

Teacher Guide and Student Journal

Sample Activity and Planning Pages

Plants and Animals Live Here KLNG



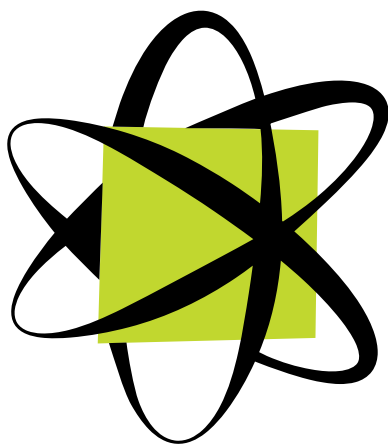
SECOND EDITION

A kindergarten unit supporting Next Generation Science Standards
and Michigan Science Standards

S E C O N D E D I T I O N

Plants and Animals Live Here KLNG

A kindergarten unit supporting **Next Generation Science Standards** and the **Michigan Science Standards** developed and written by the Battle Creek Area Mathematics and Science Center for



**CEREAL CITY
SCIENCE™**

by BCAMSC

Plants and Animals Live Here

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NEXT GENERATION SCIENCE STANDARDS

Disciplinary Core Ideas	Activities
LS1.C: Organization for Matter and Energy Flow in Organisms <ul style="list-style-type: none"> 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. 	1,2,3,4,5
K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.	1,2,3,4,5
ESS2.E: Biogeology <ul style="list-style-type: none"> Plants and animals can change their environment. 	3,4,5
K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.	3,4,5
ESS3.A: Natural Resources <ul style="list-style-type: none"> 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. 	2,3,4,5
K-ESS3-1. Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.	2,3,4,5
ESS3.C: Human Impacts on Earth Systems <ul style="list-style-type: none"> Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. 	5
K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.*	5
ETS1.B: Developing Possible Solutions <ul style="list-style-type: none"> Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. 	5
K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.*	5

*The performance Expectations marked with an asterisk integrate traditional science content with engineering through a Practice and Disciplinary Core Idea.

NEXT GENERATION SCIENCE STANDARDS

Science and Engineering Practices	
<p>Developing and Using Models Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, storyboard) that represent concrete events or design solutions.</p> <ul style="list-style-type: none"> • Use a model to represent relationships in the natural world. 	2,3,4,5
<p>K-ESS3-1. Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.</p>	2,3,4
<p>Analyzing and Interpreting Data Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.</p> <ul style="list-style-type: none"> • Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. 	1,3,4,5
<p>K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.</p>	1,3,4,5
<p>Engaging in Argument from Evidence Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s).</p> <ul style="list-style-type: none"> • Construct an argument with evidence to support a claim. 	1,3,5
<p>K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.</p>	1,3,5
<p>Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.</p> <ul style="list-style-type: none"> • Communicate solutions with others in oral and/or written forms using models and/or drawings that provide detail about scientific ideas. 	2,3,4,5
<p>K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.*</p>	5

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NEXT GENERATION SCIENCE STANDARDS

Science and Engineering Practices	
<p style="text-align: center;"><i>Connections to Nature of Science</i></p> <p>Science Knowledge is Based on Empirical Evidence</p> <ul style="list-style-type: none"> Scientists look for patterns and order when making observations about the world. 	4,5
K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.	1,4,5
Crosscutting Concepts	
<p>Patterns</p> <ul style="list-style-type: none"> Patterns in the natural and human designed world can be observed and used as evidence. 	1,2,3,4
K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.	1,2,3,4,5
<p>Cause and Effect</p> <ul style="list-style-type: none"> Events have causes that generate observable patterns. 	3,5
K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.*	5
<p>Systems and System Models</p> <ul style="list-style-type: none"> Systems in the natural and designed world have parts that work together. 	2,3,4
K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.	3
K-ESS3-1. Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.	2,3

COMMON CORE STATE STANDARDS - READING

Reading Standards—Kindergarten	Activity
Key Ideas and Details	
RI.K.1: With prompting and support, ask and answer questions about key details in a text.	2,3,4
RI.K.2: With prompting and support, identify the main topic and retell key details of a text.	2,3,4
RI.K.3: With prompting and support, describe the connection between two individuals, events, ideas, or pieces of information in a text.	2,3,4
Craft and Structure	
RI.K.4: With prompting and support, ask and answer questions about unknown words in a text.	2,3,4
RI.K.5: Identify the front cover, back cover, and title page of a book.	2,3,4
RI.K.6: Name the author and illustrator of a text and define the role of each in presenting the ideas or information in a text.	2,3,4
Integration of Knowledge and Ideas	
RI.K.7: With prompting and support, describe the relationship between illustrations and the text in which they appear (e.g., what person, place, thing, or idea in the text an illustration depicts).	2,3,4
RI.K.8: With prompting and support, identify the reasons an author gives to support points in a text.	2,3,4
RI.K.9: With prompting and support, identify basic similarities in and differences between two texts on the same topic (e.g., in illustrations, descriptions, or procedures).	3,4
Range of Reading Level of Text Complexity	
RI.K.10: Actively engage in group reading activities with purpose and understanding.	2,3,4,5

PLANNING

COMMON CORE STATE STANDARDS - WRITING

Writing Standards—Kindergarten	Activity
Text Types and Purposes	
W.K.1: Use a combination of drawing, dictating, and writing to compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or book (e.g., My favorite book is...).	2,3,4
W.K.2: Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic.	1,2,3,4,5
W.K.3: Use a combination of drawing, dictating, and writing to narrate a single event or several loosely linked events, tell about the events in the order in which they occurred, and provide a reaction to what happened.	3,4,5
Production and Distribution of Writing	
W.3.4: (Begins in third grade)	
W.K.5: With guidance and support from adults, respond to questions and suggestions from peers and add details to strengthen writing as needed.	1,2,3,4,5
W.K.6: With guidance and support from adults, explore a variety of digital tools to produce and publish writing, including in collaboration with peers.	
Research to Build and Present Knowledge	
W.K.7: Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them).	2,3,4
W.K.8: With guidance and support from adults, recall information from experiences or gather information from experiences or gather information from provided sources to answer a question.	1,2,3,4,5

COMMON CORE STATE STANDARDS - LANGUAGE

Language Standards—Kindergarten	Activity
Conventions of Standard English	
<p>L.K.1: Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.</p> <ul style="list-style-type: none"> a. Print many upper- and lowercase letters. b. Use frequently occurring nouns and verbs. c. Form regular plural nouns orally by adding /s/ or /es/ (e.g., <i>dog, dogs; wish, wishes</i>). d. Understand and use question words (interrogatives) (e.g., <i>who, what, where, when, why, how</i>). e. Use the most frequently occurring prepositions (e.g., <i>to, from, in, out, on, off, for, of, by, with</i>). f. Produce and expand complete sentences in shared language activities. 	1,2,3,4,5
<p>L.K.2: Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.</p> <ul style="list-style-type: none"> a. Capitalize the first word in a sentence and the pronoun. b. Recognize and name end punctuation. c. Write a letter or letters of most consonant and short-vowel sounds (phonemes). d. Spell simple words phonetically, drawing on knowledge of sound–letter relationships. 	1,2,3,4,5
Vocabulary Acquisition and Use	
<p>L.K.4: Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on kindergarten reading and content.</p> <ul style="list-style-type: none"> a. Identify new meanings for familiar words and apply them accurately (e.g., knowing <i>duck</i> is a bird and learning the verb <i>to duck</i>). b. Use the most frequently occurring inflections and affixes (e.g., <i>-ed, -s, re-, un-, pre-, -ful, -less</i>) as a clue to the meaning of an unknown word. 	1,2,3,4,5

COMMON CORE STATE STANDARDS - LANGUAGE

Language Standards—Kindergarten	Activity
Vocabulary Acquisition and Use	
L.K.5: With guidance and support from adults, explore word relationships and nuances in word meanings. <ul style="list-style-type: none">a. Sort common objects into categories (e.g., shapes, foods) to gain a sense of the concepts the categories represent.b. Demonstrate understanding of frequently occurring verbs and adjectives by relating them to their opposites (antonyms).c. Identify real-life connections between words and their use (e.g., note places at school that are colorful).d. Distinguish shades of meaning among verbs describing the same general action (e.g., <i>walk, march, strut, prance</i>) by acting out the meanings.	1,2,3,4,5
L.K.6: Use words and phrases acquired through conversations, reading and being read to, and responding to texts.	1,2,3,4,5

COMMON CORE STATE STANDARDS - MATHEMATICS

Counting and Cardinality—K.CC	Activities
Know number names and the count sequence.	
K.CC.1: Count to 100 by ones and by tens.	1,4,5
K.CC.2: Count forward beginning from a given number within known sequence (instead of having to begin at 1).	
K.CC.3: Write numbers from 0 to 20. Represent a number of objects with a written numeral 0–20 (with 0 representing a count of no objects).	5
Count to tell the number of objects.	
K.CC.4: Understand the relationship between numbers and quantities; connect counting to cardinality. a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. b. Understand that the last number name said tells the number of objects counted. The number of objects counted is the same regardless of their arrangement or the order in which they were counted. c. Understand that each successive number name refers to a quantity that is larger than one.	1,4,5
K.CC.5: Count to answer “how many” questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.	1,4,5
Compare numbers.	
K.CC.6: Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.	1,4,5
K.CC.7: Compare two numbers between 1 and 10 presented as written numerals.	
Measurement and Data—K.MD	
Describe and compare measurable attributes.	
K.MD.1: Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.	1,3
K.MD.2: Directly compare two objects with a measurable attribute in common, to see which object has “more of”/“less of” the attribute, and describe the difference.	
Classify objects and count the number of objects in each category.	
K.MD.3: Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.	1,4,5

PLANNING

UNIT AT A GLANCE

Activity	Time to Complete	Lesson Level Learning Goals	Phenomena/ Engineering Challenge	Summary: Students Will...
1 Schoolyard: What Lives Here?	Preparation: 20 minutes Activity 1: 3 classes Lesson 1A: 55–60 min. Lesson 1B: 45–50 min. 2 classes	Use observations and patterns to develop criteria to determine what is living and nonliving.	Observations under rocks, logs, dead leaves, and debris reveal many different animals that live there.	<ul style="list-style-type: none"> • make observations of living and nonliving things and record findings. • raise questions based on observations. • collect living and nonliving things to compare.
2 What Living Things Need	Preparation: 10 minutes Activity 2: 5 classes Lesson 2A: 55–60 min. Lesson 2B: 55–60 min. Lesson 2C: 55–60 min.	Use information from observations and text to determine a suitable habitat for the pill bug.	Potato peels left on the ground overnight and pill bugs appear.	<ul style="list-style-type: none"> • conduct close observations of pill bugs. • raise questions about what pill bugs need to survive and their habitat. • obtain information about pill bugs through text. • develop a model of a pill bug habitat where it can survive.
3 Worms	Preparation: 10 minutes Activity 3: 4 classes Lesson 3A: 45–50 min. Lesson 3B: 45–50 min. Lesson 3C: 55–60 min. Lesson 3D: 45–50 min.	Plan and conduct an investigation to determine stimuli for and response of an earthworm. Construct an explanation based on evidence from their investigations.	When there is a loud, unexpected noise my body reacts.	<ul style="list-style-type: none"> • conduct close observations of earthworms. • raise questions about what earthworms need to survive and their habitat. • obtain information about earthworms through text. • conduct an investigation into how the earthworm uses its senses to react to stimuli and its environment.

UNIT AT A GLANCE

Students Figure Out How To:	Practices/Crosscutting Concepts	Assessment
<ul style="list-style-type: none"> develop a criteria using patterns to determine what is living and nonliving. sort and classify living and nonliving things based on their criteria. 	<p>Engaging in Argument from Evidence</p> <p>Analyzing and Interpreting Data</p> <p>Patterns</p>	<p>Formative Assessment</p> <p>Science Talk Activity Page t-chart Journal Entry</p>
<ul style="list-style-type: none"> use observations and information from text to develop a model habitat for pill bugs. determine what the pill bugs will need and how to maintain their habitat. use information about pill bugs to determine what habitats are suitable for the animal. set up a long-term observation of the pill bug to determine its effect on the habitat. 	<p>Obtaining, Evaluating, and Communicating Information</p> <p>Developing and Using Models</p> <p>Systems and System Models</p>	<p>Formative Assessment</p> <p>Science Talk Activity Page Respond to Text</p> <p>Summative Assessment</p> <p>Journal Entry Science Talk</p>
<ul style="list-style-type: none"> analyze and interpret data from an investigation into the earthworms' senses to figure out how earthworms meet their needs to survive and react to their environment. use observations and information from text to determine if earthworms can live in the same habitat as the pill bugs. set up a long-term observation of the earthworm to determine its effect on the habitat. 	<p>Developing and Using Models</p> <p>Obtaining, Evaluating, and Communicating Information</p> <p>Engaging in Argument from Evidence</p> <p>Analyzing and Interpreting Data</p> <p>Patterns</p> <p>Cause and Effect</p> <p>Systems and System Models</p>	<p>Formative Assessment</p> <p>Science Talk Activity Page Handout</p> <p>Summative Assessment</p> <p>Journal Entry/Respond to Text class discussion class concept map Activity Page</p>

PLANNING

UNIT AT A GLANCE

Activity	Time to Complete	Lesson Level Learning Goals	Phenomena/ Engineering Challenge	Summary: Students Will...
<p>4</p> <p style="text-align: center;">Plants</p>	<p>Preparation: 10 minutes</p> <p>Activity 4: 3 classes</p> <p>Lesson 4A: 55–60 min.</p> <p>Lesson 4B: 55–60 min.</p> <p>Lesson 4C: 55–60 min.</p>	<p>Obtain information from investigation and text to determine the needs of plants and the habitats that are most suitable for different types of plants.</p>	<p>Pumpkins fall off a truck and roll into a ditch and new pumpkins appear the next year.</p>	<ul style="list-style-type: none"> • make observations of a variety of seeds. • raise questions about seeds and what they need to grow. • conduct an investigation to determine what plants need to grow. • obtain information from text to find out what plants need to grow.
<p>5</p> <p style="text-align: center;">Living Things Change the Place Where They Live</p>	<p>Preparation: 10 minutes</p> <p>Activity 5: 6 classes</p> <p>Lesson 5A: 45–50 min., 2 classes</p> <p>Lesson 5B: 45–50 min.</p> <p>Lesson 5C: 45–50 min.</p> <p>Lesson 5D: 45–50 min., 2 classes</p>	<p>Recognize cause-and-effect relationship between plant and animal activity and changes in the environment</p>	<p>The river and land changed after a beaver dam was built on the river.</p>	<ul style="list-style-type: none"> • make observations of changes in the environment caused by plants and animals. • describe human habitats. • make observations of the effect of human activity on the environment.

UNIT AT A GLANCE

Students Figure Out How To:	Practices/Crosscutting Concepts	Assessment
<ul style="list-style-type: none"> design and carry out an investigation to find out what seeds need to grow. compare information from two texts to find out if plants are living things and what they need to grow and survive. use information about plants to determine what habitats are suitable for different types of plants. 	<p>Connections to the Nature of Science</p> <p>Developing and Using Models</p> <p>Analyzing and Interpreting Data</p> <p>Obtaining, Evaluating, and Communicating Information</p> <p>Patterns</p> <p>Systems and System Models</p>	<p>Formative Assessment</p> <ul style="list-style-type: none"> observation booklets Science Talk Journal Entry class discussion <p>Summative Assessment</p> <ul style="list-style-type: none"> concept map
<ul style="list-style-type: none"> determine the effect on other living things of changes caused by plants and animals. develop a plan to reduce the effect of human activities on the environment. 	<p>Engaging in Argument from Evidence</p> <p>Obtaining, Evaluating, and Communicating Information</p> <p>Analyzing and Interpreting Data</p> <p>Connections to Nature of Science</p> <p>Developing and Using Models</p> <p>Cause and Effect</p>	<p>Formative Assessment</p> <ul style="list-style-type: none"> Science Talk <p>Summative Assessment</p> <ul style="list-style-type: none"> Journal Entry habitat drawings Science Talk student habitat change drawings

PLANNING

Dear Parent:

Your child is beginning a unit created at the Battle Creek Area Mathematics and Science Center. This unit was designed to promote inquiry-based science and is complete with materials to accompany the activities. During the next twelve weeks, your child will be actively involved with the *Plants and Animals Live Here* unit. This unit is geared for kindergarten students and focuses on the science concepts that all living things have basic needs, and they meet their needs in their habitat. The unit emphasizes the following enduring understandings of science concepts:

1. Living things eat, grow, and reproduce (have babies).
2. Plants and animals (including humans) need air, food, water, and habitat (space) to grow and survive.
3. Plants and animals (including humans) meet their needs for survival in their habitats.
4. Plants and animals can cause change in their habitats to meet their needs.

Kindergarten students are also encouraged to think and act like scientists and begin to develop observation and communication skills in science.

1. Communicate scientific findings to others.
2. Learn how scientists figure out answers to their questions about the world through investigation and obtaining information from text and media.
3. Develop an awareness of and sensitivity to the natural world.

Familiar organisms will be studied as your child becomes involved with the activities in this unit. During this unit of study, your child will observe and investigate the movements, the habitat, and the basic life functions of pill bugs and earthworms. He or she will learn about the different animals' effect on their habitat and surroundings. By planting different kinds of seeds, your child will begin to notice the similarities and differences between plants.

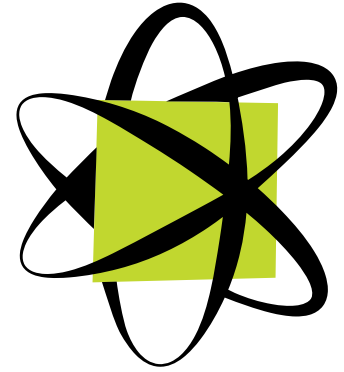
If you would like your child to participate in helping to provide food for the pill bugs and earthworms, feel free to send small amounts of the following items with your child: apple peelings, potato peelings, lettuce, cornmeal, or oatmeal.

Your child will be actively involved in constructing and reflecting on new scientific knowledge as she or he becomes a learner as well as a user of knowledge. Asking questions, developing solutions, interpreting and reconstructing information, and reflecting on his or her own knowledge are all components incorporated in this unit.

Suggestions for activities to do at home are included with this letter. These activities will reinforce the concepts taught during this unit's instruction.

May you enjoy quality time with your child while discussing the concepts involved with the *Plants and Animals Live Here* unit. Let us know if we may be of assistance.

The Outreach Staff
Battle Creek Area Mathematics and Science Center
(269) 213-3907 or (269) 213-3908



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PLANNING

- Take your child for a walk around the neighborhood to find different examples of living things. Have your child categorize the examples into two groups: plants and animals. Be sure your child observes the habitat of the living things she or he sees (i.e., birds and nests; wildflowers in a field).
- Help your child dig for earthworms. Have him or her notice the habitat and behavior of the earthworm. Stress the importance of respect for living things as your child examines the earthworm.
- Take your child to a pet store, zoo, or another place where she or he can match an adult animal with its offspring.
- Help your child find pictures of different types of plants in magazines, newspapers, and postcards, cut them out, and glue them into a notebook. Have him or her write or dictate sentences telling about the pictures.
- As the whole family takes a walk through a local park, list the plants and animals (including birds and insects) that are observed. Draw a simple map of the area and label where the living things were seen.
- Plant three different kinds of seeds in three different pots with your child. Have him or her mist the surface of the soil, cover the pots with plastic wrap, and place them in a sunny location. When the seeds sprout, have your child remove the plastic wrap and allow the plants to continue to grow in a sunny location. Have your child compare the similarities and differences between the three plants.
- Make a family plan to reduce the impact on the community by organizing a cleanup of a local park or playground. Discuss the importance of leaving no trace when hiking, playing in the park, and exploring different habitats.
- Take your child to the library to find books about living things—all plants and animals. Have him or her compare and classify familiar plants and animals on the basis of what they look like. Recommended titles include:

From Seed to Plant, by Gail Gibbons

Trees, Leaves and Bark, by Diana Burns

What Do You Do When Something Wants to Eat You? by Steve Jenkins

The Tree Book for Kids and Their Grown Ups, by Gina Ingolia

ACTIVITY 1

SCHOOLYARD: WHAT LIVES HERE?

Teacher Background Information

Classification of living and nonliving things presents an opportunity to discover the depth of understanding and the misconceptions your students have about characteristics that determine if something is living or nonliving. Scientists use eight life processes to classify and identify living things: ingestion of nutrients, reproduction, growth, respiration, excretion, movement, response, and secretion. Some of the characteristics used by scientists may only be observed at the cellular level. All living things are made up of cells. Nonliving things do not have cells. Kindergarten students are not expected to observe the eight life processes or cells, but it is important that they learn three basic observable life processes: take in or produce food, grow, and reproduce or have babies.

Young learners also struggle with identifying parts of living things as living or nonliving. For example, children may think that seeds are dead parts of plants when they are really small parts produced by plants that can grow into another plant under the proper conditions. Seeds can remain as dormant forms of life for years and, when conditions are favorable (temperature and moisture), grow into an adult plant. Falling leaves from a tree or plant are also a source of confusion for students. Children may wonder if a fallen leaf is dead or alive. When attached to the tree, leaves are an integral part of the living tree and carry out two of the three basic life processes: produce food and grow. The leaf is not part of the reproduction of the whole plant. Students should be encouraged to look at the object as a whole and not in parts and pieces. The leaf can be explained as living as long as it is attached to the tree but nonliving or dead after it has fallen to the ground and turned brown.

Another source of confusion is the use of movement, or movement on its own, as criteria for living things. Plants are classified as living things but do not move about on their own. Plant movement is limited to growth, growing toward sunlight, opening and closing of buds or blossoms, and the microscopic movement of the cells, such as the opening and closing of the stomata cells. Kindergarten students can think of plant growth as movement. They will learn more about the subtle movements of plants in later grades.

Death is a final characteristic of living things. All living things eventually die. Most kindergartners are aware of the mortality of living things by the time they begin school.

ESTIMATED TIME

Lesson 1A: 55–60 minutes
Lesson 1B: 45–50 minutes,
2 classes

LESSON LEVEL LEARNING GOALS

Use observations and patterns to develop criteria to determine what is living and nonliving.

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.
-

MATERIALS NEEDED

For each team of 2:

- 1 9-oz. cup
- 1 cup lid with holes
- 1 lunch-sized paper bag
- 1 hand lens
- 1 metal spoon
- 1 “living” card
- 1 “nonliving” card

For the class:

chart paper

Teacher provides:

chart paper
markers

LESSON 1A

TEACHING TIP

Be sure the students have an understanding of the reason for going outdoors and that they have boundaries and guidelines to follow. Restrict the outing to a specific area. Avoid the playground if possible.

TEACHING TIP

Throughout the activities in the Teacher Guide, you will notice that specific students instructions from Student Journal pages are italicized. Additional information for the teacher follows the italicized instructions in plain print.

Living Things	Nonliving Things

Engage the Learner

This lesson introduces and activates prior knowledge about living and nonliving things and what living things need to survive. Students are introduced to the phenomenon that a variety of plants and animals survive on the schoolyard. Through observations, they collect and observe different organisms collected from the schoolyard.

Considerations for Students with Special Needs

All prompts and passages in the Student Journal should be read aloud, with repeated directions and checking for understanding prior to writing.

Students are asked to draw and write in their Student Journals. Students may benefit by working with a partner in the longer writing pieces. Students with an IEP should be allowed to dictate their ideas and answers.

Many students may not handle an unstructured nature walk well. Stress that they are scientists who are quietly observing nature by looking for things that are alive and not alive. Have the students work in pairs to help each other. Make a game of the nature hunt. Instruct the students to hold onto a rope. Walk around the schoolyard and then stop walking and say, "Living!" Have the students walk to and stand by a living thing. Ask student volunteers to justify their choices. Have the students return to the rope and repeat the procedure with "Nonliving!"

LESSON 1A: LIVING AND NONLIVING

Advance Preparation

Duplicate copies of the *Parent Letter* and *Activities to Do at Home*, found on pages 33 & 34, to be sent home with each child.

Make a What We Think chart to keep a record of student initial ideas, questions, and what they figured out. The chart will be used as a reference and built on as the unit develops and students gain a greater understanding of things that are living and nonliving.

What We Think	Questions We Have	What We Did	What We Figured Out	How does that Help Us to Figure Out What Living Things Need?

Make arrangements for a nature walk in the schoolyard. If parent helpers or aids are available in your building, recruit an extra set of adult eyes and hands for the outing. Instruct your

helpers in guiding and questioning through an outdoor inquiry. Let them know that all ideas are acceptable during this phase in the lesson and ask them not to influence student thinking at this time.

Students will be collecting small nonliving and living items on the class outing. Prepare an area for them to sort their specimens by living and nonliving on a table or counter.

Procedure

Engage the learner.

Show the students the “living” card. Write “Living” at the top of a piece of chart paper or bulletin board. Ask the students for examples of things that they think are living. Ask: How can you tell if something is living? (Accept all answers at this time.) Record their ideas.

Show the students the “nonliving” card. Write “Nonliving” at the top of a piece of chart paper or bulletin board. Ask the students for examples of things that they think are nonliving. Ask: How can you tell if something is nonliving? (Accept all answers at this time.) Record their ideas.

Inform the class that they are going to go outdoors and become schoolyard detectives. They are to look for as many living and nonliving things as they can find in the schoolyard to find out how different plants and animals can survive during the school year. They are going to make observations of living and nonliving things to figure out what the living things need to survive and how they meet their needs on the schoolyard.

Ask students to predict what living and nonliving things they will find. Have them refer to their brainstorming list. Tell students that they will be using scientific tools to help in the search for living and nonliving things: hand lens, living cards, nonliving cards, metal spoon, and their eyes, ears, fingers, and noses. Tell students that the hand lens is for looking closely at things that are small to see if they are living or nonliving. Review the senses that they will need to use to be good schoolyard detectives.

Explain that students are welcome to collect specimens of living and nonliving things. The paper bag is for nonliving items, and the clear plastic cup with the lid is for living things that they can collect and observe in the classroom. Point out the holes in the lid of the cup. Ask students for their ideas of the purpose of the holes in the cup. Listen for initial ideas that living things need air.

TEACHING TIP

Make note of student ideas for the reason for holes in the lid of the cup to refer to when discussing what living things need to survive.

PLANNING AND CARRYING OUT INVESTIGATIONS

Planning and carrying out investigations in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- With guidance, plan and conduct an investigation in collaboration with peers (for K).
- **Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.**
- Evaluate different ways of observing and/or measuring a phenomenon to determine which way can answer a question.
- **Make observations (firsthand or from media) and/or measurements to collect data that can be used to make comparisons.**
- ~~Make observations (firsthand or from media) and/or measurements of a proposed object or tool or solution to determine if it solves a problem or meets a goal.~~
- **Make predictions based on prior experiences.**

LESSON 1A

TEACHING TIP

If you have access to a digital camera, take pictures of students with the choices for living and nonliving things on the schoolyard. Project the photos during the Science Talk to aid in the discussion.

TEACHING TIP/SAFETY TIP

Caution students against collecting bees or wasps in their collection cups.

ASKING QUESTIONS AND DEFINING PROBLEMS

Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested.

- Ask questions based on observations to find more information about the natural and/or designed world.
- Ask and/or identify questions that can be answered by an investigation
- ~~Define a simple problem that can be solved through the development of a new or improved object or tool.~~

TEACHING TIP

Carry a clipboard and list of student names as you circulate among the teams. Note observations and information shared by students to refer to during the Science Talk. Make a note if students begin to discuss the differences between living and nonliving things as related to what they need to survive.

Tell students that they will be taking the living and nonliving cards outside to use as labels. When they find something that they think is living, they may place the living card next to the item, and when they find something that they think is nonliving, they may place the nonliving card next to that item. Encourage them to look for living and nonliving things on the ground and in the air.

Explore the concept

Assign partners and go outdoors. Have students work together and explain to each other what they think is alive and not alive. Tell them that it is okay to look under leaves, rocks, and fallen branches for things that are living and nonliving. Encourage students to lie down in the grass and look closely between the blades of grass for living and nonliving things and then turn over and look at the sky.

When you observe students labeling items as living and nonliving, have them stand next to the item and wait for you or an adult helper to come over and talk to them about their selection. At this point in the unit, do not correct their observations. Make a note of their selection and explanation to share with the class when the class returns inside. To encourage elaboration and reflection on their explanations, ask:

- How do you know that object is living or nonliving?
- Tell me more about...
- Why did you decide to choose this object as living/nonliving?
- Is this an example you would like to bring indoors and share?
- What questions do you have about that living thing?

Small items, such as stones, leaves, twigs, and, if possible, bugs, caterpillars, and worms (to be released at the end of the science lesson) can be brought back into the classroom for further discussion. Model how to look for living and nonliving things. Look under bushes and piles of leaves, and use the metal spoon to look in the soil or under mulch. Demonstrate how to carefully scoop up a small bug or organism, place it in the plastic cup, and secure the lid. When the students have had sufficient time to explore the designated area and collect specimens, return to the classroom to discuss their ideas and discoveries.

Science Talk

Have students place their bags and observation cups in the designated areas for living and nonliving things. Have the students gather around the table and allow sufficient time for students to discuss what they found on the schoolyard and listen to the discoveries of others.

Record their ideas and questions on the What We Think chart. Take this opportunity for students to classify the items as living or nonliving and justify their ideas and then relate themselves to the other things they posted in the living category of the class chart. To help students draw on what they have experienced, ask:

- _____, I heard you say the _____ was not a living thing. Can you say more about that idea?
- Who would like to add to _____'s idea?
- How does the _____ compare to _____?
- Do the rest of you agree? Why or why not?

Assessment: Formative

Use the outdoor activity and living and nonliving card activity to assess students' initial understanding of classification of living and nonliving things.

TEACHING TIP

Science Talk is a make-meaning and pre-writing strategy used throughout the unit. An effective Science Talk is all students engaged in listening and talking to one another. The teacher serves only as the role of a facilitator and record keeper. Have your students face each other (in a circle). As they discuss their ideas, they should address one another and not discuss ideas through the teacher. Good, effective Science Talk should develop as students become more comfortable with collaboration.

PLANNING

LESSON 1B: MAKING SENSE OF OUR SCHOOLYARD OBSERVATIONS

Advance Preparation

Display the collection of items from the nature hunt from the previous lesson. You may want to add to the collection to generate interest and questions (pill bugs, sow bugs, millipedes, ladybugs, dandelion plants).

If students have not mentioned or do not freely mention plants as living, add a potted plant or uprooted weed from the schoolyard to the collection.

Procedure

Explain the concept and define the terms.

Provide a table for the children to sort the collected items from the nature hunt. As a class, collaborate to sort the items as living and nonliving and discuss their choices. Empty the paper bags and ask students to discuss the items and their reasoning for classifying the items as nonliving. As a class, make observations of the living specimens students found on the schoolyard.

Ask students to discuss the specimens and their reasoning for classifying them as living. Invite students to agree and disagree with one another and to tell why they agree or disagree. Have the class count the number of living and nonliving specimens and determine which category has the greatest number of objects. Allow sufficient time for students to verbalize their understandings at this time. Record their ideas on the What We Think chart for future reference.

Record student questions and preconceptions about their specimens on the chart. To help students raise questions and begin to think in terms of what their living specimens need to survive, ask:

- _____, can you tell us what you know/observed about your specimen?
- How is that similar to or different from _____ specimen?
- How can we find out?
- What can we say about all of the living specimens? Is that true for all cases?
- What can we say about all nonliving things? Is that true for all cases?
- What patterns can we find in our ideas about living and nonliving things?

MATERIALS NEEDED

For each student:

student pages

For each team of 2:

hand lens

For the class:

living and nonliving specimens from previous lesson

Teacher provides:

chart paper

markers

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.

MATH INTEGRATION

K.CC.1: Count to 100 by ones and by tens.

K.CC.4.c: Understand that each successive number name refers to a quantity that is one larger.

PATTERNS

- Patterns in the natural and human designed world can be observed and used as evidence.

LESSON 1B

ASKING QUESTIONS AND DEFINING PROBLEMS

Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested.

- **Ask questions based on observations to find more information about the natural and/or designed world.**
- Ask and/or identify questions that can be answered by an investigation
- ~~Define a simple problem that can be solved through the development of a new or improved object or tool.~~

ANALYZING AND INTERPRETING DATA

Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

- Record information (observations, thoughts, and ideas).
- Use and share pictures, drawings, and/or writings of observations.
- Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions.
- Compare predictions (based on prior experiences) to what occurred (observable events)
- ~~Analyze data from tests of an object or tool to determine if it works as intended.~~

Divide the class into teams of two students and distribute one living and one nonliving specimen to each team. Allow sufficient time for students to make careful observations and drawings of their specimens.

1. *Draw and label a picture of your living thing from the schoolyard.*
2. *Draw and label a picture of your nonliving thing from the schoolyard.*

Facilitate the team observation activity by circulating among the students and listening to their conversation and ideas. To help students elaborate on their explanations and descriptions, ask:

- What have you observed about your nonliving thing? Can you say the same thing about your living thing? Why do you think that?
- What have you observed about your living thing? Can you say the same thing about your nonliving thing? Why do you think that?
- What do you mean when you say...?
- Tell me more about the characteristics of your living thing.
- How do you think it is able to live in the schoolyard?
- Where else might you find that _____? What makes you think that?

Elaborate on the concept.

Have each team join another team and share their specimens and ideas. Ask students what the living things have in common and what the nonliving things have in common. After groups have had the opportunity to discuss their ideas, conduct a whole-class discussion about their findings.

Science Talk

Evaluate the students' understanding of the concept.

Invite the students to share their drawings with the rest of the class. Have each presenter tell why he or she thinks the drawing shows something that is living or nonliving. Ask the class to think about what all living things do that nonliving things do not do. Accept all reasonable answers at this time.

As a class, discuss the different characteristics of the living and nonliving things the students observed. Allow time for students to share their discoveries and ideas from their observations. Add and make adjustments to the Living Things and Nonliving Things charts created at the beginning of the activity. Check to see if any students included plants on the Living Things chart.

Ask the students what all the living things on the chart have in common. (Listen for ideas that relate to eating, growing, and reproducing.) Take this opportunity to ask:

- Will our living things survive if we keep them in the cups in the classroom? Why or why not?
- Would you be able to survive in a container for very long?
- What would you need to survive?
- Do plants and animals need the same things to survive? Why or why not?

Take this opportunity to develop a list of what students think humans need to survive. Students may have an extensive list that includes material goods. Listen for hints of the basic needs of air, water, food, and habitat or shelter to survive.

Record student ideas to refer to in the following lessons. Return all the organisms except the pill bugs to the schoolyard. Ask students to discuss what is in the schoolyard that is not in the plastic cups (trees, shrubs, birds, squirrels, etc.) that will help the living things to survive.

Ask the students to draw a picture of a living thing from the schoolyard in their Student Journal. Students can draw something that they saw on the nature hunt, in the classroom, or something that they know. Have the children color their drawings if time permits. Read the Journal Entry to the class.

Pre-Writing Strategy: Science Talk

Have the students turn to a partner and discuss and share what they are thinking about drawing and labeling in the Student Journal. Encourage the partners to share why they chose that drawing and how they know that it is living or nonliving. Give students the opportunity to respond to questions and suggestions from adults and their peers.

Science Activity Writing Center—Set up a writing center with a variety of living and nonliving items, which may have been collected from the schoolyard or the classroom. Label all items on the table. Give students time to write at the writing center independently or in pairs. Allow sufficient time for students to share their entries.

ENGAGING IN ARGUMENT FROM EVIDENCE

Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s).

- **Identify arguments that are supported by evidence.**
- Distinguish between explanations that account for all gathered evidence and those that do not.
- Analyze why some evidence is relevant to a scientific question and some is not.
- **Distinguish between opinions and evidence in one's own explanations.**
- **Listen actively to arguments to indicate agreement or disagreement based on evidence, and/or to retell the main points of the argument.**
- **Construct an argument with evidence to support a claim.**
- ~~Make a claim about the effectiveness of an object, tool, or solution that is supported by relevant evidence.~~

LESSON 1B

WRITING INTEGRATION

Text Types and Purposes

W.K.2: Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic.

Production and Distribution of Writing

W.K.5: With guidance and support from adults, respond to questions and suggestions from peers and add details to strengthen writing as needed.

EXTENSION

Have the students classify the living and nonliving things in their homes.

INTEGRATIONS

Language Arts: Provide children's books and periodicals for the students to explore and categorize things as living and nonliving.

Math: Have the students count living things and nonliving things as they classify their observations.

Journal Entry

Draw and label a picture of a living thing in the schoolyard.

Draw and label where it lives.

Assessment: Formative

Use the activity page, t-chart, Science Talk, and Journal Entry to assess the students' initial ideas of what is living and nonliving.

ENGINEERING DESIGN PROCESS

The Engineering Design Process provides students with a series of steps to guide them as they solve problems and design and test products, models, and solutions. The process is cyclical, yet not necessarily in an order. Students are encouraged to evaluate as they progress through the process, revisit the mission often, and revise thinking and their plan multiple times as the process unfolds.

Engineers do not always follow the Engineering Design Process steps in order, one after another. It is very common to design something, test it, find a problem, and then go back to an earlier step to make a modification or change the design. Engineers must always keep in mind the mission or problem they are trying to solve and the limitations (cost, time, material, etc.) that are part of the solution to the problem. Two key elements in working as an engineer are teamwork and design-test-and-redesign.

Mission

- Defines the problem and what the engineers are trying to design or build.
- Describes the limitations within which the engineers must solve the problem.

Brainstorm Ideas

- Imagine, discuss, and sketch possible solutions.
- Conduct research into what has already been done.
- Discover what materials are available, time frame, and other limitations.

Plan and Design

- Draw and write a plan.
- Design your solution through drawing and manipulating materials.
- Develop a plan or steps and a schedule.

Build

- Construct your engineering device or project.
- Follow your plan.
- Adjust and test along the way.

Test and Adjust

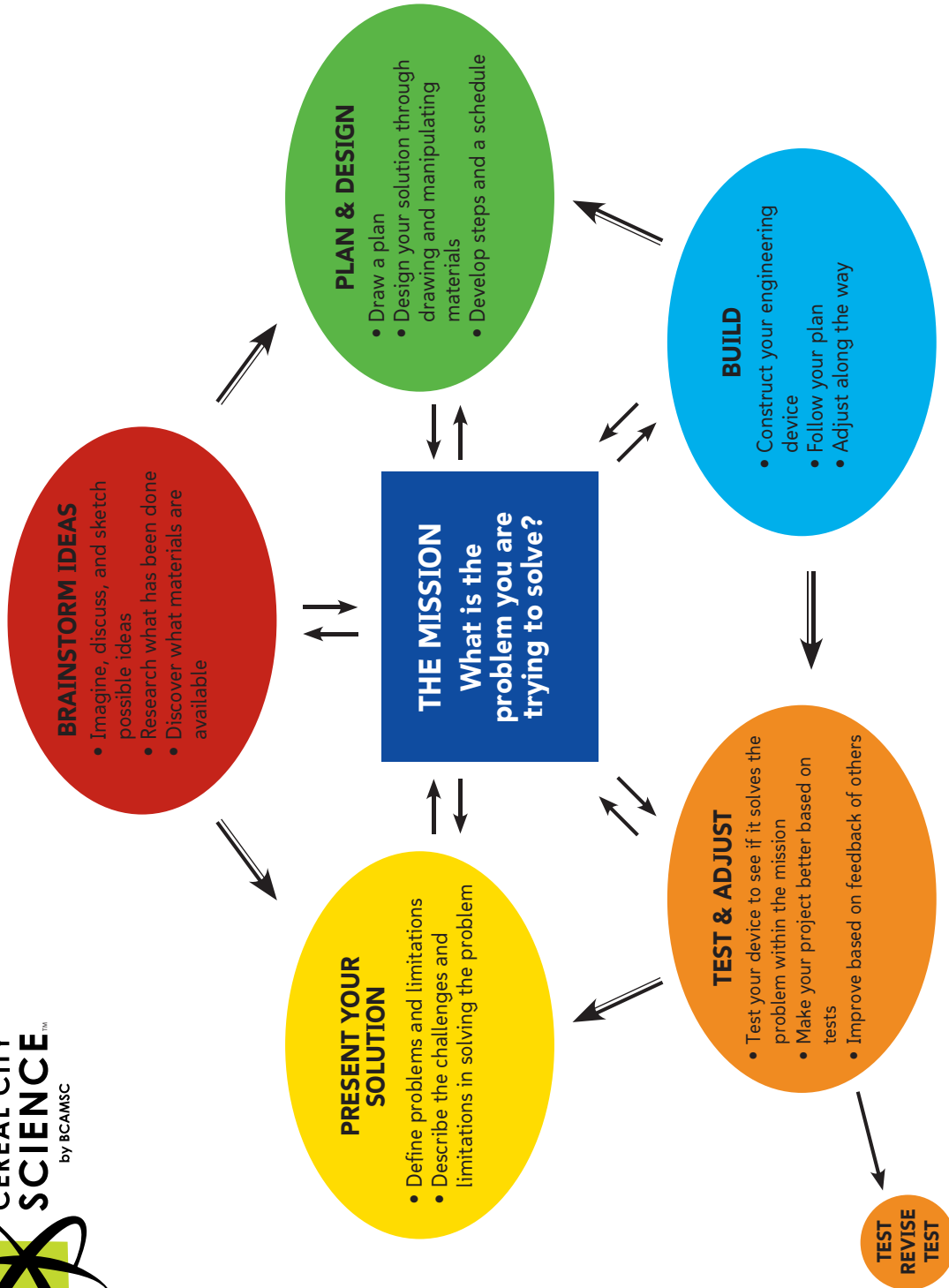
- Test your device to see if it solves the problem within the mission and limitations.
- Make your project better based on tests: Test → Revise → Test.
- Improve based on feedback of others.

Present Your Solution

- Demonstrate how your solution solves the problem.
- Define problems and limitations.
- Describe the challenges and limitations in solving the problem.
- Describe additional revisions that could improve the device or project.

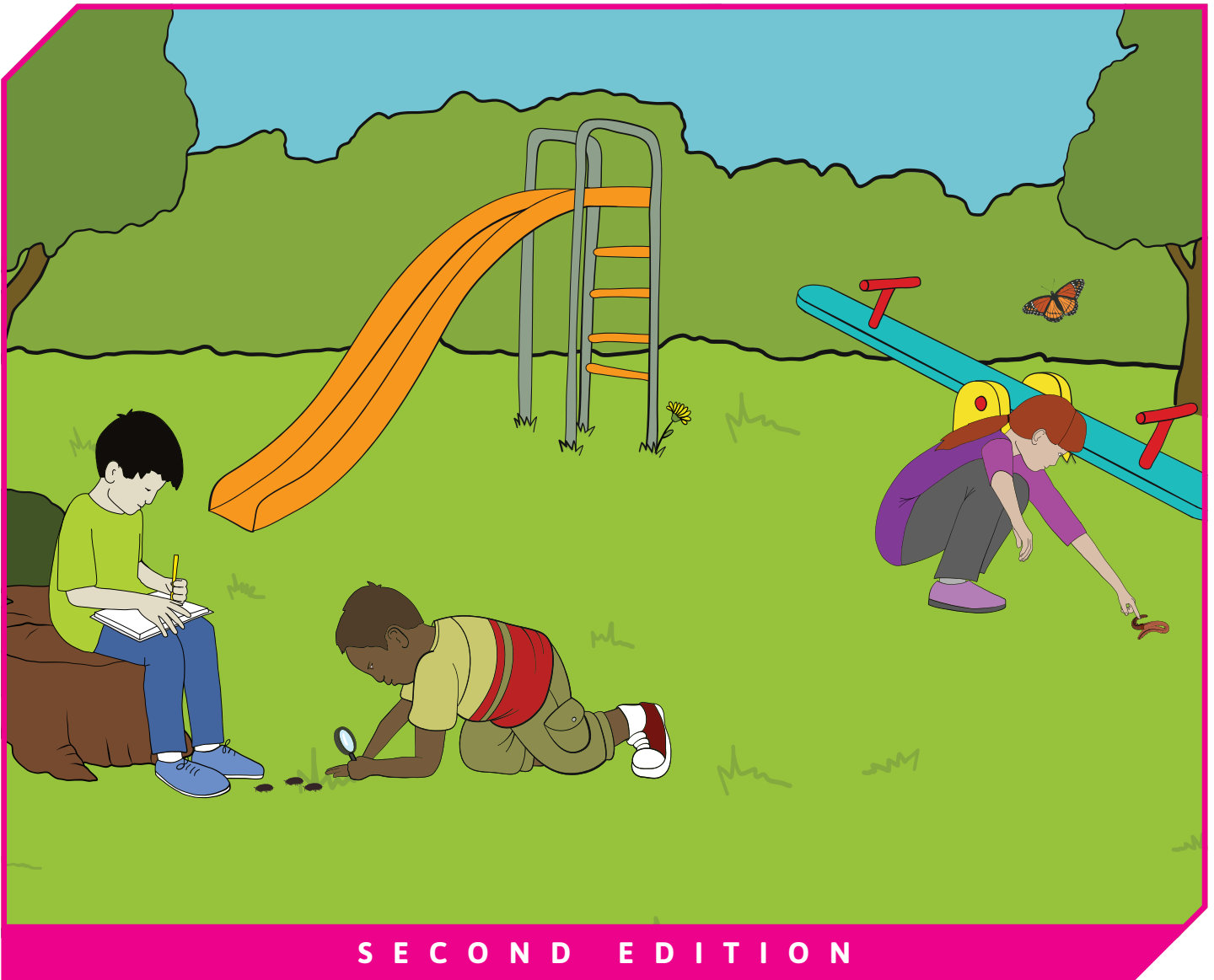
ENGINEERING DESIGN PROCESS

ENGINEERING DESIGN PROCESS



*by Battle Creek Area Mathematics and Science Center
Cereal City Science
Adopted from the Carnegie Mellon Robotics Academy*

Plants and Animals Live Here KLNG



A kindergarten unit supporting Next Generation Science Standards
and Michigan Science Standards

Name: _____

Name _____

Date _____



1. Draw and label a picture of your living thing from the schoolyard.



A large, empty rectangular box with a thin black border, intended for the student to draw and label a living thing from the schoolyard.

1B Making Sense of Our Schoolyard Observations

Name _____

Date _____

2. Draw and label a picture of your nonliving thing from the schoolyard.



Name _____

Date _____

.....
Draw and label a picture of a living thing in the schoolyard.
Draw and label where it lives.



Key Terms

Name _____

Date _____

.....
air - Air is an invisible gas that surrounds the Earth. Living things require air.

alike - To be alike is when two things are like each other in some way. One of the ways you and your teacher are alike is that you are both humans.

animal - An animal is a living thing that grows, can move around on its own, eats plants or other animals, and has babies.

animal home - An animal home is a place where an animal can get the things it needs to live and be safe. The soil is a home for earthworms and many plants. Other animal homes are nests, logs, trees, forests, and burrows.

basic needs - Basic needs for living things include air, water, food, and space to survive. Plants also need light.

different - To be different is when two things are not alike in some way. One of the ways you and a worm are different is that you have limbs and a worm does not.

food - Food is taken in by animals for growth and survival. Plants make their own food.

growth - Growth is the way living things change as they get older and bigger.

Name _____

Key Terms

Date _____

.....

habitat - A habitat is where animals make their homes and find their needs to live and grow.

have babies - Living things have babies that grow into adults that are similar to their parents.

living - Things that are living need food, grow, and have young. Animals and plants are living things.

moist - Something that is moist is slightly wet or damp.

movement - Movement is when something changes its position or goes from one place to another. Living things have movement. Animals can move from place to place. Plants move as they grow towards the light.

nonliving - Things that are nonliving do not need food, cannot grow, and cannot have young. Sand and rocks are nonliving things.

observe - To observe is to look carefully at something.

plant - A plant is a living thing that makes its own food and usually has a stem, leaves, roots, and flowers.

seed - A seed is a plant part that can grow into a new plant.

Key Terms

Name _____

Date _____

.....

survive - Survive is to continue to live.

take in food - Living things take in food to help them grow and live.

water - Water is a substance that is usually a liquid and freezes into a solid and evaporates into a gas. All living things need water.

young - A plant or animal that is young is one that is in the early part of its life or growth. A baby is a very young human.