Unit 6: Changes to Earth's Surface

Content Area: **Science**
Course(s): **Sample Course**
Time Period: **AprMay**
Length: **4.5 Weeks & Fourth Grade**
Status: **Published**

Title Section

Department of Curriculum and Instruction

Belleville Public Schools

Curriculum Guide

Science Grade 4

Unit 6: Changes to Earth's Surface

Belleville Board of Education

102 Passaic Avenue

Belleville, NJ 07109

Prepared by: Natalie Minichini

Dr. Richard Tomko, Ph.D., M.J., Superintendent of Schools

Dr. Giovanni Cusmano, Director of Elementary Education K -8

Mr. George Droste, Director of Secondary Education

Board Approved: August 30, 2017

Unit Overview

Unit six provides detailed information about Earth's changing landscape. The content within the unit explores how Earth has been shaped by water and other factors. The unit focuses on how people map Earth's surface and see patterns from maps.

(Reference HMH Science Dimensions, Unit 6)

Enduring Understanding

- Earth processes shape the land.
- Weathering, erosion, deposition constantly change Earth's surface.
- Many factors can affect the rates of weathering, erosion, and deposition.
- Water can allow organisms to live, grow, and thrive, and those organisms can change Earth's surface.
- Animals, plants, and other organisms effect the physical features of Earth's surface.
- Earth has many landforms such as mountains, valleys, and plains.
- Maps can model the surface features of Earth.
- Different maps show different things.
- Maps show patterns about locations, earthquakes, volcanoes, mountains, and ocean trenches.

Essential Questions

- **What are external structures of animals?**
- **How do external animal structures assist with growth, survival, behavior, and reproduction?**
- **What structures do animals have in common?**
- **How do structures function similarly and differently?**
- **What are internal structures of animals?**
- **What are the functions of internal animal parts?**
- **How do internal animal structures support survival and behavior?**
- **How do senses work?**

Exit Skills

By the end of Grade 4, Science Unit 6, the student should be able to:

- Ask questions and define problems
- Construct explanations and design solutions
- Define and delimit engineering problems
- Develop possible solutions
- Optimize the design solution
- Analyze the influence of science, engineering, and technology on society and the natural world

New Jersey Student Learning Standards (NJSLS-S)

4-ESS2-2	Analyze and interpret data from maps to describe patterns of Earth's features.
4-ESS2-1	Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

Interdisciplinary Connections

Connections to Math:

- **MP.2:** Reason abstractly and quantitatively.
- **MP.4:** Model with mathematics.
- **MP.5:** Use appropriate tools strategically.
- View "linked" standards below

Connections to English Language Arts:

- View "linked" standards below

MA.4.MD.A.1	Know relative sizes of measurement units within one system of units including km, m, cm, mm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two column table.
MA.4.MD.A.2	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
LA.W.4.8	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.

Learning Objectives

In Unit 6, students will demonstrate the ability to:

HMH Science Dimensions, Unit 6 - Lesson 1:

- **Compose** evidence of how water, weathering, erosion, and deposition shape Earth's surface
- **Investigate** how water impacts Earth
- **Examine** the relationships between the Earth's surface and the physical forces of weathering, erosion, and deposition

HMH Science Dimensions, Unit 6 - Lesson 2:

- **Compose** evidence regarding how rainfall, weathering, erosion and deposition shape Earth's surface
- **Investigate** how living things impact Earth
- **Examine** and **explain** the relationships between rainfall, weathering, erosion, and deposition

HMH Science Dimensions, Unit 6 - Lesson 3:

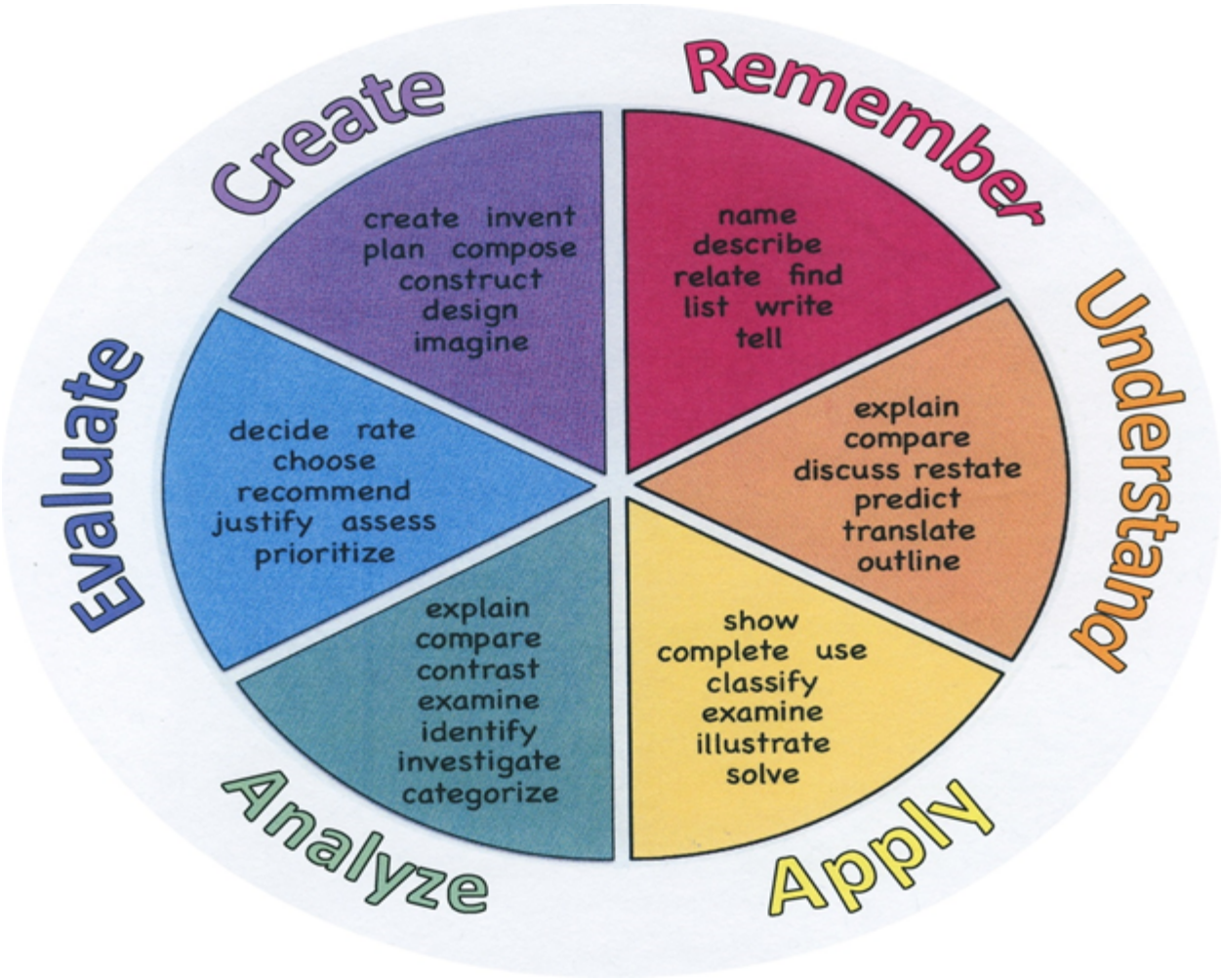
- **Observe** and **analyze** data about maps
- **Interpret** map contents that illustrate topographical features
- **Categorize** maps as sources of data about Earth's features

HMH Science Dimensions, Unit 6 - Lesson 4:

- **Analyze** data about the locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes
- **Observe** patterns on maps to describe the location they appear on land and in the oceans
- **Interpret** data to identify different patterns

Below are examples of action verbs associated with each level of the Revised Bloom's Taxonomy. These are useful in writing learning objectives, assignment objectives and exam questions.

Remember	Understand	Apply	Analyze	Evaluate	Create
Choose	Classify	Choose	Categorize	Appraise	Combine
Describe	Defend	Dramatize	Classify	Judge	Compose
Define	Demonstrate	Explain	Compare	Criticize	Construct
Label	Distinguish	Generalize	Differentiate	Defend	Design
List	Explain	Judge	Distinguish	Compare	Develop
Locate	Express	Organize	Identify	Assess	Formulate
Match	Extend	Paint	Infer	Conclude	Hypothesize
Memorize	Give Examples	Prepare	Point out	Contrast	Invent
Name	Illustrate	Produce	Select	Critique	Make
Omit	Indicate	Select	Subdivide	Determine	Originate
Recite	Interrelate	Show	Survey	Grade	Organize
Select	Interpret	Sketch	Arrange	Justify	Plan
State	Infer	Solve	Breakdown	Measure	Produce
Count	Match	Use	Combine	Rank	Role Play
Draw	Paraphrase	Add	Detect	Rate	Drive
Outline	Represent	Calculate	Diagram	Support	Devise
Point	Restate	Change	Discriminate	Test	Generate
Quote	Rewrite	Classify	Illustrate		Integrate
Recall	Select	Complete	Outline		Prescribe
Recognize	Show	Compute	Point out		Propose
Repeat	Summarize	Discover	Separate		Reconstruct
Reproduce	Tell	Divide			Revise
	Translate	Examine			Rewrite
	Associate	Graph			Transform
	Compute	Interpolate			
	Convert	Manipulate			
	Discuss	Modify			
	Estimate	Operate			
	Extrapolate	Subtract			
	Generalize				
	Predict				



Suggested Activities & Best Practices

HMH Science Dimensions, Unit 6 - Lesson 1:

- **Engage:** "Can You Explain It?" lesson
- **Explore/Explain:** "Making a Move," "Away it Goes," "Cold Stuff!," and "What About Us?" lessons and hands-on activity (Exploration 1, 2, 3, & 4)
- **Elaborate:** "Discover More" extension activity
- **Evaluate:** "Lesson Check" and "Lesson Roundup" assessments (formative/summative)

HMH Science Dimensions, Unit 6 - Lesson 2:

- **Engage:** "Can You Explain It?" lesson
- **Explore/Explain:** "Organisms and Environments," "Environments Change," and "Always Changing" (Exploration 1, 2, & 3)
- **Elaborate:** "Discover More" extension activity

- **Evaluate:** "Lesson Check" and "Lesson Roundup" assessments (formative/summative)

HMH Science Dimensions, Unit 6 - Lesson 3:

- **Engage:** "Can You Explain It?" lesson
- **Explore/Explain:** "What Is a Map," "How Do You Read a Map?," and "What Can Maps Show Us?" (Exploration 1, 2 & 3)
- **Elaborate:** "Discover More" extension activity
- **Evaluate:** "Lesson Check" and "Lesson Roundup" assessments (formative/summative)

HMH Science Dimensions, Unit 6 - Lesson 4:

- **Engage:** "Can You Explain It?" lesson
- **Explore/Explain:** "By Land or By Sea," and "Can Maps Help Us See Patterns?" (Exploration 1 & 2)
- **Elaborate:** "Discover More" extension activity
- **Evaluate:** "Lesson Check" and "Lesson Roundup" assessments (formative/summative)

HMH Science Dimensions, Unit 6 - Performance Task (Model It, Map It):

- **Define Task**
- **Research**
- **Plan Models**
- **Build Models**
- **Map Models**
- **Caption Maps**
- **Communicate**

HMH Science Dimensions, Unit 6 - Unit Project (Nearby Weathering):

- **Research and Plan**
- **Analyze Results**
- **Claims, Evidence, and Reasoning**

Evidence of Student Learning - Checking for Understanding (CFU)

- Admit Tickets
- Anticipation Guide

- Compare & Contrast
- Define
- Describe
- Evaluate
- Evaluation rubrics
- Exit Tickets
- Explaining
- Fist- to-Five or Thumb-Ometer
- KWL Chart
- Outline
- Question Stems
- Quickwrite
- Quizzes
- Red Light, Green Light
- Self- assessments
- Study Guide
- Teacher Observation Checklist
- Think, Pair, Share
- Think, Write, Pair, Share
- Unit tests

Primary Resources & Materials

Houghton Mifflin Harcourt- HMH Science Dimensions, 2018

Ancillary Resources

Science Weekly, Scholastic News, NewsELA, YouTube/TeacherTube, National Geographics Kids, Science Channel

Technology Infusion

SMARTboard, PowerPoint, Prezi, Social Media, relevant YouTube/TeacherTube videos, HMH Science Dimensions Digital Component, Laptops, WebQuests, Kahoot, Quia

Alignment to 21st Century Skills & Technology

Key SUBJECTS AND 21st CENTURY THEMES

Mastery of key subjects and 21st century themes is essential for all students in the 21st century.

Key subjects include:

- English, reading or language arts
- Mathematics
- Science

21st Century Skills/Interdisciplinary Themes

- Communication and Collaboration
- Creativity and Innovation
- Critical thinking and Problem Solving
- ICT (Information, Communications and Technology) Literacy
- Information Literacy
- Life and Career Skills
- Media Literacy

21st Century Skills

- Environmental Literacy
- Global Awareness
- Health Literacy

Differentiation

Differentiations:

- Small group instruction
- Small group assignments

- Extra time to complete assignments
- Repeat directions
- Use manipulatives
- Center-based instruction
- Study guides
- Teacher reads assessments allowed
- Scheduled breaks
- Rephrase written directions
- Additional time
- Preview vocabulary
- Preview content & concepts
- Behavior management plan
- Highlight text
- Student(s) work with assigned partner
- Small group setting

Hi-Prep Differentiations:

- Alternative formative and summative assessments
- Choice boards
- Games
- Independent research and projects
- Learning contracts
- Leveled rubrics
- Multiple intelligence options
- Multiple texts
- Project-based learning
- Problem-based learning
- Stations/centers
- Think-Tac-Toes
- Tiered activities/assignments
- Tiered products
- Varying organizers for instructions

Lo-Prep Differentiations

- Flexible grouping
- Goal setting with students
- Jigsaw
- Mini workshops to re-teach or extend skills
- Open-ended activities
- Think-Pair-Share
- Varied supplemental materials

Intervention Strategies

- allowing students to correct errors (looking for understanding)
- teaching key aspects of a topic. Eliminate nonessential information
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning
- allowing students to select from given choices
- allowing the use of note cards or open-book during testing
- collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test.
- decreasing the amount of workpresented or required
- having peers take notes or providing a copy of the teacher's notes
- marking students' correct and acceptable work, not the mistakes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using authentic assessments with real-life problem-solving
- using true/false, matching, or fill in the blank tests in lieu of essay tests
- using videos, illustrations, pictures, and drawings to explain or clarify

Special Education Learning

- printed copy of board work/notes provided
- additional time for skill mastery
- behavior management plan
- check work frequently for understanding
- computer or electronic device utilizes
- extended time on tests/ quizzes
- have student repeat directions to check for understanding
- highlighted text visual presentation
- modified assignment format
- modified test content
- modified test format
- modified test length
- multiple test sessions
- preferential seating
- preview of content, concepts, and vocabulary

- reduced/shortened reading assignments
- Reduced/shortened written assignments
- secure attention before giving instruction/directions
- shortened assignments
- student working with an assigned partner
- Use open book, study guides, test prototypes

English Language Learning (ELL)

- teaching key aspects of a topic. Eliminate nonessential information
- using videos, illustrations, pictures, and drawings to explain or clarif
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning;
- allowing students to correct errors (looking for understanding)
- allowing the use of note cards or open-book during testing
- decreasing the amount of workpresented or required
- having peers take notes or providing a copy of the teacher's notes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using true/false, matching, or fill in the blank tests in lieu of essay tests

Sample Lesson

Using the template below, please develop a **Sample Lesson** for the first unit only.

Unit Name:

NJSLS:

Interdisciplinary Connection:

Statement of Objective:

Anticipatory Set/Do Now:

Learning Activity:

Student Assessment/CFU's:

Materials:

21st Century Themes and Skills:

Differentiation/Modifications:

Integration of Technology: