

# K-12 Science Update

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# Agenda

- ★ K-12 Science Program Overview
- ★ Updates
- ★ Next Steps

# K-12 Science: Comprehensive Program Overview

[3 Dimensional Approach](#)

[Learning Progressions](#)

[Inquiry Based Pedagogy](#)

# K-8 Science: Curriculum Development Updates

## Curriculum Development

- Grade Level Teams
- Units
  - Essential Questions
  - Storyline

Grade 4

Processes  
that Shape  
the Earth

*Model of Erosion*



*Science and Engineering Design Process*



Grade 7

Earth's

Features &

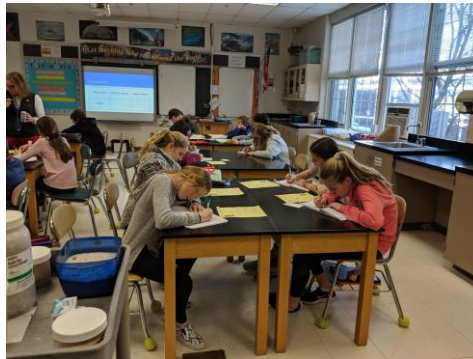
Natural

Resources

Using models to describe the cycling of Earth materials



*Planning and Carrying Out Investigations*



# Science K-12: Continuing to Study

## Continuing to Study...



### K-8

Collect Feedback & Revise  
Draft Curriculum

Professional Development

- Instructional Practices
- Assessment



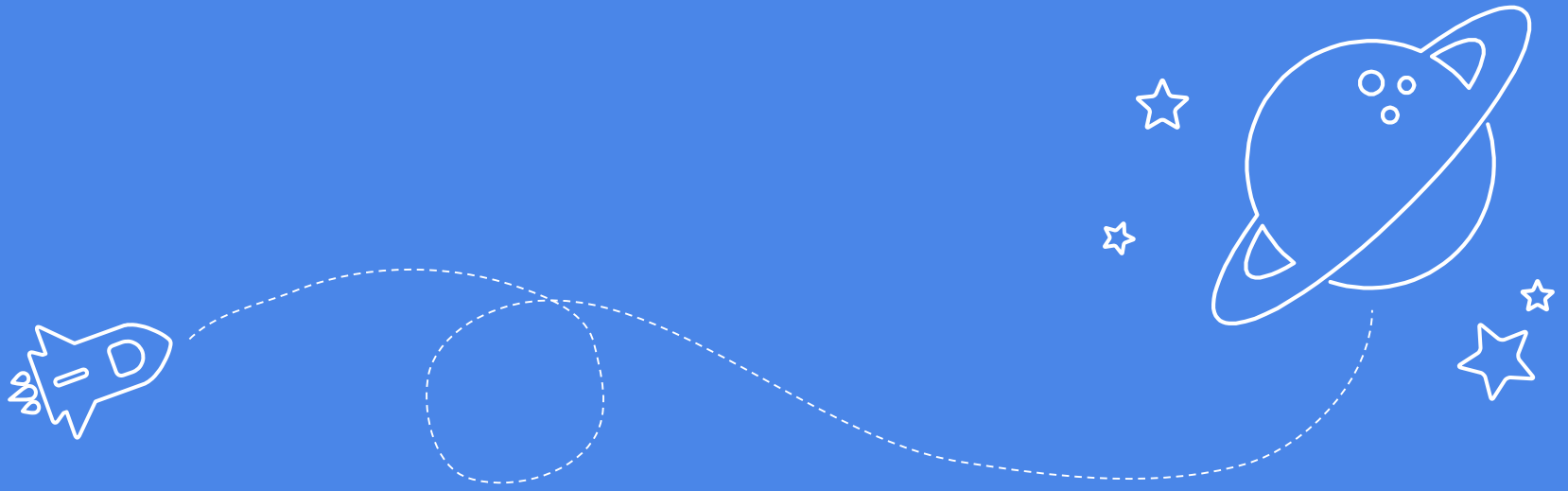
### 9-12

Crosswalk: Focus Groups

Sequence of Classes

Professional Development

- Instructional Practices
- Assessment



# QUESTIONS



# The 3 Dimensions of NGSS

## Science and Engineering Practices

1. Asking questions & defining problems
2. Developing & using models
3. Planning & carrying out investigations
4. Analyzing & interpreting data
5. Using mathematics & computational thinking
6. Constructing explanations & designing solutions
7. Engaging in argument from evidence
8. Obtaining, evaluating, & communicating information

## Disciplinary Core Ideas

### Physical Science

**PS 1:** Matter & its interactions

**PS 2:** Motion & stability: Forces & interactions

**PS 3:** Energy

**PS 4:** Waves & their applications in technologies for information transfer

### Life Sciences

**LS 1:** From molecules to organisms: structures & processes

**LS 2:** Ecosystems: Interactions, energy, & dynamics

**LS 3:** Heredity: Inheritance & variation of traits

**LS 4:** Biological evaluation: Unity & diversity

### Earth & Space Sciences

**ESS 1:** Earth's place in the universe

**ESS 2:** Earth's systems

**ESS 3:** Earth & human activity

### Engineering, Technology, & the Application of Science

**ETS 1:** Engineering design

**ETS 2:** Links among engineering, technology, science, & society

## Crosscutting Concepts

1. Patterns
2. Cause & effect
3. Scale, proportion, & quantity
4. Systems & system models
5. Energy & matter
6. Structure & function
7. Stability & change

# Learning Progressions

- [Science Engineering Practices](#)
- [Disciplinary Core Ideas](#)
- [Cross Cutting Concepts](#)

	Grades K-2	Grades 3-5	Grades 6-8	Grades 9-12
<b>ESS2: Earth's Systems</b>				
ESS2.A: Earth Materials and Systems	<ul style="list-style-type: none"> <li>• Wind and water can change the shape of the land. (2-ESS2-1)</li> </ul>	<ul style="list-style-type: none"> <li>• Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (4-ESS2-1)</li> <li>• Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. (5-ESS2-1)</li> </ul>	<ul style="list-style-type: none"> <li>• All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms. (MS-ESS2-1)</li> <li>• The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future. (MS-ESS2-2)</li> </ul>	<ul style="list-style-type: none"> <li>• Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes. (HSESS2-1),(HS-ESS2-2)</li> <li>• Evidence from deep probes and seismic waves, reconstructions of historical changes in Earth's surface and its magnetic field, and an understanding of physical and chemical processes lead to a model of Earth with a hot but solid inner core, a liquid outer core, a solid mantle and crust. Motions of the mantle and its plates occur primarily through thermal convection, which involves the cycling of matter due to the outward flow of energy from Earth's interior and gravitational movement of denser materials toward the interior. (HS-ESS2-3)</li> <li>• The geological record shows that changes to global and regional climate can be caused by interactions among changes in the sun's energy output or Earth's orbit, tectonic events, ocean circulation, volcanic activity, glaciers, vegetation, and human activities. These changes can occur on a variety of time scales from sudden (e.g., volcanic ash clouds) to intermediate (Ice ages) to very long-term tectonic cycles. (HS-ESS2-4)</li> </ul>

# Inquiry Structure

