# Unit 3: Earth’s External Processes and Changing Landscape

Content Area: **Science**
Course(s):
Time Period: **Marking Period 1**
Length: **4 Weeks**
Status: **Published**

## Brief Summary of Unit

Students will investigate the dynamic endogenic and exogenic processes that continually reshape Earth’s surface and landforms over geologic time. Key topics include structural deformation driven by tectonic forces, along with surface processes such as weathering, erosion, and deposition. Students will analyze the mechanics of major landscape-shaping agents—including mass wasting (landslides), glacial activity, fluvial systems, eolian forces, and pedogenesis (soil formation). Ultimately, students will evaluate how these physical processes remodel global topography and directly influence human populations, infrastructure, and natural hazard vulnerability.

Revised July 2026

## Standards

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| P.1 | Act as a responsible and contributing community members and employee. |
| 1 | Make sense of problems and persevere in solving them |
| 9.1.12.CFR | Civic Financial Responsibility |
| L.SS.11–12.1 | Demonstrate command of the system and structure of the English language when writing or speaking. |
| 2 | Reason abstractly and quantitatively |
| P.3 | Consider the environmental, social and economic impacts of decisions. |
| P.4 | Demonstrate creativity and innovation. |
| 3 | Construct viable arguments and critique the reasoning of others |
| P.5 | Utilize critical thinking to make sense of problems and persevere in solving them. |
| P.6 | Model integrity, ethical leadership and effective management. |
| L.KL.11–12.2 | Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening. |
| HS-PS1-5 | Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs. |
| P.8 | Use technology to enhance productivity increase collaboration and communicate effectively. |
| HS-PS2-1 | Analyze data to support the claim that Newton’s second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its |

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| | acceleration. |
| HS-PS3-2 | Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motion of particles (objects) and energy associated with the relative position of particles (objects). |

## Essential Questions/Enduring Understandings

# Essential Questions

1. How do internal Earth energy and external atmospheric forces interact to continuously construct, sculpt, and destroy Earth’s landscapes?
2. In what ways do microscopic mechanisms (such as chemical breakdown and grain transport) yield macroscopic changes to Earth's topography over geologic time?
3. How do human societies adapt to, exacerbate, or engineer solutions against the natural hazards caused by dynamic surface processes?

# Enduring Understandings

1. Earth's surface features are the result of a dynamic equilibrium between endogenic (internal tectonic) forces that uplift the crust and exogenic (surface) forces that weather, erode, and deposit materials.
2. The physical and chemical processes shaping Earth operate across vast spatial and temporal scales, where incremental actions—such as water flow, freeze-thaw cycles, and soil formation—cumulatively transform entire biomes and landscapes over millions of years.
3. Geologic processes directly govern human vulnerability and sustainability, requiring societies to understand surface dynamics to effectively manage natural resources, mitigate natural hazards (such as landslides and flooding), and design resilient infrastructure.

## Objectives: Students will know/Students will be skilled at

- Compare/contrast physical and chemical weathering.
- Describe how wind erodes the landscape.
- Determine the percentage of Earth’s surface that is covered with water.
- Determine the percentage of fresh water to ocean water on Earth.
- Determine the percentage of surface water to groundwater on Earth.
- Explain how a glacier forms.
- Explain how weathering, erosion and the various types of rock play a role in soil formation.
- Explain why the force of gravity plays a major role in weathering and erosion.
- Explain why water is the most powerful agent of erosion.
- Identify and explain factors that determine the shape of a stream/river.

- Identify factors that cause water to continuously move through the water cycle.
- Identify the many distinctive landscape features formed by glaciers.
- Identify the various agents of weathering and erosion that shape Earth's landscape.

## Learning Plan

- Activity/Lab – Creating sedimentary rock layers
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- Activity/Lab – Determining/modeling watersheds (students can determine from USGS topographic maps or use the internet/resources)
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- Activity/Lab – How does weathering break down rock (chemical vs. mechanical)
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- Activity/Lab – Modeling the water cycle (students create the water cycle with evaporation, precipitation, and condensation)
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- Activity/Lab – Stream erosion experiment (how does slope and velocity affect the erosion and deposition of a stream)
- Activity/Lab/Project – Label and identify parts of a glacier
- Activity/Lab/Project– Model/create a groundwater system diorama
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- Demonstrate the importance of topography in surface water flow and storage.
- Describe a groundwater system.
- Describe the different features of streams and rivers.
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- Describe the factors that affect the rate of weathering.
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- Describe the flow of water through a watershed.
- Describe the formation and movement of glaciers and their role in weather and deposition.
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- Describe the process by which erosion wears down and carries rock away.
- Differentiate the distribution of water on Earth.
- Discuss how permeable and impermeable rocks contribute to the formation of springs.
- Distinguish between chemical and mechanical weathering.
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- Explain how the force of gravity contributes to erosion by mass movement.
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- Explain how weathering, erosion, and time factor into the formation of fertile soils.
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- Explain the differential weathering rates in minerals and agents of weathering.
- Explain the effects of water on the formation of valleys, caves, canyons, and sinkholes.
- Explain the importance of the water cycle on Earth.
- Explain the mechanisms and effects of wind erosion and deposition.
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- Find connections between the water cycle and the rock cycle. Activity/Lab – Where's the water (students determine the distribution of water on Earth)
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- Identify features formed by glacial erosion and deposition.
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- Meaningful participation in guided question/answer sessions, individual/group discussions, demonstrating an understanding of the purpose of the unit lesson(s), key terms, and concepts
- Model the water cycle.
- Preview the essential questions, provide answers, and connect to learning throughout the unit.
- Project – Research/create poster of groundwater/river pollution in State or community
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- Quiz/Assessment – Stream erosion and deposition
- Quiz/Assessment – the water cycle
- Quiz/Assessment – the water cycle
- Unit Assessment

## Assessment

Formative:

Do Now Questions

Exit Ticket Questions

Whole Class Discussion Participation

Small Group Discussion Participation

Individual Student Questions/Responses

Independent Tasks

Lab Experiments

Quizzes

Summative:

Lab Report

Unit Test

Benchmark:

Honors Physics Midterm Exam

Alternative Assessments:

Guided Formal Lab Report

Unit Study Guide

## Materials

- Earth Science, Glencoe
- Earth Science, Merrill, and ancillary resource materials
- Earth Science, Prentice-Hall, and ancillary resource materials
- quantitative/qualitative lab equipment for activities, experiments
- related geologic maps
- sample seismogram read-outs
- sediment and soil samples
- sedimentary rock sample sets
- supplementary interactive multimedia, internet websites, videos
- Textbook, Physical Science with Earth Science, Glencoe, and ancillary resource materials