📙 Lesson Guide

Environments and Survival - Amplify Grade 3

Lesson Guide with Substitutions and other activities

Lesson	Activity/Lesson Title	Supplies	Prep Needed/
	Could begin with Biomimicry GLAD Observation Charts	Slideshow (force copy)	
1.1	Pre Assessment - Has the Intro to the unit "Biomimicry Engineers" - writing is up to teacher		May want to st chart paper?
1.2	Survival Needs (might need 2 days or 2 class periods) - Part 1 yes - Part 2 Activity → change to 4 corners game - Part 3 Make inferences	Other Activities Link	
1.3	~~Earthworms Underground~~		Parts 1, 2, & 3 - can do during make sure to ir given during th
1.4	Survival Model → change to the "Oh Deer" game *Make sure students understand survival is determined by the ease or difficulty of meeting needs in a specific environment.	Other Activities Link	To include usir could be graph population cha progresses
1.5	Explain Snails' Survival	Snail Data Cards Set 1 WB 14	*Preview the vi students Begin the shar snails with yell to survive
2.1	Hummingbird Model - Parts 1 & 2 keep - Part 3, 4→ change to Beak Buffet activity - Skip Part 5 reading	Other Activities Link	
2.2	Mystery Mouths - can be done during ELA	Book WB 19-20-21	This will reinfo activity.
2.3	Traits and Survival - Part 1 - Use other Fossil information (dinosaurs) - Part 2 and 3 can be done quickly to continue the discussion on Snail Traits	Other Activities Link	
2.4	Survival Model - Traits - Just Part 3 and 4	Handbook	For 2.4 and 2.5 discussion is i possibly be do
2.5	Making Sense of Traits and Survival - Just Part 3		
2.6	Writing about Snail Traits and Survival		Revisit your sh

			fix/add to it. *Ch 1 was focu shells are less focused on wh more likely to s explanations c
2.7	Using snail traits to inspire design - Part 1 - complete reading - Part 2 → change to Biomimicry Engineering Challenge	Other Activities Link	
2.8	Sharing and Revising Designs	Students should get time to share desig animal that inspired their invention, how can describe more than is on the paper,	
3.1	Survival Model: Changing Environment - Make sure to introduce the Investigation Question - Faster Hands-on Activity → change to Hide and Survive game/activity (same idea, just easier to do)	Other Activities Link	Another option Moth: An Evolu are addressed
3.2	Environment News - Reading - this can be done during ELA	WB 47-49-50	Possible Jigsa
3.3	Environmental Change and Adaptive Traits - Faster activity - Survival Modeling Sheet	Other Activities Link	
3.4	End Assessment - Reflect on Key Concepts	For Final Assessment you can decide if y shared writing and edit/add together ar students to write their own explanations The key understanding is that the yellow better 10 years ago because their yellow trait in their previous environment (sand	
	If you want to stop here due to time constraints, you can. Ch 4 deals with the Engineering Standards (which are still important), but you will have completed the Science Sta		
4.1	Cockroach Robots		
4.2	Planning Designs		
4.3	Make and Test Designs		
4.4	End Assessment Part 2		
4.5	Present Design Arguments		

Standards Addressed in this Unit:

- 3-LS4-1. Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.
- 3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in 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.

As well as:

- 3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.
- 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Science and Engineering Practices:	Cross Cutting Concepts:
1. Asking questions and defining problems. 2. Developing and using models. 3. Planning and carrying out investigations. 4. Analyzing and interpreting data. 5. Using mathematics and computational thinking. 6. Constructing explanations and designing solutions. 7. Engaging in argument from evidence. 8. Obtaining, evaluating, and communicating information	1. Cause and effect 2. Structure and Function 3. Systems and System Models 4. Scale, Proportion, and Quantity 5. Stability and Change 6. Energy and Matter 7. Patterns

🌎 Other Activities

Other Activities in Environments and Survival Notes:

Pre-Activity - Observation Chart - Slideshow

- These can either be printed and placed around the room (using the GLAD strategy), or just projected on the board.

1.2 Four Corners Activity

Students consider whether or not an organism can meet its needs and survive in different environments. They will get an animal with information about food, water, temperature needs, and predators.

1) Put up four papers around the room labeled grasslands, desert, tropical forests, alpine tundra. This picture is available in your Amplify slideshow. If you need to define them first, here are definitions:
    a) Grasslands - Vast, open areas covered mainly by grasses, grasslands support many grazing animals and the predators that hunt them.
    b) Tropical Forests - Characterized by high rainfall and warm temperatures, these forests have dense vegetation and the highest biodiversity of any biome.
    c) Alpine Tundra - This cold, treeless biome is found at high altitudes on mountains worldwide. The animals here are adapted to harsh winds, cold temperatures, and a short growing season.
    d) Desert - Deserts are defined by their extremely low rainfall. Animals that live here have developed remarkable adaptations to survive heat and drought.
2) Here is the doc with 10 animals for each biome (Spanish also). For a faster activity, simply cut up the table and pass it out to students. If you want to take the information and make it into more, you are free to do so. Amplify E&S 1.2 Animals **If you feel there are better animals or different words for us to use, please email me and I'll make changes/additions to the document for others in the future!*
   Here is also a slideshow with just animals and no written information, but it is separated by the four environments. Print them off and hand them out to students.
3) For the first part, students should decide which environment their organism can best have its needs met AND be able to explain WHY.
    a) Once they have decided on a corner, they should talk in partners or as a group, share their animals and discuss if they think that all of their animals belong to the same environment. If not, give them a chance to move to where they think they should be.
    b) Talk about the focus question: *Can your organism meet its needs in this environment?* Have a few students share their animals with the group and explain WHY.
    c) Pick one or two students from one environment and move them to a different environment and have the students discuss whether they would be able to meet their needs in that new environment. Share WHY.
4) Move on to Part 3, or just continue discussing the likelihood of organisms surviving in different environments.
    a) Make sure to introduce the vocabulary *inference*
    b) Remind them that it's not impossible for them to survive, but the probability of survival goes down (more likely/less likely).

1.4 Oh Deer! Game

Key Concept: Survival depends on how well an organism's needs are met.

Setup:

- Divide the class into two groups: *Deer* and *Resources*.
- Each *Deer* needs **food**, **water**, and **shelter** to survive.
- Have both groups line up facing each other about 20 feet apart.

How to play:

1. Everyone turns around so they can't see the other group.
2. *Deer* silently choose which need they're looking for (food, water, or shelter) and show it with a hand signal:
    - Food = hands on stomach
    - Water = hands by mouth
    - Shelter = hands over head
3. *Resources* also secretly choose which resource they represent using the same signals. *Up to you if you assign resources or let them choose which resource they are.
4. On the teacher's signal, everyone turns around. *Deer* run to tag a *Resource* that matches what they need.
5. If a *Deer* finds a matching *Resource*, they "survive" and bring that *Resource* back to the *Deer* side (symbolizing population growth). If they don't, they "die" and become *Resources* for the next round.
6. Repeat 4–5 rounds. Discuss what happened to the populations over time.

To add SEP 4 and more modeling, have a chart paper up graphing the deer population each round.

Discussion:

- What happened when there wasn't enough food or shelter?
- What does this tell us about how environments affect survival?

2.1 Beak Buffet Activity

Focus: Animals have traits (like beak shapes) that help them survive by getting food in their environment.

Materials:

- 4–5 different tools to act as beaks (examples below)
- Bowls or trays of "food" items
- Cups to collect "food"
- Recording sheet: Google Doc (view only); PDF

Suggested Beak Tools:

- Tweezers or clothespins = pinching beak
- Spoon = scoop beak
- Chopsticks = long, thin beak
- Straw or pipette = sipping beak
- Paperclip (opened) = probing beak

Suggested Food Items:

- Small paper squares or actual seeds (sunflower seeds, sesame seeds, etc.) = seeds
- Rubber bands or pipe cleaner bits (or for fun, gummy worms!) = worms
- Cotton balls = nectar flowers

- Dried beans or raisins = bugs
- Water in a cup = nectar

(You don't need all of these—3 or 4 types is perfect!)

How to Play:

1. **Introduce the challenge:** "You're all birds with different beak shapes. Your goal is to collect as much food as possible — but not every beak works for every kind of food!"
2. **Assign roles:** Divide students into small groups. Give each group one "beak" tool.
3. **Set the timer:** Give them 20 seconds to collect food from one type of bowl (e.g., worms). Record how much each bird collects.
4. **Rotate:** Move to the next type of food and repeat.
5. **Compare results:** Have students count or tally how much food they collected at each station.

**This can be done in two ways - students can keep one kind of beak and try all the foods, then share out. OR they can have all kinds of beaks at their station with a mix of all the foods in a bowl and see what they can come up with.

Discussion:

- Which beak worked best for which food?
- Could your bird survive in a place with mostly (worms/seeds/nectar)?
- What might happen if the environment changed?

2.3 Fossils - Traits and Survival

Fossil Slideshow - Dinosaurs - Fossils Are Clues!

2.7 Biomimicry Engineering Challenge

This activity expands a bit further than the Amplify one which limits the students to the adaptive traits of the snails. Giving students a bit more choice might help with some creativity, motivation and participation. It is completely up to you whether you have them actually build a prototype or just draw the invention design. The plan below includes building.

- **Objective:** Students use the engineering design process to design and build a prototype of a new invention inspired by an animal's adaptive trait.
- **The Prompt:** "Humans have problems, and animals have solutions! Your job is to invent something that helps a human, based on an animal's special trait."
- **Materials (if the class is building prototypes):** Simple craft and recycled materials.
    1. Cardboard, paper towel tubes, paper cups
    2. Pipe cleaners, craft sticks, straws
    3. Tape, glue, scissors
    4. Foil, plastic wrap, fabric scraps
- **Activity:**
    1. **Brainstorm (as a class):** Create a two-column chart.
        - **Column 1 (Animal Trait):** What are some cool or interesting animal adaptations? (e.g., camouflage, webbed feet, sharp claws, gills, bird wings, porcupine quills).
        - **Column 2 (Human Problem):** What problems could this trait solve? (e.g., hiding, swimming faster, grabbing things, breathing underwater, flying, protection).
    2. **The Challenge:** Present a specific problem, or let students choose one from the chart. Good 3rd-grade problems include:
        - "Design a tool to pick up trash without touching it." (Inspired by: bird beak, elephant trunk)

        - "Design a new kind of glove that helps you swim faster." (Inspired by: duck feet, fish fins)
        - "Design a helmet or jacket that protects you from getting hurt." (Inspired by: turtle shell, armadillo armor, porcupine quills)
    3. **Design & Build (in pairs):** Give students 20-30 minutes to use the materials to build a *prototype* of their invention OR draw their designs.
    4. **Share & Explain:** Have each pair present their invention and answer the key question: **"What animal inspired your design, and how does it work?"**
- **Engineering Design Process - 2.8 Sharing Designs**
    1. If there is even more time, have pairs give constructive feedback on the designs and give the teams time to make adjustments on their initial drawings/prototypes. More than one iteration is always better for the Engineering Design Process.
    2. At the end of the entire process, let the pairs reflect on their teamwork and the design itself.

3.1 Activity: Hide and Survive - When the Environment Changes (this also helps with 3.3)

- *This version directly models the adaptive → non-adaptive concept in a concrete, visible way.*

Focus: A once-helpful trait (camouflage) can become non-adaptive **when the environment changes**. Animals survive better when their traits fit the environment — and when conditions change, some may struggle.

Materials:

- Colored cubes, counters, or small objects in 2–3 colors (to represent marmots with different fur colors) - or even just cut up the same colored construction paper (white and brown)
- Construction paper in 2–3 colors (to represent environments: snow, grass, rocks)

Activity:

1. Spread one "environment" color on the table (like white paper = snowy winter).
2. Drop 20 "marmots" — mix of colors.
3. Students close eyes while the teacher (predator) picks off 5–6 marmots that are *easy to see*.
4. Count how many of each color survived.

After the first few rounds, make the environment change dramatically — like:

- Round 1: White paper (snowy mountains)
- Round 2: Green paper (summer grass)
- Round 3: Brown paper (dry fall hillside)

Then have students observe how the "best" color marmot shifts each time.

- When the environment changes, the white marmots suddenly become *easier to see* — their once-useful trait (camouflage) becomes *non-adaptive*.

Wrap-up question:

"How did the trait that helped one group survive become a problem when the environment changed?"

Reflection Page: Google Doc (View Only) PDF

3.3 Activity: Modeling Environment Changes

Two versions available

- Version 1 continues with fur - relates to activity they did in 3.1
- Version 2 uses the same idea but another context - skin type *(Moist vs. Dry):* This version helps students see that traits beyond color—like skin type—affect survival when environments change. For example, animals with moist skin thrive in wet habitats, but if the climate becomes dry, those same traits may reduce their chances of survival while scaly-skinned animals do better.

Survival_Modeling_Sheet