more and more differentiated (different) over time. He believed that all species of life on Earth are interrelated and have a common ancestor.

Questions

Study the following pictures and then answer the questions that follow.

1. What is natural selection?
2. Is it a fact or a theory? Explain your answer.
3. What science was developed later which was found to support Darwin’s theory?
4. Which theory sounds like an explanation that Lamarck might give? Explain your answer.
5. Which theory sounds like an explanation that Darwin might give? Explain your answer.
6. What are the specific clues that most clearly distinguish a Darwinian explanation from a Lamarckian explanation?
7. What term did Lamarck use to explain how new species emerged?
8. What term did Darwin use to explain how new species emerged?
9. Do you think there is any similarity in the theories proposed by the two scientists? Explain.
10. Create a brief summary of the main differences between the two theories relating to the point below. Use the following table for your summary.

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<th>Lamarck</th>
<th>Darwin</th>
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<td>Evolutionary time</td>
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11. Evolutionary biologists studied both Lamarck and Darwin’s theories very carefully. Darwin’s theory has been supported by a lot of evidence. Lamarck’s Theory of Inheritance of Acquired Characteristics has been disproved. Write a paragraph on why we should believe Darwin and disprove Lamarck. Give suitable examples to back your argument.
Teacher notes

Lamarck and Darwin - How They Agreed
Unlike most other people at that time, Darwin and Lamarck both thought that life had changed gradually over time and was still changing, that living things change to be better suited and adapted to their environments, and that all organisms are related. Darwin and Lamarck also agreed that life evolved from fewer, simpler organisms to many, more complex organisms.

Why We Believe Darwin
Darwin’s theory has been supported by a lot of evidence. Lamarck’s Theory of Inheritance of Acquired Characteristics has been disproved. This was done in two major ways. The first is by experiment. We have seen through many real examples and observations that changes that occur in an animal during life are not passed on to the animal’s offspring. If a dog’s ears are cropped short, its puppies are still born with long ears. If someone exercises every day, runs marathons, eats well, and is generally very healthy, the fitness is not passed on and the person’s children still have to work just as hard to get that fit and healthy. These and other examples show that Lamarck’s theory does not explain how life formed and became the way it is.

These runners have become very fit, but their fitness will not be passed on to their children.
The other way that Lamarck’s theory has been proven wrong is the study of genetics. Darwin knew that traits are passed on, but he never understood how they are passed on. During the time when Darwin’s first book first came out, Gregor Mendel, who discovered genetics, was just starting his experiments. However, now we know a lot more about genetics, and we know that the only way for traits to be passed on is through genes, and that genes can not be affected by the outside world. The only thing that can be affected is which gene sets there are in a population, and this is determined by which individuals die and which ones live. This is the other way that we have learned that the fruits of an animal’s efforts can not be inherited by its offspring.