Curriculum Sample Template
Max. 8 Pages

Grade Level	4th Grade	**Content Area**	Biology
Course Title (grades 9-12 Only)	Science 4		
Expected Prior Knowledge *The knowledge/skills mastered earlier in the year foundational to the mastery of the required Standard in the current sample.*	• Students understand how to work in precision partnerships effectively. • Understand the relationship of genes as the molecular basis of heredity • Collaborate in cooperative pairs • Ability to use class laptops responsibly and effectively		
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.*	This unit is built on the framework of the SIOP Model and incorporates all 8 of the SIOP Model components. Sentence framing and precision partnering are instructional strategies which promote the use and mastery of academic language. Instructional technology is incorporated by teacher and students. The core curriculum is implemented with fidelity.		
Standard Number and Description *List the Number* and the full description for the Required Standard or Science Performance Objective listed in section A.6.*	4 – Life Science 4 – Diversity, Adaptation and Behavior #1 - Recognize that successful characteristics of populations are inherited traits that are favorable in a particular environment.		
Materials/Resources Needed	• permission slips, Oxford Journal article, laptops for scienceprimer site, phenotype/genotype quiz, case studies, BBC video stream, Scientific American article, Day 1 answers, notebooks, field trip sign in, emergency contact numbers, yesterday's fieldtrip notes, article, highlighters, adaptation quiz, Day 4 quizzes, Adaptation Quiz #2, 5 paragraph rubrics, coping and mastery model copies/scans, jigsaw reading copies, human adaptation graphic organizers, presentation rubrics		

* ***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).*

	teacher instruction	student activities
Day 1	• BELL RINGER: Provide website for opening activity http://www.neok12.com/php/watch.php?v=zX537c467973705973775d59&t=Genetics • Facilitate heredity discussion • Present power point of genetics and the law of dominance • Explain how this is a frame for delving into genotype/phenotype specifics • Facilitate Mendelian Pea Plant activity • TICKET OUT: Proctor Genetics quiz	• BELL RINGER: On laptop, watch 'Mendel's Heredity experiment' • Participate in discussion about heredity and why offspring have the same phenotype (appearance) as their parents • Complete notes for genetics and the law of dominance presentation • Work with a partner to complete Mendelian Pea Plant activity and answer summary questions about the law of dominance as it pertains to pea plants, P1 and F1 generations • TICKET OUT: Genetics quiz • PERMISSION SLIPS: send permission slips home for this week's field trip
Day 2	• BELL RINGER: Review answers from Day 1 bell ringer • Stream Gost in Our Genes from BBC: http://www.documentary24.com/the-gost-in-our-genes-science-of-genetics--173/ • Distribute Punnett squares to pairs and demonstrate how Pea plant study from the previous day can be calculated using Punnett Squares • TICKET OUT: Give 1 paragraph writing prompt: write a personal response to the day's information that explores how genetics is responsible for children looking like their parents	• COLLECT PERMISSION SLIPS and GIVE REMINDERS! • BELL RINGER: Read word problem about Blue People from troublesome creek and answer questions about how the Law of segregation would apply to this case • Complete graphic organizer for documentary • Complete Punnett Square guided practice worksheet • Punnet square lab: Using a coin, students will flip to determine if each trait is dominant, mixed, or recessive. Using a Punnett square calculator on their laptops http://www.scienceprimer.com/punnett-square-calculator, they will determine the genotype and phenotype of their offspring. • TICKET OUT: Write a personal reflection about how genetics is responsible for children looking like their parents • PERMISSION SLIPS: send permission slips home for this week's field trip
Day 3	• BELL RINGER: Screen Popsci "10 Amazing Cases of Modern Evolution and Adaptations" http://www.popsci.com/science/article/2011-09/ten-	• COLLECT PERMISSION SLIPS • BELL RINGER: For each Popsci example, identify the traits (hair color, height, speed) that help the animal

	new-or-newly-discovered-animal-evolutions-including-humans • Ask for a prediction: what adaptations would be most advantageous for plants and animals living in the desert? Make a class list on the SMART Board • Present power point of natural selection and adaptations • TICKET OUT: Students identify one adaptation of an animal in the wild	survive • Participate in a prediction conversation and contribute ideas to the desert adaptation • Complete notes for genetics and the law of dominance presentation • In pairs, students will use laptops to research Tortoises on the Galapagos islands. They will identify how many variations there are to the tortoises' shells. They will choose three shells to diagram and explain how adaptation of each shell (phenotype) helps the tortoise survive in its environment. • TICKET OUT: Adaptation brain storm
Day 4	• BELL RINGER: Students use notes from previous day to answer summary question about the importance of adaptations for animals in different environments • Distribute Encyclopedia of Earth's "Adaptations of Desert Plants" http://www.eoearth.org/article/Adaptations_of_desert_plants?topic=74361 and lead discussion about additional adaptations and their advantages. • Give Build-a-beast activity rubric and explain expectations • TICKET OUT: Assign jobs (within group) for the Build-a-beast project part II for next day	• BELL RINGER: Animal adaptation to their environment questions • Students discuss adaptations they see and how those traits would be passed on to their offspring through earlier knowledge of Punnett Squares • Students complete Part I of Build-a beast activity: Students will be given an environment (cave, dessert, tundra, etc.) and will brainstorm ideas for the perfect animal for that environment. Students will need to identify what the animal will eat, how it will move, type of skin/fur, color, etc. Students will need to explain how each adaptation makes the animal well-suited for their environment • Students will review Build-a-beast project rubric for Part II for the following day • TICKET OUT: Assign jobs (within group) for the Build-a-beast project part II for next day and turn in list to teacher
Day 5	• BELL RINGER: Review Part II job assignments and have materials ready for each job (paper, scissors, colored pencils, markers, glue) • Review grading rubric for Build-a-beast project Part II and facilitate complete of posters • TICKET OUT: Clean work area	• BELL RINGER: Review job assignment for Part II of build-a-beast and make sure each person has gathered necessary supplies • Complete part II of activity: Students will complete a drawing/diagram of their perfectly adapted animal. Students will write an explanation of how each part of the animal allows it to survive in its environment.

		• specific adaptation for each animal will explain how that change could make the organism more successful • TICKET OUT: All supplies are put away and work area is cleaned
Day 6	• BELL RINGER: Give quick write prompt: What would happen to your animal if there was suddenly less rain where it lives? • Complete Part III of Build-a-beast activity: Present poster to class • Distribute presentation grading rubric and allows students time to prepare and assign roles for presentation • Distribute Build-a-beast graphic organizer and direct students to use it for presentation note taking • Facilitate presentations and complete rubrics for each • TICKET OUT: graphic org	• BELL RINGER: Writing prompt • Part III Build-a-beast: Present 'Beast' to class. Students will explain their environment and how their animal is well-adapted to live there. • Take notes when not presenting that document the main adaptation and benefit for each environment • Give presentation with group • TICKET OUT: graphic org and final draft of essay with self-assessment rubric and reflection
Day 7	• BELL RINGER: Distribute graphic organizers from yesterday and ask students to answer: What would happen to the population of this animal if they were suddenly living in your environment? How would the population need to change and adapt to survive where your animal lives? • Facilitate <u>JIGSAW READINGS</u> on populations of animals and how they adapt through generations to better survive in their environment • Facilitate discussion: Class discussion about how adaptations could make the organism more successful and how the fitness of the successful organisms would change the population over time • Review for Unit Test: Adaptations of Population in their Environment • TICKET OUT: Completed study guide	• BELL RINGER: Students will pick one animal graphic organizer chart of another group and answer: What would happen to the population of this animal if they were suddenly living in your environment? How would the population need to change and adapt to survive where your animal lives? • Read one assigned jigsaw article and document the following: 1) The main idea of the story 2) Three facts from the article that support the main ideas 3) Questions you have about the reading • Complete jigsaw through five groups to complete your worksheet. • Class discussion about how adaptations could make the organism more successful and how the fitness of the successful organisms would change the population over time • TICKET OUT: Completed study guide
Day 8	• Proctor Unit Test for Adaptations of Population in their Environment	• Take test: Adaptations of Population in their Environment

Adaptations of Population in their Environment Test Answer Key

1. B 2. A 3. C 4. C 5. D 6. D 7. A 8. B 9. B 10. C

Adaptations of Population in their Environment Quiz

4 – Life Science
4 – Diversity, Adaptation and Behavior
#1 - Recognize that successful characteristics of populations are inherited traits that are favorable in a particular environment.

1. Why do some characteristics get passed along to future generations, while others fade out of the population?
   A. Traits that offer a unique or different characteristic are more likely to be passed along.
   B. Traits that provide a survival advantage are more likely to be passed along.
   C. Traits that have been around for centuries are more likely to die out.
   D. Traits that give the organism new features are more likely to continue into the rest of the population.

2. The dominant trait would be represented by what type of letter in a Punnett Square?
   A. Capital letter
   B. Lower case letter
   C. Italic letter
   D. Bold letter

3. Why would the traits of strong leg and neck muscles be more likely to be passed along through the woodpecker population than leaner leg and neck muscles? Those muscles must:
   A. help woodpeckers to fly for longer distances.
   B. guarantee that woodpeckers will be able to climb trees more efficiently.
   C. ensure that woodpeckers are better able to hollow into trees (by using their beak) to eat and nest.
   D. assist woodpeckers in escaping from their natural predators.

4. The orchid has evolved over the years to look like a female honeybee (see the picture on the right). What purpose might this adaptation serve?
   A. It would more likely lure female honey bees who want to socialize.
   B. It would more likely repel other female honey bees trying to steal their food.
   C. It would more likely lure male honey bees looking for a mate to transport their pollen.
   D. It would more likely repel other male honey bees looking for some peace and quiet.

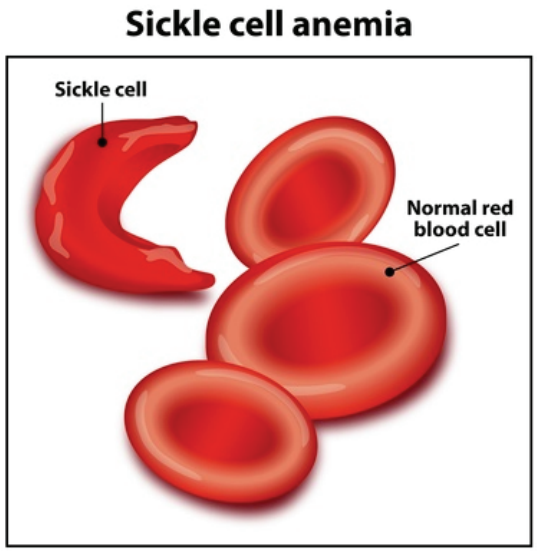
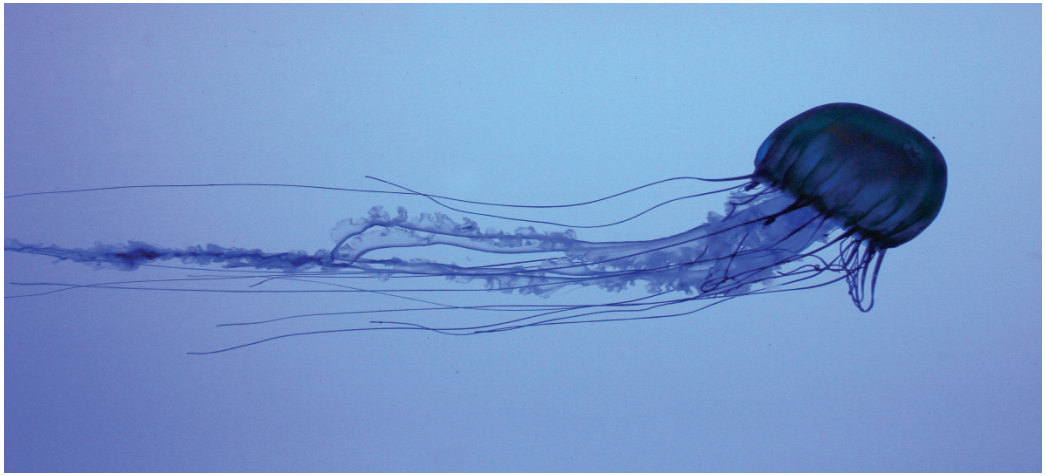
5. As many of us are painfully aware, honeybees have stingers. Why do you believe that a large sub-population of honeybees without stingers does not exist?
   A. because honeybees without stingers couldn't fight with other honeybees.
   B. because honeybees without stingers wouldn't be able to land successfully on flowers.
   C. because honeybees without stingers couldn't help pollinate flowers as well.
   D. because honeybees without stingers couldn't defend their nests from predators.

6. Which trait of a honeybee is most likely a 'behavioral adaptation'?
A. their stingers
B. the color of their jackets
C. the transparency of their wings
D. their pollen collection technique

7. Flounder are well-known for their unique physical attributes. The picture on the left shows you how the flounder appears in its natural habitat. What is the strongest reason that a flounder with a bright red skin has not become a part of the flounder population?
A. A red flounder would more likely be seen, caught, and eaten by its predators.
B. A red flounder would be less likely to attract a willing mate.
C. A red flounder would be more likely to be caught by fishermen.
D. A red flounder would struggle to find and kill food needed to survive.

8. A corpse lily has a smell quite unusual for a flower. The lily gives off a smell that has been described as the odor of 'rotting, stinking, dying flesh'. Why might this scent evolved as a successful adaptation?
   A. It attracts other corpse lilies to it during mating season.
   B. It keeps predators away with its gross smell.
   C. It warns potential prey to stay away from its blooms.
   D. It helps the lily better transport water to its leaves.

9. Sickle cell anemia is a painful human disease that changes the shape of human blood cells that causes them to get 'hooked' in the vessels and cause blockages. What might be one possible reason why this seemingly-undesirable trait still exists in the population of people living in tropical regions?
   A. The cell shape offers enhanced tanning abilities in the skin.
   B. The cell shape gives protection from the disease malaria.
   C. The cell shape cools the temperature of human blood.
   D. The cell shape reduces the flow of oxygen to parts of the body.



10. If jellyfish hadn't developed the adapted trait of venomous stingers to protect themselves, what other adaptation might have provided them with the same defense?
   A. a hard, heavy exterior shell
   B. eyes that could help them see predators
   C. flounder-like camouflage to hide them from predators
   D. teeth to help them bite