Unit 3: History of Earth

Driving Question: Can we really comprehend geologic time?
Anchor Phenomenon: The Cosmos "Cosmic Calendar" Scene
Duration: 17-20 days

Unit Overview: In this unit, students will investigate the major events that shaped Earth from its formation to the present day. Topics include the early Earth, the development of the atmosphere and oceans, and the rise of life that transformed the planet's systems. Students will then examine geologic processes such as plate tectonics, mountain building, and mass extinctions that create patterns in Earth's long term changes. Through models, fossil evidence, and investigations, students will understand how Earth's dynamic history influences the environment we live in today.

Performance Expectations [PE]:

- HS-ESS1-5: Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks.
- HS-ESS1-6: Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.
- HS-ESS2-1: Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features.
- PS1.C: Nuclear Processes: (NYSED) Spontaneous radioactive decay follows a characteristic exponential decay law allowing an element's half-life to be used for radiometric dating of rocks and other materials.

	Identifying the Driving Question	Unit 3: History of Earth				
		Precambrian Eon	Paleozoic Era	Mesozoic Era	Cenozoic Era	
Anchor Phenomenon Activity	Can we really comprehend geologic time?	How did the Precambrian set the stage for us?	What events define the era and provide evidence for plate tectonics?	What events define the era and provide evidence for plate tectonics?	What events define the era and provide evidence for plate tectonics?	Anchor Phenomenon Activity
Cosmic Calendar Video Clip Short-form Video	Driving question board. Driving Question Board Activity	How Earth Was Made Birth of the Earth Full-length Video	Burgess Shale Short-form Video	Quick Read Alfred Wegener Short-form Video	Quick Research Advancements in Tech Quick Group Research	Cosmic Calendar Video Clip Short-form Video

Unit 3: History of Earth

Driving Question: Can we really comprehend geologic time?
Anchor Phenomenon: The Cosmos "Cosmic Calendar" Scene
Duration: 17-20 days

Anchor Phenomenon Activity

Can we really comprehend geologic time?

Scope and Sequence of Activities

Cosmic Calendar from Cosmos	Life and Extinctions Artifact Walk	Student Lead Question Creation	Identifying the Driving Question
Short-form Video	Station Rotation Activity	Driving Question Board Activity	Driving Question Board Activity

Resources and Links

Link: Cosmic Calendar			

Unit 3: History of Earth

Driving Question: Can we really comprehend geologic time?
Anchor Phenomenon: The Cosmos "Cosmic Calendar" Scene
Duration: 17-20 days

Precambrian Eon

How did the Precambrian set the stage for us?

Key Concepts	Performance Expectations
1. Evidences of the Age of Earth 2. Radiometric Dating / Nuclear Processes 3. ESSRT: Geologic History of New York State 4. ESSRT: Geologically Important Radioactive Elements	HS-ESS1-6: Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history. PS1.C: Nuclear Processes: (NYSED) Spontaneous radioactive decay follows a characteristic exponential decay law allowing an element's half-life to be used for radiometric dating of rocks and other materials.

Scope and Sequence of Activities

Introduction	Discovery	Notes	Revisit	Practice	Evaluate
How Earth Was Made Birth of the Earth	Investigation Radiometric Dating	Keynote w/ Class Notes	Wrap-up Radiometric Dating	Question Clusters	Assessment [10 question]

Supplemental Materials

	Exploration Radiometric Dating				

Resources and Links

Video - Link					

Unit 3: History of Earth

Driving Question: Can we really comprehend geologic time?
Anchor Phenomenon: The Cosmos "Cosmic Calendar" Scene
Duration: 17-20 days

Paleozoic Era

What events define the era and provide evidence for plate tectonics?

Key Concepts	Performance Expectations
1. Plate Tectonics [continental evidences] 2. Mountain Building Interactions 3. ESSRT: Geologic History of New York State	HS-ESS1-5: Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks. HS-ESS2-1: Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features.

Scope and Sequence of Activities

Introduction	Discovery	Notes	Revisit	Practice	Evaluate
Short-form Video Burgess Shale	Investigation Mountain Building	Keynote w/ Class Notes	Investigation Wrap-up	Question Clusters	Assessment [10 question]

Supplemental Materials

Resources and Links

Unit 3: History of Earth

Driving Question: Can we really comprehend geologic time?
Anchor Phenomenon: The Cosmos "Cosmic Calendar" Scene
Duration: 17-20 days

Mesozoic Era

What events define the era and provide evidence for plate tectonics?

Key Concepts	Performance Expectations
1. Plate Tectonics [Wegener's Evidences] 2. ESSRT: Geologic History of New York State	HS-ESS1-5: Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks. HS-ESS2-1: Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features.

Scope and Sequence of Activities

Introduction	Discovery	Notes	Revisit	Practice	Evaluate
Quick Read Alfred Wegener	Investigation Continental Drift	Keynote w/ Class Notes	Investigation Wrap-up	Question Clusters	Assessment [10 question]

Supplemental Materials

	Exploration ESRT				

Resources and Links

Unit 3: History of Earth

Driving Question: Can we really comprehend geologic time?
Anchor Phenomenon: The Cosmos "Cosmic Calendar" Scene
Duration: 17-20 days

Cenozoic Era

What events define the era and provide evidence for plate tectonics?

Key Concepts	Performance Expectations
1. Plate Tectonics [oceanic evidences] 2. ESSRT: Geologically Important Radioactive Elements	HS-ESS1-2: Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe. HS-ESS2-1: Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features.

Scope and Sequence of Activities

Introduction	Discovery	Notes	Revisit	Practice	Evaluate
Advancements in Technology	Investigation Sea-floor Spreading	Keynote w/ Class Notes	Investigation Wrap-up	Question Clusters	Assessment [10 question]

Supplemental Materials

Resources and Links

Unit 3: History of Earth

Driving Question: Can we really comprehend geologic time?
Anchor Phenomenon: The Cosmos "Cosmic Calendar" Scene
Duration: 17-20 days

Synthesizing the Driving Question

Can we really comprehend geologic time?

Scope and Sequence of Activities

Revisit the Driving Question	Learning Check-in	Model Time	Answering the Question	Investigation Recap
Driving Question Board Activity	Significant Events in Geologic Time	Humans and a Piece of the Pie	Whole-class Discussion	More to Explore

Resources and Links