First Grade Companion Document

1-Unit 2: Animal Life

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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.

First Grade Unit:
Sorting by Properties

Content Statements and Expectations

Background –

The first grade live science curriculum builds on the students' prior knowledge of living and nonliving things and the basic needs of all living things. Students explore the development of animals through the basic life cycle: egg, young, and adult and egg, larva, pupa, and adult. They make connections between young and adult and recognize characteristics that are passed from parent to young.

1 – Unit 2: Animal Life

Big Ideas (Key Concepts)

- Animals have needs for life (air, water, food, and space).
- Animals have a life cycle that includes egg, young (larva, pupa) and adult.
- Animals share some, but not all characteristics of their parents.

Clarification of Content Expectations

Standard: Organization of Living Things

Content Statement - L.OL.E.1
Life Requirements - Organisms have basic needs. Animals and plants need air, water, and food. Plants also require light. Plants and animals use food as a source of energy and as a source of building material for growth and repair.

Content Expectation

L.OL.01.13 Identify the needs of animals.

Instructional Clarifications
1. Identify means recognize the things that animals need to stay alive.
2. Animals need air, water, and food to survive.
3. Animals need space to survive.

Assessment Clarification
1. Animals need air, water, and food to survive.

Content Statement - L.OL.E.2
Life Cycles – Plants and animals have life cycles. Both plants and animals begin life and develop into adults, reproduce, and eventually die. The details of this life cycle are different for different organisms.

Content Expectation

L.OL.01.21: Describe the life cycle of animals including the following stages: egg, young, adult; egg, larva, pupa, adult.

Instructional Clarifications
1. Describe is to tell or depict in spoken or written words how the life cycle of animals can include various stages.

2. All animals have a life cycle.
3. Life cycle of animals include egg -> young -> adult.
4. Some animals, such as the butterfly, have a life cycle that includes egg -> larva -> pupa -> adult
5. The duration of the stages of the life cycle differ in different species.

Assessment Clarifications

1. All animals have a life cycle.
2. Common Life cycles of animals include egg -> young -> adult.
3. Some animals, such as the butterfly, have a life cycle that includes egg -> larva -> pupa -> adult

Standard: Heredity

Content Statement: L.HE.E.1
Observable Characteristics-Plants and animals share many, but not all, characteristics of their parents.

Content Expectations

L.HE.01.11 Identify characteristics (for example: body coverings, beak shape, number of legs, body parts) that are passed on from parents to young.

Instructional Clarifications

1. Identify means recognize the observable physical features of animals that are passed from parent to young.
2. Characteristics are the observable physical features of animals.
3. At this stage, students compare young animals to their parents and identify the physical features that the adult animals pass on to their young.
4. Common features that pass from parent to young include type of body covering, fur/hair/feather, coloring, beak shape, and eye color.

Assessment Clarifications

1. Characteristics are observable features of animals.
2. Parents pass some physical features to their young.

L.HE.01.12 Classify young animals based on characteristics that are passed on from parents (dogs/puppies, cats/kittens, cows/calves, chicken/chicks).

Instructional Clarifications

1. Classify means to arrange animals based on resemblances and /or differences that are passed on from their parents.
2. Students match common adult and baby animals of the same species.

Assessment Clarifications

1. Students match common adult and baby animals of the same species.

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

Inquiry Process
S.IP.01.11 Make purposeful observations of the life cycle of an animal and/or characteristics of animals using the appropriate senses.
S.IP.01.12 Generate questions about the life cycle of organisms based on observations.
S.IP.01.13 Plan and conduct simple investigations into the needs of animals in the classroom habitat.
S.IP.01.14 Manipulate the hand lens, pencils, rulers, that aid observation of animals.
S.IP.01.15 Make accurate measurements of the growth of different plants and animals in a classroom habitat.
S.IP.01.16 Construct simple growth charts from observations and data of plants and animals in the classroom habitat.
Inquiry Analysis and Communication
S.IA.01.12 Share ideas about animals the their offspring through purposeful conversation.
S.IA.01.13 Communicate and present findings of observations of life cycles and growth of animals in the classroom habitat.
S.IA.01.14 Develop strategies for information gathering (ask an expert, use a book, make observations, conduct simple investigations, and watch a video) about the life cycle of different animals
Reflection and Social Implications
S.RS.01.11 Demonstrate the life cycle of an animal through various illustrations, performances, models, exhibits, and activities.

Vocabulary

Critically Important-State Assessable	Instructionally Useful
needs of animals life cycle egg young adult larva pupa characteristics parents air water food beak shape body coverings: feathers, fur, skin, hair, scales	

Instruments, Measurements, Representations

Instrument	Measurement/Observation	Representation
Metric ruler	Growth of animals	Centimeters
Hand lens	Characteristics of animals	Numbers, shapes and outstanding features

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 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. 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

Life Requirements: L.OL.01.13
Life Cycles: L.OL.01.21
Heredity: L.HE.01.11

Objectives

- Make observations of animals and their interactions within habitats.
- Focus on the needs of each and how they help the organism survive.
- Make observations on the patterns animals follow from being born to growing up and getting old.
- Make observations on parental and young characteristics.
- Compare the physical characteristics of offspring and parent.

Engage and Explore

- Students will study a live animal from egg to egg. L.OL.01.21, S.IP.01.11, S.IP.01.12, S.IA.01.12, S.IA.01.13
- Teacher will read a life cycle book about an animal with the student question - how do animals change. Then lead a discussion on what stages of growth the animal experienced. Characteristics can be used to describe the animal in its various stages of growth. L.OL.01.21, S.IP.01.11, S.IP.01.12, S.IA.01.12, S.IA.01.13, S.IA.01.14

Explain and Define

- Teacher will put on chart paper the student ideas about the growth stages of the organism. L.OL.01.21
- Students identify the needs of living things using evidence. L.OL.01.13,
- Students should be able to talk about characteristics passed from parent to offspring. L.HE.01.11, S.IP.01.11, S.IP.01.12, S.IA.01.12, S.IA.01.13, S.IA.01.14

Elaborate and Apply

- Multiple examples of passed characteristics and life cycles should be shared with the students. L.OL.01.21, L.HE.01.11, S.RS.01.11, S.RS.01.12, S.RS.01.11, S.RS.01.12

Evaluate Student Understanding

Formative Assessment Examples

- Check student observation/picture journal to determine if observations are appropriate/applicable. L.OL.01.21
- Student conversations in their groups can be used as basis for monitoring understanding. L.OL.01.21

Summative Assessment Examples

- Circle the living things. L.OL.01.13
- Circle the needs of living things. L.OL.01.13
- Draw a picture of an animal and its baby. L.HE.01.11,
- Circle the characteristic that is shared by these two animals. L.HE.01.11,
- Draw the next stage of life for this organism. L.OL.01.21

Enrichment

- Students study/research an animal of their choice to share (or turn in) by drawing the life cycle, characteristics passed from parent to offspring, life needs and habitat should be incorporated for their chosen animal.

Intervention

- Break students into research groups that focus on one aspect of the life cycle e.g. Egg group, Adult group, young group, old group, and have students cycle through each of these groups studying many different animals. Students will then rotate through the other groups to experience all of them.

Examples, Observations, and Phenomena (Real World Context)

Most young children, at one time have asked for a box or jar to capture an animal from the outdoors to bring home and watch for hours. The natural curiosity about living things has led young children to make observations, inferences, and establish ideas of their own. For example, students may not relate the caterpillar to the adult animal or a stage in an animal's life.

Through their outdoor experiences and observations, students have an understanding that animals eat specific foods and not others. They recognize that the diet of a squirrel includes acorns and other seeds and nuts and does not usually include lettuce leaves or a ham sandwich. It is through their real world experiences that students transfer what they have observed to the classroom models and observations. Young learners build understanding of life science concepts through direct experience with living things, their life cycles, habitats, and long-term observations.

Literacy Integration

Reading

R.WS.01.10 in context, determine the meaning of words and phrases including objects, actions, concepts, content vocabulary, and literary terms, using strategies and resources including context clues, mental pictures, and questioning.

R.IT.01.02 discuss informational text patterns including descriptive, sequential, and enumerative.

R.IT.01.04 respond to individual and multiple texts by finding evidence, discussing, illustrating, and/or writing to reflect, make connections, take a position, and/or show understanding.

R.CM.01.01 make text-to-self and text-to text connections and comparisons by activating prior knowledge and connecting personal knowledge and experience to ideas in text through oral and written responses.

R.CM.01.04 apply significant knowledge from grade-level science, social studies, and mathematics texts.

Examples of trade books available for learning about the life cycles of animals and animal characteristics:
Life Cycles, Donna Schaffer, 1999
In the Woods: Who's Been Here? Lindsay Barrett George*, 1995*
Whose Baby is This? Wayne Lynch, 2000
An Earthworm's Life, John Himmelman, 2000
Under One Rock, Anthony Fredericks, 2001

Writing

W.GN.01.03 write an informational piece that addresses a focus question using descriptive, enumerative, or sequence patterns that may include headings, titles, labels, photographs, or illustrations to enhance the understanding of central ideas.

W.GN.01.04 use a teacher-selected topic to write one research question; locate and begin to gather information from teacher-selected resources; organize the information and use the writing process to develop a project.

W.PR.01.01 with teacher support, set a purpose, consider audience, and incorporate literary language when writing a narrative or informational piece; begin to use specific strategies including graphic organizers when planning.

- Students use their research on an organism to write their own life cycle book on their organism.

Speaking

S.CN.01.02 explore and use language to communicate with a variety of audiences and for different purposes including making requests, solving problems, looking for solutions, constructing relationships, and expressing courtesies.

S.DS.01.01 engage in substantive conversations, remaining focused on subject matter, with interchanges building on prior responses in literature discussions, paired conversations, or other interactions.

S.DS.01.03 respond to multiple test types by reflecting, making meaning, and making connections.

- Students present report findings orally.
- Students exchange ideas for habitat set-up, observations, and inferences based on observations.
- Students engage in conversation about the readings from the suggested books and explain the connections they are making between the classroom habitat, observations, and activities and the readings.

Mathematics Integration

M.UN.01.01 Measure the lengths of objects in non-standard units to the nearest whole units.

M.UN.01.02 Compare measured lengths using the words shorter, shortest, longer, longest, taller, and tallest, etc.

D.RE.01.01 Collect and organize data to use in pictographs.

D.RE.01.02 Read and interpret pictographs.

- Sizes and growth of organisms are measured and graphed, also duration of stages such as insect pupas that are counted and graphed.