Surviving and Thriving in the Natural World
Learning Sequence at a Glance

5E Stage	Title	Description
Engage (part 1): Day 1	Camouflage Insect Observation (Paused)	Students will make and record observations of a paused video of an insect that has physical characteristics, which helps it to blend in with its natural surroundings. Since the video will be paused, it is expected that the students will focus their notes more on the environment. After recording observations in their interactive notebooks, students will discuss what they have recorded with the class, while the teacher charts observations.
Engage (part 2): Day 1	Camouflage Insect Observation (Video Playing)	After students have shared, play the video and allow students to make new observations based on the new evidence. If students did not notice the insect in the paused video, they should be able to add new information to their notes about the insect and environment. After revising notes, students will share out while the teacher records the new information. Students will then write a statement about how the physical appearance of the insect helps it survive in its natural environment. Students will share their statements with their team. Teachers should make sure that students have an understanding of camouflage.
Explore 1: Day 1	Flatland- Hands On Activity	Students will record data and create a graph, based on the predator vs. species activity.
Explain 1: Day 1	Analyzing and Interpreting Data	Students will analyze and interpret the data collected from the activity to write evidence based claims about which color variation(s) of the species is most likely and most unlikely to survive in the assigned environment.
Evaluate 1: Day 1	Explanation	Teams will share out, with the class, what they observed and explain how the physical characteristics of coloring can help or endanger a species within an environment.
Explore 2:	Second Flatlands Activity	Students will replicate the hands-on investigation from the previous day with the survivors and off-spring of the survivors. They will collect data on the rates of survival with the next generation.

Explain 2: Day 2	Analyzing and Interpreting Data	Students will analyze and interpret the data collected from the activity to write evidence based claims about which color variation(s) of the species is most likely and most unlikely to survive in the assigned environment.
Explore 3: Day 3	Insect or Animal Research	Using their Chromebooks, students will work individually to research an animal or insect that relies on camouflage to help it survive.
Explain 3: Day 3		Students will complete a graphic organizer for specific information that will be used later in the final assessment.
Evaluate: Day 3	Insect or Animal Art	Students will create color, side-by-side drawings of their insect or animal in two different environments. One environment will represent a high chance of survival and the second will represent a lower chance of survival.
Final Evaluation: Day 4	Paragraph Form Explanation	Students will write a multiple paragraph essay about the insect or animal they selected. They will include facts from their graphic organizer in paragraph 1. Paragraph 2 will compare and contrast the two environments and the likelihood of survival, using evidence from the prior hands-on activity for their claims.

Topic: Camouflage Survival

Grade Level: Third Grade

- This learning sequence will follow the lessons on physical traits, behavioral traits, structures and functions.

Estimated Teaching Time: (Days may be broken up to suit classroom time constraints.)

Day 1: Approximately 1 hour

Day 2: Approximately 45 minutes

Day 3: Approximately 45 minutes

Day 4: Approximately 45 minutes

Life Science Standard 4: Biological Evolution: Unity and Diversity

Performance Expectations

3-LS4-2 Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages of surviving, finding mates, and reproducing.

3-LS4-3 Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

Science and Engineering Practices

Analyzing and Interpreting Data: Analyzing data in 3-5 builds on k-2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digit tools should be used.

- Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS4-1)

Constructing Explanations and Designing Solutions: Constructing explanations and designing solutions in 3-5 builds on k-2 experiences and progresses the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. (This learning sequence will focus on constructing explanations with evidence.)

- Use evidence (e.g., observations, patterns) to construct an explanation. (3-LS4-2)

Disciplinary Core Ideas

LS4.B: Natural Selection

- Sometimes the difference in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. (3-LS4-2)

LS4.C: Adaptation

- For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change. (3-LS4-2), (3-LS4-3)

Patterns

- Similarities and differences in patterns can be used to sort and classify natural phenomena. (3-LS3-1)

Systems and System Models

- A system can be described in terms of its components and their interactions. (3-LS4-4)

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes consistent patterns in natural systems. (3-LS4-1)

Mathematics

MP.2 Reason abstractly and quantitatively. (3-LS4-1, 3-LS4-2, 3-LS4-3, 3-LS4-4)

MP.4 Model with mathematics. (3-LS4-1, 3-LS4-2, 3-LS4-3, 3-LS4-4)

MP.5 Use appropriate tools strategically. (3-LS4-1)

3.MD.B.3 Draw a scaled pictograph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. (3-LS4-2, 3-LS4-3)

English Language Arts

W.3.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS4-1, 3-LS4-2, 3-LS4-3, 3-LS4-4)

W.3.9 Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3-LS4-1)

Students will understand that…..

- The physical variations of some species can contribute to it surviving well or not surviving well within a habitat.
- Animals that have better camouflage coloration than other animals may be more likely to survive in an environment.

- Collecting and graphing data can be used as evidence to help explain patterns.

Goals/Objectives:

Students will be able to…..

- Identify physical variations that can help an animal/insect survive or not survive in a habitat.
- Describe how organisms can use camouflage to survive.
- Make predictions about the likelihood of survival for individuals of a particular species, based on appearance.
- Create evidence based claims about whether or not a particular species will survive in an environment.
- Use technology to gather information about an animal or insect that uses camouflage to help it survive.
- Create a side-by-side representation of an insect/animal in two different environments that represent high survival rate vs. low survival rate.
- Discuss and share findings through group shares and whole class shares.
- Write a multiple paragraph, informative essay about a researched animal or insect, and describe its natural habitat and how it uses camouflage to help it survive.

Background: This learning sequence will follow after Galt Joint Union Elementary School District's, *Surviving and Thriving in the Natural World- Part 1*. In *Surviving and Thriving in the Natural World- Part 1*, students observe plants and animals at our local Consumnes River Preserve and make observations. Part 1 also includes making observations about ducks' looks and behaviors, the functions of bird feet and beaks, and making evidence based claims about how the structure and function of bird beaks and feet help them to survive.

Vocabulary previously taught: adaptations, physical traits, behavioral traits, survival, environment, habitat, and camouflage.

Materials Needed:

- Interactive Notebook
- Flatland Procedure Guide (1 per group)
- Patterned fabric or wrapping paper: enough to cover about 2 student desks. (different pattern for each group)
- Dots punched from 10 different, solid color papers. (10 of each color)
- Small container or bag to collect dots

- 2 student desks per group or similar sized area to lay out the fabric. (floor works well also)
- Handout 1 for Hands-on Activity
- Handout 2 for Hands-on Activity
- Research Graphic Organizer
- Handout 3 for illustrations and paragraphs
- Graphing paper

O.L.D: Opportunities for Language Development

E.S.R: Expected Student Response

5E Lesson Plan		**Concept, DCI, CCC, SEP, O.L.D- Opportunities for Language Development**
Engage: The purpose for the Engage is to pique interest and gets them personally involved in the lesson, while pre-assessing prior understanding.	(Play video with sound off) Using the video https://www.youtube.com/watch?v=MrMA9tJAOkE Set up the video without students seeing it prior to activity and pause the video at 40 seconds for observations. Have students title their notes as Surviving in Nature/Flatland. With the video paused have students record observations of what they see on the screen. (Remind students that scientists use words, pictures, and labels when taking notes.) Allow students several minutes to make a quick observation in their notes. Ask students to share whole class what they observe on the screen and noted in the notebooks. Chart answers on the left hand column of a T-graph. If students repeat observations, put a check mark next to the original. Prior to un-pausing the video, tell students that they will continue taking notes on what they observe in the rest of the video. Allow	**SEP: Asking questions and modeling** **CCC: Cause and Effect** **O.L.D: Similarities and differences, sequence of events**

	students several minutes to write observations in their notes. Have students share out their new observations, while you chart on the right column. You can label the columns after the chart is complete. In their notebooks, have students complete the sentence frame: In the beginning, I observed_____, but after the video played, I observed_____. Have students write at least one question they still have about the video. Remind students that their question might be answered over the next few days, but if it isn't they can always look it up later.	
Explore 1- Day 1 The purpose for the EXPLORE stage is to get students involved in the topic; providing them with a chance to build their own understanding.	Have students turn to a new page in their notebooks and title the new page, Flatland. Tell students that Flatland is home to many tiny flatlanders named Flatis Coloris (name can be changed to suit classroom), that look a lot like dots. Flatis Coloris is a species of insect that is very similar, but with a variety of color traits. Many animals and insects like cats and beetles, also come in a variety of colors, but they are still the same species. Flatland is the environment that Flatis Coloris lives in. It looks pretty, but it is actually very dangerous. Hovering above the Flatland is a predator, ready to eat the dot shaped insects. You will be carrying out an investigation to determine what happens to the species after predators attack. Show the students the different patterned fabrics and assign one to each group with a bag of dots. (Have them keep them closed) Ask students: Based on what we observed with the Walking Stick bug, which color of Flatis Coloris do you think will be most likely to survive and which will be least likely to survive in your Flatland environment?	**Concept: Variations can help a species survive.** **SEP: Carrying out an investigation to find relationships and determine similarities and differences.** **CCC: Patterns are used to identify cause and effect relationships. Use**

	Write a prediction sentence for each scenario in on Handout 1. Have students follow procedures for the Flatland Activity after modeling a quick representation using 4 students. (If groups need to be larger than 4, you may add 3 additional students to be the dot holders after each turn.) Model this process for the class. (Groups of 4) 1. Pick 3 predators and 1 spreader in your group 2. Predators turn backs to flatland material while the spreader, spreads the dots over the flatland material. 3. When all the dots are spread out, each predator will turn around one at a time when the spreader tells them and pick up the first dot that they see. 4. When a dot is selected, the predator will turn back around and put it in their container. 5. This will be repeated until each predator has 25 dots. 6. After 75 dots have been collected, turn around and analyze what's left as a group. Fill in Table 1 with your data of survivors. (Sometimes the dots are really hard to see, so it might help that the students slowly turn over their fabric so any remaining dots can be found)	**graphs to identify patterns.** **O.L.D: traits, environment, species, predators, predict**
Explain 1-Day 1 The purpose for the EXPLAIN stage is to provide students with an opportunity to communicate what they	**I prefer students to use graph paper to create graphs, and then they cut the labeled graphs out and paste in their handouts or notebooks. ** Let's make a pictograph of the data, so we can make sense of what we found. (guided or not, depending on where your kids are) The baseline of the graph will be labeled survivors and we will write the colors across the bottom. The title for the graph should be Flatis Coloris Survivors. On the left side of the graph label it as Number of Survivors and	**Concept: Variations can help a species survive.** **SEP: Analyze data to find causal relationships and to determine**

have learned so far and figure out what it means.	mark the intervals by one's starting at 0. Put a small circle for each dot based on how many of that particular color survived. Looking at your graphs with your group members discuss, which color survived most and why? Which color survived the least and why? Evaluate your original prediction on the top of Handout 1 and reflect on that prediction by completing the sentence frame at the bottom of Handout 1. Thinking ahead to the future of our Flatis Coloris, if we returned to the environment after our dots have had babies, what differences do you predict we would see with or populations of dots from when we first started the investigation? Glue Handout 1 in your notes, following classroom procedures. If time permits, have groups share out their data from the survivors. Discuss similarities and differences in data and what might have caused those differences.	**similarities and differences.** **CCC: Patterns are used to identify cause and effect relationships. Use graphs to identify patterns.** **O.L.D: population, future**
Explore 2- Day 2 (Next Generation)	**It is important that each group gets the same fabric/material as the previous investigation. ** Our surviving dots have had off-spring that will go into our next round of our Flatland activity. 1. Take your total of survivors and multiply them by four to give you your starting numbers of generation 2. Example: 2 red survivors x4= 8 red dots for this round 2. Record the starting numbers on your table 2. 3. Count out the amounts you listed in the table for each color. These will be your new sets of dots to spread on your environment. 4. Make a new prediction about what will occur in this round on Handout 2. 5. Follow the same procedures as the day before.	**Concept: Variations can help a species survive** **SEP: Analyze data to find causal relationships and to determine similarities and differences.** **CCC: Patterns are used to identify cause and**

		effect relationships. Use graphs to identify patterns. **O.L.D: generation, off-spring**
Explain 2-Day 2 (Next Generation)	Let's make a bar graph of the data, so we can make sense of what we found. (guided or not, depending on where your kids are with graphing) The x-axis are the colors you started with. The y-axis are the numbers of survivors. The title of the graph is Round Two Survivors. What patterns do you notice in your graph? Why do you think this occurred? Look at your prediction. Were your predictions correct, why or why not? Compare and contrast the data from the two graphs. What changed between the first and second round? What could have caused these results to occur? What conclusions can be made about the survival of the Flatis Coloris? Why do you think that? Support your answer with evidence.	**Concept: Variations can help a species survive** **SEP: Analyze data to find causal relationships and to determine similarities and differences.** **CCC: Patterns are used to identify cause and effect relationships. Use graphs to identify patterns.** **O.L.D: compare and contrast** **3-D**

		Learning Sequence Concept: Construct an explanation showing why genetic variation helps species survive.
Explore 3-Day 3 (Research)	Today you will get to choose an animal or insect to research that uses camouflage to help it survive. You will research your animal/insect using the internet on your Chromebook. Students will use their Chromebooks (devices) to research an insect or animal of their choosing that uses camouflage to help it survive. Guide students on how to look for relevant sites to their topic.	**Concept: Variations can help a species survive.** **Connections to Nature of Science: Science assumes consistent patterns in natural systems.**
Explain 3-Day 3 (Graphic Organizer)	You will collect information on the graphic organizer. Remember that you can turn topics into questions to search the internet. Students will collect information while completing a graphic organizer on their chosen animal or insect. Information collected will be used in the final evaluation on day 4.	**Concept: Variations can help a species survive.** **Connections to Nature of Science: Science assumes consistent patterns in natural systems.**
Evaluate 3-Day 3 (Art)	Now that you have researched and animal or insect, you will create color, side-by-side drawings of the insect or animal in two different environments. One environment will represent a high chance of survival and the second	**Concept: Variations can help a species**

	will represent a lower chance of survival.	**survive.** **CCC: Systems and System Models**
Final Evaluate- Day 4 (Multiple Paragraph Essay)	You will write a multiple paragraph essay about the insect or animal you selected. You will include facts from your graphic organizer in paragraph 1 that summarizes which animal or insect you selected, its environment, and what type of camouflage it has. Paragraph 2 will compare and contrast the two environments you drew yesterday and the likelihood of survival, using evidence from the prior hands-on activities and your research to support your claims. Don't forget to use our C.U.P.S strategy. (C.U.P.S= Capitalization, Understanding, Punctuation, Spelling)	**Concept: Variations can help a species survive.** **Connections to Nature of Science: Science assumes consistent patterns in natural systems.** **CCC: Systems and System Models, Patterns, Cause and Effect** **3-D Learning Sequence Concept: Construct an explanation showing why genetic variation helps species survive.**

Handout 1- Day 1

Predict: Which Flatis Coloris trait (color) will be most likely/least likely to survive in your Flatland environment? Why?

_____

_____

_____

_____

Table 1: Generation One

Color	Orange	Pink	Yellow	Black	Brown	White	Blue	Green	Purple	Red
Starting #										
Survival #										

My Graph: (Create graph on grid paper. Cut and paste your graph below.)

My prediction was/was not correct because
_____.

Handout 2- Day 2

Generation Two: In order to calculate the starting # for this round, multiply your survivors from Table One by 4. Record your new starting numbers in the table below. Put an X through the colors that didn't survive.

Predict: Which Flatis Coloris trait (color) will be the most likely/least likely to survive in your Flatland environment? Why?

I predict that
_____

_____ because
_____

_____

Table 2: Generation Two

Color	Orange	Pink	Yellow	Black	Brown	White	Blue	Green	Purple	Red
Starting #										
Survival #										

My Graph: (Create graph on grid paper. Cut and paste your graph below.)

My prediction was/was not correct because
_____.

Handout 3- Day 3

Animal/Insect Research

My Animal/Insect:
_____

Where does your animal/insect live? (country, state, biome)

_____

_____

Describe the environment your animal/insect lives in. (Be specific)

_____

_____

_____

What does your animal/insect look like?

_____

_____

_____

Which physical trait helps your animal/insect camouflage in its habitat?

_____

What predator(s) like to eat your animal/insect?

_____

Name:_____

_

#_____

Handout 4- Day 4 (Final Evaluation)

In Box 1- Draw your animal/insect in an environment it would have a high chance of surviving.

In Box 2- Draw your animal/insect in an environment it would have a lower chance of surviving.

(Both drawings must be in color!)

#1	#2

Multiple Paragraph Essay: Write at least 2 paragraphs describing your animal/insect and how it can use its camouflage to survive and where its

camouflage would not help it survive. (attach graphic organizer before turning in)

Paragraph 1- Include facts from your graphic organizer to describe your animal/insect, where it lives, how it uses camouflage, and who its natural predators are.

Paragraph 2- Compare and contrast the two environments you drew and the likelihood of survival, using evidence from the prior hands-on activity for your claims.

Procedures for Flatland Investigation

1. Pick 3 predators and 1 dot spreader in your group of 4.
2. Predators turn backs to the flatland while the spreader, spreads the dots over the flatland.
3. Each predator will turn around one at a time and pick up the first dot they see. The spreader will tell you when to turn, each time.
4. The predator turns, selects, and then turns back around.
5. Repeat until each predator has 25 dots.
6. After each predator has 25 dots, fill in table 1 with your survivors. The survivors are the ones left on the flatland environment.

Flatland Rubric

Name: _____

#_____

	Grade Scale	Notes
Box 1 clearly displays an environment the animal/insect will likely survive well within.	1 2 3 4	
Box 2 clearly displays an environment the animal/insect will have a lesser chance of survival within.	1 2 3 4	
Graphic Organizer is complete with accurate details.	1 2 3 4	
Paragraph 1 is	1 2 3 4	

complete with required details.		
Paragraph 2 compares and contrasts the survivability of each environment with evidence.	1 2 3 4	
Sentences make sense/mechanics	1 2 3 4	
Punctuation	1 2 3 4	
Participation in discussions	1 2 3 4	
Active group member during investigations	1 2 3 4	
Active Listener	1 2 3 4	

Score_____/40 Overall Grade

_____

Resources

"Walking Stick Insect by StarPir1315". Youtube, StarPir1315, 17 March 2014,

https://www.youtube.com/watch?v=MrMA9tJAOkE