Curriculum Sample: HS Science
Max. 8 Pages

Grade Level	High School (9th)	**Content Area**	Science
Course Title (grades 9-12 Only)	Honors Biology		
Length of Unit	Five 55-minute periods	**Time of Year**	Second Quarter
Expected Prior Knowledge *The knowledge/skills mastered earlier in the year foundational to the mastery of the required Standard in the current sample.*	Students will understand what genotype and phenotype are.		
Alignment to Program of Instruction *Briefly outline methods of instruction found in this sequence of lessons that align to the Program of Instruction described in A.3.*	The school's program of instruction stresses alignment with research-supported instructional techniques, including Hunter's Essential Elements of Instruction.		
Standard Number and Description *List the Number* and full description for the required Standard.*	HS.4.4.2 Grade: HS Strand: 4 – Life Science Concept: 4 – Biological Evolution (Understand the scientific principles and processes involved in biological evolution) PO: #2 - Explain how genotypic and phenotypic variation can result in adaptations that influence an organism's success in an environment.		
Summative Assessment *Describe a cumulative and comprehensive activity, clearly separate from instruction and guided or independent practice, which allows each student to individually demonstrate mastery of the required Standard. A copy of the summative assessment must be attached to the curriculum sample.*	Students will complete a 1-3 page summary of the critical points of the simulation. The summary must include the answer to 5 specific questions provided. The assessment and answer key are below.		
Scoring Scale and Mastery Level *Explain how the assessment is scored, to include points per question, how points are awarded, total points possible, criteria necessary to*	The 5 open-response questions will be scored on an absolute scale with an answer key provided for both the work that should be shown and the final answer. Partial credit will be awarded for the more complicated questions in the manner indicated on the answer key. Students must get at least 4 of the 5 questions completely correct (80%) to master the standard.		

demonstrate mastery, and grading scale. A copy of the answer key and scoring rubric (whichever applicable) must be attached to the curriculum sample.	
Materials/Resources Needed	ab adapted from www.biologycorner.com --Copy of worksheets from http://www.biologycorner.com/worksheets/peppermoth_paper.html --Sheet of white paper --Newspaper --Forceps --Colored Pencils --Clock with Second Hand --30 newspaper circles and 30 white circles (made with hole punch) --stop watch or clock with minute hand

* ***Standard Number****: For English Language Arts (Reading and Writing), use Grade, Strand, Standard (e.g., 3.RI.2). For K-8 Math, use Grade, Domain, Standard (e.g., 6.EE.7). For HS Math, use Conceptual Category-Domain, Standard (e.g., A-REI.6). For Science, use Grade, Strand, Concept, PO (e.g., 4.1.3.1).*

Lesson (add as needed	**Instruction**	**Student Activities**
1	SWBAT describe the environment in industrialized England of the late 1800's Key Points: Pollution had increased the amount of soot in the air and on outdoor surfaces in industrialized England of the 1880's Peppered moths has become darker Camouflage is a way to escape predation by blending in with the surrounding environment Tut hypothesized that the changes in the color of the peppered moths were due to selective pressure from avian predators Methods: Lecture, Teacher-led discussion, Brainstorming	Do-now: Students divide into small discussion groups and discuss ways to test Tut's hypothesis in the wild, and the difficulties in doing so.
2	SWBAT discuss the pros and cons of using a simulation to conduct a test Key Points: Simulation can be a way of testing a hypothesis when it is impractical to conduct test in the wild Simulations allow many scenarios to be run quickly and at lost cost Because they simplify environments to an extreme, simulations are not always accurate tests Methods: Guided-Practice	Do-now: Students split into groups of 6, and review worksheet on how the simulation will work. Groups explicitly state hypotheses they will be testing.
3	SWBAT describe first hand he pros and cons of using a simulation to test a hypothesis	Peppered Moth Simulation Students run simulation 3 times with a dark background, writing down results each time

	Key Points: Results should become more extreme with each generation if selection pressure continues Methods: Simulation, Guided-practice	
4	SWBAT discuss how old and current data support the hypothesis Key Points: Kettlewell's results support Tut's hypothesis Modern day observations in England, where the environment is now much cleaner, also support the hypothesis Methods: Guided-practice, Independent Practice	Do-now: Students analyze their own results, and then pool the information as a class and compare Students compare the results of their simulation with Kettlewell's real world studies Students discuss the reliability of using a simulation to predict real world events
5	Teacher provides framework for Summative Assessment	Each student writes and turns in a 1-page lab report using a provided format, on the simulation

Paste Summative Assessment Here:

You are to write a 1-3 page summary paper on your simulation of the Tut/Kettlewell scenario. You must include the answers to the following questions:

1) What observations caused Tut to form his hypothesis?
2) How did Kettlewell test Tut's hypothesis?
3) What was your group's hypotheses? (You will not be penalized for whatever side you were on, you just need to state clearly what your hypothesis was).
4) Why did we choose to use a simulation to test your hypothesis?
5) Name two advantages and two disadvantages of using a simulation as a way to test a hypothesis

Paste Answer Key/Scoring Rubric Here:

1) Peppered moths in areas with heavy pollution were becoming darker.(1/3) The outside was becoming darker due to a high level of particulate matter in the air.(1/3) The main predator of peppered moths is birds, which are visual hunters.(1/3)
2) He released equal numbers of light and dark moths in a forest in a polluted area and an unpolluted area.(1/2) He then counted how many of each type survived.(1/2)
3) A clearly stated hypothesis of any form is acceptable.
4) We used a simulation due to time and cost.
5) Simulations can be used to quickly and easily make tests as additional information is obtained.(1/4) They permit us to isolate and study one variable at a time.(1/4) They are less costly, and can give us an idea in a short time of what might actually occur over

many generations. (1/4)They are not as accurate because many factors which may have unknowingly influenced the outcome have been removed.(1/4)