

# Kindergarten Companion Document

## K-Unit 4: My Earth

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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.

## Kindergarten Unit 4: My Earth

### Content Statements and Expectations

#### Background –

The essential learning in Earth Science for Kindergarteners is to be able to identify different earth materials and recognize the earth materials necessary to grow plants, linking the common thread of understanding in Life Science and Earth Science.

Code	Statements & Expectations	Page
<b>E.SE.E.1</b>	<b>Earth Materials – Earth materials that occur in nature include rocks, minerals, soils, water, and the gases of the atmosphere. Some earth materials have properties that sustain plant and animal life.</b>	1
<b>E.SE.00.11</b>	Identify earth materials that occur in nature (rocks, sand, soil, and water).	1

## K–Unit 4: My Earth

### Big Ideas (Key Concepts)

- The Earth is made of materials (rocks, sand, soil, and water) that have many different properties.

### Clarification of Content Expectations

#### Standard: Organization of Living Things

##### Content Statement – E.SE.E.1

**Earth Materials-** Earth materials that occur in nature include rocks, minerals, soils, water, and the gases of the atmosphere. Some Earth materials have properties that sustain plant and animal life.

#### Content Expectations

**E.SE.00.11** Identify Earth materials that occur in nature (rocks, sand, soil, and water).

##### Instructional Clarifications

1. Identify means to recognize rock, sand, soil and water as earth materials and to recognize their differences.
2. Identification of Earth materials is limited to the observations of rocks, sand, soil, and water.
3. Soil consists of once living and never living materials (decomposing plant and animal materials, rock, gravel, sand, and clay).

##### Assessment Clarifications

1. Identification of Earth materials is limited to the observation of rocks, sand, soil, and water.

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

### **Inquiry Processes**

**S.IP.00.11** Make purposeful observation of different earth materials (water, soil, sand, rock) using the appropriate senses.

**S.IP.00.12** Generate questions based on observations of different earth materials.

**S.IP.00.13** Plan and conduct simple investigations into the ability of different earth materials to absorb water.

**S.IP.00.14** Manipulate simple tools (hand lens, balances) that aid observation and data collection of different earth materials, including water.

**S.IP.00.15** Make accurate measurements with appropriate (non-standard) units of different earth materials.

**S.IP.00.16** Construct simple charts from data and observations of earth materials.

### **Inquiry Analysis and Communication**

**S.IA.00.12** Share ideas about investigations into the properties of earth materials through purposeful conversation.

**S.IA.00.13** Communicate and present findings of investigations into the ability of different earth materials to absorb water.

**S.IA.00.14** Develop strategies for information gathering about earth materials. (Ask an expert, use a book).

### **Reflection and Social Implications**

**S.RS.00.11** Demonstrate through models and activities how earth materials absorb water.

## Vocabulary

Critically important – State Assessable	Instructionally Useful
soil water rock sand	materials air gravel clay particle sieve

## Instruments, Measurements, Representations

Measurement	Instruments	Representations
Compare weight of different earth materials	Balance	Heavier, lighter
Observations of texture, color, grain size	Hand lens	Color, larger, smaller, rough, smooth

## 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

#### Earth Materials: E.SE.00.11

##### Objectives

- Recognize that the earth is made up of water and land.
- Make observations and classify earth materials as water, sand, soil, or rock
- Explore how water and earth materials interact when combined.

##### Engage and Explore

- Engage student thinking by finding evidence that the Earth is made up of water and land. Use an inflatable globe and toss the globe to each student. Have students tell if their thumbs landed on land or water. Collect class data using tally marks. (E.SE.00.11, S.IP.00.16, S.RS.00.11)
- Go on a class rock hunt and ask students to collect samples of rocks for a class collection. (E.SE.00.11, S.IP.00.11, S.IP.00.12)
- Students use observations of class rock collections to generate questions about earth materials. The teacher records the questions on a class chart for future reference. (E.SE.00.11, S.IP.00.12, S.IP.00.16)
- Students observe, sort, illustrate and describe rocks using different properties. (size, shape, color, texture, lighter and heavier, sink and float) (E.SE.00.11, S.IP.00.11, S.RS.00.11)
- Students sort, illustrate and classify particles in a soil sample. (E.SE.00.11, S.IP.00.11, S.RS.00.11)
- Students compare texture, particle size, and color of different soil samples. (E.SE.00.11, S.IP.00.11)

- Students plan and conduct investigations to separate mixtures of sand, soil and rocks using a variety of materials (sieve, water, funnels, coffee filters, screens) (E.SE.00.11, S.IP.00.13)
- Students plan and conduct investigations on the properties of sand, soil and rocks such as the ability to absorb water. (E.SE.00.11, S.IP.00.13)

### **Explain and Define**

- Students use observations from investigations to share their findings and describe sand, soil and rock. Students define the terms using their own descriptions and vocabulary at this time. (E.SE.00.11, S.IA.00.12)
- Students use pictures to sequence observation of rocks and soil such as from dark to light (color), small to large (size) etc. (E.SE.00.11, S.RS.00.11)
- Students describe and compare the results when water is mixed with different earth materials. (E.SE.00.11, S.IP.00.13, S.IA.00.12)
- Students describe their methods of separating mixtures earth materials in sequential order. (E.SE.00.11, S.IA.00.13)
- Students identify earth materials in pictures of different landscapes (desert, forest, beach, etc.) and classify them as soil, rocks, sand or water. (E.SE.00.11, S.RS.00.11, S.IA.00.14)
- Students identify once living materials in soil samples and describe ways that they are different from living things. (E.SE.00.11, S.IP.00.11)

### **Elaborate and Apply**

- Student predict which earth material would be best for plant growth. (E.SE.00.11, S.IP.00.12)
- Students plan and conduct and plant growth investigations in different earth materials (sand, soil, water) Observations should consist of simple descriptions using student vocabulary. (E.SE.00.11, S.IP.00.13)
- Students gather information about earth materials from picture books and videos. Students at this age need to see large examples of earth materials such as boulders, lakes, rivers, deserts, and beaches. (E.SE.00.11, S.IA.00.14)

### **Evaluate Student Understanding**

Embedded Assessment Examples:

- Student journal observations and soil classification charts. (E.SE.00.11)
- Student investigations and explanations. (E.SE.00.11)

Summative Assessment Examples:

- Circle the Earth material with the smallest parts. (E.SE.00.11)
- Circle the object that would not be a part of soil. (E.SE.00.11)
- Circle the object in the picture made from earth materials. (Picture of a landscape) (E.SE.00.11)
- Circle the place on the map that is made of water. (E.SE.00.11)
- Circle the object that is not an earth material. (E.SE.00.11)



### **Enrichment**

- Students plan and conduct investigations with other types of earth materials such as gravel, clay and peat.
- Students investigate the uses of earth materials such as in building materials. Students can take a walk outside to observe building materials such as bricks, cement and tile. Students can generate questions about the origins of these materials based on their observations.

### **Intervention**

- Sorting and classifying other familiar objects by size, texture and color.
- Measuring and comparing familiar objects using nonstandard units.
- Observing globes and identifying land and water on the globe.

### **Examples, Observations and Phenomena (Real World Context)**

Early learners are naturally curious about the objects in their environment – soil, rocks, water, sand, rain, snow, and so on. Children are fascinated by the properties of soil and water at an early age as they make mud pies and observe plants around their home and school. Kindergarteners may enter school with an idea that the Earth is made up of soil, rocks, pebbles, sand, water and living things. They should be encouraged to closely observe materials found on Earth and begin to describe their properties. The essential learning in Earth science for the kindergarten student is to be able to identify different Earth materials and recognize the Earth materials necessary to grow plants, linking the common thread of understanding in life science and Earth science. The importance of earth materials (air, water, and soil) in plant growth can be seen in home gardening projects or visits to a farm.

## Literacy Integration

### Reading

**R.CM.00.01** begin to 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.IT.00.04** respond to individual and multiple texts by finding evidence, discussing, illustrating, and/or writing to reflect, make meaning, and make connections.

*Everybody Needs a Rock*, Byrd Baylor and Peter Parnall (1985)

*Let's Look at Rocks*, Jeri Cipriano (2004)

*Dirt: The Scoop on Soil*, Natalie M. Rosinsky (2002)

*If You Find a Rock*, Peggy Christian and Barbara Hirsch Lembe (2000)

- Activate prior knowledge through class observations of rocks before reading the books.
- Use books to extend student thinking related to observing and classifying rocks.

### Writing

**W.GN.00.03** write a brief informational piece such as a page for a class book using drawings, words, word-like clusters, and/or sentences.

**W.GN.00.04** contribute to a class research project by adding relevant information to a class book including gathering information from teacher-selected resources and using the writing process to develop the project.

- Draw pictures and write words to describe properties of rocks, soil and sand.
- Draw pictures to record results from investigations.

### Speaking

**S.CN.00.01** explore and use language to communicate with a variety of audiences and for different purposes including problem solving, explaining, looking for solutions, constructing relationships, and expressing courtesies.

**S.DS.00.01** engage in substantive conversations, remaining focused on subject matter, with interchanges beginning to build on prior responses in literature discussions, paired conversations, or other interactions.

- Engage in substantive conversations generating questions, making claims, using evidence and sharing explanations.

<b>Mathematics Integration</b>
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**M.PS.00.05** Compare length and weight of objects by comparing to reference objects, and use terms such as shorter, longer, taller, lighter, heavier.

- Compare length and mass using non- standard units of measure.