

Original 5-E Lesson Plan Natural Selection

Lesson Title: Toothpick Fish	Lesson Length: 50 min.
Lesson Goal: Understanding the Process of Natural Selection	
Lesson Objectives: SWBAT demonstrate how the process of Natural selection results in changes in genotype and phenotypes of a population over time.	
Standards addressed (MSDE or national): Expectation 3.4 -The student will explain the mechanism of evolutionary change. Indicator 3.4.1 -The student will explain how new traits may result from new combinations of existing genes or from mutations of genes in reproductive cells within a population. Assessment limits: <ul style="list-style-type: none"> • natural selection (definition; effects of environmental pressure) • adaptations (effects on survival) • variation (effects on survival and reproductive success) 	
List of Materials: Worksheet: "Toothpick Fish Colored toothpicks: 8 of each, red, yellow, and green Petri dish	
INSTRUCTIONAL SEQUENCE	
Phase One: Engage the Learner	
<i>Previous lesson: Introduction to Charles Darwin and natural selection. Prior Knowledge: understanding that two alleles determine a trait, DNA determines the RNA which determines the protein which determines the traits of an organism.</i>	
What's the teacher doing? Powerpoint slide of an animal that blends into one environment and not the other.	What are the students doing? Address the question with the Powerpoint slide...what environment is the animal best suited for? Why? What determined which would be best?
Phase Two: Explore the Concept What's the teacher doing? <ul style="list-style-type: none"> • Read directions of activity to class as they follow with the paper. • Pass out the toothpicks in the petri dishes, divide into pairs • Circulate through class to see progress and assist. Summary of activity	What are the student's doing? *Reading and listening to the directions. * working with a partner to work through the activity.

5E Lesson Planning
Module 2: Biology Online Professional Development

*each toothpick represents an allele for color in the fish. Red toothpick (red allele), green toothpick (green allele) and yellow toothpick (yellow allele). Two alleles determine the fish phenotype. G is dominant to R and Y, R and Y together are codominant. GY, GR and GG = a green fish, RR= red fish, YY=yellow fish and RY= orange fish (the codominant trait). The students “mate” the fish by picking out a pair of alleles from the dish. That represents one offspring. They pair all which gives 12 offspring. They record the genotypes and phenotypes in a chart. This is generation 1. The YY fish cannot mate and do not make it to the next generation. The students remove these toothpicks. The rest of the fish go back into the pond (dish) to mate for the second generation. This goes on for 3 more generations. The fourth generation there is a toxic waste dump that kills the green weeds that the fish live in and the students have to take out all of the green fish because they cannot hide in the weeds and get eaten. Students see what happens to the alleles and phenotypes of the fish over 4 generations and that this is a model of natural selection in action.

Phase Three: Explain the Concept and Define the Terms

<p>What’s the teacher doing?</p> <p>This is a lesson that is utilizing the concepts previously taught. The concepts will be reviewed as we go over the activity.</p>	<p>What are the students doing?</p> <p>The concepts are explained as they go through the activity. They are utilizing previous knowledge of alleles, traits, genotype and phenotype. They are modeling natural selection in action.</p>
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Phase Four: Elaborate on the Concept

This lesson is an elaborate as well as explore. Learning about Darwin and Natural Selection in the previous class was the “explain”

<p>What’s the teacher doing?</p> <p>Questions are on the activity that allow the students to assess purpose of the activity. .</p>	<p>What are the students doing?</p> <p>Working individually to answer the thought questions in the activity.</p>
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Phase Five: Evaluate students' Understanding of the Concept

<p>What’s the teacher doing?</p> <p>*Checking the data...students are sharing Data on the board to see if there is a pattern.</p>	<p>What are the students doing?</p> <p>*writing data on board, answering questions</p>
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