PHASE IV EARTH SCIENCE CURRICULUM

Course 18000

Phase IV Science is a science program where seventh and eighth grade students will engage in learning from the three disciplines of science: earth science, life science, and physical science. The program engages students in three learning pathways: reading/writing, hands-on activities, and online content and activities. The Earth Science component of this series covers topics like: rocks and minerals, volcanos, earthquakes, plate tectonics, weathering and erosion, water, geologic time, energy resources, atmosphere, weather, climate, and the solar system.

PHASE IV EARTH SCIENCE OUTLINE:

Goals	Skills	Summative Assessments	Time Frame	Main Resources
 Identify the main types of landforms. Describe the rock cycle, including the three major types of rocks with characteristics and examples of each type. Explain the theory of plate tectonics including types of boundaries and the features associated with each. Explain how wind and water both cause erosion and deposition. Describe the major events in the different geologic eras. Describe the major features and processes that occur in both fresh and salt bodies of water. Explain how air masses and fronts cause different types of weather. Identify the factors that influence climate and describe how different combinations of these factors affect the environment. Describe the different bodies of our solar system and the universe including their characteristics. 	 Use models to explain scientific concepts and principles. Recognize and describe reoccurring patterns in the world around us. Use tools and equipment to make observations and gather scientific data. 	End of Chapter Tests	1-year	Pearson: Interactive Science- Earth Science

PHASE IV EARTH SCIENCE MAP:

TIME	BIG IDEAS	CONCEPTS	ESSENTIAL	STANDARDS	OBJECTIVES	DIFFERENTIA	ASSESSMEN
FRAME			QUESTIONS			TION	Т
FRAME Chapter 1- Introducing Earth (2-3 Weeks)	Lesson 1 • The Earth system has four main spheres: the atmosphere, hydrosphere, geosphere, and biosphere. • Constructive forces shape the land's surface by building up mountains and other landmasses. • Destructive forces destroy and wear away landmasses. Lesson 2 • Geologists have use two main types of evidence to learn about Earth's interior; direct evidence from rock samples and indirect evidence from seismic waves. • The three main layers of Earth are the crust, mantle, and core. Lesson 3 • There are three types of heat transfer; radiation, convection, and conduction. Lesson 4 • The three major types of landforms are	 The Earth System Earth's Interior Convection and the Mantle Exploring Earth's Surface Models of Earth Topographic Maps 	QUESTIONS Lesson 1- The Earth System • Identify and describe the main components of the Earth system. • Summarize the effects of constructive and destructive forces. Lesson 2- Earth's Interior • Explain how geologists learn about Earth's inner structures. • Identify the characteristics of Earth's crust, mantle, and core, and describe how temperature and pressure change inside Earth. Lesson 3- Convection and the Mantle • Explain how heat is transferred. • Describe convection currents in Earth's mantle. Lesson 4- Exploring Earth's Surface • Explain what the topography	 3.3.7.A1 Define basic features of the rock cycle. Describe the layers of the earth. Differentiate among the mechanisms by which heat is transferred through the Earth's system. 3.3.8.A3 Explain how matter on earth is conserved throughout the geological processes over time. S8.D.1.11 Explain the rock cycle as changes in the solid earth and rock types (igneous – granite, basalt, obsidian, pumice; sedimentary – limestone, sandstone, shale, coal; and metamorphic – slate, quartzite, marble, gneiss). 	Lesson 1- The Earth System Identify and describe the main components of the Earth system. Summarize the effects of constructive and destructive forces. Lesson 2- Earth's Interior Explain how geologists learn about Earth's inner structures. Identify the characteristics of Earth's crust, mantle, and core, and describe how temperature and pressure change inside Earth. Lesson 3- Convection and the Mantle Explain how heat is transferred. Describe convection currents in Earth's mantle. Lesson 4- Exploring Earth's Surface Explain what the topography of an area includes.	TION Students will be given the following: Preferential seating when applicable Study guides Guided notes when applicable Extended time for assignment when needed Separate testing environment when applicable.	T Daily assessments End of chapter exams Labs and classroom activities

Chapter 2 Minerals and Rocks	 plains, mountains, and plateaus. Lesson 5 Maps and globes are drawn to scale and use symbols to represent features on Earth's surface. Distances on earth are measured in degrees from the equator and the prime meridian. Lesson 6 Mapmakers use contour lines to show elevation, relief, and slope on topographic maps. Lesson 1 A mineral is a naturally 	 Properties of Minerals Classifying 	of an area includes. I dentify the main types of landforms. Lesson 5- Models of Earth Explain how maps and globes represent Earth's surface. Explain how distances on Earth can be measured using degrees. Identify latitude and longitude as reference lines that help locate points on Earth. Example 2 Example 4 Lesson 1 What is a mineral?	3.3.7.A1 Define basic features of the rock cycle.	 Identify the main types of landforms. Lesson 5- Models of Earth How do maps and globes represent Earth? How is distance measured in degrees? What are latitude and longitude. 	Students will be given the following:	Daily assessments
	 that can form by inorganic processes and that has a crystal structure and a definite chemical composition. Lesson 2 To study a rock sample, geologists observe the rock's mineral composition, color, and texture. Geologists have classified rocks into three major groups: igneous, 	 Igneous Rocks Sedimentary Rocks Metamorphic Rocks The Rock Cycle 	 minerals identified? Lesson 2 How do geologists classify rocks? Lesson 3 How do geologists classify igneous rocks? How are igneous rocks used? Lesson 4 How do sedimentary rocks form? What are the three major types of 	 Differentiate among the mechanisms by which heat is transferred through the Earth's system. 3.3.7.A2 Explain land use in relation to soil type and topography. 3.3.7.A3 Explain and give examples of how physical evidence, such as fossils and surface features of glaciation support theories that the Earth has evolved over geologic time. Compare geologic processes over time. 3.3.A Earth Structure, Processes and Cycles S7.D.1.1.2 	 minerals are identified. Explain how minerals form and where mineral sources are located. Lesson 2 List the characteristics used to identify rocks, and identify the three major groups of rocks. Lesson 3 Identify the characteristics used to identify igneous rocks. 	seating when applicable Study guides Guided notes when applicable Extended time for assignment when needed Separate testing environment when applicable.	chapter exams Labs and classroom activities

	 metamorphicand sedimentary Lesson 3 Igneous rocks are classified by their origin, texture, and mineral composition. Lesson 4 Most sedimentary rocks are formed through a sequence of processes. Lesson 5 Any rock that forms from another rock as a result of changes in heat or pressure is a metamorphic rock. Lesson 6 The rock cycle is a series of processes that occur on Earth's surface and in the curst and mantle that slowly change rocks from one kind to another. 		sedimentary rocks? How are sedimentary rocks used? Lesson 5 What are metamorphic rocks? Lesson 6 What is the rock cycle?	Explain how fossils are formed and how they can provide evidence about plants and animals that once lived on Earth.	 Describe ways in which igneous rocks are used. Lesson 4 Describe how sedimentary rocks form. List and describe the three major types of sedimentary rocks. Lesson 5 Describe the conditions under which metamorphic rocks form. Lesson 6 Describe the rock cycle. 		
Chapter 3 Plate Tectonics (2 Weeks)	 Lesson 1 Alfred Wegener proposed that all the continents were once joined together in a single landmass and have since drifted apart. Lesson 2 Mid-ocean ridges form long chains of mountains that rise up from the ocean floor. 	 Drifting Continents Sea-floor spreading Theory of Plate Tectonics 	Lesson 1 • What was Wegener's hypothesis about the continents? Lesson 2 • What are mid- ocean ridges? • What is sea- floor spreading? • What happens at deep ocean trenches? Lesson 3	 3.2.7.B3 Differentiate among convection, conduction, and radiation. Explain why heat energy consists of the random motion and vibrations of the particles of matter. 3.3.7.A1 Define basic features of the rock cycle. Describe the layers of the earth. Differentiate among the mechanisms by which heat is transferred through the Earth's system. 	Lesson 1 • Explain Alfred Wegener's hypothesis about the continents, evidence supporting the hypothesis, and why the hypothesis was rejected. Lesson 2 • Define and describe mid- ocean ridges.	Students will be given the following: Preferential seating when applicable Study guides Guided notes when applicable Extended time for assignment when needed	Daily assessments End of chapter exams Labs and classroom activities

L •	 Part the ocean floor sinks back into the mantle at deep ocean trenches. Lesson 3 The theory of plate tectonics states that Earth's plates are in slow, constant motion, driven by convection currents in the mantle. 		What is the theory of plate tectonics?	 3.3.7.A3 Explain and give examples of how physical evidence, such as fossils and surface features of glaciation support theories that the Earth has evolved over geologic time. Compare geologic processes over time. S7.D.1.1.1 Identify and describe soil characteristics (i.e., particle size, porosity, and permeability) of different biomes. S7.D.1.1.2 Explain how fossils are formed and how they can provide evidence about plants and animals that once lived on Earth. 	 Explain how sea-floor spreading affects Earth's crust. Explain deep- ocean trenches and the process of subduction. Lesson 3 Explain the theory of plate tectonics. 	Separate testing environment when applicable.	
Earthquakes (2Weeks)	 Lesson 1 Tension, compression, and shearing work over millions of years to change the shape and volume of rock. Lesson 2 Seismic waves are vibrations that are similar to sound waves. They travel through Earth carrying energy released by an earthquake. Geologists use seismic waves to locate an earthquakes epicenter. Lesson 3 Maps showing earthquakes show that earthquakes often occur along plate boundaries. 	 Forces in Earth's crust Earthquakes and Seismic Waves Monitoring Earthquakes 4. 	 Lesson 1 How does stress change Earth's crust? How do faults form? How does plate movement create new landforms? Lesson 2 What are seismic waves? How are earthquakes measured? How is an epicenter located? Lesson 3 How do seismographs work? What patterns do seismograph data reveal? 	S8.D.1.1.2 Describe natural processes that change Earth's surface (e.g., landslides, volcanic eruptions, earthquakes, mountain building, new land being formed, weathering, erosion, sedimentation, soil formation).	 Lesson 1 Explain how stress in the crust changes Earth's surface. Describe the three major types of faults. Compare and contrast the land features that result from plate movement. Lesson 2 Describe how the energy of an earthquake travels through Earth. Identify the scales used to measure the strength of an earthquake. Explain how scientists locate the epicenter of an earthquake. Lesson 3 Explain how seismographs work. 	Students will be given the following: Preferential seating when applicable Study guides Guided notes when applicable Extended time for assignment when needed Separate testing environment when applicable.	Daily assessments End of chapter exams Labs and classroom activities

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Explain the effect of wind patterns,
circulation of oceans currents, atmospheric
pressure, and temperature on weather.
\$7.D.2.1.2
Describe changes in atmospheric
conditions associated with various weather
patterns.
S8.A.3.2.1
Describe how scientists use models to
explore relationships in natural systems
(e.g., an ecosystem, river system, the solar
system).
S8.A.3.2.2
Describe how engineers use models to
develop new and improved technologies to
solve problems.
S8.A.3.2.3
Given a model showing simple cause and-
effect relationships in a natural system,
predict results that can be used to test the
assumptions in the model (e.g.,
photosynthesis, water cycle, diffusion,
infiltration).
S8.B.3.3.1
Explain how human activities may affect
local, regional, and global environments.
\$8.B.3.3.2
Explain how renewable and nonrenewable
resources provide for human needs (i.e.,
energy, food, water, clothing, and shelter).
S8.B.3.3.3
Describe how waste management affects
the environment (e.g., recycling,
composting, landfills, incineration, sewage
treatment).
S8.B.3.3.4
Explain the long-term effects of using
integrated pest management (e.g.,
herbicides, natural predators, biogenetics)
on the environment.
S8.D.1.1.1
Explain the rock cycle as changes in the
solid earth and rock types (igneous –

Chapter 6 Weathering and Soil (1-2 Weeks)	Lesson 1 • Erosion works continuously to weather and	 Rocks and Weathering How soil forms 	Lesson 1 • What processes wear down and	 granite, basalt, obsidian, pumice; sedimentary – limestone, sandstone, shale, coal; and metamorphic – slate, quartzite, marble, gneiss). S8.D.1.1.2 Describe natural processes that change Earth's surface (e.g., landslides, volcanic eruptions, earthquakes, mountain building, new land being formed, weathering, erosion, sedimentation, soil formation). S8.D.1.1.3 Identify soil types (i.e., humus, topsoil, subsoil, loam, loess, and parent material) and their characteristics (i.e., particle size, porosity, and permeability) found in different biomes and in Pennsylvania, and explain how they formed. S8.D.1.1.4 Explain how fossils provide evidence about plants and animals that once lived throughout Pennsylvania's history (e.g., fossils provide evidence of different environments). S8.D.2.1.1 Explain the impact of water systems on the local weather or the climate of a region (e.g., lake effect snow, land/ocean breezes). S8.D.2.1.2 Identify how global patterns of atmospheric movement influence regional weather and climate. S8.D.2.1.3 Identify how cloud types, wind directions, and barometric pressure changes are associated with weather patterns in different regions of the country. 3.3.7.A1 Define basic features of the rock cycle. Describe the layers of the earth. 	Lesson 1 • Describe the processes that wear down and	Students will be given the following: Preferential	Daily assessments End of
(1-2 Weeks)	weather and carry away rocks at Earth's surface. Lesson 2	forms 3. Soil Conservation	wear down and build up Earth's surface?What are the different types	Describe the layers of the earth. Differentiate among the mechanisms by which heat is transferred through the Earth's system.	wear down and build up Earth's surface.Identify the causes of the	Preferential seating when applicable Study guides	End of chapter exams

 Soil is a mixture	of mass	3.3.8.A1	different types of	Guided notes	Labs and
of rock particles,	movement?	Distinguish between physical and chemical	mass	when	classroom
	Lesson 2	weathering.	movement.	applicable	activities
minerals,	How does	weathering.	Lesson 2	applicable	activities
decayed organic		Compare and contrast the types of energy		Extended time	
material, water,	moving water	that drive Earth's systems.	Explain how		
and air.	cause erosion?	that unve Earth's systems.	moving water	for assignment when needed	
Lesson 3	What land	3.3.8.A3	causes erosion.	when heeded	
The value of soil	features are		Describe some	Conorata	
is reduced when	formed by	Explain how matter on earth is conserved	of the land	Separate	
soil loses its	water erosion	throughout the geological processes over	features that are	testing	
fertility or when	and	time.	formed by water	environment	
topsoil is lost due	deposition?	S9 A 2 2 4	erosion and	when	
to erosion.	Lesson 3	S8.A.3.2.1 Describe how scientists use models to	deposition.	applicable.	
	How do		Lesson 3		
	glaciers form	explore relationships in natural systems	 Explain how 		
	and move?	(e.g., an ecosystem, river system, the solar	glaciers form		
	How do	system).	and move.		
	glaciers cause	59 4 2 2 2	 Explain how 		
	erosion and	S8.A.3.2.2	glaciers cause		
	deposition?	Describe how engineers use models to	erosion and		
	Lesson 4	develop new and improved technologies to	deposition.		
	 How do waves 	solve problems.	Lesson 4		
	cause erosion	S8.A.3.2.3	 Explain how 		
	and	Given a model showing simple cause and-	glaciers form		
	deposition?	effect relationships in a natural system,	and move.		
	Lesson 5	predict results that can be used to test the	 Explain how 		
	 How does wind 	assumptions in the model (e.g.,	glaciers cause		
	cause erosion	photosynthesis, water cycle, diffusion,	erosion and		
	and	infiltration).	deposition.		
	deposition?		Lesson 5		
		S8.B.3.3.1	 Describe how 		
		Explain how human activities may affect	ocean waves		
		local, regional, and global environments.	cause erosion		
		iocal, regional, and global environments.	and deposition.		
		S8.B.3.3.2	Lesson 6		
		Explain how renewable and nonrenewable	 Explain how 		
		resources provide for human needs (i.e.,	wind causes		
		energy, food, water, clothing, and shelter).	erosion and		
			deposition.		
		S8.B.3.3.3			
		Describe how waste management affects			
		the environment (e.g., recycling,			
		composting, landfills, incineration, sewage			
		treatment).			
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		S8.B.3.3.4			
		Explain the long-term effects of using			
		integrated pest management (e.g.,			
		herbicides, natural predators, biogenetics)			
		on the environment.			
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				S8.D.1.1.1 Explain the rock cycle as changes in the solid earth and rock types (igneous – granite, basalt, obsidian, pumice; sedimentary – limestone, sandstone, shale, coal; and metamorphic – slate, quartzite, marble, gneiss).			
				S8.D.1.1.2 Describe natural processes that change Earth's surface (e.g., landslides, volcanic eruptions, earthquakes, mountain building, new land being formed, weathering, erosion, sedimentation, soil formation).			
				S8.D.1.1.3 Identify soil types (i.e., humus, topsoil, subsoil, loam, loess, and parent material) and their characteristics (i.e., particle size, porosity, and permeability) found in different biomes and in Pennsylvania, and explain how they formed.			
				S8.D.1.1.4 Explain how fossils provide evidence about plants and animals that once lived throughout Pennsylvania's history (e.g., fossils provide evidence of different environments).			
				S8.D.2.1.1 Explain the impact of water systems on the local weather or the climate of a region (e.g., lake effect snow, land/ocean breezes).			
				S8.D.2.1.2 Identify how global patterns of atmospheric movement influence regional weather and climate.			
				S8.D.2.1.3 Identify how cloud types, wind directions, and barometric pressure changes are associated with weather patterns in different regions of the country.			
Chapter 7 Erosion and Deposition (1-2 Weeks)	 Lesson 1 Weathering, erosion, and deposition act together in a 	 Mass movement water erosion glacial erosion 	Lesson 1 • What processes wear down and build up	3.3.7.A1 Define basic features of the rock cycle. Describe the layers of the earth.	Lesson 1 • Describe the processes that wear down and	Students will be given the following: Preferential seating when applicable	Daily assessments End of chapter exams

Г	cycle that wears	4. wave erosion	Earth's	Differentiate among the mechanisms by	build up Earth's		
	down and builds	5. wind erosion	surface?	which heat is transferred through the	surface.	Study guides	Labs and
	up Earth's	o. wind crosion	What are the	Earth's system.	 Identify the 	Olddy galaco	classroom
	surface.		different types	3.3.8.A1	causes of the	Guided notes	activities
	Lesson 2		of mass	0.0.0.711	different types	when	douvidos
	 Moving water is 		movement?	Distinguish between physical and chemical	of mass	applicable	
	the major agent		Lesson 2	weathering.	movement.	applicable	
	of the erosion		 How does 	weathering.	Lesson 2	Extended time	
	that has shaped			Compare and contrast the types of energy	 Explain how 	for assignment	
	Earth's land		moving water	that drive Earth's systems.	 Explain now moving water 	when needed	
	surface.		cause erosion?		causes	when hecded	
	Lesson 3			3.3.8.A3	erosion.	Separate	
	Continental			Explain how matter on earth is conserved	 Describe some 	testing	
	glaciers can flow		features are	throughout the geological processes over	 Describe some of the land 	environment	
	in all directions		formed by	time.	features that	when	
	as they move.		water erosion			applicable.	
	 Glaciers can 		and deposition?	S8.A.3.2.1	are formed by water erosion	~pp.100.0101	
	form only in an		Lesson 3	Describe how scientists use models to	and deposition.		
	area where		 How do 	explore relationships in natural systems	Lesson 3		
	more snow falls		glaciers form	(e.g., an ecosystem, river system, the solar	 Explain how 		
	than melts.		and move?	system).	glaciers form		
	Lesson 4		How do		and move.		
	Waves shape		glaciers cause	S8.A.3.2.2	 Explain how 		
	the coast		erosion and	Describe how engineers use models to	glaciers cause		
	through erosion		deposition?	develop new and improved technologies to	erosion and		
	by breaking		Lesson 4	solve problems.	deposition.		
	down rock and		How do		Lesson 4		
	moving sand		waves cause	S8.A.3.2.3	 Explain how 		
	and other		erosion and	Given a model showing simple cause and-	glaciers form		
	sediment.		deposition?	effect relationships in a natural system,	and move.		
	Lesson 5		Lesson 5	predict results that can be used to test the	 Explain how 		
	 Wind erosion 		How does	assumptions in the model (e.g.,	glaciers cause		
	and deposition		wind cause	photosynthesis, water cycle, diffusion,	erosion and		
	may form sand		erosion and	infiltration).	deposition.		
	dunes and loess		deposition.		Lesson 5		
	deposits,			S8.B.3.3.1	 Describe how 		
	acpeene,			Explain how human activities may affect	ocean waves		
				local, regional, and global environments.	cause erosion		
					and deposition.		
				S8.B.3.3.2	Lesson 6		
				Explain how renewable and nonrenewable	 Explain how 		
				resources provide for human needs (i.e.,	wind causes		
				energy, food, water, clothing, and shelter).	erosion and		
					deposition.		
				S8.B.3.3.3	aopoolion.		
				Describe how waste management affects			
				the environment (e.g., recycling,			
				composting, landfills, incineration, sewage			
				treatment).			
				S8.B.3.3.4			
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	Explain the long-term effects of using integrated pest management (e.g., herbicides, natural predators, biogenetics) on the environment.		
	S8.D.1.1.1 Explain the rock cycle as changes in the solid earth and rock types (igneous – granite, basalt, obsidian, pumice; sedimentary – limestone, sandstone, shale, coal; and metamorphic – slate, quartzite, marble, gneiss).		
	S8.D.1.1.2 Describe natural processes that change Earth's surface (e.g., landslides, volcanic eruptions, earthquakes, mountain building, new land being formed, weathering, erosion, sedimentation, soil formation).		
	S8.D.1.1.3 Identify soil types (i.e., humus, topsoil, subsoil, loam, loess, and parent material) and their characteristics (i.e., particle size, porosity, and permeability) found in different biomes and in Pennsylvania, and explain how they formed.		
	S8.D.1.1.4 Explain how fossils provide evidence about plants and animals that once lived throughout Pennsylvania's history (e.g., fossils provide evidence of different environments).		
	S8.D.2.1.1 Explain the impact of water systems on the local weather or the climate of a region (e.g., lake effect snow, land/ocean breezes).		
	S8.D.2.1.2 Identify how global patterns of atmospheric movement influence regional weather and climate.		
	S8.D.2.1.3 Identify how cloud types, wind directions, and barometric pressure changes are associated with weather patterns in different regions of the country.		

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Chapter 8 A	Lesson 1	1. Fossils	Lesson 1	3.3.7.A1	Lesson 1	Students will	Daily
Trip Through	The fossil record	2. The Relative	What are	Define basic features of the rock cycle.	 Explain how 	be given the	assessments
Geologic	provides	age of rocks	fossils?	- - - - - - - - -	fossils form.	following:	
Time	evidence about	3. Radioactive	 What are the 	Describe the layers of the earth.	 Identify the 	Preferential	End of
(2-3 Weeks)	the history of life	Dating	kinds of		different kinds of	seating when	chapter
	and past	4. Geologic	fossils?	Differentiate among the mechanisms by	fossils.	applicable	exams
	environments on	Time Scale	 What do fossils 	which heat is transferred through the	 Describe what 		
	Earth.	5. Early Earth	show?	Earth's system.	fossils tell about	Study guides	Labs and
	Lesson 2	Eras of	Lesson 2		organisms and		classroom
	 According to the 	Earth's	 How old are 	3.3.8.A3	environments of	Guided notes	activities
	law of	History	rock layers?	Explain how matter on earth is conserved	the past.	when	
	superposition, in		How can rock	throughout the geological processes over	Lesson 2	applicable	
	undisturbed		layers change?	time.	 Describe how 		
	horizontal		Lesson 3		geologists	Extended time	
	sedimentary rock		What is	S8.A.3.2.1	determine the	for assignment	
	layers the oldest		radioactive	Describe how scientists use models to	relative age of	when needed	
	layer is at the		decay?	explore relationships in natural systems	rocks.		
	bottom. Each		What is	(e.g., an ecosystem, river system, the solar	 Explain how 	Separate	
	higher layer is		radioactive	system).	unconformities	testing	
	younger than the		dating?		and folding can	environment	
	layers below it.		Lesson 4	S8.D.1.1.2	alter the order of	when	
	Lesson 3		What is the	Describe natural processes that change	rocks.	applicable.	
	 In radioactive 			Earth's surface (e.g., landslides, volcanic	Lesson 3		
	dating, scientists		geologic time scale?	eruptions, earthquakes, mountain building,	 Explain what 		
	first determine		Lesson 5	new land being formed, weathering,	happens during		
	the amount of			erosion, sedimentation, soil formation).	radioactive		
	radioactive		How did Earth		decay.		
	element in a rock		form?	S8.D.1.1.3	 Describe what 		
	and compare it		Lesson 6	Identify soil types (i.e., humus, topsoil,	can be learned		
	with the amount		What	subsoil, loam, loess, and parent material)			
	of a stable		happened in	and their characteristics (i.e., particle size,	from radioactive		
	element into		the Paleozoic	porosity, and permeability) found in	dating. Lesson 4		
	which the		Era?	different biomes and in Pennsylvania, and			
	radioactive		What	explain how they formed.	 Explain how and 		
	element decays.		happened in		why the		
	Lesson 4		the Mesozoic		geologic time		
	Because the time		Era?		scale is used to		
	span of Earth's		 What 		show Earth's		
	past is so great,		happened in		history. Lesson 5		
	geologists use		the Cenozoic				
	the geologic time		Era?		 Explain how 		
	scale to show				Earth developed		
	Earth's history.				during		
	Lesson 5				Precambrian		
	 Scientists think 				time.		
	that Earth began				Lesson 6		
	as a ball of dust,				Describe the		
	rock, and ice in				major events in		
	space. Gravity				the Paleozoic		
	pulled this mass				Era.		
	together.				 Describe the 		
	iogeniei.				major events in		

	Lesson 6 • Earth's history is broken up into				the Mesozoic Era. • Describe the		
	different eras.				Describe the major events in the Cenozoic Era.		
Chapter 9 Energy Sources (1-2 Weeks)	 Lesson 1 Three major fossil fuels are coal, oil, and natural gas. Since fossil fuels take hundreds of millions of years to form, they are considered nonrenewable resources. Lesson 2 Renewable sources of energy include sunlight, water, wind, nuclear power, biomass fuels, geothermal energy, and hydrogen. Lesson 3 One way to preserve our current energy resources is to increase the efficiency of our energy use. 	 Fossil fuels Alternative Sources of Energy Energy Use and Conservation 	 Lesson 1 What are the three major fossil fuels? Why are fossil fuels? Why are fossil fuels nonrenewable resources? Lesson 2 What are some renewable sources of energy? How does a nuclear power plant produce electricity? Lesson 3 How has energy use changed over time? How can we ensure there will be enough energy for the future? 	 3.3.7.A1 Define basic features of the rock cycle. Describe the layers of the earth. Differentiate among the mechanisms by which heat is transferred through the Earth's system. 3.3.8.A2 Describe renewable and nonrenewable energy resources. 3.3.8.A3 Explain how matter on earth is conserved throughout the geological processes over time. S8.B.3.3.2 Explain how renewable and nonrenewable resources provide for human needs (i.e., energy, food, water, clothing, and shelter). S8.D.1.1.1 Explain the rock cycle as changes in the solid earth and rock types (igneous – granite, basalt, obsidian, pumice; sedimentary – limestone, sandstone, shale, coal; and metamorphic – slate, quartzite, marble, gneiss).	 Lesson 1 Name the three major fossil fuels. Explain why fossil fuels are considered nonrenewable. Lesson 2 Identify and describe various renewable sources of energy. Explain how a nuclear power plant produces electricity. Lesson 3 Explain how human energy use has changed over time. Name ways to ensure that there will be enough energy for the future. 	Students will be given the following: Preferential seating when applicable Study guides Guided notes when applicable Extended time for assignment when needed Separate testing environment when applicable.	Daily assessments End of chapter exams Labs and classroom activities
Chapter 10 Water (2-3 Weeks0	 Lesson 1 All living things need water in order to carry out their body processes. In addition, many living things live in water. In the water cycle, water continuously moves from Earth's surface to the atmosphere 	 Water on Earth Surface Water Water Underground Exploring the Ocean Wave Action Currents and Climate. 	 Lesson 1 Why is water important? Where is water found? What is the water cycle? Lesson 2 What is a river system? What are ponds and lakes? How can lakes change? 	 3.3.7.A4 Differentiate among Earth's water systems. Describe the motions of tides and identify their causes. 3.3.8.A4 Explain how the oceans form one interconnected circulation system powered by wind, tides, the Earth's rotation, and water density differences. 3.3.8.A5 Explain how the curvature of the earth contributes to climate. 	 Lesson 1 Describe how Earth's water is distributed. State how people and other living things use water. Explain how Earth's water movers through the water cycle. Lesson 2 	Students will be given the following: Preferential seating when applicable Study guides Guided notes when applicable	Daily assessments End of chapter exams Labs and classroom activities

T	and back, driven	Lesson 3		Tell what a river	Extended time
	by the energy	How does	Compare and contrast water vapor, clouds,	system is.	for assignment
	from the sun and	water move	and humidity.	 Explain how 	when needed
	gravity.	underground?	······································	ponds and lakes	
	Lesson 2	 How do people 	S7.D.1.2.1	form.	Separate
	A river and all the	use	Compare the different water systems on	 Describe the 	testing
	streams and	groundwater?	Earth (e.g., wetland, watershed, ocean,	changes that	environment
	smaller rivers that	Lesson 4	river).	occur in ponds	when
	flow into it make	How do		and lakes.	applicable.
	up a river system.	conditions vary	S7.D.1.2.3	Lesson 3	approable
	Lesson 3	in Earth's	Describe the importance of water systems	 Describe how 	
	Precipitation	oceans?	on the diversity and distribution of life on	 Describe now water moves 	
	infiltrates the		Earth.		
	ground and	What are some	Earth	underground	
	becomes	features of the	S8.D.2.1.1	through layers	
		ocean floor?	Explain the impact of water systems on the	of soil and rock.	
	groundwater.	Lesson 5	local weather or the climate of a region	Explain how	
	People obtain groundwater for	How do waves	(e.g., lake effect snow, land/ocean	people obtain	
	groundwater for	form and	breezes).	water from an	
	their use by	change?	bioo200j.	aquifer.	
	drilling a well.	How do waves		Lesson 4	
	Lesson 4	affect the		 Identify 	
	The water in	shore?		characteristics	
	Earth's oceans	Lesson 6		of the ocean	
	varies in salinity,	 What causes 		and ocean	
	temperature, and	surface		water.	
	pressure.	currents?		 Identify the 	
	Lesson 5	 What causes 		features and	
	 Most waves form 	deep currents?		main sections of	
	when winds			the ocean floor.	
	blowing over the			Lesson 5	
	water's surface			 Explain how 	
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	Lesson 6			characteristics	
	The Coriolis			of waves.	
	Effect causes			 Describe how 	
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	in a clockwise			shorelines and	
	rotation in the			beaches.	
	Northern			Lesson 6	
	Hemisphere and			 Identify what 	
	а			causes surface	
	counterclockwise			currents and	
	rotation in the			explain how	
	Southern			surface currents	
	Hemisphere.			affect climate.	
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sun travels toto the Sun'shappens to theEarth in the formenergy when itSun's energy inof visible lightreaches Earth?the atmosphereand infraredLesson 5and at Earth'sradiation. A• How issurface.smaller amounttemperatureLesson 5arrives asmeasured?• Describe howultraviolet• How is heattransferred?radiation.• Lesson 6• Describe how		energy from the						
Earth in the form of visible light and infrared radiation. A smaller amount arrives as ultraviolet radiation.energy when it reaches Earth? Lesson 5Sun's energy in the atmosphere and at Earth's surface. Lesson 5Amount arrives as ultraviolet radiation.• How is temperature measured?Sun's energy in the atmosphere and at Earth's surface.• How is temperature radiation.• How is temperature measured?Lesson 5• Some sunlight is• How is heat transferred?• Describe how temperature is measured.• Some sunlight isLesson 6• Describe how temperature is measured.		sun travels to						
of visible light and infrared radiation. A smaller amount arrives as ultraviolet radiation.reaches Earth? Lesson 5 • How is temperature measured?the atmosphere and at Earth's surface. Lesson 5 • Describe how temperature is measured.• How is temperature ultraviolet radiation.• How is temperature measured?• Describe how temperature is measured.• Some sunlight isLesson 6• Describe how temperature measured.								
and infrared Lesson 5 and at Earth's radiation. A • How is surface. smaller amount temperature Lesson 5 arrives as measured? • Describe how ultraviolet • How is heat temperature is radiation. transferred? measured. • Some sunlight is Lesson 6 • Describe how		of visible light						
radiation. A • How is surface. smaller amount temperature Lesson 5 arrives as measured? • Describe how ultraviolet • How is heat temperature is radiation. transferred? measured. • Some sunlight is Lesson 6 • Describe how								
smaller amount arrives as ultraviolet radiation. temperature measured? Lesson 5 • Describe how temperature is measured. • Some sunlight is Lesson 6		radiation. A						
arrives as measured? • Describe how ultraviolet • How is heat temperature is radiation. transferred? measured. • Some sunlight is Lesson 6 • Describe how								
ultraviolet • How is heat temperature is radiation. transferred? measured. • Some sunlight is Lesson 6 • Describe how						 Describe how 		
radiation. transferred? measured. • Some sunlight is Lesson 6 • Describe how								
Some sunlight is Lesson 6 Describe how								
				Lesson 6		 Describe how 		
absorbed or • What causes heat is								
reflected by the winds? transferred.								
atmosphere Lesson 6		atmosphere						

Chapter 12 Weather (2-3 Weeks)	before it can reach the Earth's surface. The rest passes through to the surface. Lesson 5 • Heat is transferred in three ways: convection, conduction, and radiation. Lesson 6 • Winds are caused by differences in air pressure are caused by the unequal heating of the atmosphere. Lesson 1 • In the water cycle, water vapor enters the atmosphere through evaporation and	 Water in the atmosphere Clouds Precipitation Air masses Storms Predicting 	 How do local winds and global winds differ? Lesson 1 How does water move through the atmosphere? What is relative humidity and 	3.3.7.A5 Describe basic elements of meteorology. Explain the relationship between the energy provided by the sun and the temperature differences among water, land and atmosphere.	 Explain how scientists describe and explain winds. Distinguish between local winds and global winds and identify major global wind belts. Lesson 1 Describe how water moves to and from the atmosphere during the water cycle. 	Students will be given the following: Preferential seating when applicable	Daily assessments End of chapter exams
	 leaves condensation. Lesson 2 Clouds form when water vapor in the air condenses to form liquid water or ice crystals. Lesson 3 Common types of precipitation include rain, 	the weather	 how is it measured? Lesson 2 How do clouds form? What are the three main types of clouds? Lesson 3 What are common types of 	 3.3.7.A6 MODELS/SCALES Describe the scales involved in characterizing Earth and its atmosphere. MODELS/SCALES Create models of Earth's common physical features. S7.D.1.1.2 Explain how fossils are formed and how they can provide evidence about plants and animals that once lived on Earth. 	 Describe humidity and how it is measured. Lesson 2 Explain how clouds form. Name the three main types of clouds. Lesson 3 Identify the common types 	Study guides Guided notes when applicable Extended time for assignment when needed Separate testing environment	Labs and classroom activities
	 sleet, freezing rain, snow, and hail. Lesson 4 Four major types of air masses influence the weather in North 		 precipitation? What are the causes and effects of floods and droughts? Lesson 4 	S7.D.1.2.1 Compare the different water systems on Earth (e.g., wetland, watershed, ocean, river). S7.D.2.1.1	of precipitation. • Describe floods and droughts and their effects. Lesson 4 • Identify the major air masses that	when applicable.	

	America			Eveloin the offect of winds at a stars			I
	America;		What are the	Explain the effect of wind patterns,	affect the weather in North		
	maritime polar,		major air	circulation of oceans currents, atmospheric	America and		
	maritime tropical,		masses?	pressure, and temperature on weather.			
	continental polar,		What are the	S7.D.2.1.2	describe how		
	and continental		main types of		they move.		
	tropical. Lesson 5		fronts?	Describe changes in atmospheric conditions associated with various weather	Name the main		
			 What weather 		types of fronts.		
	 A storm is a violant 		do cyclones	patterns.	Explain the type		
	violent		and		of weather that		
	disturbance in the		anticyclones		is associated		
	atmosphere. Lesson 6		bring?		with cyclones		
			Lesson 5		and		
	Meteorologists		How do the		anticyclones.		
	use maps, charts, computers, and		different types		Lesson 5		
	other technology		of storms		List the main		
	to make weather		form?		kinds of storms		
	forecasts.		How can you		and explain how		
	101000313.		stay safe in a		they form.Describe		
			storm?		 Describe measures that 		
			Lesson 6		can be taken to		
			How do you		ensure safety in		
			predict the		a storm.		
			weather?		Lesson 6		
			What can you		Explain how		
			learn from		weather		
			weather maps?		forecasts use		
					observations,		
					data, and		
					technology to		
					predict the		
					weather.		
Chapter 13	Lesson 1	1. What causes	Lesson 1	3.3.7.A5	Lesson 1	Students will	Daily
Climate and	 Temperature is 	climate?	 What factors 	Describe basic elements of meteorology.	 Identify the 	be given the	assessments
Climate	affected by	2. Climate	affect	Explain the relationship between the	factors that	following:	
Change	latitude, altitude,	regions	temperature?	energy provided by the sun and the	influence	Preferential	End of
(1-2 Weeks)	distance from	3. Changes in	 What factors 	temperature differences among water, land	temperature.	seating when	chapter
, , ,	large bodies of	climate	affect	and atmosphere.	 Identify factors 	applicable	exams
	water, and ocean	4. Human	precipitation?	·	that influence		
	currents.	activities and	Lesson 2	3.3.7.A6	precipitation.	Study guides	Labs and
	Lesson 2	climate	How do	MODELS/SCALES	Lesson 2		classroom
	 Scientists classify 		scientists	Describe the scales involved in	 Identify factors 	Guided notes	activities
	climates		classify	characterizing Earth and its atmosphere.	used to define	when	
	according to two		climates?		climates.	applicable	
	major factors:		 What are the 	MODELS/SCALES	Describe the six		
	temperature and		six main	Create models of Earth's common physical	main climate	Extended time	
	precipitation.		climate	features.	regions.	for assignment	
	Lesson 3		regions?		Lesson 3	when needed	
	Possible		Lesson 3	S7.D.1.1.1	 Explain the 		
1 1	and a set and fair		I			Separate	
1 I	explanations for major climate		 How do 		principle that	testing	

	 changes include movement of the continents, variations in the position of Earth relative to the Sun, major volcanic eruptions, and changes in the Sun's energy output. Lesson 4 Many human activities are increasing the level of greenhouse gases in the atmosphere and producing changes in climate worldwide. This increase is causing global temperatures to rise. 		ancient climates? • What natural factors can cause climate change? Lesson 4 • How are human activities affecting Earth's climate?	Identify and describe soil characteristics (i.e., particle size, porosity, and permeability) of different biomes. S7.D.1.1.2 Explain how fossils are formed and how they can provide evidence about plants and animals that once lived on Earth. S7.D.1.2.1 Compare the different water systems on Earth (e.g., wetland, watershed, ocean, river). S7.D.1.2.2 Compare biotic and abiotic features of freshwater and saltwater systems. S7.D.1.2.3 Describe the importance of water systems on the diversity and distribution of life on Earth. S7.D.2.1.1 Explain the effect of wind patterns, circulation of oceans currents, atmospheric pressure, and temperature on weather. S7.D.2.1.2 Describe changes in atmospheric conditions associated with various weather patterns.	in studying ancient climates. Identify natural factors that can cause climate change. Lesson 4 Explain how human activities are affecting the temperature of the atmosphere	environment when applicable.	
Chapter 14 Earth, Moon, and Sun (2-3 Weeks)	 Lesson 1 A constellation is a pattern or group of stars that people imagined to represent a figure, animal, or object. Lesson 2 Earth moves in space in two major ways; rotation and revolution. Lesson 3 The strength of the force of gravity between 	 The sky from Earth Earth in space Gravity and motion Phases and eclipses Tides Earth's moons 	 Lesson 1 What can you see in the night sky? How do objects in the sky appear to move? Lesson 2 How does Earth move? What causes seasons? Lesson 3 What determines the gravity? 	 3.3.7.B1 Explain how gravity is the major force in the formation of the planets, stars, and the solar system. Describe gravity as a major force in determining the motions of planets, stars, and the solar system. Compare and contrast properties and conditions of objects in the solar system to those on Earth. 3.3.7.B2 SCALE AND MEASUREMENT Identify a variety of instruments used to gather evidence about the universe. PATTERNS 	 Lesson 1 Identify objects and constellations visible without a telescope in the night sky. Describe the apparent motions of stars and planets throughout the year. Lesson 2 Demonstrate how Earth moves in space. Explain what causes the cycle 	Students will be given the following: Preferential seating when applicable Study guides Guided notes when applicable Extended time for assignment when needed Separate testing environment	Daily assessments End of chapter exams Labs and classroom activities

two objects depends on two factors; the masses of the objects and the distance between them. Lesson 4 • The changing relative positions of the moon, Earth, and sun cause the phases of the moon.	ts in Earth-Moon systems. 4 causes SCALE Relate planetar solar system us are model. ses? 3.3.7.B3 Understand h Identify quest through scientifie evaluate the ap Design and c investigations. Describe relat and prediction. Use approprition to gather, analy understand that allows scientists results of invest Develop desce models using et that these empt logically consists based on scient theories. Analyze alter understanding ti through legitimat Use mathematics Scientific inquiry Understand to the scientific inquiry Understand to the methods, or pro- or new technoloc collection. 3.3.8.B1 Explain how light	y size and distance in our ing an appropriate scale now theories are developed. tions that can be answered ic investigations and propriateness of questions. conduct a scientific id understand that current edge guides scientific ationships using inference ate tools and technologies ize, and interpret data and it it enhances accuracy and is to analyze and quantify tigations. criptions, explanations, and vidence and understand hasize evidence, have tent arguments, and are tific principles, models, and mative explanations and hat science advances ate skepticism. atics in all aspects of	of seasons on Earth. Lesson 3 Identify what determines the strength of the force of gravity between two objects. Describe two factors that keep the moon and Earth in orbit. Lesson 4 Explain what causes the phases of the moon. Describe solar and lunar eclipses.	when applicable.	
	Explain how ligh be used to class 3.3.8.B2 SCALE AND M Explain measur				

	Compare and contrast scientific theories.	
	Know that both direct and indirect	
	observations are used by scientists to	
	study the natural world and universe.	
	Identify questions and concepts that	
	guide scientific investigations.	
	Formulate and revise explanations and	
	models using logic and evidence.	
	Recognize and analyze alternative	
	explanations and models.	
	Explain the importance of accuracy and	
	precision in making valid measurements.	
	provision in making valid measurements.	
	3.3.B	
	Origin and Evolution of the Universe	
	S7.D.3.1.1	
	Describe the patterns of Earth's rotation	
	and revolution in relation to the Sun and	
	Moon (i.e., solar eclipse, lunar eclipse,	
	phases of the Moon, and time).	
	phases of the woon, and time).	
	57 5 2 4 2	
	\$7.D.3.1.2	
	Explain how gravity is the essential force in	
	determining the motions of the planets and	
	other objects in the solar system.	
	S7.D.3.1.3	
	Compare the properties and conditions of	
	objects in the solar system to those of	
	Earth.	
	S7.D.3.1.4	
	Identify and describe instruments that are	
	used to study the universe (e.g., telescope,	
	probes, satellites, space observatories).	
	S8.A.2.2.1	
	Describe the appropriate use of	
	instruments and scales to accurately and	
	safely measure time, mass, distance,	
	volume, or temperature under a variety of	
	conditions.	
	S8.A.2.2.2	
	Apply appropriate measurement systems	
	(e.g., time, mass, distance, volume,	
	temperature) to record and interpret	
	observations under varying conditions.	
	S8.A.2.2.3	
	Describe ways technology (e.g.,	
	microscope, telescope, micrometer,	
L		

Chapter 15 The Solar System (3-4 Weeks)	Lesson 1 In a geocentric model, Earth is at the center of the revolving planets and stars. Lesson 2 Our solar system consists of the sun, the planets, their moons, and a variety of smaller objects. Lesson 3 The sun has an interior and an atmosphere. Lesson 4 The inner planets are small and dense and have rocky surfaces. Lesson 5 The four outer planets are much larger and more massive than Earth, and they do not have solid surfaces. Lesson 6	 Models of the Solar System Introducing the solar system The Sun The Sun The Sun The Outer planets Small solar system objects 	Lesson 1 • What was the geocentric model? • How did the heliocentric model develop? Lesson 2 • What makes up the solar system? • How did the solar system form? Lesson 3 • What is the structure of the Sun? • What features can you see on the Sun? Lesson 4 • What do the inner planets have in common? • What are the characteristics of the inner planets?	 enhances human abilities for specific purposes. S8.D.3.1.1 Describe patterns of earth's movements (i.e., rotation and revolution) in relation to the moon and sun (i.e., phases, eclipses, and tides) S8.D.3.1.2 Describe the role of gravity as the force that governs the movement of the solar system and universe. S8.D.3.1.3 Compare and contrast characteristics of celestial bodies found in the solar system (e.g., moons, asteroids, comets, meteors, inner and outer planets). 3.3.7.B1 Explain how gravity is the major force in the formation of the planets, stars, and the solar system. Describe gravity as a major force in determining the motions of planets, stars, and the solar system. Compare and contrast properties and conditions of objects in the solar system to those on Earth. 3.3.7.B2 SCALE AND MEASUREMENT Identify a variety of instruments used to gather evidence about the universe. PATTERNS Describe repeating patterns in the Sun-Earth-Moon system and the positions of stars. SCALE Relate planetary size and distance in our solar system using an appropriate scale model. 3.3.7.B3 Understand how theories are developed.	 Lesson 1 Describe the geocentric model of the solar system. Recognize how scientists such as Copernicus, Kepler, and Galileo contributed to acceptance of the heliocentric model. Lesson 2 Identify the objects that make up the solar system. Explain how the solar system. Explain how the solar system formed. Lesson 3 Identify the layers of the sun's interior and atmosphere. Describe features that form on or 	Students will be given the following: Preferential seating when applicable Study guides Guided notes when applicable Extended time for assignment when needed Separate testing environment when applicable.	Daily assessments End of chapter exams Labs and classroom activities
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Scientists classify these objects based on their	Lesson 5 • What do the outer planets	Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions.	above the sun's surface. Lesson 4	
sizes, shapes, compositions, and orbits. Major categories are dwarf planets, comets, asteroids, and meteoroids.	 What are the characteristics of the outer planets? Lesson 6 How do scientists classify small objects in the solar system? 	Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations. Describe relationships using inference and prediction. Use appropriate tools and technologies to gather, analyze, and interpret data and understand that it enhances accuracy and allows scientists to analyze and quantify results of investigations. Develop descriptions, explanations, and models using evidence and understand that these emphasize evidence, have logically consistent arguments, and are based on scientific principles, models, and	 Describe the characteristics that the inner planets have in common. Identify the main characteristics that distinguish each of the inner planets Lesson 5 Describe characteristics that the gas giants have in common. 	
		theories. Analyze alternative explanations and understanding that science advances through legitimate skepticism. Use mathematics in all aspects of scientific inquiry. Understand that scientific investigations may result in new ideas for study, new methods, or procedures for an investigation or new technologies to improve data collection. 3.3.8.B1	 Identify characteristics that distinguish each outer planet. Lesson 6 Explain how scientists classify small bodies in the solar system. 	
		Explain how light, measured remotely, can be used to classify objects in the universe. 3.3.8.B2 SCALE AND MEASUREMENT Explain measurements and evidence indicating the age of the universe. 3.3.8.B3		
		Compare and contrast scientific theories. Know that both direct and indirect observations are used by scientists to study the natural world and universe. Identify questions and concepts that guide scientific investigations. Formulate and revise explanations and models using logic and evidence. Recognize and analyze alternative explanations and models.		

Explain the importance of accuracy and precision in making valid measurements. S7.D.3.1.1 Describe the patterns of Earth's rotation and revolution in relation to the Sun and	
S7.D.3.1.1 Describe the patterns of Earth's rotation	
Describe the patterns of Earth's rotation	,
Moon (i.e., solar eclipse, lunar eclipse, phases of the Moon, and time).	
S7.D.3.1.2 Explain how gravity is the essential force in determining the motions of the planets and other objects in the solar system.	
S7.D.3.1.3 Compare the properties and conditions of objects in the solar system to those of Earth.	
S7.D.3.1.4 Identify and describe instruments that are used to study the universe (e.g., telescope, probes, satellites, space observatories).	
S8.A.2.2.1 Describe the appropriate use of instruments and scales to accurately and safely measure time, mass, distance, volume, or temperature under a variety of conditions.	
S8.A.2.2.2 Apply appropriate measurement systems (e.g., time, mass, distance, volume, temperature) to record and interpret observations under varying conditions.	
S8.A.2.2.3 Describe ways technology (e.g., microscope, telescope, micrometer, hydraulics, barometer) extends and enhances human abilities for specific purposes.	
S8.D.3.1.1 Describe patterns of earth's movements (i.e., rotation and revolution) in relation to the moon and sun (i.e., phases, eclipses, and tides)	
S8.D.3.1.2	

Chapter 16 Stars, Galaxies, and the Universe (2-3 Weeks)	Lesson 1 • Telescopes are instruments that collect and focus light and other forms of electromagnetic radiation. Lesson 2 • Since the numbers that astronomers use are often very large, they have developed larger scale such as light-year. Lesson 3 • Characteristics used to classify stars include color, temperature, size, composition, and brightness. Lesson 4	 7. Telescopes 8. The scale of the universe 9. Characteristi cs of stars 10. Lives of stars 11. Star systems and galaxies 12. The expanding universe 	Lesson 1 • What are the regions of the electromagneti c spectrum? • What are telescopes and how do they work? Lesson 2 • How do astronomers measure distances to the stars? • How do astronomers describe the scale of the universe? Lesson 3 • How are stars classified? • What is an H-R diagram and how do	Describe the role of gravity as the force that governs the movement of the solar system and universe. S8.D.3.1.3 Compare and contrast characteristics of celestial bodies found in the solar system (e.g., moons, asteroids, comets, meteors, inner and outer planets). 3.3.7.B1 Explain how gravity is the major force in the formation of the planets, stars, and the solar system. Describe gravity as a major force in determining the motions of planets, stars, and the solar system. Compare and contrast properties and conditions of objects in the solar system to those on Earth. 3.3.7.B2 SCALE AND MEASUREMENT Identify a variety of instruments used to gather evidence about the universe. PATTERNS Describe repeating patterns in the Sun- Earth-Moon system and the positions of stars. SCALE Relate planetary size and distance in our solar system using an appropriate scale model.	 Lesson 1 State the regions of the electromagnetic spectrum. Explain what telescopes are and how they work. Lesson 2 Describe how astronomers measure distances to the stars. Explain how astronomers describe the scale of the universe. Lesson 3 Explain how stars are classified. Explain the H-R diagram, and and the stare of the universe. 	Students will be given the following: Preferential seating when applicable Study guides Guided notes when applicable Extended time for assignment when needed Separate testing environment when applicable.	Daily assessments End of chapter exams Labs and projects
	developed larger scale such as light-year. Lesson 3 • Characteristics used to classify stars include color, temperature, size, composition, and		 the stars? How do astronomers describe the scale of the universe? Lesson 3 How are stars classified? What is an H-R diagram and 	SCALE AND MEASUREMENT Identify a variety of instruments used to gather evidence about the universe. PATTERNS Describe repeating patterns in the Sun- Earth-Moon system and the positions of stars. SCALE Relate planetary size and distance in our	 stars. Explain how astronomers describe the scale of the universe. Lesson 3 Explain how stars are classified. Explain the H-R 	time for assignment when needed Separate testing environment when	

star systems. Lesson 6 • According to the Big Bang Theory, the universe formed in an instant, billions of years ago, in an enormous explosion.	major types of galaxies? Lesson 6 • What does the Big Bang Theory say about the universe?	results of investigations. Develop descriptions, explanations, and models using evidence and understand that these emphasize evidence, have logically consistent arguments, and are based on scientific principles, models, and theories. Analyze alternative explanations and understanding that science advances through legitimate skepticism. Use mathematics in all aspects of scientific inquiry. Understand that scientific investigations may result in new ideas for study, new methods, or procedures for an investigation or new technologies to improve data collection. 3.3.8.B1 Explain how light, measured remotely, can be used to classify objects in the universe. .3.8.B2 SCALE AND MEASUREMENT Explain measurements and evidence indicating the age of the universe. 3.3.8.B3 Compare and contrast scientific theories. Know that both direct and indirect observations are used by scientists to study the natural world and universe. Identify questions and concepts that guide scientific investigations. Formulate and revise explanations and models using logic and evidence. Recognize and analyze alternative explanations and models. Explain the importance of accuracy and precision in making valid measurements. 3.3.B Origin and Evolution of the Universe S7.D.3.1.1 Describe the patterns of Earth's rotation and revolution in relation to the Sun and	 State what the big bang theory says about the universe. 		
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Explain how gravity is the essential force in determining the motions of the planets and
other objects in the solar system.
S7.D.3.1.3 Compare the properties and conditions of
objects in the solar system to those of
Earth.
S7.D.3.1.4 Identify and describe instruments that are
used to study the universe (e.g., telescope, probes, satellites, space observatories).
S8.A.2.2.1
Describe the appropriate use of instruments and scales to accurately and
safely measure time, mass, distance,
volume, or temperature under a variety of conditions.
S8.A.2.2.2
Apply appropriate measurement systems (e.g., time, mass, distance, volume,
temperature) to record and interpret observations under varying conditions.
S8.A.2.2.3
Describe ways technology (e.g., microscope, telescope, micrometer,
hydraulics, barometer) extends and
enhances human abilities for specific purposes.
S8.D.3.1.1
Describe patterns of earth's movements (i.e., rotation and revolution) in relation to
the moon and sun (i.e., phases, eclipses, and tides)
S8.D.3.1.2
Describe the role of gravity as the force that governs the movement of the solar
system and universe.
S8.D.3.1.3 Compare and contrast characteristics of
celestial bodies found in the solar system
(e.g., moons, asteroids, comets, meteors, inner and outer planets).