

Wednesday, February 5, 2014

Unit: Genetics

Lesson 14

Big Ideas

Genetic information is passed from parent to offspring.

Living things change over time: Evolution

Living things are alike yet different

Objectives

1. Students will be able to model the process of natural selection in an activity
2. Students will be able to debate the merits of evolution, natural selection, artificial selections, adaptations, and mutations.

Materials

Science Notebooks

Science books

Project Wild sheets

Beads

Bottle neck jar

Slips for discussion questions

Video

Procedures/Strategy

1. Students will enter the classroom and write the I can statements in their notebooks. Teacher will instruct students on the objectives of the day.
 - If 2 hour delay, video and discussion
 - If normal day, bottleneck activity
2. Activation of prior knowledge: Engage
 - Think/Pair/Share
 - What is the difference between natural selection and artificial selection?

- How does natural selection lead to evolution?

3. Bottleneck activity

- Divide class into groups (2-4 students)
 - Each group gets: Copy of Key to Genetic Characteristics, Key to Environmental situations, and Black footed ferret bottleneck scenarios
 - Review terms of genetic diversity and how natural selection acts on genes to cause evolution in a population/ species
 - Discuss Gene color key
 - Place genes into colored bottle and mix.
 - Distribute genes randomly (as in a population).
 - Have students match genes to the genes in the key.
 - Choose 5 cards from the deck
 - Complete the worksheet using your information
 - Present results
 - Class room discussion
 - Why does genetic diversity help protect a population?
 - Why would a small population have a higher risk of being eliminated than a large population?
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OR

1. Watch video (Explain/Explore)
 - <http://vimeo.com/47181679>
2. Socratic discussions (Elaborate)
 - Break classroom up into either groups of 4 or assign groups
 - Put questions in strips in beakers.

Content Vocabulary

Species	Evolution	Variation
Fossil	Scientific Theory	
Adaptation	Natural Selection	

Evaluation

1. Formative
Response to discussion, thumbs up/down
2. Summative
Quiz Monday/Tuesday

Extensions/Next Steps

- In the next class we will be continuing in another activity to model natural selection, students will have another opportunity to see the information in a new format
- Next lesson: Rates of change
- Homework: None, Vocabulary due on Friday.

What is the difference between natural selection and artificial selection?

What is evolution? Provide an example.

Does genetic diversity help, or hurt a population? How?

How can mutations be helpful and harmful?

Why would a small population have a higher risk of being eliminated than a large population?

What are adaptations? Provide 4 examples

What evidence does science have for evolution?

Some people argue that because evolution is only a theory, does not that mean it is true, what do you think? Consider the definition of theory in your answer.

What do you think of the term 'survival of the fittest'? Is it the best description of evolution?

Does evolution always produce animals which are "better"? What about cave-living fish which lose their eyes? Or island-living birds which lose the ability to fly?

Why do you think that some species survive and evolve while others go extinct?

Many schools in the USA teach creationism – the idea that God put humans on Earth in their present form some 7,000 years ago - as an alternative to evolution. What do you think of this?

What do you think of the idea of "Young Earth Creationism," the idea that the Earth is only, roughly, 6000 years old? Is this belief scientifically plausible at all?

Are evolution and religion naturally incompatible?

Supporters of the idea of "Intelligent Design" maintain that if something looks designed then it was designed. What do you think of this argument?

Do you think that intelligent design or creationism are legitimate scientific alternatives to evolution? Why or why not?