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Program Support Notes

Senior **S**econdary

29 mins

Natural Selection Its Place in Modern Society

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Suitable for:

Biology

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Natural Section – Its Place in Modern Society

For Teachers:

Introduction

Natural selection is a process which affects every species on Earth, including humans. Many people believe that as members of modern, technological societies we are immune to natural processes because we can modify our environment to suit our needs. This program illustrates how natural selection continues to affect us today and how it will determine our future survival as a species. The program includes a brief explanation of natural selection, examples of how natural selection is operating all around us, an exploration of the affects of natural selection on human evolution, and it's affects on our daily lives. The program concludes with the reciprocal view of how modern human society is affecting natural selection processes in the environment, and the consequences for the future of life on Earth.

Program Timeline

00:00:00	Introduction
00:01:24	What is natural selection
00:05:45	Summary – What is natural selection?
00:06:26	Is natural selection still operating today?
00:09:38	Summary – Is natural selection still operating today?
00:10:18	Does natural selection work on humans?
00:15:14	Summary – Does natural selection work on humans?
00:15:45	Genetic engineering and artificial selection
00:20:30	Summary – Genetic engineering and artificial selection
00:21:25	How will natural selection affect our future?
00:26:24	Summary – How will natural selection affect our future?
00:26:55	Conclusion
00:27:15	Credits
00:28:36	End program

Useful Resources

Hollis, Stephanie (2003) *Biology Options: The Human Story*. McGraw-Hill.

Website References

- <http://www.pbs.org/wgbh/evolution/library/index.html>
- <http://www.becominghuman.org/>
- <http://evolution.berkeley.edu/>
- <http://www.hhmi.org/biointeractive/>

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Student Worksheet:

Before Viewing the Program

1. Do you think living species are variable or unchanging? Why?
2. Briefly explain, in biological terms, what you think is meant by the term natural selection.
3. Briefly explain, in biological terms, what you think is meant by the term artificial selection.
4. Identify and explain an example of how natural selection could benefit our modern society.

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While Viewing the Program

1. What is the main **reproductive** way species attempt to ensure the survival of their kind?

2. Complete the sentences:

Natural selection favours certain _____ of species. The selection _____ lead to differential survival of some _____ over others. In the cat family, surviving individuals like the cheetah end up with

3. What is the common term used for human induced selection pressures?

4. What has possibly been the most profound historical influence that humans have had on the evolution of modern species?

5. Fill in the blanks:

Powerful selection pressures are exerted in the modern world by

P _____ v _____ and a _____ .

Humans also exert selection pressures within the natural environment through

- _____
- _____
- _____
- _____

6. What are the three major types of variations apparent among modern humans?

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7. What is the evolutionary reason for the range of differences within the human race?

8. Identify two ways in which modern humans are still subject to natural selection.

9. What is the common term for the transplanting of genetic material to achieve a change in the characteristics of a species?

10. Identify one reason that genetically modified organisms (GMOs) can be a cause for concern.

11. Why wouldn't natural selection and adaptation continue to sustain a high level of biodiversity in spite of modern, human-influenced climate change?

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After Viewing the Program

1. Investigate the information provided about natural selection via the four website links under Website References.
2. In small groups, design a poster illustrating how natural selection drives evolutionary adaptation in living things, using an example of your choice (e.g. a predator/prey relationship).
3. Write a short story about how you would genetically modify yourself using characteristics of other organisms, in an attempt to survive dramatic climate change.
4. Discuss, design and act out a role-play based around the evolutionary adaptations of modern humans over the past 150,000 years. Include the three major types of variations (morphological, physiological and behavioural).
5. In small groups, design your own games of 'hangman' based on words related to natural selection and play it with the rest of the class.

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Suggested Student Responses

1. What is the main reproductive way in which species attempt to ensure the survival of their kind?
Through the overproduction of young organisms.
2. Complete the sentences:

Natural selection favours certain **variations** of species. The selection **pressures** lead to differential survival of some **individuals** over others. In the cat family, surviving individuals like the cheetah end up with **advantageous characteristics**.
3. What is the common term used for human induced selection pressures?
Artificial selection
4. What has been perhaps the most profound historical influence that humans have had on the evolution of modern species?
The domestication of plants
5. Fill in the blanks:
Powerful selection pressures are exerted in the modern world by
Pesticides Vaccines and Antibiotics .
6. Humans also exert selection pressures within the natural environment through
 - **Hunting**
 - **Clearing**
 - **Conservation**
 - **Farming**
7. What are the three major types of variations apparent among modern humans?
Morphological
Physiological
Behavioural
8. What is the evolutionary reason for the range of differences within the human race?
Adaptation in various ways to different biological and environmental niches
9. Identify two ways in which modern humans are still subject to natural selection.
Individuals with high red blood cell numbers are better suited for survival at high altitudes.
Individuals with dark skin pigment are better suited for survival in hot, dry climates.
10. What is the common term for the transplanting of genetic material to achieve a change in the characteristics of a species?
Genetic engineering
11. Identify one reason that genetically modified organisms (GMOs) can be a cause for concern.
The genetic alteration could affect wild populations in unknown ways through natural hybridisation
12. Why wouldn't natural selection and adaptation continue to sustain a high level of biodiversity in spite of modern, human-influenced climate change?
Natural selection is a slow evolutionary process that, in most species, occurs gradually over many hundreds of generations. Because of this, many populations would not be able to adapt fast enough to survive accelerated, dramatic changes in climate.