**PBS Evolution Movies  Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Bio H (Wear Headphones)

**Objectives:**

Bio.3.4 Explain the theory of evolution by natural selection as a mechanism for how species change over time.

Bio.3.4.1 Explain how fossil, biochemical, and anatomical evidence support the theory of evolution.

 • Summarize the hypothesized early atmosphere and experiments that suggest how the first “cells” may have evolved and how early conditions affected the type of organism that developed (first anaerobic and prokaryotic, then photosynthetic, then eukaryotic, then multicellular).

 • Summarize how fossil evidence informs our understanding of the evolution of species and what can be inferred from this evidence.

 • Generalize what biochemical (molecular) similarities tell us about evolution. • Generalize what shared anatomical structures (homologies) tell us about evolution.

Bio.3.4.2 Explain how natural selection influences the changes in species over time.

 • Develop a cause and effect model for the process of natural selection:

 ▪ Species have the potential to increase in numbers exponentially.

 ▪ Populations are genetically variable due to mutations and genetic recombination.

 ▪ There is a finite supply of resources required for life.

 ▪ Changing environments select for specific genetic phenotypes.

 ▪ Those organisms with favorable adaptations survive, reproduce and pass on their alleles.

 ▪ The accumulation and change in favored alleles leads to changes in species over time.

 • Illustrate the role of geographic isolation in speciation.

Bio.3.4.3 Explain how various disease agents (bacteria, viruses, chemicals) can influence natural selection.

 • Develop a cause and effect model for the role of disease agents in natural selection including evolutionary selection of resistance to antibiotics and pesticides in various species, passive/active immunity, antivirals and vaccines.

DIRECTIONS:

Watch the following movies and answer the questions about each. Be prepared to discuss your thoughts.

  –site location:  <http://www.pbs.org/wgbh/evolution/educators/teachstuds/svideos.html>

1- Go to the web site.

2- Click on *Quick Time* under the video clip.

3- Click Descriptive Video Services ONCE and wait ~ 1min.

4- Watch the video clips on Quick time and answer the following questions.  You may pause and replay the clips as needed.

 If for some reason they don’t play, go to You Tube and search the title of the video ‐they have been uploaded there also <https://www.youtube.com/playlist?list=PL5270149AB732F0FB>

***Please view these clips with an open mind; remembering that an educated person must be able to listen and consider the view of others even if one decides this view is not right for him/her.***

**1.  Isn’t Evolution just a Theory** [5:07 min]*[Please, watch video clip prior to answering questions.]*

a.  What is a *theory* in science?

b.  What is the theory that new species change over time?

c.  What did people used to believe about the SUN?

d.  What did evidence do to disprove this theory that the sun revolved around the Earth?

e. Use the information above to answer the following statement in paragraph format.

 Is it correct to say the evolution is JUST a theory? Is gravity JUST a theory? Defend your answer.



**2.  Who was Charles Darwin?**[5:07 min]

a.  Why was Darwin considered to be a "revolutionary"? [2-3 sentences.]



**3.  How do we know Evolution Happens?**

a.  What are the 3 types of evidence presented in the video?

b. Describe the transitional fossils associated with whale evolution. Include specific examples of these fossils and explain why they are considered to be whale ancestors?



**4.  How does Evolution Really work?**

a.  What is the definition of Evolution?

b.  How do new species arise?

c.  What is natural selection?

d.  What is genetic variation?

e.  What is overproduction of offspring?

f. What is struggle for existence?

g. THINK ABOUT IT! Can a millimeter change in the length in a hummingbird’s bill have an affect on the hummingbird’s life?

 Describe the process of natural selection and how it affects hummingbird populations. [2-3 sentences]



**Video 5 - Did Humans Evolve?**

a. Explain how DNA sequences are used to provide evidence of common ancestry.



**Video 6.  Why does Evolution Matter now?**

a.  Why is the Russian prison system considered to be “ground zero” in the fight against TB? (Tuberculosis)

b.  What is responsible for the evolution of TB strains that are resistant to multiple drugs?

c.  How does the misuse of antibiotics affect the evolution of disease‐causing bacteria? Use the theory of natural  selection to explain the growing resistance to antibiotics.

d.  Why should we care about a resistant strain of TB in Russia?



**Video 7 - Why Is Evolution Controversial Anyway?**

Many mainstream religions (including Catholicism) do not find a conflict between faith and evolution.  Describe how a person can reconcile what the bible says with what science says and include your own views about whether you think a person can believe in God (and the bible) and also understand the Theory of Evolution.

|  |  |  |  |
| --- | --- | --- | --- |
| Grading  | Per video section |  |  |
|  | Beginning | Knowledgeable | Exemplary |
| Expression | Ideas are vague and not well supported (1 pts) | Ideas expressed are concrete and supported by thoughts and evidence (2 pts) | Ideas expressed are concrete, show depth of thought, and are well supported (3 pts) |
| Clarity | The question of the essay is not answered, opinions are meandering and unfocused (1 pt) | The question is answered clearly and thoughtfully, although focus is somewhat lacking. (2 pts) | The question is answered clearly and thoughtfully, writer maintains focus and clearly defends position. (2 pts) |

**PBS Evolution Movies  Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Bio (Wear Headphones)

Objectives:

Bio.3.4 Explain the theory of evolution by natural selection as a mechanism for how species change over time.

Bio.3.4.1 Explain how fossil, biochemical, and anatomical evidence support the theory of evolution.

 • Summarize the hypothesized early atmosphere and experiments that suggest how the first “cells” may have evolved and how early conditions affected the type of organism that developed (first anaerobic and prokaryotic, then photosynthetic, then eukaryotic, then multicellular).

 • Summarize how fossil evidence informs our understanding of the evolution of species and what can be inferred from this evidence.

 • Generalize what biochemical (molecular) similarities tell us about evolution. • Generalize what shared anatomical structures (homologies) tell us about evolution.

Bio.3.4.2 Explain how natural selection influences the changes in species over time.

 • Develop a cause and effect model for the process of natural selection:

 ▪ Species have the potential to increase in numbers exponentially.

 ▪ Populations are genetically variable due to mutations and genetic recombination.

 ▪ There is a finite supply of resources required for life.

 ▪ Changing environments select for specific genetic phenotypes.

 ▪ Those organisms with favorable adaptations survive, reproduce and pass on their alleles.

 ▪ The accumulation and change in favored alleles leads to changes in species over time.

 • Illustrate the role of geographic isolation in speciation.

Bio.3.4.3 Explain how various disease agents (bacteria, viruses, chemicals) can influence natural selection.

 • Develop a cause and effect model for the role of disease agents in natural selection including evolutionary selection of resistance to antibiotics and pesticides in various species, passive/active immunity, antivirals and vaccines.

Watch the following movies and answer the questions about each. Be prepared to discuss your thoughts.

  –site location:  <http://www.pbs.org/wgbh/evolution/educators/teachstuds/svideos.html>

1- Go to the web site.

2- Click on *Quick Time* under the video clip.

3- Click Descriptive Video Services ONCE and wait ~ 1min.

4- Watch the video clips on Quick time and answer the following questions.  If for some reason they don’t play, go to You Tube and search the title of the video ‐they have been uploaded there also <https://www.youtube.com/playlist?list=PL5270149AB732F0FB>

***Please view these clips with an open mind; remembering that an educated person must be able to listen and consider the view of others even if one decides this view is not right for him/her.***



**1.  Isn’t Evolution just a Theory**

a.  What is a theory in science?

b.  What is the theory that new species change over time?

c.  What did people used to believe about the SUN?

d.  What did evidence do to disprove this theory that the sun revolved around the Earth?



**2.  Who was Charles Darwin?**

a.  Why was Darwin considered to be a "revolutionary"?

b. Write 3 sentences to summarize the video



**3.  How do we know Evolution Happens?**

a.  What are the 3 types of evidence presented in the video?

b. Describe the transitional fossils associated with whale evolution. Include specific examples of these fossils and explain why they are considered to be whale ancestors?



**4.  How does Evolution Really work?**

a.  What is the definition of Evolution?

b.  How do new species arise?

c.  What is natural selection?

d.  What is genetic variation?

e.  What is overproduction of offspring?

f. What is struggle for existence?

g. Can a millimeter change in the length in a hummingbird’s bill have an affect on the hummingbird’s life? Describe the process of natural selection and how it affects hummingbird populations.

**Video 5 - Did Humans Evolve?**

a. Explain how DNA sequences are used to provide evidence of common ancestry.

**Video 6.  Why does Evolution Matter now?**

a.  Why is the Russian prison system considered to be “ground zero” in the fight against TB? (Tuberculosis)

b.  What is responsible for the evolution of TB strains that are resistant to multiple drugs?

c.  How does the misuse of antibiotics affect the evolution of disease‐causing bacteria? Use the theory of natural  selection to explain the growing resistance to antibiotics.

d.  Why should we care about a resistant strain of TB in Russia?



**Video 7 - Why Is Evolution Controversial Anyway?**

Many mainstream religions (including Catholicism) do not find a conflict between faith and evolution.  Describe how a person can reconcile what the bible says with what science says and include your own views about whether you think a person can believe in God (and the bible) and also understand the Theory of Evolution.