Grade 7: Natural processes and human activities shape Earth's web of life

Life Science	Earth and Space Science	Physical Science	ETS	Guiding Questions
Instruction Segment 1: Living and nonliving things are made up of atoms				
• Organisms are made of molecules made mostly of six different elements	• Earth materials are made mostly of eight different elements. • Earth has mineral, energy and water resources	• The interactions and motions of atoms explain properties of matter. • Thermal energy affects particle motion, temperature and physical state.		How does the matter in living and nonliving things differ? How does adding or removing thermal energy affect the physical states of matter? How do interactions at the atomic level help us understand the observable properties of organisms and nonliving matter?
	ESS3-1	PS1-1, PS1-3, PS1-4		
Instruction Segment 2: Matter cycles and energy flows in systems of all scales within the Earth systems				
• Organisms grow and get energy by rearranging atoms in food molecules.	• Earth's cycles of matter are driven by solar energy, Earth's internal thermal energy and by gravity.	• Chemical reactions make new substances, and can release or absorb thermal energy. • Mass is conserved in physical changes and chemical reactions.	• Design criteria • Evaluate solutions • Analyze data • Iteratively test & modify	How do rocks and minerals record the flow of energy and cycling of matter in the Earth How do we get energy from our food? How are hot objects different than cold objects? What changes when they heat up or cool down?
LS1-6, LS1-7	ESS2-1	PS1-2, PS1-5, PS1-6	ETS1-1, ETS1-2, ETS1-3, ETS1-4	
Instruction Segment 3: Natural processes and human activities have shaped Earth's resources and ecosystems				
• Matter cycles & energy flows among living and nonliving parts of ecosystems. • Resource availability affects organisms and ecosystem populations. • Ecosystems have common patterns of organism interactions.	• Fossils, rocks, continent shapes, and seafloor structures provide evidence of plate motions. • Geoscience processes unevenly distribute Earth's mineral, energy and groundwater resources.	• Chemical reactions make new substances. • Mass is conserved in physical changes and chemical reactions.		How can we use interactions between individual rocks or individual organisms to understand systems as big as the whole geosphere or whole ecosystem? How can use patterns in geosphere interactions to predict the location of resources? How can we use patterns in ecosystem interactions to predict how organisms compete and share resources?
LS2-1, LS2-2, LS2-3	ESS2-3, ESS3-1	PS1-2, PS1-3, PS1-5		
Instruction Segment 4: Human activities can help sustain biodiversity and ecosystem services in a changing world				
• Biotic and abiotic changes affect ecosystem populations. • Design solutions can help maintain biodiversity and ecosystem services.	• Geoscience processes change Earth's surface. • Damages from natural hazards can be reduced.	• Synthetic materials impact society.	• Design criteria • Evaluate solutions • Analyze data	What natural processes and human activities threaten biodiversity and ecosystem services? How can people help sustain biodiversity and ecosystem services in a changing world?
LS2-4, LS2-5	ESS2-2, ESS3-2	PS1-3	ETS1-1, ETS1-2	