Third Grade Companion Document
3-Unit 3: Structures and Functions of Living Things

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Introduction to the K-7 Companion Document
An Instructional Framework

Overview

The Michigan K-7 Grade Level Content Expectations for Science establish what every student is expected to know and be able to do by the end of Grade Seven as mandated by the legislation in the State of Michigan. The Science Content Expectations Documents have raised the bar for our students, teachers and educational systems.

In an effort to support these standards and help our elementary and middle school teachers develop rigorous and relevant curricula to assist students in mastery, the Michigan Science Leadership Academy, in collaboration with the Michigan Mathematics and Science Center Network and the Michigan Science Teachers Association, worked in partnership with Michigan Department of Education to develop these companion documents. Our goal is for each student to master the science content expectations as outlined in each grade level of the K-7 Grade Level Content Expectations.

This instructional framework is an effort to clarify possible units within the K-7 Science Grade Level Content Expectations. The Instructional Framework provides descriptions of instructional activities that are appropriate for inquiry science in the classroom and meet the instructional goals. Included are brief descriptions of multiple activities that provide the learner with opportunities for exploration and observation, planning and conducting investigations, presenting findings and expanding thinking beyond the classroom.

These companion documents are an effort to clarify and support the K-7 Science Content Expectations. Each grade level has been organized into four teachable units- organized around the big ideas and conceptual themes in earth, life and physical science. . The document is similar in format to the Science Assessment and Item Specifications for the 2009 National Assessment for Education Progress (NAEP). The companion documents are intended to provide boundaries to the content expectations. These boundaries are presented as “notes to teachers”, not comprehensive descriptions of the full range of science content; they do not stand alone, but rather, work in conjunction with the content expectations. The boundaries use seven categories of parameters:

a. **Clarifications** refer to the restatement of the “key idea” or specific intent or elaboration of the content statements. They are not intended to denote a sense of content priority. The clarifications guide assessment.
b. **Vocabulary** refers to the vocabulary for use and application of the science topics and principles that appear in the content statements and expectations. The terms in this section along with those presented

within the standard, content statement and content expectation comprise the assessable vocabulary.

c. **Instruments, Measurements and Representations** refer to the instruments students are expected to use and the level of precision expected to measure, classify and interpret phenomena or measurement. This section contains assessable information.
d. **Inquiry Instructional Examples** presented to assist the student in becoming engaged in the study of science through their natural curiosity in the subject matter that is of high interest. Students explore and begin to form ideas and try to make sense of the world around them. Students are guided in the process of scientific inquiry through purposeful observations, investigations and demonstrating understanding through a variety of experiences. Students observe, classify, predict, measure and identify and control variables while doing “hands-on” activities.
e. **Assessment Examples** are presented to help clarify how the teacher can conduct formative assessments in the classroom to assess student progress and understanding
f. **Enrichment and Intervention** is instructional examples the stretch the thinking beyond the instructional examples and provides ideas for reinforcement of challenging concepts.
g. **Examples, Observations, Phenomena** are included as exemplars of different modes of instruction appropriate to the unit in which they are listed. These examples include reflection, a link to real world application, and elaboration beyond the classroom. These examples are intended for instructional guidance only and are not assessable.
h. **Curricular Connections and Integrations** are offered to assist the teacher and curriculum administrator in aligning the science curriculum with other areas of the school curriculum. Ideas are presented that will assist the classroom instructor in making appropriate connections of science with other aspects of the total curriculum.

This Instructional Framework is NOT a step-by-step instructional manual but a guide developed to help teachers and curriculum developers design their own lesson plans, select useful portions of text, and create assessments that are aligned with the grade level science curriculum for the State of Michigan. It is not intended to be a curriculum, but ideas and suggestions for generating and implementing high quality K-7 instruction and inquiry activities to assist the classroom teacher in implementing these science content expectations in the classroom.

3rd Grade Unit 3:
Structures and Functions of Living Things

Content Statements and Expectations

Code	Statements & Expectations	Page
L.OL.E.3	**Structures and Functions – Organisms have different structures that serve different functions in growth, survival, and reproduction.**	1
L.OL.03.31	Describe the function of the following plant parts: flower, stem, root, and leaf.	1
L.OL.03.32	Identify and compare structures in animals used for controlling body temperature, support, movement, food getting, and protection (fur, wings, teeth, claws, scales).	2
L.OL.E.4	**Classification – Organisms can be classified on the basis of observable characteristics.**	2
L.OL.03.41	Classify plants on the basis of observable physical characteristics (roots, leaves, stems, and flowers).	2
L.OL.03.42	Classify animals on the basis of observable physical characteristics (backbone, body covering, limbs).	3
L.EV.E.1	**Environmental Adaptation – Different kinds of organisms have characteristics that help them to live in different environments.**	4
L.EV.03.11	Relate characteristics and functions of observable parts in a variety of plants that allow them to live in their environment (for example: leaf shape, thorns, odor, color).	4
L.EV.03.12	Relate characteristics and functions of observable body parts to the ability of animals to live in their environment (for example: sharp teeth, claws, odor, body coverings).	5

3 – Unit 3: Structures and Functions of Living Things

Big Ideas (Key Concepts)

- Plant and animal structures have specific functions.
- Plants and animals can be classified by observable characteristics.
- Plants and animals have observable characteristics that allow them to live and survive in their environment.

Clarification of Content Expectations

Standard: Organization of Living Things

Content Statement – L.OL.E.3
Structures and Functions – Organisms have different structures that serve different functions in growth, survival, and reproduction.

Content Expectations

L.OL.03.31: Describe the function of the following plant parts: flower, stem, root, and leaf.

Instructional Clarifications

1. Describe is to tell or depict in spoken or written words the function of the flower, stem, root, and leaf.
2. Plant parts have specific functions that contribute to the life of a plant.
3. Flowers produce seeds inside fruits and some flowers attract pollinators such as bats, birds and insects.
4. The stem carries water and minerals from the roots to the leaves and flowers. They also provide support to the plant and allow the leaves to reach sunlight.
5. The roots provide support by anchoring the plant and absorbing water and nutrients needed for growth. They also store sugars and carbohydrates.
6. Leaves create food in green plants. They are the site of photosynthesis, a process that uses carbon dioxide, water and sunlight to create food (glucose) and oxygen for the plant and other forms of life. Leaves also have openings that allow water and air to come and go.
7. A common misconception is that plants get food from the ground.
8. A common misconception is that plants make food for other organisms and not for themselves.
9. A common misconception is that plants and seeds are not living.

Assessment Clarifications

1. Flowers produce seeds.

2. The stem carries water and nutrients from the roots to the leaves and flowers. They also provide support to the plant and allow the leaves to reach sunlight.
3. The roots provide support by anchoring the plant and absorbing water and nutrients needed for growth.
4. Leaves make food in green plants.

L.OL.03.32 Identify and compare structures in animals used for controlling body temperature, support, movement, food getting, and protection (fur, wings, teeth, claws, scales).

Instructional Clarifications
1. Identify means to recognize the differences between structures in animals used for controlling body temperature, support, movement, food getting, and protection. Compare means to recognize how the structures are alike or similar among animals.
2. Animals have specific structures and body coverings that assist in controlling body temperature such as fur, feathers, skin, and hair.
3. Animals have specific structures that provide support such as a skeleton (bones) or an exoskeleton (no bones) in insects and crayfish.
4. Structures that provide movement for animals include limbs, wings, fins and muscles.
5. Structures used for food getting may include claws, jaws, teeth, beaks, legs, wings, and camouflage.
6. Structures used for protection may include exoskeletons, shells, scales, claws, teeth, legs and wings.

Assessment Clarifications
1. Body coverings such as fur, feathers, skin, and hair help control body temperature.
2. Skeletons provide support.
3. Limbs, wings, fins and muscles help animals move.
4. Animals use jaws, teeth, claws, and beaks for getting food.
5. Animals use scales, shells, claws, teeth, beaks, and wings for protection.

Content Statement – L.OL.E.4
Classification – Organisms can be classified on the basis of observable characteristics.

Content Expectations

L.OL.03.41 Classify plants on the basis of observable physical characteristics (roots, leaves, stems, and flowers).

Instructional Clarifications
1. Classify means to arrange or organize plants by category.
2. Scientists classify organisms (plants and animals) based on physical characteristics.

3. Plants can be classified based on observable physical characteristics such as roots, leaves, stems, and flowers.
4. Seed plants can be classified into two categories: evergreens and broad-leafed.
5. There are generally two types of root systems in green plants. A taproot is a single, prominent root. Examples are carrots and radishes. The other type of root system is branching.
6. Plants leaves can be classified in many ways. Two common ways are by shape and pattern. Green plants can have needle-like leaves or broad flat leaves. It is not important for third grade students to identify the specific leaf structures used for classification. They should be able to recognize that there are different leaf types and classify based on observable characteristics such as leaf type, leaf shape, veins.
7. Plant stems vary considerably and are divided into two groups. Plants may have woody stems such as in trees and shrubs. Plants may have green, non-woody stems such as in flowering plants and grasses.
8. Plants may be classified based on the type of flower. Flowers can be classified by color, shape and number of petals.

Assessment Clarification

1. Plants can be classified based on observable physical characteristics such as roots, leaves, stems, seeds and flowers.

L.OL.03.42 Classify animals on the basis of observable physical characteristics (backbone, body covering, limbs).

Instructional Clarifications

1. Classify means to arrange or organize animals by category.
2. Scientists classify organisms (plants and animals) based on physical characteristics.
3. Observable physical characteristics are the structures that are visible through observations.
4. Animals can be classified into two broad categories: backbone (internal skeleton or vertebrate) which are mammals, fish, birds, reptiles and amphibians or no backbone (external skeleton or exoskeleton or invertebrate) which include animals such as worms, insects and crustaceans. Third grade students will be limited to the general classification of animals with a backbone or no backbone. Animals with no backbone either have a skeletal system in the form of a shell or hard outer covering (insects, crustaceans, mollusks) or no skeletal system (worms, jellyfish).
5. Third grade students should classify animals with a backbone into fish, amphibian, reptile, bird and mammal.
6. Animals with backbones can be classified based on body covering and other observable physical characteristics: fish (scales and gills), amphibians (smooth wet skin), reptiles (dry, rough skin), birds (wings, two feet, feathers), and mammals (hair, feed their young milk).
7. A common misconception is that only large mammals are animals.
8. A common misconception is that humans are not animals.

9. A common misconception is that penguins and turtles are amphibians because they are both in and out of the water.
10. A common misconception is that whales, jellyfish, and starfish (or any animal that lives in the water) are all fish.
11. A common misconception is that behavior and habitat are used as criteria for classifying animals.
12. A common misconception is that animals with no backbone have no skeletal system.
13. A common misconception is that turtles have a shell, no backbone, and can pull out of their shells completely like a hermit crab can.

Assessment Clarifications

1. Animals can be classified based on observable physical characteristics (backbone, body covering, limbs).

Standard: Evolution

Content Statement – L.EV.E.1
Environmental Adaptation – Different kinds of organisms have characteristics that help them to live in different environments.

Content Expectations

L.EV.03.11 Relate characteristics and functions of observable parts in a variety of plants that allow them to live in their environment (for example: leaf shape, thorns, odor, color).

Instructional Clarifications

1. Relate means to establish an association or connection between characteristics and functions of observable parts of plants that allow them to live in their environment.
2. Plants have characteristics such as leaf shape, thorns, odor, or color that help them survive in different areas.
3. Leaf shape is important to a plant's survival. In desert areas, leaves may be very small or non-existent to help conserve water. Prairie grasses have long slender leaves that help prevent water loss. In deciduous forests, most trees have thin, broad leaves that can capture a lot of sunlight during the warm months and fall off during the winter to prevent water loss.
4. Some plants such as roses have thorns to prevent animals from eating them.
5. Some flowers such as roses have a strong sweet odor to attract birds and insects for pollination, while other plants such as skunk cabbage or tobacco plants have a strong toxic odor to deter insects or mammals from eating their leaves.
6. Color is another plant characteristic that helps with survival. Certain flower colors attract birds and insects for pollination. Colors may also help camouflage flowers.

7. The emphasis in third grade is characteristics that help an organism survive in its environment.
8. A common misconception is that plants need dirt or soil to grow.

Assessment Clarification

1. Plants have characteristics such as leaf shape, thorns, odor, or color that help them survive in different areas.

L.EV.03.12: Relate characteristics and functions of observable body parts to the ability of animals to live in their environment (for example: sharp teeth, claws, odor, body coverings).

Instructional Clarifications

1. Relate means to establish an association or connection between characteristics and functions of observable body parts to the ability of animals to live in their environment.
2. Animals have different characteristics such as sharp teeth, claws, odor, and body coverings that help them survive in their environment.
3. Sharp teeth help animals catch and hold their prey. Sharp teeth also help an animal defend itself.
4. Claws are used for defense and for catching prey. They can help an animal hold on to its prey and keep other animals from taking its meal. They may help an animal climb a tree or dig a hole.
5. Animals such as skunks and some snakes have a strong odor to keep predators away. Animals also use odor to find animals of the same kind.
6. Body coverings help animals survive in their environment. Color for camouflage and the type of covering are two important characteristics. Polar bears have white, thick fur that helps them live in a cold, snowy climate. Feathers help birds stay warm and fly or swim. Scales help fish and snakes live in their environments. The coloration of zebras and green tree frogs helps them hide or blend into their environments. The thick skin of the rhinoceros and quills of porcupine help them defend themselves. Mimicry and protective resemblance are two additional means of survival.
7. A common misconception is that animals migrate because it is too cold for them to survive.
8. Animals migrate to areas where they can find food, mate, and raise young.

Assessment Clarification

1. Animals have different characteristics such as sharp teeth, claws, odor, and body coverings that help them survive in their environment.

Inquiry Process, Inquiry Analysis and Communication, Reflections and Social Implications

Inquiry Processes
S.IP.03.11 Make purposeful observations of plants and animals using the appropriate senses.
S.IP.03.12 Generate questions based on observations of plants and animals.
S.IP.03.13 Plan and conduct simple and fair investigations.
S.IP.03.14 Manipulate simple tools that aid observation and data collection (hand lens, thermometer, tape measure).
S.IP.03.15 Make accurate measurements with appropriate units (Celsius, centimeters).
S.IP.03.16 Construct simple charts and graphs from data and observations of plants and animals.
Inquiry Analysis and Communication
S.IA.03.11 Summarize information from charts about structures and functions of plant and animal parts.
S.IA.03.12 Share ideas about plant and animal structures and functions through purposeful conversation in collaborative groups.
S.IA.03.13 Communicate and present findings of observations and investigations.
S.IA.03.14 Develop research strategies and skills for information gathering and problem solving about plants and animals.
Reflection and Social Implications
S.RS.03.11 Demonstrate understanding of plant and animal structures and functions through illustrations, descriptions, or discussions.
S.RS.03.14 Use samples as evidence to separate fact from opinion when classifying plants and animals.
S.RS.03.15 Use evidence when communicating about plants and animals.
S.RS.03.16 Identify technology used in everyday life when taking temperatures, making measurements, and making a power point presentation.
S.RS.03.17 Identify current problems about plants and animals that may be solved through the use of technology.
S.RS.03.18 Describe the effect invasive species have on the balance of the natural world.
S.RS.03.19 Describe how people such as Barbara McClintock and Jean Lamarck have contributed to science throughout history and across cultures.

Vocabulary

Critically Important – State Assessable	Instructionally Useful
air	habitat
animal features	herbivore
color	living organism
plant	omnivore
backbone/no backbone	pollinators
environment	skeleton
minerals	exoskeleton
organism	crustacean
plant root	evergreens
flowers	broad-leafed plants
stem	woody stems
leaf	tap root
survival of organisms	branching root
temperature	plant adaptations
Celsius	animal adaptations
thermometer	predator
centimeter	camouflage
support	mimicry
movement	protective adaptations
food getting	mammal
protection	fish
structure	bird
function	amphibians
physical characteristics	reptile
compare	insect
classify	worm

Instruments, Measurements, Representations

Measurement	Instrument	Representation
temperature	thermometer	Celsius
length	tape measure	centimeter

Instructional Framework

The following Instructional Framework is an effort to clarify possible units within the K-7 Science Grade Level Content Expectations. The Instructional Framework provides descriptions of instructional activities that are appropriate for inquiry science in the classroom and meet instructional goals. Included are brief descriptions of multiple activities that provide the learner with opportunities for exploration and observation, planning and conducting investigations, presenting, findings, and expanding thinking beyond the classroom. The Instructional Framework is NOT a step-by-step instructional manual, but a guide intended to help teachers and curriculum developers design their own lesson plans, select useful and appropriate resources and create assessments that are aligned with the grade level science curriculum for the State of Michigan.

Instructional Examples

Plants L.OL.03.31, L.OL.03.41, L.EV.03.11

Objectives

- Describe the functions of the basic plant parts.
- Classify plants on the basis of observable physical characteristics.
- Relate how characteristics and functions of observable parts in a variety of plants allow them to live in their environment.

Engage and Explore

- Take a walk outside and observe where plants live and don't live. Discuss reasons why plants might not be able to live in certain areas. (L.EV.03.11, S.IP.03.11, S.IA.03.12, S.RS.03.15)
- Display a variety of plants that show different parts. Students observe the different parts of the plants and try to identify the flowers, stems, roots, and leaves. Note the place where the root changes into the stem if possible. Have hand lenses available. Include some plants that might have some confusing parts such as a cactus, evergreen, moss, etc. (L.OL.03.31, S.IP.03.14, S.IA.03.12, S.IA.03.12, S.RS.03.11, S.RS.03.15)
- In cooperative groups students decide what the function of each plant part is and report out to the class. Record the structures and functions of the parts of the plants on charts or in science journals. (L.OL.03.31, S.IP.03.11, S.IP.03.12, S.IA.03.11, S.IA.03.13, S.RS.03.11, S.RS.03.15)
- Place a celery stalk or a white flower in a glass of colored water. Observe what happens to the leaves or flower petals. (L.OL.03.31, S.IP.03.11, S.IA.03.14)

Explain and Define

- Explain what is meant by the terms structures and functions. Every structure has a function or multiple functions that allow the plant to survive in its environment. Scientists use the structures to sort or classify plants. (L.OL.03.31, L.OL.03.41, L.EV.03.11)
- As a class, organize student thinking about plant parts and their functions into a t-chart.

Plant Part	Function

Elaborate and Apply

- Elaborate on how scientists classify organisms by observable physical characteristics. The leaves can either be broad-leaf or needle-like. Roots can be a single taproot or fibrous and branching. Stems can be woody or green. Flowers can be classified by color, shape, or number of petals. In cooperative groups have students observe various plants, decide how scientists might classify them, and record their ideas using charts. The groups could report out to the class telling their rationale for their choices. (L.OL.03.41, S.IP.03.11, S.IP.03.12, S.IP.03.16, S.IA.03.11, S.IA.03.13, S.RS.03.14)
- Make a plant part salad. Assign each student a different edible plant part (let the student choose) to bring in to put into a salad. As they add their plant part to the salad, they tell the structure and function. (L.OL.03.31, S.RS.03.11)
- Expand on student thinking by deciding how some structures of plants allow them to live in their environment. Leaf shape, thorns, odor, or color are very important to some plants' survival. Students can find examples of these characteristics either in pictures or outside. Record the examples in science journals. Difficulties in understanding arise when students try to describe how a plant part is specially designed to help the plant survive in an area. For instance, all plants have leaves, and all leaves gather sunlight. Just stating that a plant survives in an area because it has leaves to gather sunlight is not enough. Some better explanations are: a plant has extremely large leaves to capture more sunlight than other plants; a plant will put its leaves out very quickly in the spring to gather sunlight as soon as possible; or a plant with needle-like leaves that keep moisture in will keep their leaves all winter so they can gather sunlight all year round. Note: In third grade the term adaptation means how specific characteristics and functions allow a plant to survive in its environment. In fourth grade the emphasis will be on how variations in physical characteristics of individual organisms give them an advantage for survival and reproduction. (L.EV.03.11, S.IP.03.11, S.IA.03.12, S.RS.03.11, S.RS.03.15)

- Using fast growing plants, grow plants from seeds through a full life cycle. Observe and measure the different plant parts as they develop. Record the observations and measurements on a chart or in science journals. (L.OL.03.31, S.IP.03.14, S.IP.03.15, S.IP.03.16, S.IA.03.14, S.RS.03.15, S.RS.03.16)

Evaluate Student Understanding

Formative Assessment Examples

- Use the information students put on charts and their reporting out to the class to assess student understanding of classification of plants. (L.OL.03.41)
- Use the students' pictures and labels in their science journals to assess their ability make and record observations with accuracy. (L.OL.03.31)
- Use the students observations of plant parts have further discussion about ways plants can survive in their environment or have multiple adaptations for a single plant part. (L.EV.03.11)

Summative Assessment Examples

- Students plan and create a make-believe plant to demonstrate their understanding of structures and characteristics that help a plant survive in its environment. The make-believe plant has to have all of the plant parts, labels, the plant shown in its correct environment, and an adaptation that will help the plant survive in its environment. (L.OL.03.31, L.EV.03.11)
- Put out plants that have not yet been observed in the classroom. Students identify marked parts, tell the functions of the parts, and group the plants according to specified criteria. (L.OL.03.31)
- Put out plants that have not yet been observed in the classroom. Students sort the plants into groups based on observable physical characteristics. (L.OL.03.41)

Enrichment

- Armed with a camera, students go on a hike to look for specific examples of adaptations that help plants survive in different environments. Make a poster or a power point presentation showing the examples.
- Bring in a horticulturalist from a nearby nursery or botanical garden to show exotic plants and tell about their structures, functions and how the plant is designed to survive in its environment.
- Go on a field trip to a nursery or botanical garden.
- Research plants that are invasive species. What adaptations does the plant(s) have that makes it so successful in a particular environment.

Intervention

- Match Game: Provide cards that include the plant parts and all of the functions for each plant part: root – 1) provides support by anchoring the plant and 2) absorbs water and nutrients (note: nutrients are not food); stem – 1) carries water and nutrients from roots to leaves and 2) provides support to the plant and allows the leaves to reach sunlight; leaf – makes food; flower – produces seeds. Put each function and each plant part on separate cards. Students match the different functions with each plant part.
- Use pictures of plants and sort them into groups by their roots, leaves, stems, seeds, and flowers.
- Gather as many examples as possible of either real plants and/or pictures that show very specific ways a plant part helps a plant survive in its environment. For instance find as many plants as possible that have a long tap root or thorns.

Examples, Observations, and Phenomena (Real World Context)

The produce department of the grocery store is a place where children can practice identifying the different parts of the plants. Children are often removed from farms and consume prepackaged food and do not always realize where much of the food comes from.

Michigan is faced with many invasive species that have adapted to survive in all areas of the state. Some of the common invasive plant species are: garlic mustard, purple loosestrife, Eurasian milfoil, and hydra.

The rainforest has many new species that scientists are continually classifying. No one knows how many undiscovered species of plants there are because of the alarming rate at which the rainforest is being destroyed.

As gardening, green lawns, and golf courses become more popular, more herbicides and fertilizers are being applied to yards that in turn have a huge affect on the lakes, rivers, ponds, etc.

Contributions of scientists throughout history and across cultures have contributed significantly to current scientific thought. The contributions of scientists such as Barbara McClintock and George Washington Carver have used the parts of plants to advance the use of food plants.

Instructional Examples

Animals L.OL.03.32, L.OL.03.42, L.EL.03.12

Objectives

- Identify and compare structures in animals used for controlling body temperature, support, movement, food getting, and protection.
- Classify animals on the basis of observable physical characteristics.
- Relate how characteristics and functions of observable body parts in a variety of animals allow them to live in their environment.

Engage and Explore

- Students use pictures and/or parts of animals (i.e. skulls, teeth, pelts, feathers, etc.) to identify the structures that help the animals control body temperature, provide support, provide movement, get food, and protect themselves. Discuss and record information on a chart or in science journals. (L.OL.03.32, S.IP.03.11, S.IP.03.12, S.IP.03.16, S.IA.03.12, S.IA.03.13, S.RS.03.11)
- Students use pictures of animals and try to group animals using their own criteria. (L.OL.03.42, S.IP.03.11, S.IA.03.14, S.RS.03.14, S.RS.03.15)

Explain and Define

- Explain what is meant by the terms structures and functions. Structures (i.e. fur, wings, teeth, claws, and scales) are used to allow the animal to control its body temperature, support its body, move, get food, and protect itself. Many of the characteristics of the observable body parts enable an animal to survive in its environment. Scientists use structures, not behaviors, to classify animals into groups. (L.OL.03.32, L.OL.03.42, L.EV.03.12, S.RS.03.11, S.RS.03.14, S.RS.03.15)

Elaborate and Apply

- Students use pictures, actual animals, and/or videos to explore ways in which body parts and body coverings help an animal survive in its environment. Difficulties in understanding arise when students try to describe how specific body parts or body coverings help animals survive in their environment. For instance, the sentence, “Teeth are used for eating,” tells the structure (teeth) and the function (eating) but not how teeth help an animal survive in its environment. “Flat teeth are used for grinding seeds,” or “Sharp teeth are used for tearing meat,” explain how the

structure helps an animal survive in its environment more clearly. (L.OL.03. L.EV.03.12, S.IP.03.11, S.RS.03.15)

- To show how body coverings help keep animals warm, students experiment with different ways heat can be kept in cans of warm water by wrapping various materials (fake fur, fiberfill, wool, aluminum foil, etc.) around them, taking their temperatures, and recording the data on a chart. (L.EV.03.12, S.IP.03.13, S.IP.03.15, S.IP.03.16, S.IA.03.13, S.IA.03.14, S.RS.03.15, S.RS.03.16)
- To show how body coverings protect animals from temperature differences, students make a "blubber glove" out of two zip-top bags (one inside the other). Put vegetable shortening between the two bags so a hand can be inserted into the inner part and remain clean. Put the "blubber gloved" hand and a hand with no glove into both ice water and warm water and see if any temperature differences can be detected. (L.EV.03.12, S.IP.03.13, S.IA.03.13, S.IA.03.14, S.RS.03.11, S.RS.03.15)
- To show how body coverings help an animal hide or blend in with its environment, students use colored pencils, markers, and/or colored paper to design and make small insects or animals that can be placed in the open but camouflaged around the classroom. (L.EV.03.12, S.IP.03.11, S.IA.03.14, S.RS.03.11)
- To show how body parts such as claws and teeth are also used to get food, students use a variety of instruments such as toothpicks, chopsticks, spoons, strainers, etc. to simulate animal body parts. Pick up and/or tear apart different types of foods (beans, water, gelatin, rice, etc.) using the different instruments. Record the findings and report out to the class which types of body parts work best for handling which types of foods. (L.OL.03. L.EV.03.12, S.IP.03.13, S.IP.03.14, S.IA.03.11, S.IA.03.12, S.IA.03.13, S.IA.03.14, S.RS.03.11, S.RS.03.16, S.RS.03.17)
- To show how scientists classify animals, students in cooperative groups cut out pictures to sort animals into groups. First the students sort by skeletons on the outside of the body and skeletons on the inside of the body. Once animals have been divided into these two groups, the animals are grouped further based on observable physical characteristics i.e., body coverings and limbs. Use large chart paper to glue or record all the mammals together, fish, birds, etc. Students report out to the class. (L.OL.03.42, S.IP.03.11, S.IP.03.12, S.IP.03.16, S.IA.03.12, S.IA.03.13, S.RS.03.14)
- Note: The expectations are written with plants and animals combined. Although they have been separated in the Instructional Examples for ease of teaching, the intent is for students to make the connection that all organisms (plant and animal) have structures and functions, are classified by observable characteristics, and have characteristics that allow the organism to survive in its natural environment.

Evaluate Student Understanding

Formative Assessment Examples

- Use the information students put on charts and their reporting out to the class to assess student understanding of animal parts and their functions. (L.OL.03.32)
- Use the charts students created to check understanding of classification of animals. (L.OL.03.42)
- Use the students' observations of animal body parts or body coverings to have further discussions about ways animals can survive in their environment. (L.EV.03.12)

Summative Assessment Examples

- Students demonstrate understanding of animal structures and functions by designing a make believe animal that has special body parts and body coverings that help the animal survive in its environment. The body parts and coverings need to match the animal's habitat, and a description of how the structures help the animal survive needs to be given. (L.EV.03.12)
- Students write a paragraph explaining how a scientist would classify a new animal that was found. (L.OL.03.42)
- Using a particular animal, give one or two body parts or body coverings that help the animal survive in its environment. For instance a rabbit has brown fur for camouflage, large hind feet so it can run fast, large ears to hear predators, and large incisors for gnawing. (L.EV.03.12)

Enrichment

- Find other adaptations animals have in order to help them survive in their environment. For instance look at actions or behaviors animals have, such as migration and hibernation or a rabbit running a zigzag pattern to escape a predator; or ways animals can get oxygen through skin or gills.
- Students can study owls and look at all of the structures an owl has to allow it to be such a successful hunter. Then dissect owl pellets to look at what is found in the pellets. Sort the bones, and identify the bones and the animals they come from.
- Research animals that are invasive species. What special adaptations do the animals have that allow them to be successful in an area?

Intervention

- Match Game: Make cards that say: "controlling body temperature", "support", "movement", "food-getting", and "protection". Have lots of pictures of animals with various parts marked (i.e. fur, wings, teeth, claws). Students match the pictures with the functions.
- Students practice sorting objects such as buttons or attribute blocks. First they have to sort the objects into two main groups such as buttons with two holes and buttons without two holes or blocks that are round and blocks that are not round. Then sort the two groups further. Students have to set the criteria they use for sorting.

Examples, Observations, and Phenomena (Real World Context)

Michigan is faced with many invasive species that have adapted to survive in all areas of the state. Students need to be aware of how to try to help contain them so they don't travel out of certain areas and take over habitats of native species, and they need to be aware of how to prevent invasive species from coming into an area. Some of the major invasive animal species are: zebra mussels, quagga mussels, rusty crayfish, emerald ash borer, spiny water flea, ruffe, and round gobi.

Children love to watch the nature programs on TV or read nature books. Many of the TV programs and books focus on structures that help animals survive in their environment. By knowing about structures and functions of animals, children can be more aware while watching TV or reading and be able to make text-to-self connections.

The rainforest has many new species that scientists continue to classify. No one knows how many undiscovered species of animals there are because of the alarming rate at which the rainforest is being destroyed.
The application of pesticides has an effect on ecosystems and animals becoming more resistant to them.

Contributions of scientists throughout history and across cultures have contributed significantly to current scientific thought. Students research and recognize the contributions of scientists such as Jean Lamarck, Carolus Linnaeus, and Jane Goodall.

Literacy Integration

Reading

R.CM.03.01 connect personal knowledge, experiences, and understanding of the world to themes and perspectives in text through oral and written responses.

R.CM.03.02 retell in sequence the story elements of grade-level narrative text and major idea(s) and relevant details of grade-level in formational text.

R.CM.03.04 apply significant knowledge from grade-level science, social studies, and mathematics texts.

R.MT.03.02 plan, monitor, regulate, evaluate skills, strategies, and processes to construct and convey meaning (e.g. decoding unknown words), and use graphic organizers to deepen understanding of problem/solution and organizational patterns.

Examples of the trade books available for learning about plants and animals:
How Plants Survive by Kathleen Kudlinski, 2003
Plant Parts by Louise Spilsbury, 2008
How Do Animals Adapt by Bobbie Kalman and Niki Walker, 2000
Hatchet by Gary Paulson, 1987

Writing

W.GN.03.03 write an informational piece including a report that demonstrates the understanding of central ideas and supporting details using an effective organizational pattern (e.g. compare/contrast, cause/effect, problem/solution) with a title, heading, subheading, and a table of contents.

W.GN.03.04 use the writing process to produce and present a research project; initiate research questions from content area text from a teacher-selected topic; and use a variety of resources to gather and organize information.

W.PR.03.01 set a purpose, consider audience, and replicate authors' styles and patterns when writing a narrative or informational piece.

- Read the book *Hatchet* to the class. Students will write a literature response about why Brian has so much difficulty shooting wild game.

L.CN.03.01 ask substantive questions of the speaker that will provide additional elaboration and details.

L.CN.03.02 listen to or view knowledgeably while demonstrating appropriate social skills of audience behaviors (e.g. eye contact, attentive, supportive) in small and large group settings.

Mathematics Integration

M.UN.03.01 know and use common units of measurements in length, weight, and time.

D.RE.03.01 solve problems using information in bar graphs, including comparison of bar graphs.

D.RE.03.02 read scales on the axes and identify the maximum, minimum, and range of values in a bar graph.