Lesson 1: Introduction to the Anchoring Phenomenon and Peppered Moth Survey Activity

I. Content Area: Life Sciences

II. Connection to the Central Focus

Central Focus: Evolution By Natural Selection

III. Clarifying Your Goals for the Daily Plan

Content Standard(s):

MS-LS4-4. Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.

Essential Questions:
Unit: How and why are the Bajau community unique to communities like ours?
Lesson: How do differences in coloration benefit some moths over others and allow them to avoid predation?

Learning Objectives:
Students will predict what traits are needed for the Bajau community to survive by the water by making observations of the Bajau community in order to understand how different groups of people have inherited different adaptations based on their environment.

Students will observe and analyze how different traits can be more or less advantageous by completing the Peppered Moth Activity to understand how variation is an integral principle of natural selection.

Students will analyze and interpret data by graphing their data from the Peppered Moth Survey to understand the role of the environment on beneficial traits.

Learning (Cognitive) Task:
Students will engage in a brief discussion of the anchoring phenomenon of the Bajau people, an indigenous community who reside on the coast of Indonesia who have multiple adaptations for spending 80% of their awake time in the water, students will be asked to think about how and Bajau people are able to spend so much time in water and why we cannot. After this discussion, students will move onto the main learning task which is the Peppered Moth Activity. Here students will be introduced to moths with two types of variations a white variety and a spotted variety. Students will also be given background information on the Peppered Moth's ecosystem and how its environment has changed as a result of human activity. Using white paper and

newspaper to model the 2 types of moths as well as the ecosystem before and after human influence students will observe and analyze how coloration can be a helpful or harmful adaptation when attempting to avoid predators.

IV. Scaffolding

A. Incorporating Academic Language

1. Language Objective:

Students will use general and specific nouns to explain how differences in color in moth populations allow certain moths to avoid predation as the environment has changed as result of the industrial revolution.

Describe how you would support students in their academic language for this lesson:

Language Demands	Content Specific Examples	Language Supports
Language Function (purpose)	Explanation of how the industrial revolution caused the environment to be altered and how that change resulted in different traits being more beneficial than others	Model how to write an explanation with students using a different species in a different environment
Vocabulary	peppered moth variation, light moth variation, environment, predation, industrial revolution, pollution	Read background information as a class and highlight and define any important or unknown academic words and phrases (mini lesson to pre-teach vocab prior to starting the activity)
Syntax	Using transition words and phrases to establish a causal relationship between the environment if	Providing sentence frames and providing anchor charts with transition words, phrases and causal connectives
Discourse	collaborative and proactive talk when working in lab groups during peppered moth activity, writing analysis and conclusion of activity, connecting lab conclusions to anchoring phenomenon of the Bajau people	Intentional seating and grouping of students in lab groups with varying academic abilities and strengths so that students can support one another, Provide summary table graphic organizer to record observations and connections to anchoring phenomenon

V. Formative (embedded) and/or Summative Assessments:

In this lesson, students will complete 2 forms of a formative assessment. The first formative assessment will be the activity packet and analysis and conclusion questions that will be collected the following day. The second is the graphic organizer, the summary table, in which students will connect what they have learned from the lab to the anchoring phenomenon of the Bajau community.

Once the unit is completed, a summative assessment in which students will answer the essential question in the form of a written, oral or google slide deck CER will be administered.

VI. Lesson Resources/Materials: ***List materials here.***

Materials needed for Lesson 1 include the slides with photographs of the Bajau people as well as the essential questions that will drive the entire unit. Furthermore, students will need newspaper discs and full newspapers, white paper discs and full white paper, forceps and the activity handout, as well as a summary table they will continue to use and fill out with subsequent lessons.

VII. Differentiation/Universal Design for Learning (UDL) Strategies

Engagement: Stop and Jot- Throughout the lab, I will explain questions and procedures prior to prompting students to continue the lab or answer their discussion questions

Representation: Pre-teaching- Because this is an intro activity to natural selection, some terms will have to be defined prior to students completing the lab.

Expression: Think pair share- As students discuss their observations with each other, students will be engaging in a think pair share.

VIII. Instructional Sequence: Engaging Student in the learning Process

Section/Time	Instructional Routines and Teacher/Student Actions	Differentiation
Introduction: 10 Minutes ● Connect to previous learning and personal, cultural, and community assets ● Create inquiry ● Set expectations and Goals ● Student Grouping ● Scaffolding for Diverse Learners ● Evidence of student learning ● Monitor/feedback	● Warm up- mid-week check in ● Introduction of the anchoring phenomenon, the Bajau people, an indigenous community native to Indonesia - encourage student curiosity ● Accountable partner talk of how and why the Bajau people might be able to spend so much time in water ● Class discussion based on partner/group discussions to get initial ideas of how adaptations might arise in population- check for understanding of initial ideas ● Transition to activity for the day by setting goals and expectations for the activity	● sentence frames for partner talks given verbally for students that need it ● Intentional seating arrangement and grouping of students for partner talks
Body: 30 Minutes ● Access new information ● Process new information ● Student Grouping ● Scaffolding for Diverse Learners ● Evidence of student learning ● Monitor/feedback	● Students performing the lab procedure based on activity procedures ○ counting newspaper discs and white paper discs ○ placing discs on either newspaper or white paper background ○ using forceps to grab discs to model the predator catching prey (discs)	● Intentional seating and grouping of students for lab activity ● frequent check ins with lab groups to check for understanding and monitor student learning ● providing feedback to individual students and groups

	● Students graphing and analyzing results of procedure in lab groups ● students answering lab analysis and conclusion questions	● mini-lesson on graphing for students who need it
Closure: 15 minutes ● Revisit Learning Target ● Connect today's concepts/knowledge/skills to the big idea(s) of the unit ● Students reflect on their learning and establish goals for the next lesson	● Class discussion of main findings of lesson activity ● Class analysis of graphical data ○ embedded with partner talk structures to interpret data where students identify observation and patterns ● Filling out summary table as a whole class to connect observations of lesson activity back to the anchoring phenomenon ● exit ticket where students explain why the differences in the coloration provided an advantage to predations before and after the industrial revolution	● intentional grouping of students for partner talks of graphical analysis and interpretation ● Modeling filling out summary table under document camera ● sentence frames and anchor charts for exit ticket explanation