Second Grade Companion Document

2-Unit 3: Earth's Surface Features

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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.

Second Grade Unit:
Earth's Surface Features

Content Statements and Expectations

2 – Unit 3: Earth's Surface Features

Big Ideas (Key Concepts)

- Earth surface has many major landform types.

Clarification of Content Expectations

Standard: Solid Earth

Content Statement - E.SE.E.2
Surface Changes –The surface of Earth changes. Some changes are due to slow processes, such as erosion and weathering, and some changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes.

Content Expectation

E.SE.02.21 Describe the major landforms of the surface of the Earth (mountains, plains, plateaus, valleys, hills).

Instructional Clarifications
1. Describe is to tell or depict in spoken or written words about the major landforms on the Earth's surface.
2. Major landform descriptions are limited to mountains, plains, plateaus, valleys and hills.

Assessment Clarification
1. Major landform descriptions are limited to mountains, plains, plateaus, valleys and hills.

Content Statement – E.FE.E.2
Water Movement – Water moves in predictable patterns.

Content Expectations

E.FE.02.21 Describe how rain collects on the surface of the Earth and flows downhill into bodies of water (streams, rivers, lakes, oceans) or into the ground.

Instructional Clarifications

1. Describe means to tell or depict in spoken or written words how rain collects and flows on the Earth's surface.
2. Rain collection can become run-off as water flows downhill over impervious surfaces.
3. Rain collection can become ground water as water lands on and enters porous surfaces.

Assessment Clarifications

1. Students can describe how rainwater flows downhill over parts of the Earth into bodies of water. (Assessment clarification went beyond the GLCE)
2. Students can describe how rainwater lands on and soaks into the soil.

E.FE.02.22 Describe the major bodies of water on the Earth's surface (lakes, ponds, oceans, rivers, streams).

Instructional Clarifications

1. Describe is to tell or depict in spoken or written words about the major bodies of water on the surface of the earth.
2. Major bodies of water descriptions are limited to lakes, ponds, oceans, rivers and streams.

Assessment Clarification

1. Major bodies of water descriptions are limited to lakes, ponds, oceans, rivers and streams.

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

Inquiry Process
S.IP.02.11 Make purposeful observations of how rain collects on models of major landforms and bodies of water.
S.IP.02.12 Generate questions about the flow of water over land and into the ground based on observations.
S.IP.02.13 Plan and conduct simple investigations into the flow of water downhill into bodies of water, or into the ground.
S.IP.02.14 Manipulate simple tools that aid in observations of models, (hand lens, meter sticks, measuring cups, graduated cylinders)
S.IP.02.15 Make accurate measurements with appropriate units (centimeters, milliliters) for the measurement tool.
S**.IP.02.16** Construct simple charts and graphs from data and observations of investigations into the flow of water downhill into bodies of water or into the ground.
Inquiry Analysis and Communication
S.IA.02.11 Share ideas about observations of how water flows downhill through purposeful conversation.
S.IA.02.12 Communicate and present finding of observations and investigations into the flow of water downhill into bodies of water, or into the ground.
S.IA.02.13 Develop strategies and skills for information gathering about landforms, bodies of water, and how water flows downhill into bodies of water or into the ground.
Reflection and Social Implications
S.RS.02.12 Use evidence from their investigations when communicating how rain water collects on the Earth's surface, flows downhill into bodies of water, or into the ground.
S.RS.02.13 Recognize that when a science investigation is done the way it was done before, similar results are expected.
S.RS.02.14 Demonstrate landforms, bodies of water, how rain collects on Earth's surface, and flows downhill into bodies of water or into the ground through models or exhibits.

Vocabulary

Critically Important – State Assessable	Instructionally Useful
plateau valley hill mountain plain lake pond river stream ocean downhill soak	impervious porous flow gravity

Instruments, Measurements, and Representations

Measurement	Instruments	Representations
Rate of water flow	senses, stream tables, watersheds models	Fast, slow
Shape of landforms	3-D models of landforms, relief maps	Flat, high, low

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

Surface Changes: E.SE.02.21
Water Movement: E.FE.02.21, E.FE.02.22

Objectives

- Describe major landforms (mountains, plains, plateaus, valleys and hills).
- Describe major bodies of water (lakes, ponds, oceans, rivers, streams).
- Describe how water flows over the Earth's surface into bodies of water and into the soil.

Engage and Explore

- Students walk around their schoolyard and observe land for changes in shape such as raised flowerbeds, small hills, slope of driveways, etc. (E.SE.02.21, S.IP.02.11)
- Students investigate the flow of water over different surfaces in their schoolyard (driveway, soil, grass, playground, street) based on their questions from observations. (E.FE.02.21, S.IP.02.11, S.IP.02.12, S.IP.02.13)
- Students use observations to generate questions about changes in shape of land and water flow. The teacher will record questions for future reference. (E.SE.02.21, E.FE.02.21)
- Students use observations of pictures, videos, relief maps, or globes to describe characteristics of different landforms and bodies of water. (E.SE.02.21, E.FE.02.22, S.IP.02.11)
- Students build models of different landforms using a variety of materials. (E.SE.02.21, S.RS.02.11)

- Students investigate the flow of water using a watershed mode made out of paper crumpled inside of a tin pan and sprayed with water. Students make observations of water flowing over with different shapes and slopes. Students observe the formation of different bodies of water as well as the rate and direction of water flow in the model. (E.SE.02.21, E.FE.02.21, E.FE.02.22, S.IP.02.13)
- Students observe water soaking into the soil using stream tables with mixtures of sand and soil. Students also observe the formation of different landforms as the water moves the soil. Students use observations to generate more questions about the flow of water. (E.SE.02.21, E.FE.02.21, E.FE.02.22, S.IP.02.11, S.IP.02.12)

Explain and Define

- Students use observations and models to compare and contrast different landforms and bodies of water. Students present findings to the class. (E.SE.02.21, E.FE.02.22, S.IA.02.12, S.IA.02.13)
- Students use observations and models to explain how water collects on Earth surfaces after rain to form lakes, streams and rivers. (E.FE.02.21, E.FE.02.22, S.IA.02.13)
- Students use findings from investigations to explain the downhill flow of water using stream tables. (E.FE.02.21, E.FE.02.22, S.RS.02.15)
- Students use findings from investigation to explain how water soaks into the ground. (E.FE.02.21, S.RS.02.15)
- Students draw diagrams to demonstrate the downhill flow of water. (E.FE.02.21, E.FE.02.22, S.RS.02.11)

Elaborate and Apply

- Students investigate the relationship between the shape of landforms and the formation of bodies of water using watershed models. Students will observe the shape of the land where different bodies of water form, such as flat areas forming lakes and ponds and sloped areas forming rivers and streams. (E.SE.02.21, E.FE.02.21, E.FE.02.22, S.IP.02.13)
- Students investigate the relationship between the flow of water and the formation of landforms using stream tables. Students will observe how the speed of the flow of water changes the shape of rivers and streams produced. (E.SE.02.21, E.FE.02.21, E.FE.02.22, S.IP.02.11, S.IP.02.13)
- Students further investigate with stream tables by changing the slant of the stream table. Students can also change the surface that the water is flowing over by adding moss to the stream table for grass or plastic to represent pavement. (E.FE.02.21, S.IP.02.11, S.IP.02.13)
- Students plan and conduct investigations into how water soaks into different earth materials. (E.FE.02.22, S.IP.02.13)

Evaluate student Understanding

Formative Assessment Examples

- Use the student models, presentations and discussions to assess the students' ability to describe landforms and bodies of water. (E.SE.02.21, E.FE.02.22)
- Use the students' watershed and stream table investigations to assess student ability to raise questions and plan simple investigations. (E.FE.02.21, S.IP.02.12, S.IP.02.13)
- Use student diagrams assess students' ability to demonstrate the downhill flow of water over the Earth's surface. (E.FE.02.21, S.RS.02.11)

Summative Assessment Examples

- Circle the picture that shows a lake. (E.FE.02.22)
- Circle the picture that shows a plateau. (E.SE.02.21)
- Circle the picture that shows the path of rainwater after it reaches the Earth's surface. (E.FE.02.21)
- Circle the answer that shows bodies of water from biggest to smallest. (E.FE.02.22)

Enrichment

- Students plan and conduct sink and float activities in fresh and salt water to compare oceans to fresh bodies of water.
- Model ways that pollutants and other contaminants can flow through a watershed.
- Students build models of Michigan to show major landforms and bodies of water.

Intervention

- Students given an opportunity to explore interaction of water, sand and soil.
- Students use songs with hand motions or body movements to describe different landforms and bodies of water.

Examples, Observations, and Phenomena (Real World Context)

Children observe changes in the Earth's surface all the time without realizing it. They watch erosion and deposition take place at the edge of the grass after a rainstorm. They see the flow of water down the street and into the storm drain. They see sand castles at the beach washed away by a wave. Students need to connect these small-scale changes in the Earth' s surface to larger scale changes. The Earth's surface features can be investigated during family vacations, by reading books and taking field trips to local parks.

Literacy Integration

Reading

R.WS.02.11 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.02.02 discuss informational text patterns including descriptive, sequential, enumerative, and compare/contrast.

R.IT.02.04 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.02.01 make text-to-self and text-to-text connections and comparisons by activating prior knowledge, connecting personal knowledge, experience, and understanding of others to ideas in text through oral and written responses.

R.CM.02.04 apply significant knowledge from grade-level science, social studies, and mathematics texts.

Paddle-to-the-sea, Clancy Holling, 1941
Where The River Begins, Thomas Locker, 1993
Hills, Christine Webster, 2005
Mountains, Christine Webster, 2005
Plains, Christine Webster, 2005
Valleys, Christine Webster, 2005
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- Connect personal knowledge, experience, and understanding of rivers and hills to ideas in the text and through oral and written response.
- Retell relevant details of the flow of river water as described in the book.

Writing

W.GN.02.03 write an informational piece including a magazine feature article using an organizational pattern such as description, enumeration, sequence, or compare/contrast that may include graphs, diagrams, or charts to enhance the understanding of central and key ideas.

W.GN.02.04 use the writing process to produce and present a research project, develop two research questions related to a teacher-selected topic; gather electronic or print resources and organize the information using key ideas with teacher assistance.

W.GR.02.01 in the context of writing, correctly use more complex complete sentences, nouns, and verbs, commas, contractions, colons to denote time, and capitalization of proper nouns.

- Write about landforms using data from stream table observations in the writing piece.
- Write a story about a trip on a body of water or visiting a landform. Include illustrations and labels. Write the story from the child's point of view and they should describe their surroundings.

Speaking

S.CN.02.02 explore and use language to communicate effectively with a variety of audiences and for different purposes including questions and answers, discussions, and social interactions.

S.DS.02.01 engage in substantive conversations, remaining focused on subject matter, with interchanges building on prior responses in book discussions, peer conferencing, or other interactions.

S.DS.02.03 respond to multiple text types by reflecting, making connections, taking a position, and/or showing understanding.

- Present their landforms models to the class.
- Write and perform a skit, rap or song describing different landforms or the flow of water on the Earth's surface.

Mathematics Integration

M.UN.02.01 Measure lengths in meters, centimeters, inches, feet, and yards approximating to the nearest whole unit and using abbreviations: cm, m, in, ft. yd.

M.UN.02.02 Compare lengths; add and subtract lengths (no conversion of units).

M.PS.02.10 Solve simple word problems involving length and money.

- Compare the height of different landforms in student models.
- Compare the length of rivers produced in stream table models