

Earth System Evolution Storyline – Astronomy – Chapter 1

Unit is supplemented with:

- Space History Project – each student researches and presents information about a specific space mission

Big Idea:

3. Change through time produced Earth, the net result of constancy, gradual changes, and episodic changes over human, geological, and astronomical scales of times and space.
4. Extraterrestrial influences upon Earth include extraterrestrial energy, material, and influences due to Earth’s position and motion as a subsystem of an evolving solar system, galaxy, and universe.

	Activity 1 – The History and Scale of the Solar System	Activity 2 – The Earth-Moon System	Activity 3 – Orbits and Effects	Activity 4 – Impact Events and the Earth System	Activity 5 – The Sun and Its Effects on Your Community	Activity 6 – The Electromagnetic Spectrum and Your Community	Activity 7 – Our Community’s Place Among the Stars
Key Evidence Learned	- scale model of solar system - calculate distances using AU, parsecs and light years - nebular theory of formation - formation of universe	- lunar phases - tidal forces - types of tides - Moon’s origin - appearance of the Moon compared to other solar system bodies	- construct and measure ellipses - eccentricity - Earth’s orbit - how a changing orbit could affect climate - orbits of comets and asteroids	- mechanics of an impact event - energy released in a collision - impact events - chances of an impact event	- structure of the Sun - reflection, absorption and scattering - solar wind - space weather - sunspots, solar flares and other phenomenon	- explain the EM spectrum - different instruments used to detect EM - spectral fingerprints - how EM info is used to determine other objects - benefits and hazards	- understand our place in the galaxy - stellar structure and stellar evolution - relationship between brightness and magnitude - other stars affect on Earth
Connection to:							
Big Idea	- how the universe and solar system formed and has changed over time	- changes of Earth - tides - lunar phases	- orbits of Earth, planets and other objects	- impact events – causes and hazards	- how extraterrestrial energy impacts Earth	- extraterrestrial energy - other objects in the universe	- our place in the galaxy and universe
Real Life and Chapter Challenge	- formation of the universe and solar system	- lunar phases - tides	- possibility of collisions - orbits	- chance of an impact event - how impact events have changed life	- impact of the Sun on our lives, not just by light	- how EM spectrum impacts our lives - objects in the universe	- how our star compares to others in the galaxy and universe
Geosphere	- formation of planets	- formation of the Moon	- collision events	- impact craters - impact hazards			
Hydrosphere	- formation of oceans	- why there is no water on the Moon	- collision events	- impact hazards			
Atmosphere	- formation of air	- why there is no air on the Moon		- impact hazards	- auroras		
Cryosphere							
Biosphere		- astronaut discoveries	- orbit changes	- impact hazards	- hazards of solar radiation	- hazards and benefits of EM radiation	- greater understanding of our universe
State Stand.		4.4.a, 4.4.b	4.4.b			4.4.c, 4.4.e	4.4.d, 4.4.e
Jeffco Stand.		4.4.a, 4.4.b	4.4.b			4.4.c., 4.4.e	4.4.d, 4.4.e
CSAP Frame.	4.4.2.b, 4.4.2.c	4.4.1.b, 4.4.1.c, 4.4.2a	4.4.2.a, 4.4.2.b, 4.4.2.c	4.4.5.c	4.4.4.d	4.4.3.a, 4.4.3.b, 4.4.3.c	4.4.4.a, 4.4.4.b, 4.4.4.c,
Jeffco PE		U 2b, 2c	U 2b, 2c		U 1d, 2a	U 1a, 1b, 3c	U 1c, 1e

Earth System Evolution Storyline – Climate Change – Chapter 2

Big Idea:

3. Change through time produced Earth, the net result of constancy, gradual changes, and episodic changes over human, geological, and astronomical scales of times and space.
6. Fluid spheres within the Earth system include the hydrosphere, atmosphere, and cryosphere, which interacts and flow to produce ever-changing weather, climate, glaciers, seascapes, and water resources. These affect human communities, shape the land, transfer Earth materials and energy, and change surface environments and ecosystems. Natural hazards associated with Earth processes and events include drought, floods, storms, volcanic activity, earthquakes and climate change. They pose risks to humans, their property and communities. Earth science is used to study, predict, and mitigate natural hazards so that we can assess risks, plan wisely, and acclimate to the effects of natural hazards.
7. Dynamic environments and ecosystems are produced by the interaction of all the geospheres at the Earth’s surface, and include many different environments, ecosystems, and communities that affect one another and change through time.
8. In order to sustain the presence and quality of human life, humans and communities must understand their dependency on Earth resources and environments, realize how they influence Earth systems, appreciate Earth’s carrying capacity, manage and conserve nonrenewable resources and environments, develop alternate sources of energy and materials needed for human sustenance, and invent new technologies.

	Activity 1 – Present-Day Climate in Your Community	Activity 2 – Paleoclimates	Activity 3 – How do Earth’s Orbital Variations Affect Climate?	Activity 4 – How do Plate Tectonics and Ocean Currents Affect Global Climate?	Activity 5 – How do Carbon Dioxide Concentrations in the Atmosphere Affect Global Climate?	Activity 6 – How Might Global Warming Affect Your Community?
Key Evidence Learned	- factors of the physical environment - topo maps - climate data interpretation - compare and contrast climate data - how physical features can impact climate	- Climate change as evidenced by: - tree rings - ice cores - geologic sediments - glacial sediments - fossil pollen	- axial tilt is 23 ½ degrees - cause of seasons - how our orbit impacts climate - insolation	- REVIEW of information previously covered in other units	- compare data of past CO2 levels and relationship to climate - predict future temps using data - causes of global warming	- ways that global warming might influence Earth - impact on community - positive and negative feedback loops - limitations of models
Connection to:						
Big Idea	- how different climate and ecosystems are formed - understanding our place on Earth	- how climate has changed over time	- how orbit and tilt create seasons - how changes in orbit or tilt change climates		- how humans have impacted global climates	- how climates might change in the future
Real Life and Chapter Challenge	- our place on Earth - our ecosystem	- how climate has changed over time	- seasons - how changes in orbit and/or tilt would impact climate and seasons		- how humans have impacted global climates	- how our local climate might change in the future
Geosphere	- how topography plays a role in climate	- geologic sediments - glacial sediments				
Hydrosphere	- how water affects local climate	- ice core data				- rising/falling sea levels
Atmosphere	- how climate regions impact the weather	- ice core data	- seasons		- global climate change	- climate changes
Cryosphere	- how location determines the presence of ice	- ice core data - glacial sediments				- glacial impacts
Biosphere	- different climates	- tree rings - fossil pollen	- seasons		- global climate change	- global climate change
State Standard	4.3.d, 4.2.c, 4.2.e	4.2.e	4.4.a, 4.4.b		4.2.e	4.2.e
Jeffco Standard	4.2.d, 4.2.e, 4.3.c	4.2.e	4.4.a, 4.4.b		4.2.e	4.2.e
CSAP Frame.	4.2.5.a	4.2.1.d, 4.2.5.b, 4.2.5.c	4.4.1.a		4.2.5.b, 4.2.5.c	4.2.5.c
Jeffco PE	W&C 3a	W&C 3b	U 2c		W&C 3b	W&C 3b

Earth System Evolution – Changing Life – Chapter 3

This unit is supplemented with:

- time line construction and placement of major Earth events
- different models of the geologic time line

Big Idea:

3. Change through time produced Earth, the net result of constancy, gradual changes, and episodic changes over human, geological, and astronomical scales of times and space.
7. Dynamic environments and ecosystems are produced by the interaction of all the geospheres at the Earth’s surface, and include many different environments, ecosystems, and communities that affect one another and change through time.

	Activity 1 – The Fossil Record and Your Community	Activity 2 – North American Biomes	Activity 3 – Your Community and the Last Glacial Maximum	Activity 4 – The Mesozoic-Cenozoic Boundary Event	Activity 5 – How Different is Your Community Today from that of the Very Deep Past?
Key Evidence Learned Connection to:	- process of fossilization - why certain things become fossilized - where fossils form	- our communities biome - organisms have physical and chemical limits on where they can live - most common plants/animals in our community - how changes in physical and chemical conditions could change a biome - predictable relationships between where biomes occur	- pollen and spore data - forest coverage data - how our community has changed in the last 18,000 years - how climate change has affected plants/animals in our community	- how changes in climate have impacted organisms - organisms of today are different than those of the past - severe ecological conditions alter the history of life – extinction and recovery - similar body features are evolved	- plants/animals of the Phanerozoic - plants/animals of the deep past are very different from today - plants/animals that once lived in our community - geologic causes of population changes - lines of fossil evidence that supports the theory of evolution
Big Idea	- how organisms have been preserved	- how ecosystems are formed and changed	- how a local ecosystem has changed	- how life has changed over time	- how life has changed over time
Real Life and Chapter Challenge	- how and which organisms have been preserved	- what our biome is - how our biome has changed over time	- how our local ecosystem has changed - how plants/animals have changed	- how life has changed over time	- how life has changed over time
Geosphere	- where/how fossils form	- how physical conditions change biomes			- geologic causes of population change
Hydrosphere	- water environments for fossil formation				
Atmosphere					
Cryosphere					
Biosphere	- how organisms are preserved - which parts of organisms are preserved	- biomes - how biomes change - which plants/animals live in each biome	- how plants/animals have changed over time	- how life has changed over time	- how life has changed over time
State Standard	4.1.c				
Jeffco Standard	4.1.c				
CSAP Framework	4.1.3.g		4.1.3.g	4.1.3.g	4.1.3.g
Jeffco PE					