Life Sciences:
Needs and Classifications of Living Things, How Living Things Interact with the Environment

Washington University in St. Louis
Institute for School Partnership

Unit 1: Teacher Guide

Introduction to Plants and Animals

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Teacher Background Information

In this unit, students will have the opportunity to tackle many big concepts that are central in the study of biology. Students will begin with learning the characteristics of living things and how to differentiate the living from the nonliving. These ideas then extend to plants and animals as students consider the similarities and differences between the organisms in each category.

Characteristics of Living Things

Scientists classify all things into two categories: living things and nonliving things. In order to be classified as a living thing, organisms must have certain characteristics.

CELLS

All living things are made up of cells. Cells are the smallest structural and functional component of an organism. In multicellular organisms, like animals and humans, cells are grouped together to form tissues and organs that perform complex functions like blood circulation, digestion, and breathing. Other organisms, like bacteria, are only made up of one cell that is able to carry out all the functions necessary for survival.

ENERGY USE

All living things use energy to carry out necessary functions, grow, develop, and survive. Plants use the energy from the sun to produce their own food through a process of photosynthesis. Animals and humans eat food to obtain energy.

GROWTH AND DEVELOPMENT

All living things grow. In multicellular organisms, cells divide to produce new cells. As the number of cells increases, the organism grows larger and larger. Over time, cells may get damaged or grow old, but living things are able to make cellular repairs which aid in survival.

REPRODUCTION

All living things reproduce to create offspring and continue the species. In sexual reproduction, the cells from both a male and female parent are joined to make a new cell for the offspring. Many living things, including animals, humans, and plants, reproduce sexually. Other organisms, such as single-celled organisms and some plants and animals, reproduce asexually. In this process, one parent copies their DNA and then divides to produce a new cell.

RESPONSE TO ENVIRONMENT

All living things must respond to and adapt to the environment. All organisms are affected by the environment. Anything that affects the organism and causes it to respond is called a stimulus (plural = stimuli). Some stimuli are external. For example, plants grow toward the sun, animals seek shelter in the rain, a dog's ears turn towards sound, and humans sweat on hot days. Other stimuli are internal like when the human body signals hunger or thirst.

In response to their environment, living things may actually change the environment. If an animal is too hot or too cold, it may build a shelter to protect from wind, rain and/or sun. An insect invasion may destroy crops and other plants that animals and humans use for food. Plants change their environment by growing up over buildings or in between cracks in pavement.

ADAPTATION TO ENVIRONMENT

All living things must adapt to their environment. Over time, species adapt to their environment, and these adaptations aid in survival. Adaptation occurs because the organisms that are well suited to the environment survive and reproduce. The traits that have allowed the organism to survive are passed on to the offspring. Organisms that do not possess these helpful traits are unable to survive long enough to reproduce, so those traits die out.

Needs of Living Things

All living things have the same basic needs: light/warmth, air, nutrients, and water. Sunlight is a source of energy and provides light and warmth for living organisms. Air provides oxygen and carbon dioxide. Nutrients are obtained through food and the environment and give organisms the energy they need to function and survive. Water keeps cells hydrated and contributes to the overall function of living things.

Plant Parts and Function

ROOTS

Roots help to anchor and stabilize the plants in soil. Roots also suck up water, air, and nutrients for delivery to the rest of the plant and store extra food for the future.

STEM

The stem helps support the plant's leaves and flowers. The stem provides a way for the plant to get the light and water it requires for healthy growth. The root systems sucks up water and nutrients and then the stem delivers it to the leaves and flowers.

LEAVES

The plant's leaves are important because they allow the plant to make and store food during photosynthesis. The leaves have many pores called stomata that allow gases (such as oxygen and carbon dioxide) and water to enter and escape. As the water exits the plant, it provides a cooling effect that helps the plant maintain a proper temperature.

FLOWERS

Flowers contain the reproductive structures of the plant. The primary structures are the pistil (female) and the stamen (male). Flowers are also fragrant and brightly colored to attract butterflies and other pollinators which help contribute to fertilization and reproduction.

SEEDS

Seeds contain a miniature plant that is dormant inside a protective covering along with a food source (called an endosperm) to give energy to the plant. If the seed is in an environment with the correct temperature and amount of water, the seed will germinate.

Animal Classifications

All living things are divided into categories based on their physical structure. The classification system starts out describing the organism on a very broad level but eventually separates into very narrow categories. The science of classifying animals based on their characteristics is called taxonomy.

The largest category of classification is called a kingdom. All animals (including insects) are considered part of the animal kingdom. The other kingdoms are Plants, Fungi, Bacteria, and Protists (single-celled organisms). The animal kingdom is divided into phylums based on shared physical characteristics and body organization. A large animal phylum is Chordata which contains all the vertebrates (animals with a backbone). Within a particular phylum, the organisms are grouped into even smaller categories called classes. Within the Chordata phylum some common classes are mammals, birds, and fish. The classes are divided again into orders. Examples of orders within the Mammal class are carnivores, primates, and rodents. The orders are divided into even more narrow categories to create families. Two categories within the Carnivore family are cats and dogs The families are finally divided into the two smallest categories of genus and species. It is the genus and species that gives us the scientific name for an organism. For example, the scientific name for a lion is Panthera leo. Panthera is the genus and leo is the species. The scientific name is in Latin so that scientists from all over the world, regardless of their native language, will know what animal is being discussed.

Insects Parts and Function

Insects are the largest group of living organisms on the planet. Insects are part of the animal kingdom and are classified in the Arthropoda phylum and Insecta class.

Arthropods are invertebrates (no spinal cord), have hard external skeletons, three body parts (head, thorax, and abdomen) and lay eggs. By some accounts, there are over 900,000 species of insects.

HEAD

The head of an insect is the first or front section of the insect. The head is responsible for sensory input and contains the eyes (sight), antennae (smell, feel, and sometimes sound), and mouthparts (taste).

THORAX

The thorax is the middle segment of the insect and is attached in between the head and the abdomen. The legs and wings of an insect are joined to the thorax. The six legs of an insect are divided into three pairs of legs and are used for walking, swimming, and holding prey. Insects generally have two wings (fore wing and hind wing) on each side of the thorax that are used for flight. Insects can beat their wings very fast. Some very small insects beat their wings 1000 times each second.

ABDOMEN

The abdomen is the final segment of the insect. The abdomen contains the heart, reproductive organs, and the digestive organs.

Food Chains

Food chains represent the sequence in which living things eat other living things. All food chains begin with producers which are living things that produce their own food. Plants are producers that produce their own food using energy from the sun. Consumers form the next three levels of the food chain. Consumers eat producers and/or other smaller consumers. Primary consumers, also called herbivores, eat only plants. Some examples of primary consumers are rabbits, mice, horses, and turtles. Secondary consumers, including snakes and owls, eat primary consumers. Tertiary consumers, such as hawks, wolves and lions, eat secondary consumers. A food chain ends with a top predator, like humans or alligators, that has no natural enemies. Since consumers are classified by what they eat, some animals can act as primary consumer in one food chain and a secondary or tertiary consumer in another food chain. Animals that eat only other animals are called carnivores, while animals that eat both plants and animals are called omnivores. In an ecosystem, many food chains overlap and intertwine to create a food web.

Further Readings and Sources

Characteristics of living things:
https://eschooltoday.com/learn/characteristics-of-living-things/

Needs of living things:
https://eschooltoday.com/learn/introduction-to-needs-of-living-things/

Missouri Botanical Garden biology of plants:
http://www.mbgnet.net/bioplants/main.html

Great Plant Escape:
https://extension.illinois.edu/gpe/gpe.html

Insect body parts:
https://www.amentsoc.org/insects/what-bug-is-this/insects.html

Insects:
http://www.biokids.umich.edu/critters/Insecta/

Insect Identification:
http://www.insectidentification.org/

University of Kentucky insect trivia:
https://www.uky.edu/Ag/Entomology/ythfacts/bugfun/trivia.htm

Additional Teacher Resources

BOOKS

On the Move, by Ming Tan

Morning, Noon and Night, by Jean George & Minor

Who Lives at the Zoo? by Mark Macey

Animals is Hiding, by Melvin Berger

Earthworms Underground, by Kevin Beals

Taking Care of Farm Animals, by Dimi Stanos

Fishy Facts, by Anne Miranda

What Do you Do with a Tail Like This?, by Jenkins and Page

Brown Bear, What do You See? by Martin & Carle

What do Pets Need? by Ellie Roper

Count the Animals, by Dimi Stanos

A Dog's Life, by Rose Lorenzo

In the Garden, by Rose Lorenzo

Strange Plants, by Monica Halpern

Peanuts, by Pamela Graham

Look at the Tree, by Stewart Gardiner

Seeds Grow into Plants, by Mario Lucca

Flowers for Grandma, by Karl Jensen

Watermelons, by Terry O'Brady

The Amazing Silkworm, by Monica Halpern

Who Looks after Me?, by Dimi Stanos

Curious George/Apple Harvest, by PBS Kids

FRUIT, My First Discoveries, by Jeunesse and Bougoing

The Seasons of Arnold's Apple Tree, by Gail Gibbons

From Blossom to Fruit, by Gail Saunders-Smith

Chicken Life Cycles, by David Schwartz

ONLINE RESOURCES

"Earthworms Do Good Work"
http://www.readworks.org/passages/earthworms-do-good-work

"Animals Build Homes"
http://www.readworks.org/passages/animals-build-homes

"Animals Eat Earthworms"
http://www.readworks.org/passages/animals-eat-earthworms

"Rainforest Animals"
http://www.readworks.org/passages/rain-forest-animals

"The Four Seasons"
http://www.readworks.org/passages/four-seasons

"All Kinds of Plants"
http://www.readworks.org/passages/all-kinds-plants

"How Do Seeds Grow?"
http://www.readworks.org/passages/how-do-seeds-grow

"Rain Forest Plants
http://www.readworks.org/passages/how-do-seeds-grow

Helpers"
http://www.readworks.org/passages/rain-forest-plants-are-helpers

"How Do Seeds Sprout?"
http://wonderopolis.org/wonder/how-do-seeds-sprout

"Do All Plants Have Roots?"
http://wonderopolis.org/wonder/do-all-plants-have-roots

"How Much Water Do You Need To Survive?"
http://wonderopolis.org/wonder/how-much-water-do-you-need-to-survive

"Why Are Cats' Tongues Rough?"
http://wonderopolis.org/wonder/why-are-cats-tongues-rough

"Why Do Catfish Have Whiskers?"
http://wonderopolis.org/wonder/why-do-catfish-have-whiskers

"What's the Difference Between Turtles, Tortoises and Terrapins?"
http://wonderopolis.org/wonder/whats-the-difference-between-turtles-tortoises-and-terrapins

"What Makes An Animal a Mammal?"
http://wonderopolis.org/wonder/what-makes-an-animal-a-mammal

"What Is a Raven?"
http://wonderopolis.org/wonder/what-is-a-raven

"Do Fish Sleep With Their Eyes Open?"
http://wonderopolis.org/wonder/do-fish-sleep-with-their-eyes-open

"How Do Fish Breathe Underwater?"
http://wonderopolis.org/wonder/how-do-fish-breathe-underwater

"How Hungry Are Hippos?"
http://wonderopolis.org/wonder/how-hungry-are-hippos

"Why Can't Every Animal Be a Pet?"
http://wonderopolis.org/wonder/why-cant-every-animal-be-a-pet

"Do Pets Need Exercise?"
http://wonderopolis.org/wonder/do-pets-need-exercise

"Why Do People Keep Pets?"
http://wonderopolis.org/wonder/why-do-people-keep-pets

DISCOVERY ED *(Subscription Required)*

A First Look: Plants:
http://bit.ly/1JGGQpV (17:00)
Tip: Includes What Plants Need to Live & Parts of a Plant segment

Nonliving and Living Things:
http://bit.ly/1S1rGi9 (12:00)
Tip: Choose relevant video segments

Plant Life Cycles:
http://bit.ly/1HmAXOq (20:00)
Tip: Includes How a Seed Grows segment

Insects:
http://bit.ly/1S1wu6W (2:26)

CAREER CONNECTIONS

Veterinarians:
https://www.careergirls.org/?s=veterinarian

Entomologist:PBS LearningMedia- Scientist Profile: Entomologist (2:46)

Aquatic Biologist:

PBS LearningMedia- Scientist Profile: Aquatic Biologist (4:39)

Ethnobotanist:

PBS LearningMedia- Scientist Profile: Ethnobotanist (2:47)

Zoologist:
http://easyscienceforkids.com/best-zoology-careers-video-for-kids/

Zoo Keeper:
http://www.stlzoo.org/animals/soyouwanttobeazookeeper/

FIELD TRIP CONNECTIONS

World Bird Sanctuary:

http://www.worldbirdsanctuary.org/

St Louis Zoo: https://www.stlzoo.org/

Forest Park: https://www.forestparkforever.org/visitor-center/

Conservation Areas: https://nature.mdc.mo.gov/discover-nature/places including Columbia Bottoms (just north of highway 270 and east of 367) and August Busch Wildlife (just west of highway 64 and 94 in St. Charles). Both places offer fishing, hiking and explorations.

Humane Society: http://www.hsmo.org/education/visitingus.html

Missouri Botanical Garden: http://www.missouribotanicalgarden.org/learn-discover/students-teachers/school-programs-and-field-trips.aspx

Unit 1 Overview

DESIGN CHALLENGE:

How can we make a model and use it to compare the basic needs of pets and wild animals?

ANCHORING PHENOMENON:

A deer eats in the forest.

STORYLINE

In this unit, students explore the survival patterns of plants and animals. The Crosscutting Concepts of Patterns and Systems and System Models are featured prominently as students explore what living things need to survive and how living things interact with their environments.

First, students identify what living things do and need. Students use this information to determine that plants and animals are living.

Next, students grow plants in order to see what they need to live, and identify how plants are similar yet different.

After learning about plant needs and parts, students determine how plants and animals are different. Students identify and compare different animal needs and use observations to classify animals into groups.

Finally, students recognize that all living things have needs that must be met in order to survive. The environments in which they live must meet these needs. Students use the information from this unit to act as a zoologist and make a model (drawing). They will use their model to compare the basic needs of pets

and wild animals.

OVERVIEW

Section 1 *What are living things?*	**Section 2** *What is a plant?*	**Section 3** *What is an animal?*	**Section 4** *How do living things interact with their environments?*
Total Time: 4 days LESSON 1 Is it living?	*Total Time: 4 days + monitoring* LESSON 2 How do seeds become plants? LESSON 3 How are plants alike and different?	*Total Time: 7 days* LESSON 4 What makes animals different from plants? LESSON 5 How are animals alike and different? LESSON 6 How are invertebrate animals alike and different?	*Total Time: 5 days* LESSON 7 How do living things use their environment to survive? LESSON 8 Why are plants and animals important to us? LESSON 9 How can we make a model and use it to compare the basic needs of pets and wild animals?

Teacher Prep List - Section 1

	Inside mySci kit, you'll find:	Items you must supply:	Prep and copies:
Lesson 1 *(4 days)*	6 sets of living and nonliving cards *What's Alive?*, by Kathleen Weidner Zoehfeld	Chart paper	Review MySci Safety Guidelines Copy and administer the pre-assessment Send home Parent/Guardian Letter (Partner Resource Page 5) Copies of Student Pages 2-5 or Student Science Journals NOTE: Decide if you will use individual handouts or if you will create Student Science Journals for each student. Teacher Pages 2-4 ***VIRTUAL RESOURCES:*** Is It Living? virtual adaptation Living and Nonliving Cards as Slides What are Living Things Mini-Lesson video

① *SECTION 1: What are living things?*

LESSON 1: *Is it living?*

LEARNING TARGETS
Identify characteristics of living things.

VOCABULARY
living nonliving energy grow classify

SUMMARY
ESTIMATED NUMBER OF DAYS: 4
This kindergarten lesson is a foundational experience, in which students figure out basic needs of organisms and habitat characteristics. This unit will prepare students for future life science topics including life cycles and ecosystem interactions.

In this lesson, students use observations, a reading, and a video to determine what is living. **Students figure out that living things need food, water, and air. Living things move and grow. Plants and animals are living things.**

This lesson sets the foundation for students to explore patterns of what living things need, and the connection between what a living thing specifically needs and where it lives.

FRAMING THE UNIT
Show the following video of a deer in the forest (Deer- 0:37) courtesy of Mike Karschti. Ask students: *What do you wonder about this creature?* Tell students, *This unit is all about living things and how living things work with the things around them so that they can survive or live. We are going to learn what it means to be a living thing. By the end of our unit, we are going to answer the question, 'How can we make a model and use it to compare the basic needs of pets and wild animals?' What do you think we need to know in order to be able to answer this question? What questions do you have about this design challenge?* Ask students to turn and talk to a partner, then to share out some answers to the whole class. You may want to write some of their ideas and questions on a piece of chart paper to revisit throughout the unit.

ENGAGE
Ask the class: *How do we know if something is living?* Ask them for their reasoning and record it on chart paper titled "Living Things..." Save their

MYSCI MATERIALS:

6 sets of Living and Nonliving cards

What's Alive? By Kathleen Weidner Zoehfeld

TEACHER PROVIDES:

Copies of Student Pages 2-5 or Student Science Journals

Teacher Pages 2-4

Chart paper

VIRTUAL RESOURCES:

Is It Living? virtual adaptation

Living and Nonliving Cards as Slides

What are Living Things Mini-Lesson video

Teaching Tip:

This icon highlights an opportunity to check for understanding through a formal or informal assessment.

Teaching Tip:

Throughout the unit, you may choose to read any of the Life Cycle Books, a mySci loaner item, as a read aloud to your class. These books will provide students with more information about living things.

Tech Tip:

The interactive Google slides in this

responses for later. Ask: *What are some things you think are living?* Take a few answers, but do not confirm correct responses. Pass out copies of Is it Living? (Student Page 2) and have the students circle the objects that they think are living. You may also choose to complete the activity as a class or on iPads using the Is it Living? interactive activity.

Collect and save these. Say: *Today we will use observations to figure out what is living. If you aren't sure about your answers on the Is It Living? worksheet that is okay. We will look at these again to see if our thinking changes.*

EXPLORE

Divide the students into six small groups. Give each group a set of Living and Nonliving laminated cards and explain that they are going to classify the items on each card as living or nonliving. To classify means to sort into groups based on similarities or differences. Ask the students to discuss the reasoning for their choices.

EXPLAIN

Hold a class discussion about student sorting choices. Record student thoughts about each card. This can be done by posting each picture and recording tally mark votes for living or non-living or sorting a set of cards into class majority piles of living and nonliving, with students counting the cards. Say: *Some of you might not be sure about your sorting choices. That is okay right now! We are going to have the chance to sort the cards again after we learn more about living things.*

Read *What's Alive?* (See Teacher Page 3 for Read-Aloud Guide, with the key content takeaway bolded).

Say: *Let's go back to our card sort. Are there any items that you want to change since we read the book? Why or why not?* Have students give evidence to support their claim of whether or not the items on the card show living or nonliving things. Living things cards include: an ant, bear, baby, worm, goldfish, flowers and seeds. Nonliving things cards include: a toy ant, doll, stones, teddy bear and bike. Students may still have questions about the seeds at this point. The next lesson will explore those questions.

ELABORATE

Tell the class they are going on a hunt to look for living objects in the environment around the school. Ideally, take students outside for this activity. If the weather doesn't permit, have them look out the window. If you have plants or class pets in the classroom, they could record those objects as well. The students will record their findings on the Living Thing Scavenger Hunt (Student Pages 3-5). Pass the journal pages out to the class

unit can be used as a class or completed individually if your classroom is 1:1. Keep in mind that you will first need to save a copy to your own Google Drive and that the interactive features work only outside of the presentation mode.

Math Connections:

https://learning.ccsso.org/wp-content/uploads/2022/11/ADA-Compliant-Math-Standards.pdf

ELA Connections:

https://learning.ccsso.org/wp-content/uploads/2022/11/ADA-Compliant-ELA-Standards.pdf
MLS K.R.1.A.b
MLS K.R.1.A.c
MLS K.R.1.B.b
MLS K.R.1.C.a

and show them where they will draw the objects they find. When doing the scavenger hunt, make sure students are pointing out plants as well as animals. When everyone is finished, discuss student findings. Later lessons will more deeply explore classification and what the difference is between plants and animals. At this point, simply focus on general identification of living things.

EVALUATE

Refer students to the Is it Living? Probe (Student Page 2) again and tell students that they may go back and change any of their choices as to what is living and what is not living. Ask students questions about how they know their revised choices are correct. A key for Student Page 2 is provided on Teacher Page 2.

NGSS/MLS Connections:

K-LS1-1. (K.LS1.C.1.) Use observations to describe patterns of what plants and animals (including humans) need to survive.

Science & Engineering Practices in lesson:

- [x] Asking questions and defining problems
- [ ] Developing and using models
- [ ] Planning and carrying out investigations
- [ ] Analyzing and interpreting data
- [ ] Constructing explanations and designing solutions
- [x] Engaging in argument from evidence
- [ ] Using mathematics and computational thinking
- [x] Obtaining, evaluating and communicating information

Crosscutting Concepts in lesson:

- [x] Patterns
- [ ] Cause and effect
- [ ] Structure and function
- [ ] Scale, proportion and quantity
- [ ] Stability and change of systems
- [ ] Systems and models
- [ ] Energy and matter in systems

S1 - L1 Is It Living?

DIRECTIONS
Circle the objects that are living.

flowers

turtle

worm

doll

playset

tricycle

stones

bear

baby

seeds

teddy bear

ant

fish

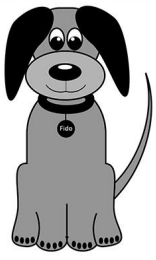
toy bug

Source:
Adapted from Page Keeley

S1 - L1 Living Thing Scavenger Hunt

DIRECTIONS

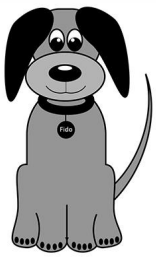
Draw a living thing you see.

Drawing 1	
I know it is living because it...	This living thing is a...
▢ a. Grows and Changes ▢ b. Needs Air ▢ c. Needs Food and Water ▢ d. Moves By Itself	▢ Plant  ▢ Animal 

S1 - L1 Living Thing Scavenger Hunt

DIRECTIONS

Draw a living thing you see.

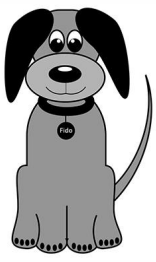
Drawing 2	
I know it is living because it...	This living thing is a...
▢ a. Grows and Changes ▢ b. Needs Air ▢ c. Needs Food and Water ▢ d. Moves By Itself	▢ Plant  ▢ Animal 

S1 - L1 Living Thing Scavenger Hunt

DIRECTIONS

Draw a living thing you see.

Drawing 3

I know it is living because it...	This living thing is a...
▢ a. Grows and Changes ▢ b. Needs Air ▢ c. Needs Food and Water ▢ d. Moves By Itself	▢ Plant  ▢ Animal 

Teacher Page S1 - L1 Is It Living?

DIRECTIONS
Circle the objects that are living.


flowers


turtle


worm


doll


playset


tricycle


stones

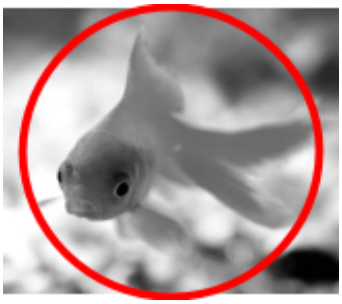

bear


baby


seeds


teddy bear


ant


fish


toy bug

Source:
Adapted from Page Keeley

Teacher Page S1 - L1 Read Aloud Guide: *What's Alive?*

Read the title, author, and illustrator to students. Say to students: *This book can help us figure out what it means to be a living thing.*

Pages 4-5: Ask students: *Are you like a cat?* Allow students to share what they think. Ask students: *How are you different than a cat?* Allow students to share ideas. Ask students: *How are you the same as a cat?* Allow students to share ideas. If students don't mention the similarities and differences on the page, you can use those as examples.

Pages 6-7: Ask students: *Are you like a flower or a tree?* Allow students to share what they think. Ask students: *How are you different than a flower or a tree?* Allow students to share ideas. Ask students: *How are you the same as a flower or tree?* Allow students to share ideas. If students don't mention the similarities and differences on the page, you can use those as examples.

Pages 8-9: Say to students: *A bird, a flower, a cat, a tree, and you are all alike in one important way. You are all alive.*

Pages 10-11: Ask students: *Do you see anything on these pages that are NOT alive?* Allow students to share, then read the page as written. **After reading this page, you may want to pause to revisit the chart paper from Engage and ask students if they should add anything to their list of what living things are like. (Living things use water, food, and air to give them energy. They use energy to grow and move.)**

Pages 12-13: Read as written.

Pages 14-15: Read as written.

Pages 16-17: Read as written.

Pages 18-21: Skip these pages.

Pages 22-23: Say to students: *You can explore around our schoolyard, your backyard, or a park to find examples of things that are living and things that are not living.*

Pages 24-25: Say to students: *We're going to look at our cards again and see if we changed our minds about any of the things in the cards being living or not. We will use what we found out in this book to decide.* Ask students: *How can we tell if something is living?* Allow students to share their ideas. **(Living things need air, food, and water. Living things grow and move.)**

Pages 26-27: Read as written. Take student ideas. Reinforce to students that even dead things still count as living things, because they were once alive.

Pages 28-32: Skip these pages.

Teacher Page S1 - L1 Living Thing Scavenger Hunt - *Sample*

DIRECTIONS

Draw a living thing you see.

Drawing 1

K-LS1-1. (K.LS1.C.1.)

I know it is living because it...	This living thing is a...
☑ a. Grows and Changes ☑ b. Needs Air ☑ c. Needs Food and Water ☑ d. Moves By Itself	☐ Plant  ☑ Animal 

Teacher Prep List - Section 2

	Inside mySci kit, you'll find:	Items you must supply:	Prep and copies:
Lesson 2 *(2 days plus 3 weeks for observing)*	6 biofact bags containing: feather, shell, bone, acorn, lima bean, sunflower seed, rock, penny, marble, paper clip, nail, pompom *How a Seed Grows*, by Helene Jordan Grow light Seed starting kit with soil, water tray, etc. 30 radish seeds Extra seeds (for demonstration of no light and no water) Spray bottle Hand lenses	Chart paper Warm water	In this lesson, students will germinate and grow different plants. The process will take from one week to a month. The students will take care of their plants as they do more lessons. Copies of Student Page 6 or Student Science Journals Teacher Pages 5-6 Planting Tutorial ***VIRTUAL RESOURCES:*** What is a Plant Mini-Lesson
Lesson 3 *(2 days)*	6 sets of Plant Cards	Chart paper Extra books, videos, live plants or pictures about plants if taking a walk outside is not feasible.No materials	Copies of Student Pages 7-8 or Student Science Journals Teacher Page 7 ***VIRTUAL RESOURCES:*** Plant Cards as Slides

SECTION 2: *What is a plant?*

LESSON 2: *How do seeds become plants?*

LEARNING TARGETS

Identify that a seed will grow into a plant.

Identify the needs of a plant, including water, space, air, and light.

VOCABULARY

seed soil plant

SUMMARY

ESTIMATED NUMBER OF DAYS: 2 + 3 weeks for observing

In the previous lesson, students figured out that plants and animals are living things, and living things need food, air, and water.

In this lesson, students will observe the needs and growth of different kinds of seeds. **Students figure out that plants need water and light to live and grow.**

This lesson sets the stage for the next lesson, where students will explore similarities and differences between plants, and explore the connection between plant needs and plant habitats.

ENGAGE

Say: *We already learned about how to tell if something is living or not living. What are some things that living things do or need?* (Grow, need air/breathe, need food, need water, etc) *I am going to give your group some objects to sort into two groups: things that will grow and things that won't grow when planted in soil.* Divide the class into small groups. Pass out the biofact bags. Ask students to sort the items in the bag into two groups, things that will grow and things that won't grow when planted in soil. Have the students use the hand lenses to examine the objects closely. Have a discussion about student choices, recording responses on chart paper or a tally sheet. Teacher Note: The acorns and bones in these bags are fake models. Only the seeds (bean and sunflower) will grow when planted in soil.

EXPLORE

Tell students that we will try growing some of the objects from the biofact bag. Ask students what the objects are that they think will grow. Ask: *What will grow from these objects?* Take student responses.

Demonstrate how to plant the bean, sunflower seeds, and whatever else

MYSCI MATERIALS:

6 biofact bags containing: feather, shell, bone, acorn, lima bean, sunflower seed, rock, penny, marble, paper clip, nail, pompom

How a Seed Grows, by Helene Jordan

Grow light

Seed starting kit with soil, water tray, etc.

30 radish seeds

Extra seeds (for demonstration of no light and no water)

Spray bottle

Hand lenses

TEACHER PROVIDES:

Copies of Student Page 6 or Student Science Journals

Teacher Pages 5-6

Warm water

Chart paper

VIRTUAL RESOURCES:

What is a Plant Mini-Lesson

Teaching Tip:

In this lesson, students will germinate and grow different plants. The process will take from one week to a month. The students will take care of their plants while they complete more lessons. You may want to ask for a classroom helper if possible during this lesson.

students think will grow in the soil (even if the items are not correct). Give the objects water. See tutorial for set up instructions.

Tell the students they are going to plant a seed on their own. Read the Guide included in the kit for setting up the seed starter before having students plant their seeds. Give each student a radish seed to examine with a hand lens. The students will watch the teacher set up the seed starter, adding the warm water to expand the soil pellets. Tell students that the soil pellets will provide space for the seed to grow. Have the students place the radish seeds on the top of the pellet.

Each student should give their pellet two squirts from the spray bottle because plants need water to grow. Ask students: *We gave the seeds water- what else do plants need to grow?* (Take student ideas based on the book *What's Alive?*) Place the pellets in an area that receives sunlight and/or use the grow light to provide this need.

If possible, take a couple of the seeds and do not give them water. Take another couple of the seeds and place them in a dark area, with wet soil pellets. This can show students through demonstration that plants cannot grow well without light or water.

EXPLAIN

Say: *Where might you find seeds if I didn't give you one to plant?* Students might say they can find seeds in fruit, in their spice racks in the pantry or from their yards. Some examples of seeds they could find are apple, strawberry or orange seeds from fruit, seeds from a packet bought at a store, peppercorns, coriander, etc. As a further extension, students could look for and bring seeds that they find from home to the classroom to plant.

Read and discuss *How a Seed Grows,* by Helene Jordan (see Teacher Page 5 for Read-Aloud Guide). Compare the seeds and how the seeds get what they need to grow in the book to the ones you planted. Recall that to grow, plants need space, water, air and sunlight. Students might say that living things need food too. Point out that plants make their own food and do not eat like animals do.

ELABORATE

Say: *We know that seeds grow, but just like us, they take some time to grow. How long do you think it will take our radish seeds to begin to grow?* Make a chart of student predictions. (Radishes take about two weeks to sprout, but then finish growing in another two weeks).

Say: *Seeds are the beginning of a plant's life and plants are alive. What do you think would happen if we don't water the plants? Or put a plant in the dark?* Take a few student responses. You may want to chart their

Teaching Tip:

If needed, request the mySci loaner item, Plant Light House, to use to provide additional sunlight for plants.

Tech Tip:

For the Evaluate section, if your district does not have Google accounts for students or you do not have the Slides app installed on the iPads another option is to:

1) Open the document on your computer.

2) With an iPad the student can take a photo of the screen or board where the document is displayed.

3) To demonstrate understanding a student can interact with the image by adding lines, text, and even voice using apps such as Educreations or Seesaw. Doodle Buddy is a third suggested app, but doesn't have the voice feature.

Teaching Tip:

Care for and observe the radish seeds over the next days and weeks and discuss their growth. Remind students that they must continue to provide the seeds with their needs throughout the germination and growing process.

ELA Connections:

https://learning.ccsso.org/wp-content/uploads/2022/11/ADA-Compliant-ELA-Standards.pdf

MLS K.R.1.A.b

MLS K.SL.3.A.c

predictions and see how they compare to the seeds you set aside without water or light.

Review with the students what plants need to grow (space, water, sunlight, air).

EVALUATE

Ask students: *What do plants need to live and grow?* Pass out and administer the What a Plant Needs assessment (Student Page 5). You may also choose to complete the activity as a class or on iPads using the What a Plant Needs interactive activity.

A key is provided on Teacher Page 3.

NGSS/MLS Connections:

K-LS1-1. (K.LS) Use observations to describe patterns of what plants and animals (including humans) need to survive.

Science & Engineering Practices in lesson:

- [ ] Asking questions and defining problems
- [ ] Developing and using models
- [x] Planning and carrying out investigations
- [ ] Analyzing and interpreting data
- [ ] Constructing explanations and designing solutions
- [ ] Engaging in argument from evidence
- [ ] Using mathematics and computational thinking
- [x] Obtaining, evaluating and communicating information

Crosscutting Concepts in lesson:

- [ ] Patterns
- [x] Cause and effect
- [ ] Structure and function
- [ ] Scale, proportion and quantity
- [ ] Stability and change of systems
- [ ] Systems and models
- [ ] Energy and matter in systems

S2 - L2 What a Plant Needs

DIRECTIONS

Draw a line connecting the plant and what it needs to live and grow.

SUN

AIR

WATER

PIZZA

BED

SPACE TO GROW

Teacher Page S2 - L2 Read Aloud Guide: *How a Seed Grows*

Read the title, author, and illustrator to students. Say to students: *Look at the picture. What do you think this book will be about? What do you wonder about seeds?* Take student responses. *Let's find out.*

Page 3: Read as written. Ask students: *What else do you know that grows from a seed?* Take student responses.

Pages 4-5: Read as written. Ask students: *What does a seed need to become a big tree or a beautiful flower?* Take student responses.

Pages 6-7: Read as written. Ask students: *Do you have any big trees around your home?* Allow students to describe trees in their neighborhood.

Page 8: Read as written.

Page 9: Instead of reading the text, say: *We planted radish seeds, but the students in this book are going to plant bean seeds. We used a seed starter kit, but you can plant seeds in eggshells, tin cans, old cups, or little flower pots. Be sure that the containers have holes in the bottoms.* Ask students: *Why do the containers need to have holes in the bottoms?* (The holes make sure the water doesn't rot the roots.)

Pages 10-13: Instead of reading the text, say: *If you want to plant a seed, you put soil in a container, put the seed down into the soil, and cover it up. Then, you make sure to give it water and don't let it dry out.*

Pages 14-15: Instead of reading the text, say: *Next, you put your seeds in the light. Some seeds take a long time to sprout, or begin to grow.*

Pages 16-17: Read as written. Ask students: *What has the book told us about what plants need to grow?* (They need water and light.)

Pages 18-27: Say to students: *Let's pretend we planted a seed and looked at it on different days as it grows over time. Here's what we might find.* Read as written. Ask students: *Do you think we will find the same thing about our seeds- that some will grow, and some will not grow? Will our seeds turn into plants?*

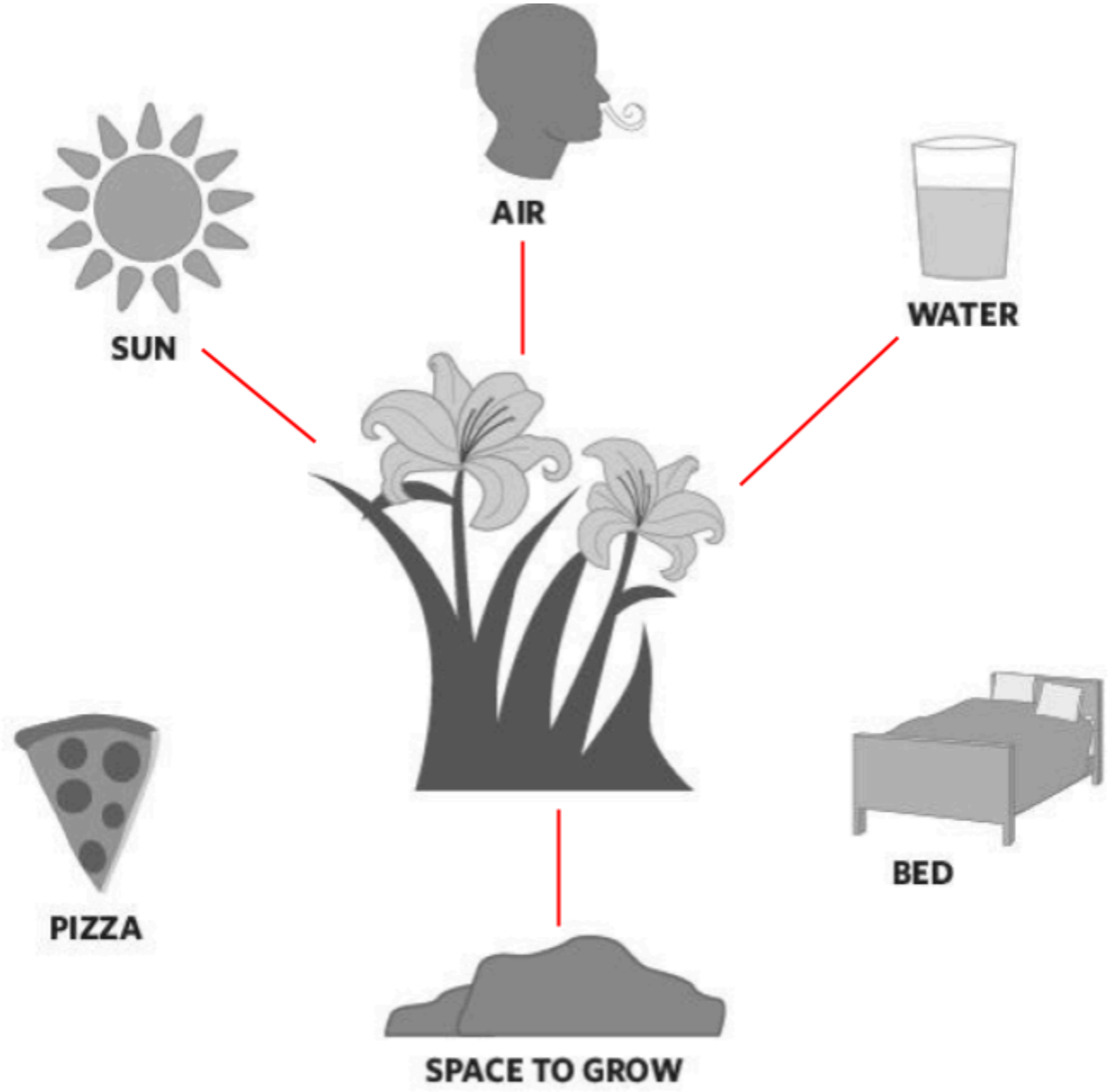
Pages 28-31: Read as written.

Teacher Page S2 - L2

What a Plant Needs Key

DIRECTIONS

Draw a line connecting the plant and what it needs to live and grow.



K-LS1-1. (K.LS1.C.1.)

② *SECTION 2: What is a plant?*

LESSON 3: *How are plants alike and different?*

LEARNING TARGETS

Describe how the needs of plants are connected to where they grow.

Identify the parts of a plant, including stem, leaf, root, and flower.

Describe how plants are similar yet different.

VOCABULARY

flower leaf root stem fruit

SUMMARY

ESTIMATED NUMBER OF DAYS: 2

In the previous lesson, students investigated with seeds to determine that plants need light and water to grow.

In this lesson, students notice the similarities and differences of plants in different environments through pictures and observations. **Students figure out that plants grow in habitats where they can get the sunlight, water, and air they need to live. Plants can change their environment to meet their needs.**

In the next section, students will explore animal needs and characteristics, and will compare animals to plants using what they have learned in this section.

ENGAGE

Have students draw a picture of a plant on the Plant Drawing sheet (Student Page 7) and share with a neighbor. You should explain to students that an environment is a particular area or place (For example, you can find trees in many different environments: a forest, a yard, a park, etc.). Students will discuss how living things use their environments to survive in Lesson 7. You may choose to circulate and help students add descriptions to their illustrations. Ask: *Is your plant exactly like your neighbor's? How is it different? Where do you think you would find a plant like the one you drew?*

EXPLORE

If possible, go outside with your students and have them observe where the most plants are growing. Turn over a big rock to see if a plant is growing under the rock (in the dark). Look for very dry places and see if many plants are growing there. Ask students: *Why do you think we wouldn't find*

MYSCI MATERIALS:

6 sets of Plant cards

TEACHER PROVIDES:

Copies of Student Pages 7-8 or Student Science Journals

Teacher Page 7

Extra books, videos, live plants or pictures about plants if taking a walk outside is not feasible

Chart paper

VIRTUAL RESOURCES:

Plant Cards as Slides

Teaching Tip:

For the Explore section, teachers may choose to bring in live plants, pictures, or other resources for students to explore.

plants under big rocks, or in very dry places? (The plants cannot get the water and light they need to grow in those places.) Have students look for evidence of how plants change what they do, or their environment, to meet their needs of light and water. This might include tree roots breaking through concrete because they need more room to grow or plants growing in a direction to better face the sun.

EXPLAIN

After your walk outside, chart your findings with students. Ask students: *Where did we find the most plants outside? Where did we not find plants? Why?* (We found the most plants in sunny areas where they could get water. This is because that's what they need to survive.) Students may have noticed some plants did grow in shady areas. There is still some light in these areas, though. You could point out that some plants need more light than others.

ELABORATE

Put the students in groups and pass out the plant cards and discuss similarities and differences. Ask students: *Are all plants the same? How are they different?*

Ask: *What parts do all plants have in common?* Come up with common parts such as leaves, stems and roots. Refer students to the Plant Parts Poster (Student Page 8), label together and discuss. You may also choose to complete the activity as a class or on iPads using the Plant Parts Poster interactive activity. A key for this page is provided on Teacher Page 7. Have the students go back to the picture of the plant they drew in the Engage section. Ask: *Did you draw the leaves, stems and roots? If not, go back and add those, or draw a new picture.*

EVALUATE

Pass out the plant cards to small groups again. Ask: *What plant parts do you see? What parts can you not see? What do all plants need to live?* (Sun, space to grow (like in the soil), water and air). *Where do you think these plants would live?* (In a place where they could get what they need.)

ELA Connections:

https://learning.ccsso.org/wp-content/uploads/2022/11/ADA-Compliant-ELA-Standards.pdf

MLS K.SL.3.A.a

NGSS/MLS Connections:

K-LS1-1. (K.LS) Use observations to describe patterns of what plants and animals (including humans) need to survive.
K-ESS3-1. (K.Science) Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.

Science & Engineering Practices in lesson:

- ☐ Asking questions and defining problems
- ☑ Developing and using models
- ☑ Planning and carrying out investigations
- ☐ Analyzing and interpreting data
- ☐ Constructing explanations and designing solutions
- ☐ Engaging in argument from evidence
- ☐ Using mathematics and computational thinking
- ☑ Obtaining, evaluating and communicating information

Crosscutting Concepts in lesson:

- ☐ Patterns
- ☐ Cause and effect
- ☑ Structure and function
- ☐ Scale, proportion and quantity
- ☐ Stability and change of systems
- ☑ Systems and models
- ☐ Energy and matter in systems

S2 - L3 Plant Drawing

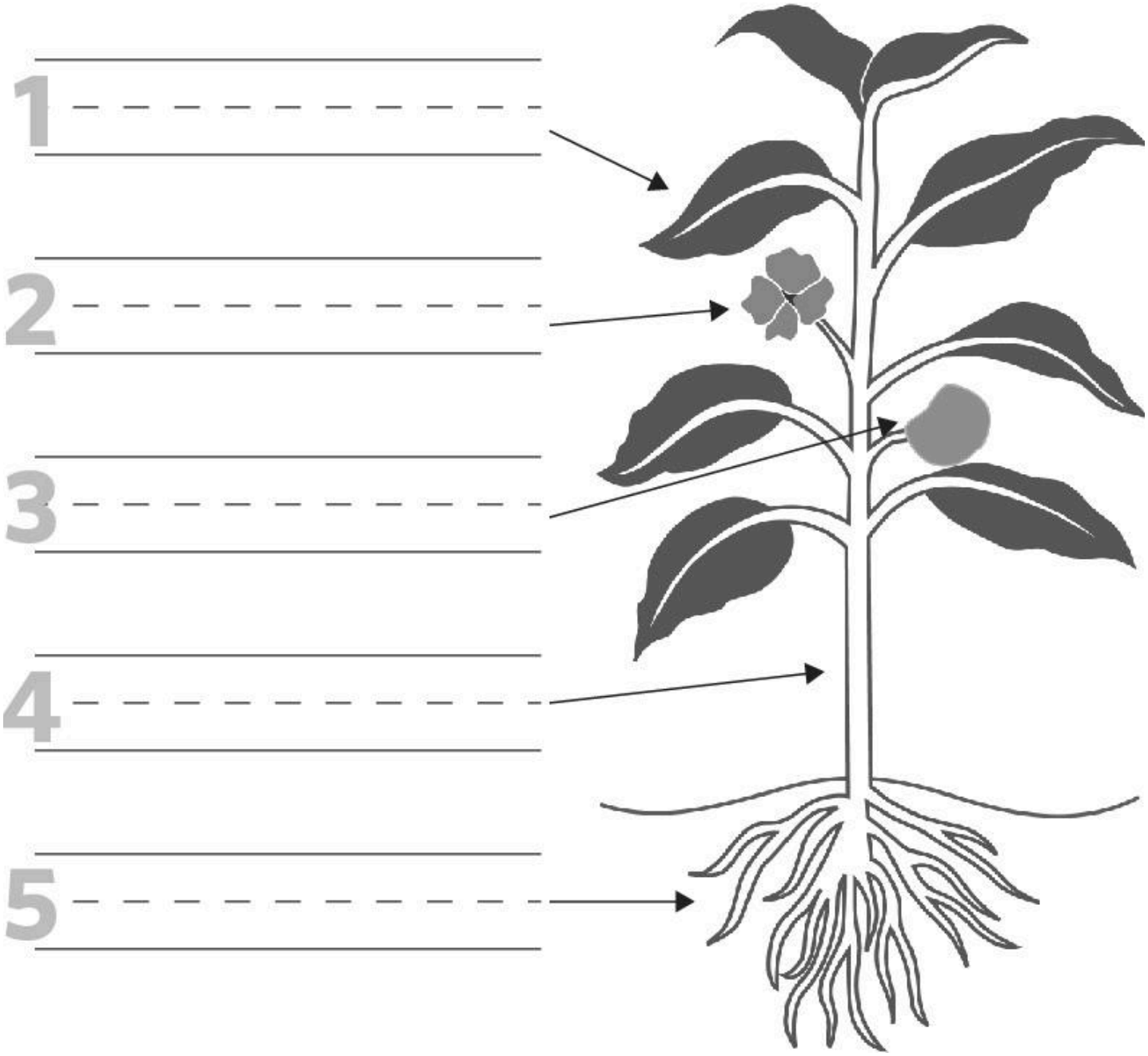
DIRECTIONS
Draw a picture of a plant in an environment.

My plant is...

S2 - L3 Plant Parts Poster

LABEL THE FOLLOWING:

stem leaf root flower fruit

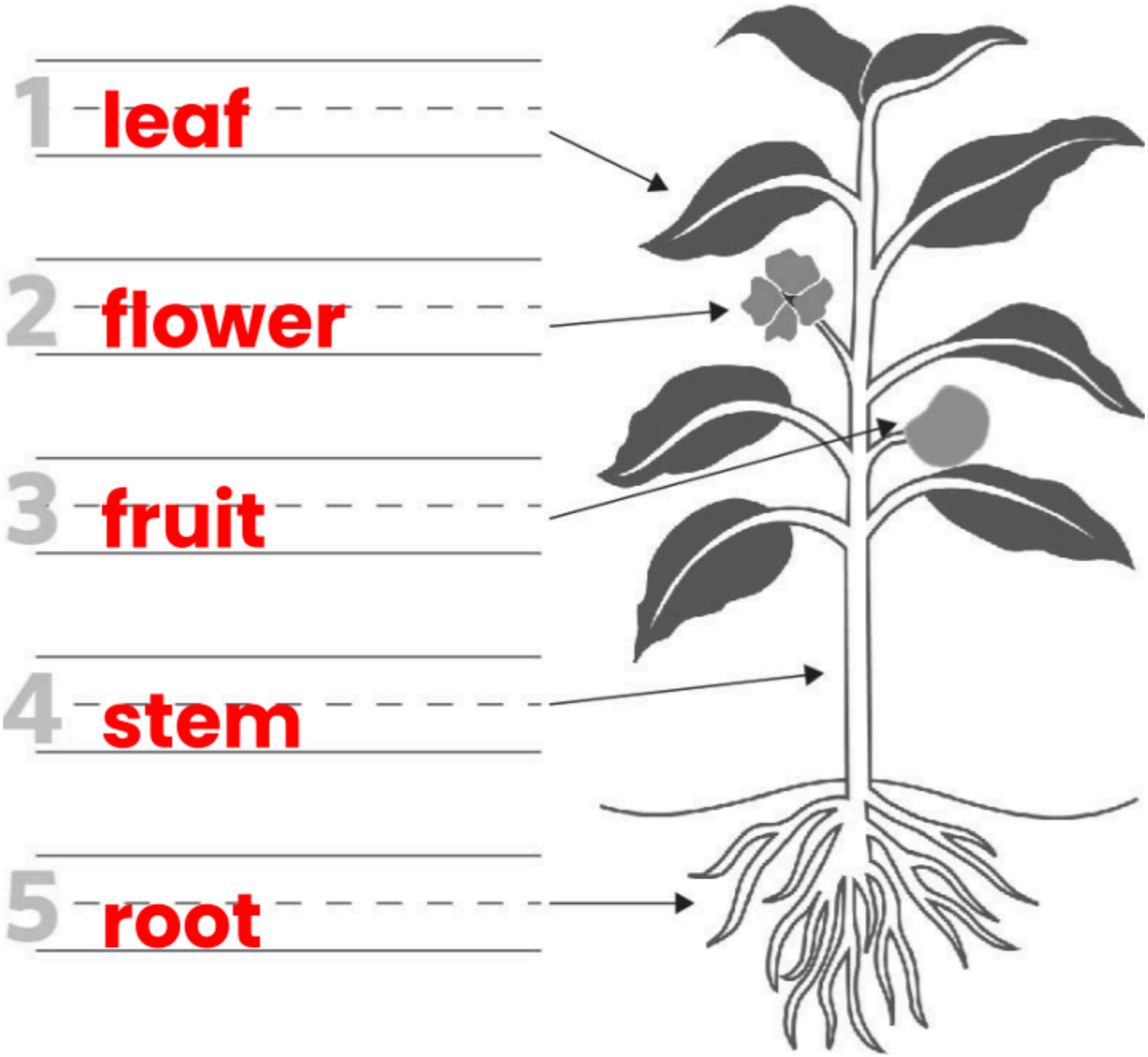


Teacher Page S2 - L3

Plant Parts Poster

LABEL THE FOLLOWING:

stem leaf root flower fruit



Teacher Prep List - Section 3

	Inside mySci kit, you'll find:	Items you must supply:	Prep and copies:
Lesson 4 *(2 days)*	Living and Nonliving cards from Lesson 1 with the nonliving cards removed Plant cards (from Lesson 3)	Living vs. nonliving chart (from Lesson 1) Scissors Chart paper	Copies of Student Page 9 or Student Science Journals Teacher Pages 8-10 **Mix the plant and animal cards together before students get the cards.** ***VIRTUAL RESOURCES:*** What Is an Animal? Mini-Lesson Plant Cards as Slides
Lesson 5 *(3 days)*	Animal cards 6 biofact bags (from Lesson 2) 6 bags of plastic animals: 1 bird, 1 fish, 1 amphibian, 1 reptile, 1 mammal	Chart paper	Copies of Student Pages 10-12 or Student Science Journals ***VIRTUAL RESOURCES:*** Animal Cards as Slides
Lesson 6 *(2 days)*	6 bags of 12 Invertebrate models containing: Beetle, Dragonfly, Grasshopper, Fly, Bee, Worker Ant, Butterfly, Caterpillar, Spider 1, Spider 2, Crab, Scorpion hand lenses		Copies of Student Page 13 or Student Science Journals Teacher Page 11

3 *SECTION 3: What is an animal?*

LESSON 4: *What makes animals different from plants?*

LEARNING TARGETS

Compare and contrast what plants and animals can do and what they need to survive.

VOCABULARY

animal

SUMMARY

ESTIMATED NUMBER OF DAYS: 2

In the previous lessons, students identified characteristics of all living things, and what plants need to survive.

In this lesson, students will use plant and animal cards to find similarities and differences among plants and animals. **Students figure out that animals must eat food (plants or other animals) to grow and live, while plants do not have to eat food. Both animals and plants need water.**

This lesson sets the stage for deeper explorations of different types of animals, and the connection between what an animal needs and the habitat in which it lives.

ENGAGE

Use the living object cards from Lesson 1 and plant cards from Lesson 3. Ask students to sort the cards into plant and animal groups. Discuss reasons why they sorted the way they did.

EXPLORE

Go back to the "Living Things..." chart from Lesson 1. Review what the students originally said about living things. Use chart paper to create a Venn diagram of plant and animal needs and parts based on what students already know about living things and the reasoning they used to sort plant and animal card groups. Here is an example:

Animals: Find and eat their food, usually move from place to place on their own, need shelter

Plants: Do not need to eat, need light, do not move from place to place on their own, most have green leaves

Both: Need food, need water, grow, need space, need air

MYSCI MATERIALS:

Living and nonliving cards (from Lesson 1), with the nonliving cards removed by teacher

Plant cards (from Lesson 3)

TEACHER PROVIDES:

"Living Things..." chart from Lesson 1

Copies of Student Page 9 or Student Science Journals

Teacher Pages 8-10 (1 copy of Teacher Page 9 cut-outs for each student)

Scissors

Chart paper

Mix the plant and animal cards together before students get the cards.

VIRTUAL RESOURCES:

What Is an Animal? Mini-Lesson

Plant Cards as Slides

ELA Standards:

https://learning.ccsso.org/wp-content/uploads/2022/11/ADA-Compliant-ELA-Standards.pdf

MLS K.R.1.B.a

MLS K.W.2.A.c

EXPLAIN

Ask: *What makes an animal different from a plant? Let's look at our cards again.* Have students pick one animal card and one plant card. *How are they the same? How are they different?*

Show the Basic Needs of Plants & Animals (2:28) .

Say: *Animals and plants are both living things. They all need water and air, need space to grow, and need food.*

Even though they are the same in some ways, plants and animals are different, too. One of the ways they are different is the parts of animals versus plants. Make a T-chart of plant parts and animal parts. Talk about the differences between plants and animals. Use the Plant and Animal Parts Guide (Teacher Page 8) to lead this discussion.

ELABORATE

Hold up the baby card. Ask: *Is this a plant or animal? How do you know? Humans are animals too! What do we have in common with other animals?*

Compare the baby to the kitten, fish, turtle, etc., discussing parts and what the animals do.

EVALUATE

Ask: *What do animals need to live and grow? What are some things that animals need and do that plants don't?* (Find and eat their food, move from place to place on their own, need shelter). Revisit the deer eating in the forest. Ask students: *What have we figured out that helps us understand what the deer is doing? What do you wonder about this deer?*

Pass out the Plants and Animals Chart (Student Page 9) and Plants and Animals Chart Word Tiles (Teacher Page 9). Review directions with the class. You may choose to have students complete this whole group, small group, in partners or independently. A key is provided on Teacher Page 10.

Teaching Tip:

The sentence strips are numbered in order for the teacher to help identify which statement is being discussed.

NGSS/MLS Connections:

K-LS1-1. (K.LS) Use observations to describe patterns of what plants and animals (including humans) need to survive.

Science & Engineering Practices in lesson:

- ☐ Asking questions and defining problems
- ☐ Developing and using models
- ☐ Planning and carrying out investigations
- ☐ Analyzing and interpreting data
- ☐ Constructing explanations and designing solutions
- ☐ Engaging in argument from evidence
- ☐ Using mathematics and computational thinking
- ☑ Obtaining, evaluating and communicating information

Crosscutting Concepts in lesson:

- ☑ Patterns
- ☐ Cause and effect
- ☐ Structure and function
- ☐ Scale, proportion and quantity
- ☐ Stability and change of systems
- ☐ Systems and models
- ☐ Energy and matter in systems

S3 - L4 Plants and Animal Chart

DIRECTIONS

Color the column titles: Animals - Blue
Plants - Green
Both - Red

Color the word tiles from the page your teacher gave you to match the column titles.

Cut out the word tiles

Glue the word tiles to where they belong on the chart.

ANIMALS 	PLANTS 	BOTH  

Plant & Animal Parts Guide

PLANT PART	WHAT THE PART DOES	ANIMAL PART	WHAT THE PART DOES
roots	transport water from soil to plant	mouth	drink water, eat food
stem	holds plant up and moves water and nutrients	backbone	holds body up
leaves	make food	veins	moves blood around
flower	makes seeds	stomach	holds and digests food
fruit	holds the seeds	eyes, nose, ears	finding food and staying safe
		skin	to hold everything in, protects insides

Teacher Page S3 - L4 Plants & Animal Chart Word Tiles

DIRECTIONS

Color the column titles: Animals - Blue
Plants - Green
Both - Red

Color the word tiles from the page your teacher gave you to match the column titles.

Cut out the word tiles

Glue the word tiles to where they belong on Student Page 9.

WORD TILES

1. Need shelter	2. Can move on their own from place to place	3. Are usually green with leaves
4. Come from seeds	5. Need air	6. Make their own food from the sun
7. Can see and hear	8. Need water	9. Can grow and change

Teacher Page S3 - L4

Plants and Animal Chart Key

DIRECTIONS

Color the column titles: Animals - Blue
Plants - Green
Both - Red

Color the word tiles from the page your teacher gave you to match the column titles.

Cut out the word tiles.

Glue the word tiles to where they belong on the chart.

ANIMALS 	PLANTS 	BOTH  
1. Need shelter	3. Are usually green with leaves	5. Need air
2. Can move on their own from place to place	4. Come from seeds	8. Need water
7. Can see and hear	6. Make their own food from the sun	9. Can grow and change

K-LS1-1. (K.LS1.C.1.)

3 SECTION 3: *What is an animal?*

LESSON 5: *How are animals alike and different?*

LEARNING TARGETS

Classify animals such as mammals, reptiles, amphibians, birds, and fish according to their physical structures.

VOCABULARY

mammal	reptile	amphibian	bird
fish	model	structure	

SUMMARY

ESTIMATED NUMBER OF DAYS: 3

In the previous lesson, students identified similarities and differences between plants and animals.

In this lesson, students compare different structures of animals, and discuss classification of animals. **Students figure out that animals each have their own shapes, and we can sort them based on these shapes. Animals can change their environment to meet their needs.**

This lesson will set the foundation for the design challenge, where students will model the needs of different animals.

ENGAGE

Ask: *What are some of your favorite animals? What do you know about these animals? Do you have any favorite plants? What do you know about these plants?*

Plants and animals are both living, so they both need or make food, need water and air, they grow, and they need space. What are some things that animals need and do that plants don't? (need shelter, move from place to place on their own, find their food, etc.) Pass out the biofact bags to groups of students. Tell students to carefully dump the contents of the bag onto the table. Students should sort the objects into three groups: things that come from plants, things that come from animals, and things that do not come from either plants or animals. Say to students: *Let's look at the things you said come from animals. What do you think the bone or feather or shell might come from?* (bird, animal, snail, etc). Prompt students to support their claims with evidence. Teacher Note: The bone is only a model bone, but you can tell students that we are going to pretend it is real.

Say: *A shell, bone, and feather are all examples of structures that scientists*

MYSCI MATERIALS:

6 biofact bags (from Lesson 2)

Animal card set

6 bags of animal models: 1 amphibian, 1 reptile, 1 mammal, 1 bird, 1 fish

TEACHER PROVIDES:

Copies of Student Pages 10-12 or Student Science Journals

Chart paper

VIRTUAL RESOURCES:

Animal Cards as Slides

Teaching Tip:

The students will need extra time to look at and think about the animal models. This activity would work very well for a "center," so the students have multiple opportunities to use the animal models in different ways.

ELA Connections:

https://learning.ccsso.org/wp-content/uploads/2022/11/ADA-Compliant-ELA-Standards.pdf
MLS K.W.2.B.a

might use to put animals in groups. A structure is a part of an animal that helps the animal do a certain job. Collect the biofact bags.

EXPLORE

Put students in small groups and pass out animal model bags. Have students carefully look at each animal model and notice the different parts of the animals. Ask: *Does it have feet? Does it have wings? What structures can I see? Now that we have looked at each model of an animal, are there any that are similar? How can you group these? (by number of legs, body structures, etc.)* Allow students to work in groups to sort their animal models. Discuss student groupings.

EXPLAIN

Show Animal Classification video (4:08). When the narrator talks about feeling your spine, pause and have students feel their own spines.
Tell students: *Scientists have given special names to some groups of animals depending on what they have or do. What are some of the group names?* (The names of those groups are: mammals, reptiles, amphibians, birds, fish, and invertebrates.) *Let's look at the animal models that were in our bags. What would you call each of these animals? What structures would we use to put them into the mammal, reptile, amphibian, bird, or fish group?* Review the definition of each class of animal and make a chart that organizes the classifications of the animals in the bag.

Next, have students add to this chart by reviewing and classifying the animals on the Animal Card set. Ask students: *Even though these animals all look different, what is the same about them?* (They all need air, food, water, and shelter.) Students may notice that all of these animals except one have backbones. (The earthworm does not. You can let students guess which animal.) You can preview the next lesson by discussing with students that some animals have backbones (like the ones they are looking at today) and some animals do not (like the ones we will look at in the next lesson).

Ask students to point out the animals that live near them in Missouri. You can use the Missouri Department of Conservation Field Guide website to display pictures of examples of Missouri animals for each group of animals.

ELABORATE

Say: *We previously talked about ways plants can change what they do or change their environment to better fit their needs; animals can do this too!* Use the bird from the animal model bag to give an example of how animals change their environment or their behavior to meet their survival needs. Birds use items from their environment to build a nest that provides them with shelter. Ask: *What are some other ways that animals change their environment to meet their needs?* Students may use the animal models

from their bags or other animals they are familiar with to come up with examples. Some examples include: animals (including humans) using natural materials to build shelters (such as dams or nests), squirrel digging in the ground to hide its food, earthworm burrowing into the ground, humans clearing land to build houses, animals eating plants in their environment, animals storing food for winter, etc. All student claims should be supported with evidence. Note: This standard (K-ESS2-2/K.ESS2.E.1) will be explored more deeply in 1st grade mySci Units 5 and 6.

EVALUATE

Pass out the What Animal Am I? activity sheets (Student Pages 10-12) and one animal card from the kit to small groups of students. Have students work in these groups to fill out their activity sheets based on their animal photo. Then have students share the riddle on Student Page 12 as a class presentation and have other groups guess what animal they reported on.

Revisit the deer eating in the forest. Ask students: *What have we figured out that helps us understand what the deer is doing? What do you wonder about this deer?*

NGSS/MLS Connections:

K-LS1-1. (K.LS) Use observations to describe patterns of what plants and animals (including humans) need to survive.

Science & Engineering Practices in lesson:

- ☐ Asking questions and defining problems
- ☑ Developing and using models
- ☐ Planning and carrying out investigations
- ☐ Analyzing and interpreting data
- ☐ Constructing explanations and designing solutions
- ☑ Engaging in argument from evidence
- ☐ Using mathematics and computational thinking
- ☑ Obtaining, evaluating and communicating information

Crosscutting Concepts in lesson:

- ☐ Patterns
- ☐ Cause and effect
- ☑ Structure and function
- ☐ Scale, proportion and quantity
- ☐ Stability and change of systems
- ☐ Systems and models
- ☐ Energy and matter in systems

S3 - L5 What Animal Am I?

DIRECTIONS
Answer the following questions about your animal.

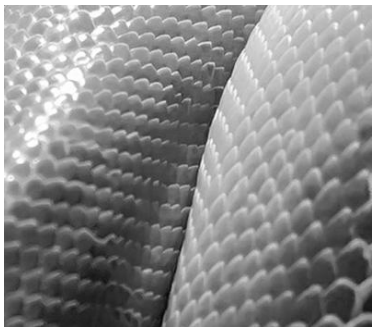
1. Do I have legs?

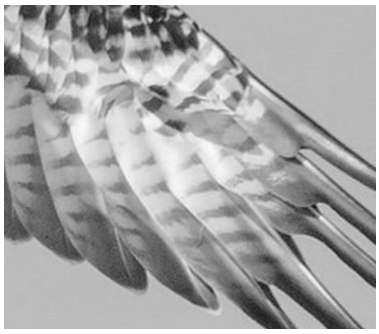
▢ Yes ▢ No How many? _____

2. Do I have color?

▢ Yes ▢ No What color? _____

3. Circle what kind of skin I have:


Smooth / Scaly


Feathery


Furry

4. Am I bigger or smaller than your hand?

▢ Bigger ▢ Smaller

5. What do I eat?

▢ Plants ▢ Animals ▢ Both

S3 - L5 What Animal Am I? (continued)

6. Draw where I could live:

7. How do I move?

▢ Fly ▢ Walk ▢ Swim ▢ Crawl ▢ Hop

8. Do I make a sound?

▢ Yes ▢ No

S3 - L5 What Animal Am I? (continued)

I have _____ legs.

I am this color: _____.

My skin is (scaly) (furry) (smooth).

I am (bigger) (smaller) than my hand.

I live in _____.

I like to eat _____.

I move by _____.

The sound I make is _____.

3 SECTION 3: *What is an animal?*

LESSON 6: *How are invertebrate animals alike and different?*

LEARNING TARGETS

Identify the parts of an insect, including head, thorax, abdomen, and antennae.

VOCABULARY

insect	thorax	abdomen	invertebrate
vertebrate	head	antennae	entomologist

SUMMARY

ESTIMATED NUMBER OF DAYS: 2

In the previous lesson, students explored the major classification groups of vertebrate animals.

In this lesson, students use models and song to discuss the parts of invertebrate animals. **Students figure out that invertebrates do not have bones like we do. Insects have a particular body shape and habitat needs, but they are still animals.**

This section set the foundation for the next section, where students will more deeply consider how organisms interact with their environment to meet their needs.

ENGAGE

Ask: *Are insects animals? How do we know?* Review what animals need and do. Ask: *What animal category would an insect belong? What about a worm? These animals have their own classification group called "invertebrates."* Review the definition of invertebrate. Ask the students if they think a worm or a butterfly has a backbone. Tell students that bones are structures that scientists use to sort animals. All the other classifications include animals that have backbones; those animals are called vertebrates. The lack of a backbone makes animals like worms and insects invertebrates.

EXPLORE

Tell the students that they are going to become entomologists—scientists that study insects.

Pass out the bags of invertebrates and allow time for the students to explore.

MYSCI MATERIALS:

6 bags of 12 invertebrate models containing: beetle, dragonfly, grasshopper, fly, bee, worker ant, butterfly, spider 1, spider 2, crab, scorpion, caterpillar

Hand lenses

TEACHER PROVIDES:

Copies of Student Page 13 or Student Science Journals

Teacher Page 11

Teaching Tip:

These models of insects would make great "center" activities.

With the students in groups, explain that they will be working with their model sets of invertebrates to classify them into two categories—insects and non-insects. Have them look at each invertebrate, count legs on each, examine body parts and look for antennae.

Tell students they may use the hand lenses to examine the invertebrates more closely.

Ask: *How did you sort your invertebrates? What rule did you use to help you decide how to classify the model invertebrates?* (You may want to chart students' initial ideas about how to classify insects.)

Say to students: *Do you think that these insects are more like plants or animals? Why?* (They are animals because they have animal body parts such as legs and eyes. They can move freely from place to place.)

EXPLAIN

Display the Insect Poster (Teacher Page 11), and explain to the students that certain body structures tell scientists if an animal is an insect or not. Insects have six legs, three body parts (head, thorax, abdomen) and two antennae. We call this the 6-3-2 rule. Use the poster to highlight each. Explain that while each insect is a little different, these characteristics stay the same. Some heads are smaller than others, sometimes the thorax and abdomen look like they are the same part, but insects will always follow the 6-3-2 rule. Tell students they have to look closely, just like scientists do. After reviewing the 6-3-2 rule with students, have them revisit the invertebrate models and change their groupings. (Insects - caterpillar, beetle, dragonfly, grasshopper, fly, bee, worker ant, butterfly; Non-Insects - spider 1, spider 2, crab, scorpion) Again, this is a good time to reinforce with students that even though insects have specific characteristics that make them different than other animals, they still have the same general things they need to survive, just like other animals (food, water, air). Each insect type eats its own type of food, though. You could look for examples of insects that eat only plants (for example, caterpillars, grasshoppers, bees, or butterflies) and examples of insects that eat only meat (for example, dragonflies, some beetles, some ants).

ELABORATE

If possible, take students outside to try to observe some insects or other invertebrates. Ask students to classify whatever you observe. As you find them, say to students: *What do the insects get in this habitat?* (They can get the food, air, and water they need to survive.) You can also use the Missouri Department of Conservation Field Guide website to show students examples of Missouri insects. Be sure to point out that they live in Missouri because that is where they can get what they need to survive.

Teaching Tip:

Note that the caterpillar may be difficult for students to classify. Caterpillars are insects because they do have six legs on their thorax, and do have a head, thorax, and abdomen region. If this is not apparent on the plastic models, you may want to show students some pictures of caterpillars.

Math Connections:

https://learning.ccsso.org/wp-content/uploads/2022/11/ADA-Compliant-Math-Standards.pdf
MO.K.DS.A.2

Lead a sing along to the tune of Head, Shoulders, Knees, And Toes:

Head and thorax, abdomen, ABDOMEN!!

Head and thorax, abdomen, ABDOMEN!!

Six jointed legs, antennae, and some wings,

Head and thorax, abdomen, ABDOMEN!!

EVALUATE

Have students draw an insect and label its parts using the 6-3-2 rule on the Insect Drawing sheet (Student Page 13). Students might use the invertebrate models to help them with this illustration.

NGSS/MLS Connections:

K-LS1-1. (K.LS) Use observations to describe patterns of what plants and animals (including humans) need to survive.
K-ESS3-1. (KScience) Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.

Science & Engineering Practices in lesson:

- ☐ Asking questions and defining problems
- ☑ Developing and using models
- ☐ Planning and carrying out investigations
- ☐ Analyzing and interpreting data
- ☐ Constructing explanations and designing solutions
- ☐ Engaging in argument from evidence
- ☐ Using mathematics and computational thinking
- ☐ Obtaining, evaluating and communicating information

Crosscutting Concepts in lesson:

- ☐ Patterns
- ☐ Cause and effect
- ☑ Structure and function
- ☐ Scale, proportion and quantity
- ☐ Stability and change of systems
- ☐ Systems and models
- ☐ Energy and matter in systems

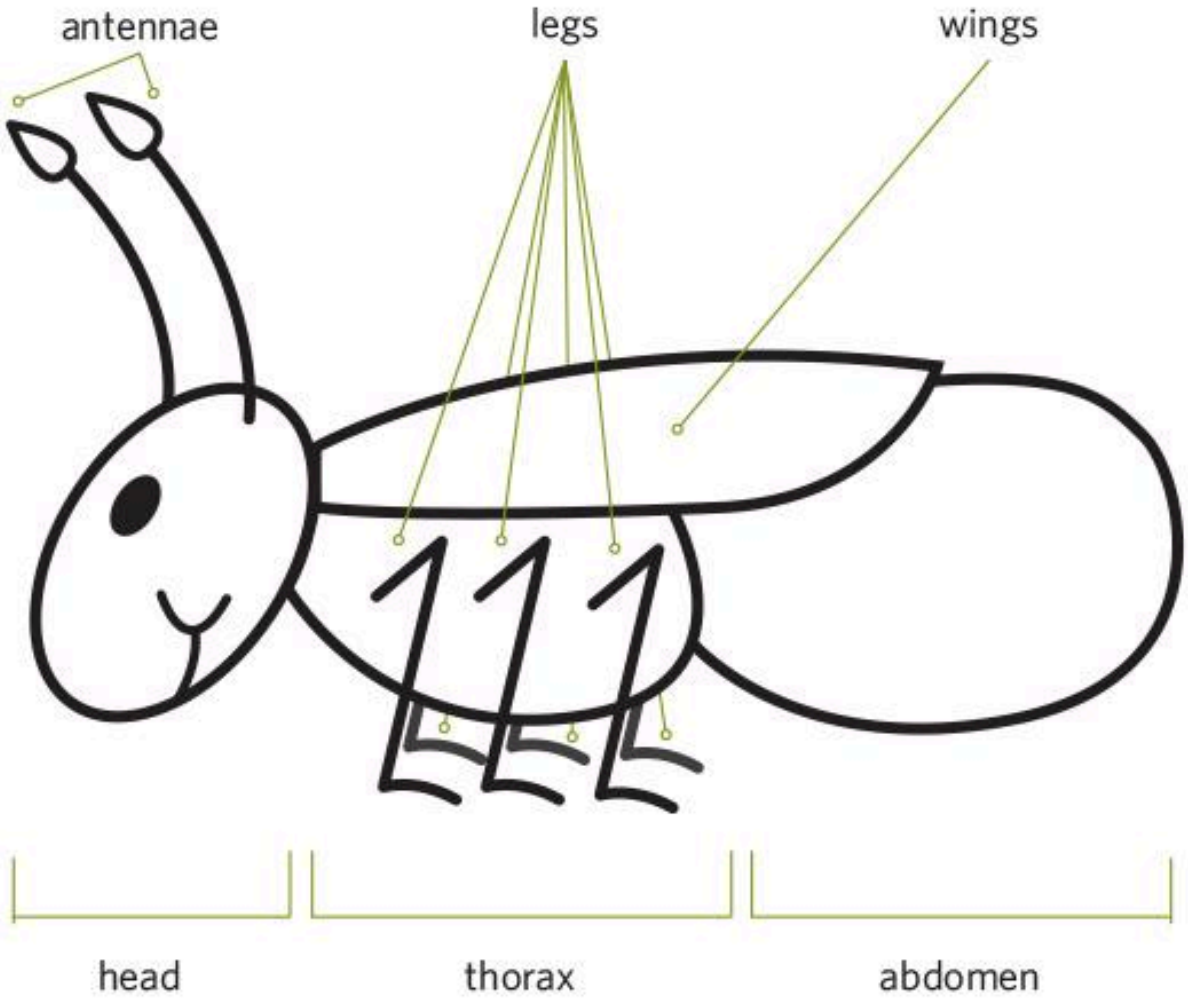
S3 - L6 Insect Drawing

DIRECTIONS Draw a picture of an insect getting what it needs to survive in its habitat. Label its parts. Use words from the word bank.

WORD BANK:	antennae	legs	thorax	abdomen	head

I drew a _____

Teacher Page - S3 - L6 Insect Drawing



Teacher Prep List - Section 4

	Inside mySci kit, you'll find:	Items you must supply:	Prep and copies:
Lesson 7 *(2 days)*	Bags of animal models (from Lessons 5-6)		Copies of Student Pages 14-16 or Student Science Journals Teacher Page 12 ***VIRTUAL RESOURCES:*** How Do Living Things Interact With Their Environment? Mini-Lesson
Lesson 8 *(1 day)*			Copies of Student Page 17 or Student Science Journals Teacher Page 13
Lesson 9 *(2 days)*	*What do Pets Need?*, by Ellie Roper Animal cards (from Lessons 5 & 6)		Copies of Student Pages 18-20 or Student Science Journals Teacher Pages 14-16 Copy and administer post-assessment ***VIRTUAL RESOURCES:*** Animal Cards as Slides

4 *SECTION 4: How do living things interact with their environments?*

LESSON 7: *How do living things use their environment to survive?*

LEARNING TARGETS

Identify that plants and animals live in environments where they can get what they need to survive.

VOCABULARY

resource environment

SUMMARY

ESTIMATED NUMBER OF DAYS: 2

In the previous lessons, students identified examples of plants and animals, classified animals, and figured out basic needs of plants and animals.

In this lesson, students will use models to explain the relationship between the needs of living things and the places in which they live. **Students figure out that living things live in places where they can get the things they need to survive. Different living things need different types and amounts of food, water, and air.**

This lesson sets the stage for the design challenge, where students will create their own model to compare the needs of two different kinds of living things.

ENGAGE

Say: *The things around the area where plants and animals live are part of their environment. How would you describe the environment around our school?*

What types of living things survive in the environment around our school? Why do they survive here? Students should point out different plants and animals, the places where these things live, and the things that the animals and plants need to survive.

EXPLORE

Have students work in pairs or small groups to choose a plastic animal model and describe its environment. Students should describe what the animal needs and how the environment provides this need. As students work, ask questions like, *What does a fish need to survive? How do fish get these things?* Students might say, for example, that fish need water to swim, so they live in water environments like lakes, ponds, rivers, oceans,

MYSCI MATERIALS:

Bags of animal models from Lessons 5-6

TEACHER PROVIDES:

Copies of Student Pages 14-16 or Student Science Journals

Teacher Page 12

VIRTUAL RESOURCES:

How Do Living Things Interact With Their Environment? Mini-Lesson

Teaching Tip:

If you have access to school plants or pets, have students identify the needs of these living things and how they access these resources in their natural environments vs. school environment.

or fish tanks. Prompt students to support any claims with evidence about what living things need to survive. Chart student responses for the different types of animals and where they live.

Revisit some of the Missouri animals you pointed out in Lessons 5 and 6. Some key examples might be deer, bluegill fish, bald eagle, tree frog, and bull snake. You can vary these based on student interest. Ask students what they think each animal needs, and where it might live to meet those needs. (Example: A bluegill fish needs to live in a pond or lake with insects around it, because it eats insects. All fish need to live in water, but different fish eat different things. This fish eats insects. A bald eagle nests in trees and hunts in rivers for fish, so it must live in a forest near a river.)

EXPLAIN

Watch and discuss PBS What Do Animals Eat? video (1:10) Ask: *What were some of the animals in this video and what were they eating? Where were they getting their food?* (They were getting their food from their environment.)

Say: *Animals and plants live in certain environments because these places have resources the animal needs to survive. A resource is a supply of something that the animal needs. For example, caterpillars eat leaves, so plants are a resource that caterpillars need to survive. How do the environments fish live in compare with environments that birds live in?* Have students provide examples comparing environments and needs of various animals.

Say: *Plants are living things and have needs too. What are some resources that plants need from their environment?*

Have students choose and draw an environment on the Environment Drawing sheet (Student Page 14). Their illustration should include at least one plant and one animal along with the resources the living things need to survive. Students might use the animal models to help prompt their thinking. Circulate and assist students with recording their responses to "What is in your environment?"

As students create their model environment drawings, circulate to ask students to use their drawings to describe how the plant and animal in their environment might interact with each other, and with the nonliving parts of their environment. Ask students to describe how the environment is the right kind of environment for the plant and animal in their picture.

ELABORATE

Review how plants and animals can change the environment in which they live. Examples include animals using resources in their environment to

ELA Connections

https://learning.ccsso.org/wp-content/uploads/2022/11/ADA-Compliant-ELA-Standards.pdf

MLS K.L.1.B.a

MLS K.L.1.B.b

MLS K.L.1.B.d

build shelters and plant roots moving or breaking environmental structures like sidewalks as they grow and change.

Have students go back to their environment drawing and add how the living things they drew might change the environment. This might include creating a shelter, burying food for winter, etc. Students should use the Environment Drawing Checklist (Student Page 15) to assess their drawing. This could be a whole-class activity, or the teacher could have one-on-one meetings with students to assist them with filling out the rubric.

EVALUATE

Have students complete the Surviving in an Environment worksheet (Student Page 16).

Revisit the deer eating in the forest. Ask students: *What have we figured out that helps us understand what the deer is doing? What do you wonder about this deer?*

EXTEND (OPTIONAL)

Say: *We are going to play a game where you choose what different animals eat. I will name an animal and it is your job to figure out what you think the animal eats.*

(Predetermine which corners of the room will represent which of the following: plants, animals, both plants and animals. Label the corners accordingly using pictures.

You have three choices. Corner 1 is plants, like grass and berries. What animal do you know that eats plants? Corner 2 is animals. What animal do you know that eats other animals or meat? Corner 3 is both. What animal do you know that eats both plants and animals?

Show students the Animal Game Cards from the kit one at a time and ask students to move to the corresponding corner to show what the animals on the card eat. As students move to corners, ask them what specific plants or animals they think the animals on the card might eat.

Answers for the Animal Game cards:

Eats Plants - giraffe, sheep, camel, deer, tortoise, cow

Eats Animals (Meat) - tiger, coyote, penguin, hawk, snake

Eats Both - squirrel, bear, raccoon, human, pig

NGSS/MLS Connections:

K-LS1-1. (K.LS) Use observations to describe patterns of what plants and animals (including humans) need to survive.
K-ESS3-1. (K.Science) Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.

Science & Engineering Practices in lesson:

- ☐ Asking questions and defining problems
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- ☑ Obtaining, evaluating and communicating information

Crosscutting Concepts in lesson:

- ☑ Patterns
- ☑ Cause and effect
- ☐ Structure and function
- ☐ Scale, proportion and quantity
- ☐ Stability and change of systems
- ☐ Systems and models
- ☐ Energy and matter in systems

S4 - L7 Environmental Drawing

DIRECTIONS

Pick an environment to draw. Draw plants and animals that live in the environment you chose to draw.

pond

forest

garden

What is in your environment?

S4 - L7 Environmental Drawing Checklist

	NO 	SOMEWHAT 	YES 
I picked an environment.			
I included at least one animal in my environment.			
I included things my animal needs to survive.			
I included at least one plant in my environment.			
I included things my plant needs to survive.			
I showed how living things can change an environment.			

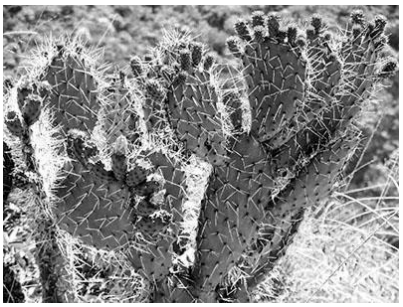
S4 - L7 Surviving in an Environment

DIRECTIONS

Circle some resources a bird might need to survive in its environment.

Water

Nest



Cactus

Pizza

Worm / Food

Basketball

Ocean

Cherries

Fish / Food

House

Teacher Page - S4 - L7

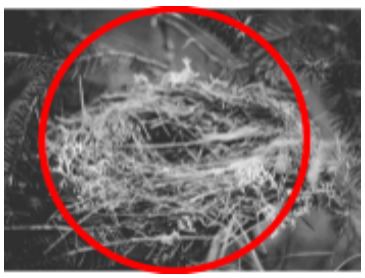
Surviving in an Environment

Key

DIRECTIONS

Circle some resources a bird might need to survive in its environment.

Water



Nest

Cactus

Pizza

Worm / Food

Basketball

Ocean

Cherries

Fish / Food

House

K-ESS3-1. (K.ESS3.A.1)

4 *SECTION 4: How do living things interact with their environments?*

LESSON 8: *Why are plants and animals important to us?*

LEARNING TARGETS
Identify ways that plants and animals are important to humans.

VOCABULARY
No new vocabulary.

SUMMARY
ESTIMATED NUMBER OF DAYS: 1
In the previous lesson, students considered the relationship between where an animal lives, and what it needs to survive.

In this lesson, students use discovery walks, discussion, and videos to explore ways animals and plants are an important part of our lives. **Students figure out that plants and animals provide us with resources like food, shelter, books, companionship, and beauty. All of our food comes from a plant or animal.**

This lesson is the final puzzle piece students need for the design challenge, where they will make a model to compare needs of our pet animals and their wild counterparts.

ENGAGE
Ask: *What is your favorite food? Does your favorite food come from a plant, an animal or something else?* Discuss with students how food is a basic need that all animals need to stay alive.

EXPLORE
Take a walk around the classroom or school (cafeteria, library, etc.) and have students try to point out things that are or came from plants or animals. Examples might include wooden chairs or tables, various food or snacks from the cafeteria, decorative plants or fish tanks, therapy dogs, wooden doors or door frames, or paper. You may also point out to students that the framework of the school building itself, or their home, may have been made from wood from trees.

MYSCI MATERIALS:

TEACHER PROVIDES:
Copies of Student Page 17 or Student Science Journals

Teacher Page 13

EXPLAIN

When you return to the classroom, chart what students found, and what type of living thing (plant or animal) it is. Ask students: *Why are plants and animals important to humans?* (They provide us with food/energy, shelter, furniture, books, companionship, and beauty.)

Take an example of a student's favorite meal, and chart where each part of the meal is from. (Example: Macaroni and Cheese with Chicken Nuggets come from cows, wheat, and chicken. If students look on a box at home with parents, they may even be able to figure out more plants in the meal (for example, soybeans or corn).

ELABORATE

What are some other ways animals help us? Watch the following video, then ask students to brainstorm more examples of ways animals help us. Chart examples such as food, clothing, and pets.

Visit Greenland Dog Sled Video (TKSST and Visit Greenland) (2:56)

EVALUATE

Have students complete the Where Does Food Come From worksheet (Student Page 17).

ELA Connections:

https://learning.ccsso.org/wp-content/uploads/2022/11/ADA-Compliant-ELA-Standards.pdf
MLS K.SL.3.A.a
MLS K.SL.3.A.c

NGSS/MLS Connections:

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Crosscutting Concepts in lesson:

- ☐ Patterns
- ☐ Cause and effect
- ☐ Structure and function
- ☐ Scale, proportion and quantity
- ☐ Stability and change of systems
- ☐ Systems and models
- ☑ Energy and matter in systems

S4 - L8 Where Does Food Come From?

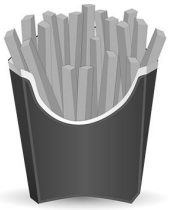
DIRECTIONS

Match the food to the plant or animal it came from.

milk

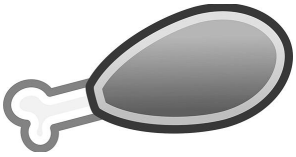
bacon

French fries

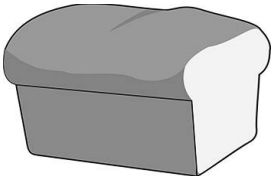


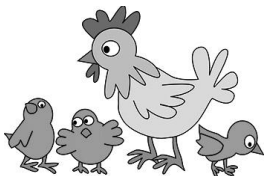
ketchup

drumstick



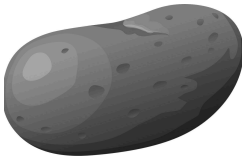
bread



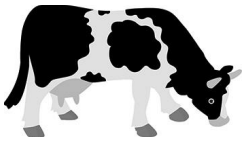


chicken

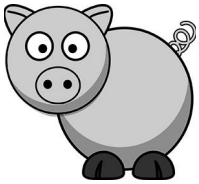
potato



cow

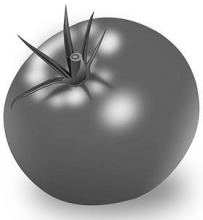


pig



wheat

tomato

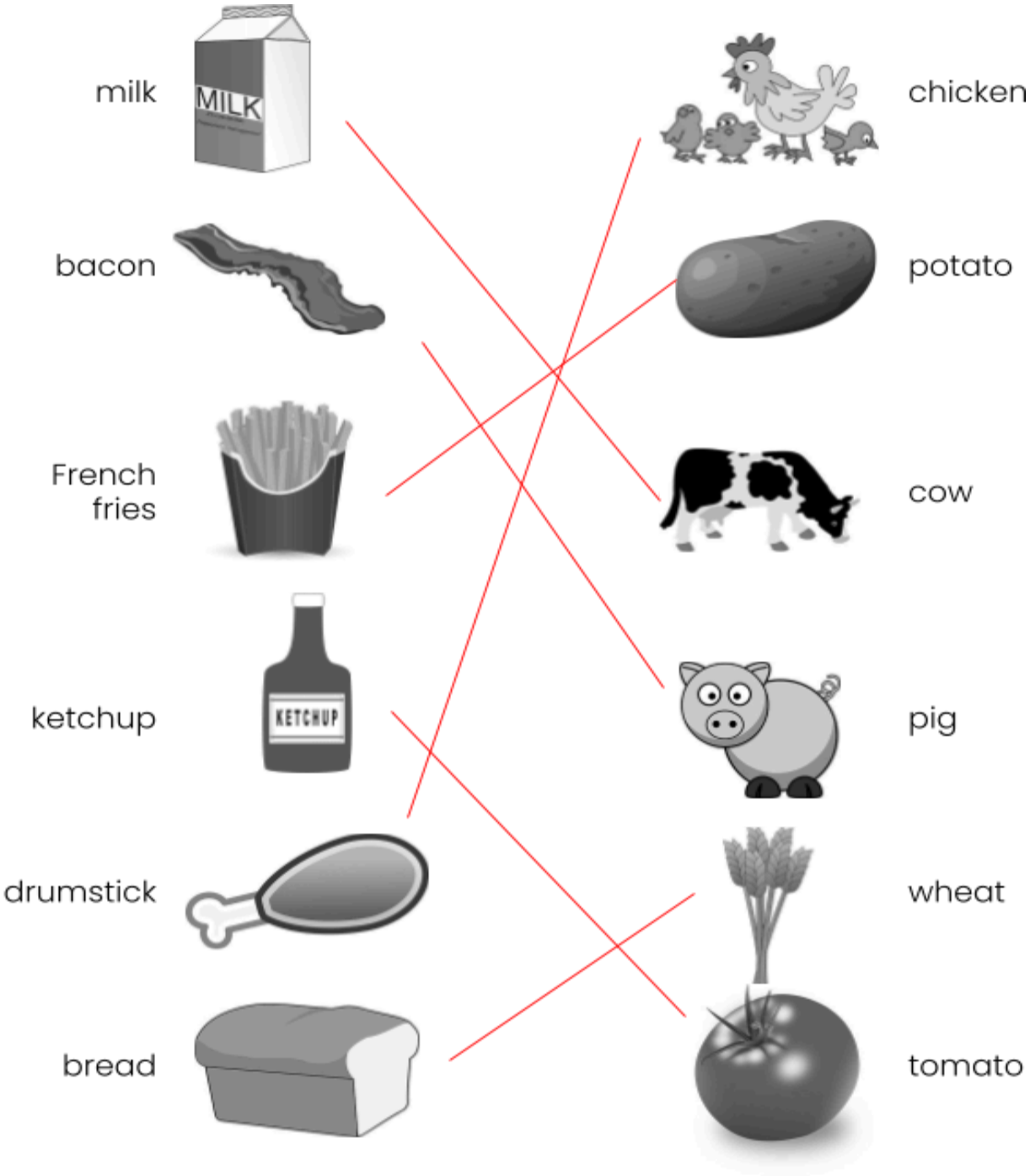


Teacher Page - S4 - L8

Where Does Food Come From?

DIRECTIONS

Match the food to the plant or animal it came from.



K-ESS3-1. (K.ESS3.A.1)

4 *SECTION 4: How do living things interact with their environments?*

LESSON 9: *How can we make a model and use it to compare the basic needs of pets and wild animals?*

LEARNING TARGETS

Make a model to compare needs and habitats of pets and wild animals.

VOCABULARY

zoologist model

SUMMARY

ESTIMATED NUMBER OF DAYS: 2

In previous lessons, students explored differences between types of animals, and connected what an animal needs to the habitat in which it lives.

In this final lesson, students explore and identify the basic needs of pets and compare them to the needs of wild animals. **Students figure out that pets have the same general needs as wild animals, but get these needs met in very different ways.**

This unit has set the foundation for deeper explorations of animal structure and function (mySci Unit 17), life cycles (mySci Units 5, 6, and 14), and ecosystem interactions (mySci Unit 13).

ENGAGE

Ask students: *Where can animals live? Do all animals live in the wild?* (Animals can live in homes, in zoos, or in the wild.) *How are the needs of a pet dog the same or different compared to the needs of a wolf?* Ask students to share examples of pets in their homes, and pets they have seen otherwise (dogs, cats, fish, birds, turtles, frogs, snakes, hamsters, etc.).

EXPLORE

Split students into groups and pass out a few of the animal cards from Lessons 5 and 6 to each group. Ask students to decide what these animals need to survive. Review the basic needs of animals, referring to the charts they made earlier in the unit. Ask students: *Which animals on the cards could live in the wild? In your house? In a zoo?* What do you think each animal needs to survive?

MYSCI MATERIALS:

What Do Pets Need?, by Ellie Roper

Animal Cards (from Lessons 5 & 6)

TEACHER PROVIDES:

Copies of Student Pages 18-20 or Student Science Journals

Teacher Pages 14-16

Chart paper

Copy and administer post assessment

VIRTUAL RESOURCES:

Animal Cards as Slides

Tech Tip:

If you use mobile devices you may want to add a digital component to the Evaluate section. You can choose any combination that is appropriate, but students can take a photo of the Animal Needs Report and use an app to write and/or draw and even add voice if you wish.

Suggested apps:

Seesaw

Educreations

Doodle Buddy (no voice)

If students need further differentiation a more advanced extension would be to transform the written copy into a narrated slideshow using the Shadow Puppet Edu app.

Slide 1 - My animal's name is...with a photo, text, and voice

Slide 2 - My animal is a...with a photo, text, and voice

Slide 3 - Photo of the hand or digitally drawn picture of what the animal needs to survive, with voice explanation

EXPLAIN

Read *What Do Pets Need?* (see Read-Aloud Guide on Teacher Page 14).

Ask: *Has anyone heard of the word, "zoologist"? Is there a part of the word you know? Yes, zoo! The part of the word "ologist" means to study. So a zoologist studies animals! Some zoologist jobs also include making sure that zoos have what it takes to meet the basic needs of animals.*

Watch a Zoologist from What's It Like to Be A Zoologist | NBS Connecticut Kids Connections (2:00).

Ask, "What do our pets and wild animals need to survive?" Discuss with the class that all animals, no matter where they live, need the same things to survive (food, water, air, shelter, etc.). Ask, *"How do our pets get these things? How do zoo animals get these things? How do animals in the wild get these things?"* Guide the students to compare and contrast how animals get these things in different living situations.

Access the San Diego Zoo animal cams (scroll down to find the cams). Students should observe and discuss how animals survive and how their needs are met in the zoo.

ELABORATE

Pass out the Wild Animal and Pet Comparison sheet and tiles (Student Page 18 and Teacher Page 15), and have the students complete it. Go through each part of the sheet with the whole class afterwards.

EVALUATE

Ask students to name their favorite types of zoo animals as you list them on the board. Instruct students to choose one animal and have them complete the Animal Needs Report (Student Page 19). You may choose to complete a sample report as a whole class to model. You may also choose to have students conduct research on their animals. An Animal Needs Report Rubric is provided on Student Page 20. After students complete the design challenge by making their paper model (the Animal Needs Report), have them use their model to compare the needs of the wild zoo animal they drew to the needs of the pets and wild animals they learned about earlier in this lesson.

Revisit the deer eating in the forest. Ask students: *What have we figured out that helps us understand what the deer is doing? How does what the deer is doing compare to a gazelle in the zoo, or a pet rabbit we keep in our house?*

EXTEND (OPTIONAL)

Students could create a physical model in centers to show each of their animals' habitats, using center materials such as blocks or other toys.

Tech Tip:

Here is a link to the San Diego Zoo animals. Since there is no read-aloud feature one suggestion is to show students how to have the browser read the text to them, although it is more of a robotic voice. Have students put headphones on, then highlight the paragraph of text to be read, go to the Edit menu and select Speech > Start speaking.

ELA Connections:

https://learning.ccsso.org/wp-content/uploads/2022/11/ADA-Compliant-ELA-Standards.pdf

MLS K.W.2.A.c

MLS K.W.2.A.d

NGSS/MLS Connections:

K-ESS3-1. (K.Science) Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.

Science & Engineering Practices in lesson:

- [x] Asking questions and defining problems
- [ ] Developing and using models
- [ ] Planning and carrying out investigations
- [ ] Analyzing and interpreting data
- [ ] Constructing explanations and designing solutions
- [ ] Engaging in argument from evidence
- [ ] Using mathematics and computational thinking
- [x] Obtaining, evaluating and communicating information

Crosscutting Concepts in lesson:

- [x] Patterns
- [ ] Cause and effect
- [ ] Structure and function
- [ ] Scale, proportion and quantity
- [ ] Stability and change of systems
- [ ] Systems and models
- [ ] Energy and matter in systems

S4 - L9 Wild Animal and Pet Comparison

DIRECTIONS

Cut out the word tiles.

Glue the word tiles to where they belong on the chart.

	 lion	 cat
I live . . .		
I eat . . .		
I get water . . .		
I sleep . . .		

S4 - L9 Animal Needs Report

NAME _____

DIRECTIONS

Choose an animal that lives in the zoo. Draw your animal below.

My animal's name is _____

Here is a drawing of my animal and what it needs to survive:
(water, food, space, air & shelter)

S4 - L9 Animal Needs Report Rubric

	NO	SOMEWHAT	YES
 I drew an animal.			
 I drew how my animal gets water.			
 I drew how my animal gets food.			
 I drew where my animal lives.			

Feedback

Teacher Page - S4 - L9 Read Aloud Guide: *What Do Pets Need?*

Read the title, author, and illustrator to students. Say to students: *Look at the picture. What do you think this book will be about? What do you wonder about pets?* Take student responses. *Let's find out.*

Note: This is a book that some students may be able to read on their own. You might choose to point out sight words or ask students to read out loud for you.

Pages 2-3: Read page 2. Read the flap on page 3. Take student responses. Lift the flap and let them say what is under the flap.

Pages 4-5: Read page 4. Read the flap on page 5. Take student responses. Lift the flap and let them say what is under the flap.

Pages 6-7: Read page 6. Read the flap on page 7. Take student responses. Lift the flap and let them say what is under the flap.

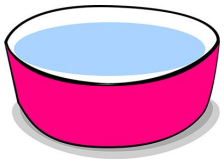
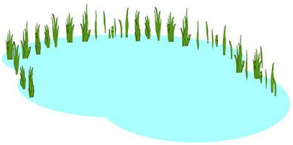
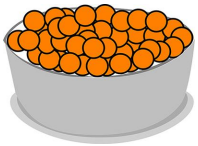
Page 8: Read as written.

Teacher Page - S4 - L9 Wild Animal & Pet Comparison Tiles

DIRECTIONS

Cut out the word tiles

Glue the word tiles to where they belong on the chart.

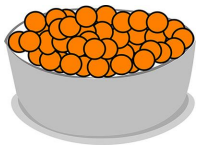
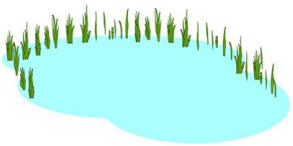
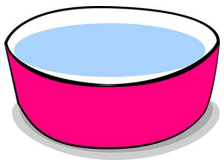
 from a water bowl	 meat
 from a pond	 from a bowl
 in a den	 In a bed
 in a house	 in a grassland

Teacher Page - S4 - L9 # Wild Animal & Pet Comparison Key

DIRECTIONS

Cut out the word tiles.

Glue the word tiles to where they belong on the chart.

	 LION	 CAT
I live . . .	 in a grassland	 in a house
I eat . . .	 meat	 from a bowl
I get water . . .	 from a pond	 from a water bowl
I sleep . . .	 in a den	 In a bed

K-ESS3-1. (K.ESS3.A.1)

Name: _____ Date: _____

ASSESSMENT CHECKLIST ***Unit 1: Introduction to Plants and Animals***

Materials Needed: Student science journals, plant picture cards

LESSON		1 - BEGINNING	2 - DEVELOPING	3 - PROFICIENT
1	Student is able to sort living and nonliving things and explain his/her choices. Completed orally in small groups during Explain.			
	Student is able to identify living and nonliving things in his/her science journal. Completed during Evaluate.			
2	Student is able to identify what a plant needs in order to live and grow in his/her science journal. Completed individually during Evaluate.			
3	Student is able to identify parts of a plant using plant cards. Completed in small groups during Evaluate.			
	Student is able to identify where plants would live to get what they need. Completed orally during Evaluate.			
4	Student is able to categorize similarities and differences between plants and animals in his/her science journal. Completed during Evaluate.			
5	Student is able to identify different characteristics and structures of animals by using observations to record information in his/her science journal. Completed in small groups during Evaluate.			
6	Student is able to draw and label an insect in his/her science journal. Completed during Evaluate.			
7	Student is able to identify items animals might need to survive in their environment in his/her science journal. Assessment opportunities provided in both Explain and Evaluate.			
	Student is able to identify how living things can change their environment. Completed orally and/or in student journals in Elaborate.			
8	Student is able to identify where food comes from in his/her science journal. Completed during Evaluate.			
9	Student is able to differentiate the needs of pets versus wild animals in his/her science journal. Completed during Elaborate.			
	Student is able to represent the needs of an animal in his/her science journal. Completed during Evaluate.			

ASSESSMENT CHECKLIST ***Unit 1: Introduction to Plants and Animals***

Materials Needed: Student science journals, plant picture cards

LESSON & OBJECTIVE	STUDENT NAMES																								
	STUDENT SCORES: 1 - BEGINNING 2 - DEVELOPING 3 - PROFICIENT																								
LESSON 1: Student is able to sort living and nonliving things and explain his/her choices. Completed orally in small groups during Explain.																									
LESSON 1: Student is able to identify living and nonliving things in his/her science journal. Completed during Evaluate.																									
LESSON 2: Student is able to identify what a plant needs in order to live and grow in his/her science journal. Completed individually during Evaluate.																									
LESSON 3: Student is able to identify parts of a plant using plant cards. Completed in small groups during Evaluate.																									
LESSON 3: Student is able to identify where plants would live to get what they need. Completed orally in small groups during Evaluate.																									

LESSON & OBJECTIVE	STUDENT NAMES																								
	STUDENT SCORES: 1 - BEGINNING 2 - DEVELOPING 3 - PROFICIENT																								
LESSON 4: Student is able to categorize similarities and differences between plants and animals in his/her science journal. Completed during Evaluate.																									
LESSON 5: Student is able to identify different characteristics and structures of animals by using observations to record information in his/her science journal. Completed in small groups during Evaluate.																									
LESSON 6: Student is able to draw and label an insect in his/her science journal. Completed during Evaluate.																									

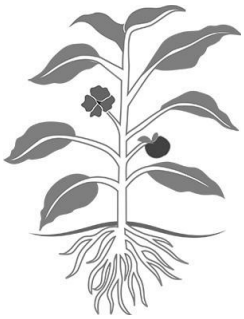
LESSON & OBJECTIVE	STUDENT NAMES																								
	STUDENT SCORES: 1 - BEGINNING 2 - DEVELOPING 3 - PROFICIENT																								
LESSON 7: Student is able to identify items animals might need to survive in their environment in his/her science journal. Assessment opportunities provided in both Explain and Evaluate.																									
LESSON 7: Student is able to identify how living things can change their environment. Completed orally and/or in student journals in Elaborate.																									
LESSON 8: Student is able to identify where food comes from in his/her science journal. Completed during Evaluate.																									
LESSON 9: Student is able to differentiate the needs of pets versus wild animals in his/her science journal. Completed during Elaborate.																									
LESSON 9: Student is able to represent the needs of an animal in his/her science journal. Completed during Evaluate.																									

Section 1 Pre/Post Assessment

Unit 1 | Section 1: Is it living?

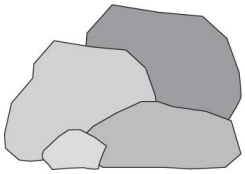
Name: _____ Date: _____

1. Put a circle around the pictures of things that are living.



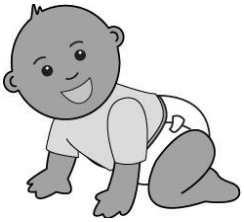
Plant

Toy Bear



Rock

Butterfly



Baby

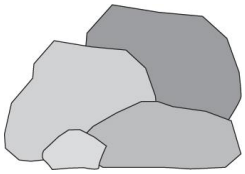
Unit 1 | Section 1: Is it living?

1. Put a circle around the pictures of things that are living.

5 POINTS, 3 for circling the correct answers, 2 for NOT circling the incorrect answers.

Plant

Toy Bear



Rock

Butterfly

Baby

Unit 1 | Section 1 Assessment Standards Breakdown

STANDARDS ADDRESSED IN QUESTION 1: (Lesson 1)
LS1.C: Organization for Matter and Energy Flow in Organisms. All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.

Section 2 Pre/Post Assessment

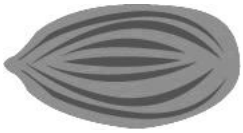
Unit 1 | Section 2: What is a plant?

Name: _____ Date: _____

1. Circle all the pictures of the things that are seeds.

Marble

Popcorn



Nut

Penny

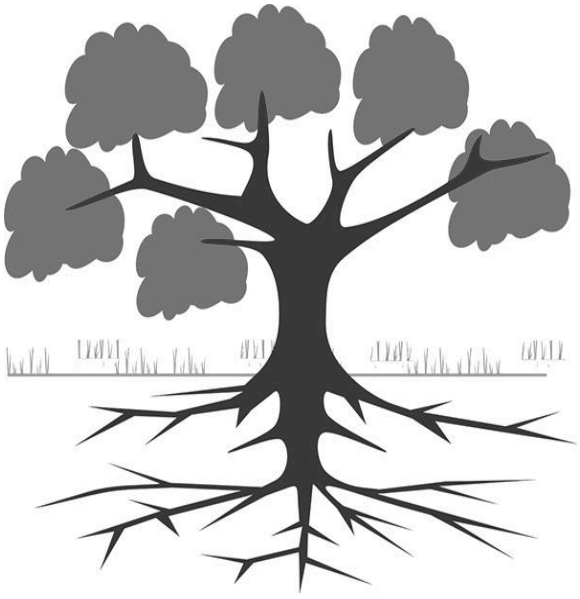
Beans

2. For each picture draw a line from the word to the part of the plant:

STEM

LEAF

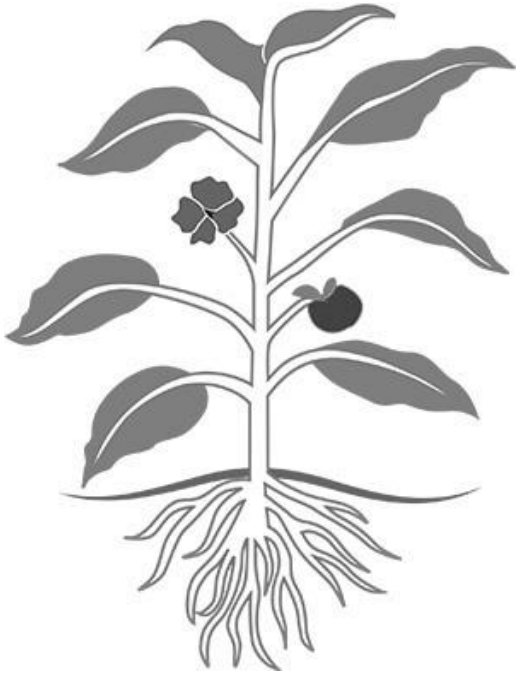
ROOTS



STEM

LEAF

ROOTS



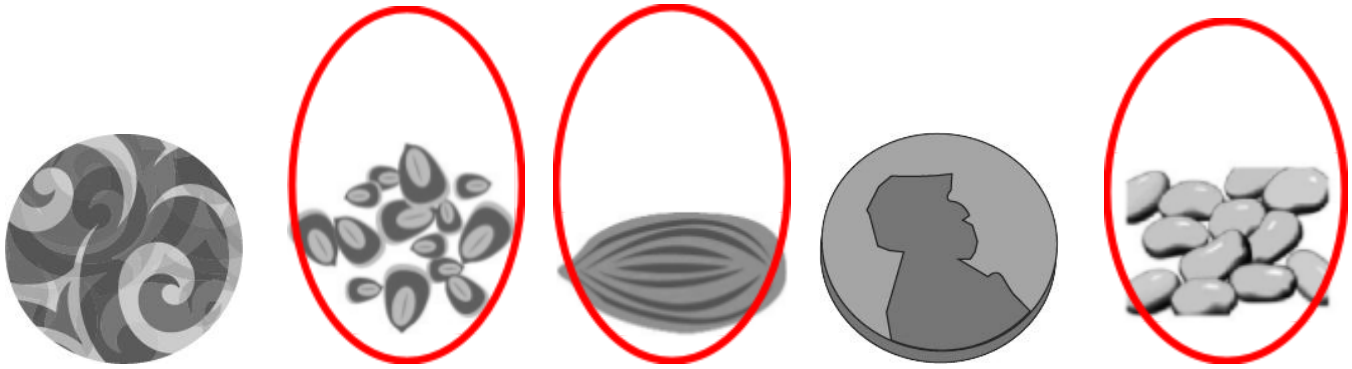
3. Now, circle the part of the plant that helps it get the water it needs to live and grow.

Section 2 Pre/Post Assessment Answer Key 12 pts

Unit 1 | Section 2: What is a plant?

1. Circle all the pictures of the things that are seeds.

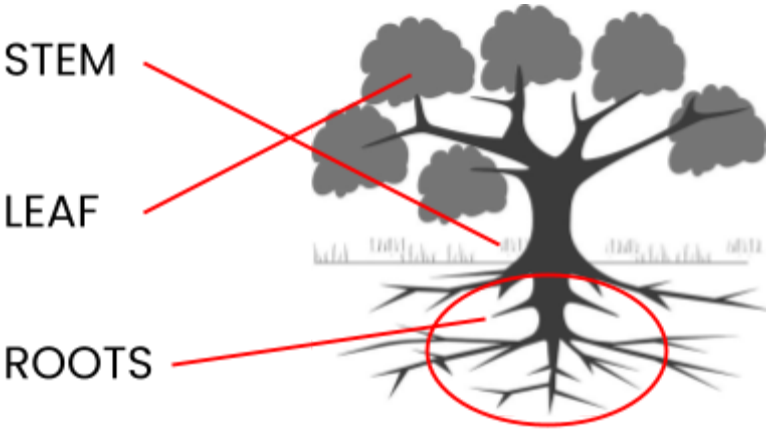
5 POINTS, 3 for circling the correct answers, 2 for NOT circling the incorrect answers.

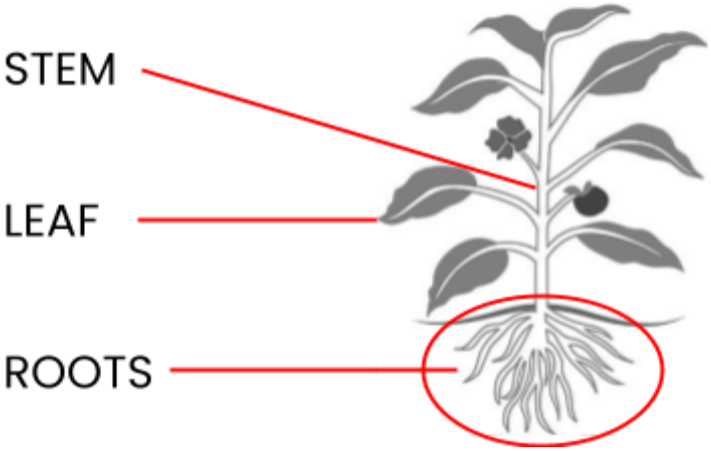


Marble Popcorn Nut Penny Beans

2. For each picture draw a line from the word to the part of the plant:

6 POINTS 1 point for each line drawn from the word to the part of the plant.





3. Now, circle the part of the plant that helps it get the water it needs to live and grow. **1 POINT** for circling the roots in one or both pictures.

Unit 1 | Section 2 Assessment Standards Breakdown

STANDARDS ADDRESSED IN QUESTION 1: (Lesson 2)
LS1.C: Plants need water and light to live and grow.
STANDARDS ADDRESSED IN QUESTION 2: (Lesson 3)
LS1.C: Plants need water and light to live and grow.

Section 3 Pre/Post Assessment

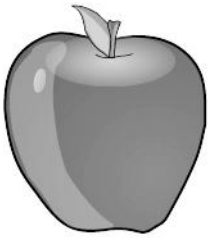
Unit 1 | Section 3: What is an animal?

Name: _____ Date: _____

1. Circle the pictures of the things that animals need in order to live and grow.

Water

TV

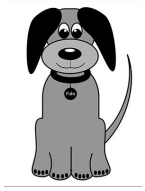


Food

Shelter

Phone

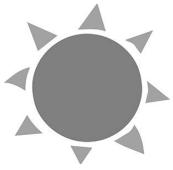
2. The data table below shows what different things need to live and grow.

	Needs water?	Needs light?	Needs food?
 Plant			
 Animal			
 Toy Bear			

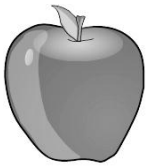
Circle the things that animals needs to live and grow.


FOOD

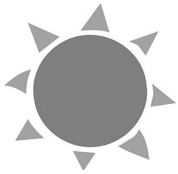

WATER


LIGHT

Circle the things that plants need to live and grow.

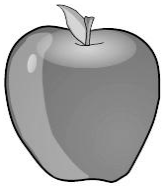

FOOD


WATER

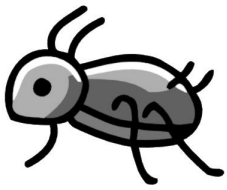

LIGHT

3. Jenelle did an experiment to see what kind of food her cricket liked best.

She set two different types of food out and wrote an X each time the insect ate the food. Here is what she saw:

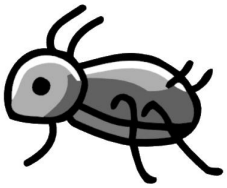


APPLE			
X	X	X	X
X	X	X	

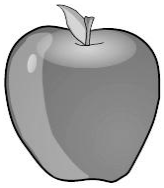


APHID			
X	X	X	

Circle the food the cricket liked the best.



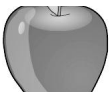
APHID

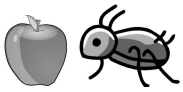


APPLE

Circle the sentence that says what the cricket eats.

a. Crickets eat only plants. 

b. Crickets eat only animals. 

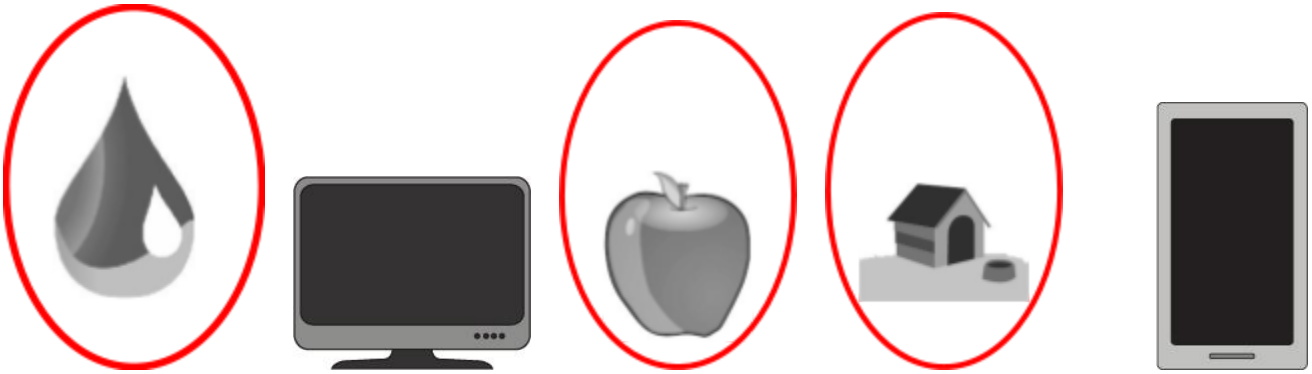
c. Crickets eat plants and animals. 

Section 3 Pre/Post Assessment Answer Key 13 pts

Unit 1 | Section 3: What is an animal?

1. Circle the pictures of the things that animals need in order to live and grow.

5 POINTS, 3 for circling the correct answers, 2 for NOT circling the incorrect answers.



Water TV Food Shelter Phone

2. The data table below shows what different things need to live and grow.

	Needs water?	Needs light?	Needs food?
 Plant			
 Animal			
 Toy Bear			

Circle the things that animals needs to live and grow.

3 POINTS, 2 for circling the correct answers, 1 for NOT circling the incorrect answers.


FOOD


WATER


LIGHT

Circle the things that plants need to live and grow.

3 POINTS, 2 for circling the correct answers, 1 for NOT circling the incorrect answers.

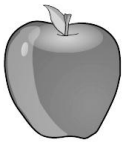

FOOD


WATER

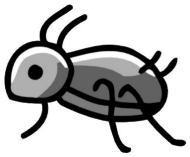

LIGHT

3. Jenelle did an experiment to see what kind of food her cricket liked best

She set two different types of food out and wrote an X each time the insect ate the food. Here is what she saw:



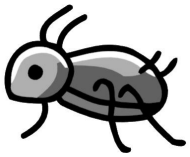
APPLE			
X	X	X	X
X	X	X	



APHID			
X	X	X	

Circle the food the cricket liked best.

1 POINT for circling the correct picture



APHID

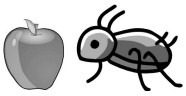
APPLE

Circle the sentence that says what the cricket eats.

1 POINT for circling the correct statement

a. Crickets eat only plants. 

b. Crickets eat only animals. 

c. Crickets eat plants and animals. 

STANDARDS ADDRESSED IN QUESTION 1: (Lesson 4)		
LS1.C: Organization for Matter and Energy Flow in Organisms: All animals need food in order to live and grow.		
STANDARDS ADDRESSED IN QUESTION 2: (Lesson 4)		
K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.		
SCIENCE & ENGINEERING PRACTICES	**DISCIPLINARY CORE IDEAS**	**CROSSCUTTING CONCEPTS**
Analyzing and Interpreting Data ● Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions.	LS1.C: Organization for Matter and Energy Flow in Organisms ● All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow	Patterns ● Patterns in the natural and human designed world can be observed and used as evidence.
STANDARDS ADDRESSED IN QUESTION 3: (Lesson 5)		
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SCIENCE & ENGINEERING PRACTICES	**DISCIPLINARY CORE IDEAS**	**CROSSCUTTING CONCEPTS**
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NEXT GENERATION SCIENCE STANDARDS / MISSOURI LEARNING STANDARDS

NGSS codes begin with the grade level, then the Disciplinary Core Idea code, then a standard number.
MLS codes begin with the grade level, then the Disciplinary Idea code, followed by a letter and number.
The Disciplinary Core Ideas are:

Physical Sciences PS1: Matter and its interactions PS2: Motion and stability: Forces and interactions PS3: Energy PS4: Waves and their applications in technologies for information transfer **Life Sciences** LS1: From molecules to organisms: Structures and processes LS2: Ecosystems: Interactions, energy, and dynamics LS3: Heredity: Inheritance and variation of traits LS4: Biological evolution: Unity and diversity	**Earth and Space Sciences** ESS1: Earth's place in the universe ESS2: Earth's systems ESS3: Earth and human activity **Engineering, Technology, and Applications of Science** ETS1: Engineering design ETS2: Links among engineering, technology, science, and society

For more information about NGSS, visit http://www.nextgenscience.org/next-generation-science-standards
For more information about MLS, visit https://dese.mo.gov/college-career-readiness/curriculum/missouri-learning-standards#mini-panel-mls-standards3

Note: The MLS codes are listed in parentheses in the table below.

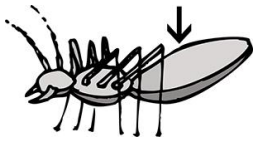
PERFORMANCE EXPECTATIONS	CONNECTION TO UNIT ACTIVITIES
K-LS1-1. (K.LS1.C.1.) Use observations to describe patterns of what plants and animals (including humans) need to survive.	Students observe living and non-living objects in their classroom and schoolyard, and look for evidence of their basic needs being met. Students compare and contrast the basic needs of plants to animals. Students chart basic needs of all living organisms; air, water, food or energy, space and possibly shelter.
K-ESS3-1. (K.ESS3.A.1) Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.	Students compare the differences between plants and animals, and make drawings and charts about the differences. Students compare plants and animals from different ecosystems.
K-2- ETS1-2. (K.ETS1.B.1) Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	Students draw and label a picture of a plant and its parts.
DISCIPLINARY CORE IDEAS	**CONNECTION TO UNIT ACTIVITIES**

LS1.C: Organization for Matter and Energy Flow in Organisms All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.	Students plant radish seeds and predict their germination and growth. They water and give the seeds sunlight. Students play a food chain game, linking what different animals eat and how all energy originally comes from the sun. Students discuss where different items of human food originate and chart them.
ESS2.E: Biogeology Plants and animals can change their environment.	Students observe how animals or plants have changed their playground or school yard; observing tree branch growth, noting leaf damage from insects, or holes dug in the ground by squirrels, etc.
ESS3.A: Natural Resources Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.	Students read about, see videos and make first hand observations of animals and plants in different habitats. They discuss how their basic needs are met through the environment in which they live. Students chart the origin of common food they eat to their source; French fries are made from potato, etc. Students observe and discuss books and videos about how humans use animals; for food, work and companionship.

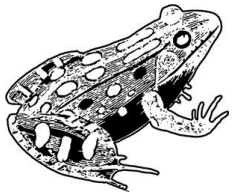
SCIENCE AND ENGINEERING PRACTICES (SEP)	CONNECTION TO UNIT ACTIVITIES
Asking Questions and Defining Problems	Students ask questions to find out more about the differences in how plants and animals meet their basic needs. Students ask questions to find out more about the differences between how plants and animals meet their basic needs in different environments.
Developing and Using Models	Students create drawings of plants and their structures and functions. Students use models of insects and non–insects to compare common features and differences. Students use animal models to compare common features and contrast differences.
Planning and Carrying Out Investigations	Students make observations of living and nonliving items to make comparisons. Students plant radish seeds, predict and observe their germination and growth.
Engaging in Argument From Evidence	Groups of students discuss and decide which cards can be sorted into living and nonliving piles, depending on the evidence stated. Students listen and engage in arguments agreeing or disagreeing on which artifacts came from plants or animals.

Obtaining, Evaluating, and Communicating Information	Students read *What's Alive?, How a Seed Grows, What Do Pets Need*? Students share information on a specific animal with oral and drawn ideas. Students watch several videos about how animals help humans.
CROSSCUTTING CONCEPTS	**CONNECTION TO UNIT ACTIVITIES**
Patterns	Students observe and discuss the patterns of basic needs of living organisms. Students observe and discuss the patterns and compare the differences between plants and animal needs. Students observe and discuss comparisons of different animal structures and their functions.
Cause and Effect: Mechanism and Prediction	Students predict and observe the effect of watering and sunlight on their radish seeds. Students draw pictures of an organism's environment and discuss the effects changes in the environment make on the organism.
Systems and System Models	Students draw and label a model of a plant, describing the parts, and how they work together. Students observe the different parts of insect models and notice how they work together.
Structure and Function	Students observe, discuss and chart comparisons of animal and plant structures and their functions. Students observe, discuss and draw insects, noticing the shapes and stability of structures relating to their functions.
Energy and Matter	Students trace the food they eat back to animals and/or plants, which get their energy from the Sun.
Stability and Change	Students observe and discuss how plants and animals can change their environment over time. Students draw pictures of an organism's environment and discuss the effects that changes in the environment have on the organism.

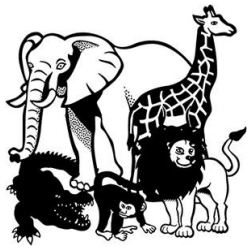
Unit 1 Vocabulary and Glossary



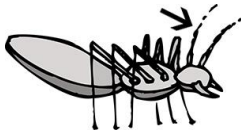
ABDOMEN
the belly; the last body part of an insect, behind the thorax



AMPHIBIAN
an animal that has a backbone, lives in water when it is young and lives on land as an adult

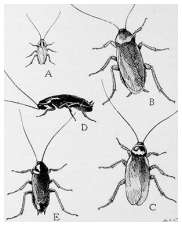


ANIMAL
a living thing that moves on its own, breathes oxygen, and gets food from other plants and animals

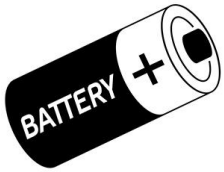


ANTENNAE
a pair of long, skinny organs on the heads of insects and some other animals

BIRD
an animal that has a backbone, wings, feathers, breathes air, and lays eggs



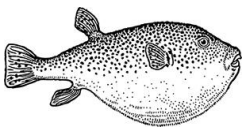
CLASSIFY
to arrange or organize into groups based on similarities and differences



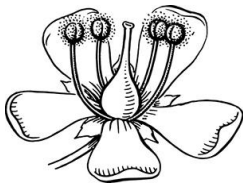
ENERGY
measure of the ability of a body or system to do work

ENTOMOLOGIST
a scientist that studies insects

ENVIRONMENT
a particular area and its conditions that surround living things



FISH
an animal that has a backbone, has scales or rough skin, has fins, lives in water, and breathes with gills

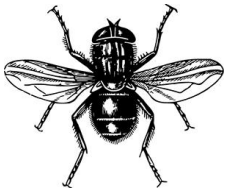


FLOWER
a plant part that helps the plant reproduce (make new plants) by making fruits and seeds

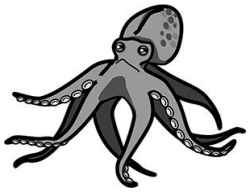
FRUIT
the plant part that grows from a flower and holds seeds

GROW
experience natural development by increasing in size and changing physically

HEAD
the upper or top part of an insect or other animal that contains the brains, mouth, and other sense organs



INSECT
an animal that has six legs, three body parts, and two antennae

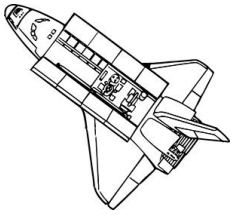


INVERTEBRATE
an animal that does not have a backbone

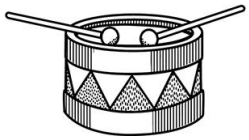
LEAF
the flattened, usually green plant part that uses sunlight, air, water and nutrients to make food for the plant during photosynthesis usually attached to a stem

LIVING
alive; something that needs nutrients, water, air, and space to grow and change

MAMMAL
an animal that has a backbone, has hair or fur, breathes with lungs, gives birth to live young, and feeds milk to its young

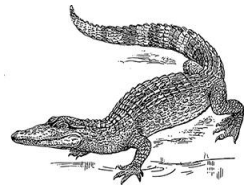


MODEL
a picture, idea or object that represents another object or process



NONLIVING
not alive; does not need food, water, air or space; does not grow and change

PLANT
a living thing that uses the energy from the sun to make its own food



REPTILE
an animal that has a backbone, breathes air with lungs, has rough, dry skin or scales, and lays eggs or gives birth to live young

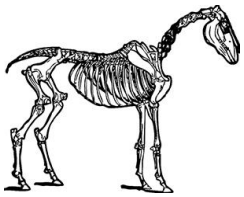
RESOURCE
supply of something

ROOT
the part of a plant that holds it in place (typically underground) and takes in water and nutrients from the soil

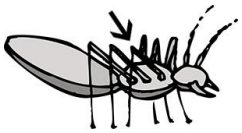
SEED
the small structure produced by a plant that grows into a new plant

SOIL
the loose top layer of the Earth's surface

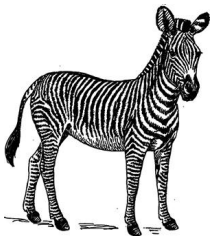
STEM
the main body or stalk of a plant; holds the leaves up to sunlight and moves water, nutrients, and food through the plant



STRUCTURE
construction and arrangement of parts



THORAX
the middle section of an insect between the head and abdomen that includes the legs and wings



VERTEBRATE
an animal that does have a backbone

ZOOLOGIST
a scientist that studies animals

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