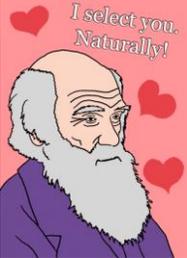


5-E Updated Lesson Plan Natural Selection

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: *Computers, Access to Glog designed by Alyson Donoghue (www.adonoghue.weebly.com select the page ‘Natural Selection Glog’ under the GT bio tab...als under the UDL class tab) *printer *Colored toothpicks: 8 of each, red, yellow, and green (For 7 sets) *Petri dish (7)	
INSTRUCTIONAL SEQUENCE	
Phase One: Engage the Learner	
<i>Previous lesson: Introduction to Charles Darwin and natural selection. This is available on the Glog to review. Summary of Charles Darwin and the Theory of Evolution from the MSDE On-line course Unit 6: Evolution, Lesson A: Explaining biodiversity Activity 1 P4: Charles Darwin video and notes using the graphic organizer.</i>	
	
<i>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>	
<u>What’s the teacher doing?</u> *Guiding students to drop backpacks off at their desk and going to an assigned lab	<u>What are the students doing?</u> *Glog: click on the Drill “Who Wants to Survive a Million Years?”

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<p>table. *direction students to go to teacher web page and selection “Natural Selection Glog” under Gt Bio tab. *assisting students as needed. *lead the discussion after all groups have a chance to play a few times.</p>  <p style="text-align: right;">image to select on Glog</p>	<p>*play the game to see what it takes to survive to a million years. Students select organisms with specific traits that they think will help their organisms survive. There are environmental conditions that change and students have a chance to add different organisms into the population. Questions: Did you survive the first try? Why or why not? What adjustments did you make? What traits did the organisms have to help them survive? Why? What determined which traits would be best?</p>
Phase Two: Explore the Concept	
<p><u>What’s the teacher doing?</u></p> <ul style="list-style-type: none"> • Instruct student to view the rest of the glog. • Pass out the toothpicks in the petri dishes. • Circulate through class to see progress and assist. 	<p><u>What are the student’s doing?</u></p> <p>*Reading and listening to the directions in the Glog. * working with group members to work through the activities. *record data on the spreadsheet (accessed by a link on Glog)</p>
Summary of activity	
<p>* The Glog has pictorals and written descriptions of what to do in the activity. Along with the written description is an audio for each part.</p> <p>The hands-on part of the activity: *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 codominate 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. Please see the Glog.</p>	
Phase Three: Explain the Concept and Define the Terms	
<p><u>What’s the teacher doing?</u></p> <p>This is a lesson that is utilizing the concepts</p>	<p><u>What are the students doing?</u></p> <p>The concepts are explained as they go</p>

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previously taught. The concepts will be reviewed as we go over the activity.	through the activity. They are utilizing previous knowledge of alleles, traits, genotype and phenotype, dominant and recessive alleles. There are links on vocabulary words that define each. The students are modeling natural selection in action.
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<p style="text-align: center;"></p> <p>Phase Four: Elaborate on the Concept</p>	image on Glog to select
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This lesson is an elaborate as well as explore. Learning about Darwin and Natural Selection in the previous class was the “explain”

<p><u>What’s the teacher doing?</u> Questions for analysis is on the Glog as a picture of a person with a thinking cap. When student select this, it links to a google doc survey with the questions.</p>	<p><u>What are the students doing?</u> *creating a graph by selecting the graph icon on the Glog. The graph will allow the student to identify trend in the data. *Working as a group to answer the thought questions in the activity as the google doc link.</p>
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Phase Five: Evaluate students' Understanding of the Concept

<p><u>What’s the teacher doing?</u> *Checking the data students enter as a group in the google docs *assessing graphs printed out or e-mailed *assessing the “Documentary” created by Each group.</p>	<p><u>What are the students doing?</u> * Answering the questions based on the data from the graph and the activity. *printing or-emailing graph *Using one of the listed tools to create a Toothpick fish and explain its genotype, phenotype, and what happened to it in the scenario by writing, making an audio or video “documentary”...directions in Glog. *There is a summary of what each group is to hand in by selecting “What are YOU to do?”</p>
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