5.12A Interdependence (2021)

Organisms & Environments Strand Observe and describe how a variety of organisms survive by interacting with biotic and abiotic factors in a healthy ecosystem.

O Overview | R Recall | P Practice A | P Practice B | A Apply

Overview

Side-by-Side TEKS Comparison

2017 Streamlined TEKS	2021 TEKS
5.9A Observe the way organisms live and survive in their ecosystem by interacting with the living and nonliving components.	5.12A Observe and describe how a variety of organisms survive by interacting with biotic and abiotic factors in a healthy ecosystem. • Added “describe” • Added biotic and abiotic factors • Emphasis on “healthy” ecosystems

Central Concepts

- All life depends on basic needs including food, shelter, air, and space for habitat.
- All living, or biotic, organisms interact with other living and nonliving, abiotic, parts of their ecosystems.
- Living organisms rely on the integration of living and nonliving components to grow and reproduce.

Misconceptions

- Dead organisms are considered organic biotic factors in ecosystems, not abiotic. They were once living.
- Students need to understand that populations refer to living things and that a community is made of both the living and nonliving parts of an ecosystem.
- Students should know that one ecosystem or environment can be made of many overlapping habitats. A habitat and ecosystem are not the same thing.
- When space is used as one of the needs of living things, students need to understand that it includes more than an area to live, but an area to find food, water, reproduce and raise young.

Segment Title & Activities Description

- **Recall**
  Review: What Do Living Things Need?
  Students recall prior knowledge of the basic needs of all organisms in their environment with transparent thinking.

- **Practice A**
  Investigation: Rain & Shine
  Students collect and analyze data in a simulated comparative investigation to answer the research question, “How does water affect plant growth?”

- **Practice B**
  In the Field: Billie the Birdwatcher
  Students actively read and reflect as field scientists, support a second-hand field investigation with Billie the Birdwatcher, and identify appropriate habitats for three North American bird species.

- **Apply**
  Mission: The Great Turtle Rescue
  Students embark on a task-based, problem-solving real-world scenario with a mission to release wildlife in a nearby wildlife refuge using habitat maps adapted from Brazoria National Wildlife Refuge of coastal eastern Texas.

Standards Alignment

All standards are based on Texas Essential Knowledge & Skills (TEKS) statements unless otherwise noted.

Looking Ahead: Middle School

- **Science**
  - 6.12A Investigate how organisms and populations in an ecosystem depend on and may compete for biotic factors such as food and abiotic factors such as availability of light and water, range of temperatures, or soil composition.
  - 8.12A Explain how disruptions such as population changes, natural disasters, and human intervention impact the transfer of energy in food webs in ecosystems.

Recall

- **Scientific & Engineering Practices**
  - 3.12A Explain how temperature and precipitation affect animal growth and behavior through migration and hibernation and plant responses through dormancy.
  - 4.12A Investigate and explain how most producers can make their own food using sunlight, water, and carbon dioxide through the cycling of matter.
  - 5.1F Construct appropriate graphic organizers used to collect data, including tables, bar graphs, line graphs, tree maps, concept maps, Venn diagrams, flow charts or sequence

maps, and input-output tables that show cause and effect.

- **English Language Arts and Reading**
  - 5.6E Make connections to personal experiences, ideas in other texts, and society.

Practice A

- **Scientific & Engineering Practices**
  - 5.1A Ask questions and define problems based on observations or information from text, phenomena, models, or investigations.
  - 5.1B Use scientific practices to plan and conduct descriptive and simple experimental investigations and use engineering practices to design solutions to problems.
  - 5.1C Demonstrate safe practices and the use of safety equipment during classroom and field investigations as outlined in Texas Education Agency-approved safety standards;
  - 5.1D use tools, including calculators, microscopes, hand lenses, metric rulers, Celsius thermometers, prisms, concave and convex lenses, laser pointers, mirrors, digital scales, balances, spring scales, graduated cylinders, beakers, hot plates, meter sticks, magnets, collecting nets, notebooks, timing devices, materials for building circuits, materials to support observations of habitats or organisms such as terrariums and aquariums, and materials to support digital data collection such as computers, tablets, and cameras to observe, measure, test, and analyze information.
  - 5.1E Collect observations and measurements as evidence.
  - 5.1F Construct appropriate graphic organizers used to collect data, including tables, bar graphs, line graphs, tree maps, concept maps, Venn diagrams, flow charts or sequence maps, and input-output tables that show cause and effect.
  - 5.1G Develop and use models to represent phenomena, objects, and processes or design a prototype for a solution to a problem.
  - 5.2E Evaluate experimental and engineering designs.
  - 5.3A Develop explanations and propose solutions supported by data and models;
  - 5.3B Communicate explanations and solutions individually and collaboratively in a variety of settings and formats.
  - 5.3C Engage respectfully in scientific discussion.

- **Recurring Themes & Concepts**
  - 5.5A Identify and use patterns to explain scientific phenomena or to design solutions.
  - 5.5B Identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems.
  - 5.5D Examine and model the parts of a system and their interdependence in the function of the system.
  - 5.5G Explain how factors or conditions impact stability and change in objects, organisms, and systems.

- **Math**
  - 5.1D Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.

- 5.8C Graph in the first quadrant of the coordinate plane ordered pairs of numbers arising from mathematical and real-world problems, including those generated by number patterns or found in an input-output table.

Practice B

- **Scientific & Engineering Practices**
  - 5.4B Research and explore resources such as museums, libraries, professional organizations, private companies, online platforms, and mentors employed in a science, technology, engineering, and mathematics (STEM) field to investigate STEM careers.

- **English Language Arts and Reading**
  - 5.3B Use context within and beyond a sentence to determine the relevant meaning of unfamiliar words or multiple-meaning words (R).
  - 5.6F Make inferences and use evidence to support understanding.
  - 5.6I Monitor comprehension and make adjustments such as re-reading, using background knowledge, asking questions, and annotating when understanding breaks down.
  - 5.7B Write responses that demonstrate understanding of texts, including comparing and contrasting ideas across a variety of sources.

Apply

- **Scientific & Engineering Practices**
  - 5.4B Research and explore resources such as museums, libraries, professional organizations, private companies, online platforms, and mentors employed in a science, technology, engineering, and mathematics (STEM) field to investigate STEM careers.

- **Math**
  - 5.8C Ordered pairs of numbers arising from mathematical and real-world problems, including those generated by number patterns or found in an input-output table.

- **English Language Arts and Reading**
  - 5.3B Use context within and beyond a sentence to determine the relevant meaning of unfamiliar words or multiple-meaning words.
  - 5.9E Responses: Recognize characteristics and structures or argumentative text, identifying the claim.

English Language Proficiency Standards (ELPS)

Emergent bilingual students may come from diverse linguistic and cultural backgrounds, and may have varying levels of proficiency in English. The English Language Proficiency Standards (ELPS) provide a framework that is designed to support emergent bilingual students in developing their English language skills while learning academic content across four domains of language development: listening, speaking, reading, and writing. Helpful literacy tasks to support all levels of language acquisition proficiency are included in each segment of this TREK.

General tips for working with emergent bilingual students are provided below.

Listening

- **Provide real-life examples:** Use examples from the students' own experiences to help them connect the concepts to their own lives.
- **Ask clarifying questions:** Encourage students to seek clarification from their peers or teacher on confusing concepts or instructions.
- **Assess Listening Comprehension:** Provide multiple modes of opportunity for students to demonstrate listening comprehension including responding to questions, collaborating with peers, and taking notes.

Speaking

- **Use routine language:** Repeat key vocabulary and phrases multiple times throughout the lesson to reinforce the routine use of complete sentences.
- **Allow for group work:** Encourage students to work in small groups to reinforce the concepts and vocabulary.
- **Assess speaking:** Monitor students as they demonstrate their speaking skills through retelling, giving information, and asking for information.

Reading

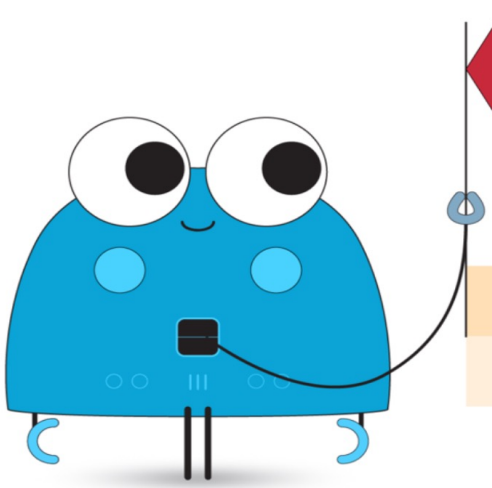
- **Use visual aids:** Use images, diagrams, and videos to help students better understand the concepts being taught.
- **Use graphic organizers:** Use graphic organizers, such as Venn diagrams or concept maps, to help students see the relationships between the basic needs of producers and consumers
- **Incorporate hands-on activities:** Incorporate hands-on activities, such as sorting and categorizing basic needs, to help students better understand and remember the concepts.
- **Use gestures and movements:** Encourage students to use gestures and movements to help reinforce the vocabulary they are learning and ask for help from peers and teachers.

Writing

- **Use sentence frames:** Use sentence frames to help students express their ideas and thoughts in English. This can help them feel more confident and participate more actively in writing assignments.

Learning Strategies

- **Provide positive reinforcement:** Provide positive reinforcement and praise for student efforts and progress in understanding the concepts.
- **Allow for individual practice:** Provide opportunities for individual practice, such as matching definitions with vocabulary words or creating their own examples.
- **Monitor understanding:** Regularly check in with students to assess their understanding of the concepts and vocabulary being taught.



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TREKs™

5.12A Interdependence

Overview

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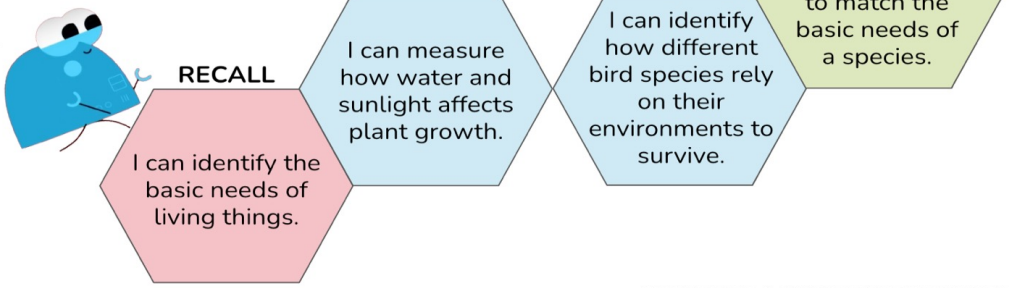
TREK Goals

5.12A: Interdependence
Observe and describe how a variety of organisms survive by interacting with biotic and abiotic factors in a healthy ecosystem.



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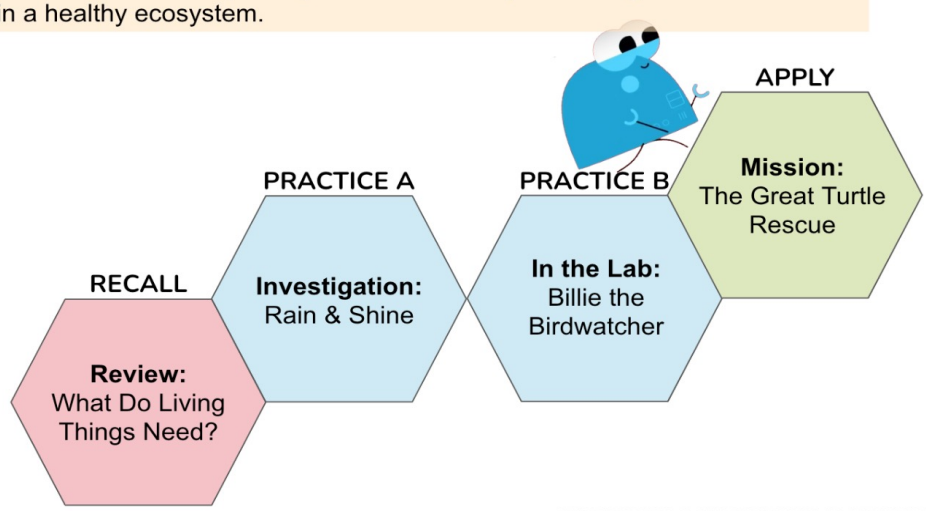
TREK Segments

5.12A: Interdependence
Observe and describe how a variety of organisms survive by interacting with biotic and abiotic factors in a healthy ecosystem.



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