Science 7

Curriculum Guide

Dunmore School District

Dunmore, PA



Science 7

Prerequisite:

• Successful completion Sixth Grade Science

Course Description:

The Science 7 (Earth and Space Science) course is the study of space, geologic structures and forces, the waters on our planet, and the atmospheric forces that shape our world. Students will explore the Earth's spheres including the geosphere, hydrosphere, atmosphere, and the cycles of the Earth such as the water and carbon cycle. Students will learn about scientific inquiry, geologic time, space exploration, the solar system, and the universe. This course allows students connect with geological history, the amazing landforms around the globe, the nature of the sea and air, and the newest discoveries about our universe, it gives students an opportunity to relate to their everyday world.

Special Education:

After a student has been evaluated and found to be eligible for specially designed instruction under one of the 13 disability categories, an individualized education plan will be developed to help the student succeed through a more intense intervention program. Special Education is the practice of educating students in a way that addresses their individual differences and needs. The purpose of special education is to provide equal access to education for children ages birth through 21 by providing specialized services that will lead to school success in general education. Our goal for each student is for him/her to be educated in his/her least restrictive environment with additional supports by way of specially designed instruction. After all interventions in the general education setting have been exhausted and the student is still not making progress, students can receive direct instruction in a special education classroom. Direct instruction provides more intense intervention and replacement instruction in order to minimize skill deficits. In our special education classrooms, students will have access to the standards-based general education curriculum, as well as using various research-based intervention programs. Resources and activities will be adjusted based on individual student needs. Suggested time found within the curriculum will be adjusted as needed per individual student's needs.

Special Education Strategies can be located in the IEP Enhancements table located in Appendix: A at the end of this document.

Year-at-a-glance

Subject: Science 7	Grade Level: 7	Date Completed: 4/8/2019

1st Quarter

Торіс	Resources	Standards
Earth as a System	Teacher made documents	3.5.7.A, 3.5.7.C, 3.5.7.D, 3.1.7.A,
	Teacher prepared labs	3.1.7.B, 3.1.7.E,
	Lab on carbon sequestration	3.2.7.A, 3.2.7.B, 3.2.7.C,
	Show movie Tapped with worksheet	3.2.7.D, 3.1.7.D
Resources and the Environment	Teacher made documents	3.1.7.A, 3.1.7.D, 3.1.7.E,
	Teacher prepared labs	3.2.7.A, 3.2.7.B, 3.2.7.C,
	Lab on alternative energies	3.2.7.D, 3.5.7.A, 3.5.7.B
Earth History	Teacher made documents	3.5.7.B, 3.1.7.A, 3.1.7.D,
	Teacher prepared labs	3.1.7.E, 3.2.7.A, 3.2.7.B,
	Lab on Minerals	3.2.7.C, 3.2.7.D, 3.5.7.A,
	Acid testing for calcite Lab	3.4.7.B, 3.4.7.D
	Lab Identify the missing rock layer	
	Video PBS NOVA Origins of North America with	
	worksheet	
	Lab Grand Canyon Stream Table	
	Video on Weathering and Erosion with worksheet	
	Seawater/Limestone lab	
	Adding tape timelines for the Earth	
	PBS timelines website	
	Lab on Salol Crystals and crystal size	
	Lab Convection in fluids	
	Lab on Plate Tectonics	

2nd Quarter

Торіс	Resources	Standards
Earth History Continued	See Quarter 1	3.5.7.B, 3.1.7.A, 3.1.7.D,
		3.1.7.E, 3.2.7.A, 3.2.7.B,
		3.2.7.C, 3.2.7.D, 3.5.7.A,
		3.4.7.B, 3.4.7.D

3 rd	Quarter
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Торіс	Resources	Standards
Weather and Water	Teacher made documents	3.1.7.A, 3.1.7.B, 3.1.7.C,
	Teacher prepared labs	3.1.7.D, 3.1.7.E, 3.2.7.A,
	Lab Gas in a syringe	3.2.7.B, 3.2.7.C, 3.2.7.D,
	Lab balloon balance	3.4.4.D, 3.4.7.D, 3.5.7.C,
	Lab Air Pressure pressure in a jar	3.5.7.D
	Video Natgeo Bill Nye Global Meltdown with	
	worksheet	
	Lab on Radiation and Energy Transfer	
	Sun and Seasons animated graphic	
	Direct Solar Energy demonstration	
	Lab Conduction Aluminum and Steel in hot water	
	Lab Density layering salt solutions	
	Lab Density of hot and cold water	
	Lab Convection Chamber gas	
	Lab on relative humidity	
	Lab on condensation and dew point	
	Lab making a Cloud in a bottle	
	Lab on Oceans	

4th Quarter

Торіс	Resources	Standards
Weather and Water Continued	See Quarter 3	3.1.7.A, 3.1.7.B, 3.1.7.C, 3.1.7.D, 3.1.7.E, 3.2.7.A, 3.2.7.B, 3.2.7.C, 3.2.7.D, 3.4.4.D, 3.4.7.D, 3.5.7.C, 3.5.7.D
Origins the Sun, the Solar System, and our Moon	Teacher made documents Teacher prepared labs Lab on Relativity and Gravity Lab on stars and outer solar system Video on the Sun with worksheet Activities and demonstrations with telescope Activity with the phases of the Moon Video on the Moon with worksheet	3.1.7.A, 3.1.7.B, 3.1.7.C, 3.1.7.D, 3.2.7.A, 3.2.7.B, 3.2.7.C, 3.2.7.D, 3.4.4.D, 3.4.7.D
The Planets, Solar System, and Life Cycle of Stars	Teacher made documents Teacher prepared labs Lab on spectroscopy Lab on Planets	3.1.7.A, 3.1.7.B, 3.1.7.C, 3.1.7.D, 3.2.7.A, 3.2.7.B, 3.2.7.C, 3.2.7.D, 3.4.4.D, 3.4.7.D
Review and Final Exam		

General Topic	Anchor Descriptor	Eligible Content,	Resources & Activities	Assessments	Suggested
	PA Academic and Core Standards	Essential Knowledge,			Time
	PA Academic and Core Standards	Skills & Vocabulary			(In Days)
Earth as a System	Anchor Descriptor:	Eligible Content:	Teacher made	Teacher prepared tests,	15 Days
	S8.A.1.1 Explain, interpret, and	.1.1.1 Distinguish between a	documents	quizzes, etc.	
What is Earth	apply scientific, environmental, or	scientific theory and an			
system science?	technological knowledge	opinion, explaining how a	Teacher prepared labs	Series available	
	presented in a variety of formats	theory is supported with		assessments online.	
What are the Earth	(e.g., visuals, scenarios, graphs).	evidence, or how new	Atlantic Magazine	(Optional)	
system's four		data/information may change	Article 50 Greatest		
spheres, and how	S8.A.1.2 Identify and explain the	existing theories and practices.	Inventions		
do they affect one	impacts of applying scientific,		Calculators		
another?	environmental, or technological	S8.A.1.1.2 Explain how certain	Chromebooks		
	knowledge to address solutions to	questions can be answered	DVD "Tapped"		
What are cycles	practical problems.	through scientific inquiry	Follow direction Quiz		
and how do they		and/or technological design.	Google Classroom		
work?	S8.A.1.3 Identify and analyze		Google Drive		
	evidence that certain variables	S8.A.1.1.3 Use evidence, such	Google Form		
The Earth is a	may have caused measurable	as observations or	Google Sheets		
complex and	changes in natural or human-	experimental results, to	Lab on carbon		
dynamic set of	made systems.	support inferences about a	sequestration		
interconnected		relationship.	Newsela website		
systems (e.g.	S8.A.2.1 Apply knowledge of		Prezi online slideshow		
geosphere,	scientific investigation or	S8.A.1.1.4 Develop	Print out of notes for		
hydrosphere,	technological design in different	descriptions, explanations,	students		
atmosphere,	contexts to make inferences to	predictions, and models using	Promethean Board		
biosphere) that	solve problems.	evidence.	Summative		
interact over a			Assessment		
wide range of	S8.A.2.2 Apply appropriate	S8.A.1.2.1 Describe the	Video Worksheet		
temporal and	instruments for a specific purpose	positive and negative,	Vocabulary		
spatial scales.	and describe the information the	intended and unintended,	Worksheet on carbon		
	instrument can provide.	effects of specific scientific	sequestration		

The Earth's		results or technological	youTube class review	
processes affect	S8.A.3.1 Explain the parts of a	developments (e.g., air/space	videos	
and are affected	simple system, their roles, and	travel, genetic engineering,		
by human	their relationships to the system	nuclear fission/fusion, artificial		
activities.	as a whole.	intelligence, lasers, organ		
		transplants).		
	S8.A.3.2 Apply knowledge of			
	models to make predictions, draw	S8.A.1.2.2 Identify		
	inferences, or explain	environmental issues and		
	technological concepts.	explain their potential long-		
		term health effects (e.g.,		
	S8.A.3.3 Describe repeated	pollution, pest controls,		
	processes or recurring elements in	vaccinations).		
	natural, scientific, and			
	technological patterns.	S8.A.1.2.3 Describe		
		fundamental scientific or		
	S8.B.3.3 Explain how renewable	technological concepts that		
	and nonrenewable resources	could solve practical problems		
	provide for human needs or how	(e.g., Newton's laws of motion,		
	these needs impact the	Mendelian genetics).		
	environment.			
		S8.A.1.2.4 Explain society's		
	S8.D.1.3 Describe characteristic	standard of living in terms of		
	features of Earth's water systems	technological advancements		
	or their impact on resources.	and how these advancements		
		impact on agriculture (e.g.,		
	PA Academic Standards: Science	transportation, processing,		
		production, storage).		
	3.1.7.A Explain the parts of a			
	simple system and their	S8.A.1.3.1 Use ratio to describe		
	relationship to each other.	change (e.g., percents, parts		
	• Describe a system as a group of	per million, grams per cubic		
	related parts that work together	centimeter, mechanical		
	to achieve a desired result (e.g.,	advantage).		

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-	tive system).			
-	plain the importance of order	S8.A.1.3.2 Use evidence,		
	ystem.	observations, or explanations		
• Dist	tinguish between system	to make inferences about		
inputs	s, system processes and	change in systems over time		
syster	m outputs.	(e.g., carrying capacity,		
• Dist	tinguish between open loop	succession, population		
and c	losed loop systems.	dynamics, loss of mass in		
• Apr	ply systems analysis to solve	chemical reactions, indicator		
proble	ems.	fossils in geologic time scale)		
		and the variables affecting		
3.1.7.	B Describe the use of models	these changes.		
as an	application of scientific or			
techn	ological concepts.	S8.A.1.3.3 Examine systems		
• Ider	ntify and describe different	changing over time, identifying		
types	of models and their	the possible variables causing		
functi	ions.	this change, and drawing		
• App	ly models to predict specific	inferences about how these		
result	s and observations (e.g.,	variables affect this change.		
popul	lation growth, effects of			
infect	ious organisms).	S8.A.1.3.4 Given a scenario,		
• Exp	lain systems by outlining a	explain how a dynamically		
syster	m's relevant parts and its	changing environment		
purpo	ose and/or designing a model	provides for the sustainability		
that il	llustrates its function.	of living systems.		
3.1.7.	D Explain scale as a way of	S8.A.2.1.1 Use evidence,		
relati	ng concepts and ideas to one	observations, or a variety of		
anoth	ner by some measure.	scales (e.g., mass, distance,		
• App	ly various applications of	volume, temperature) to		
size a	nd dimensions of scale to	describe relationships.		
scient	tific, mathematical, and			
techn	ological applications.	S8.A.2.1.4 Interpret		
• Des	cribe scale as a form of ratio	data/observations; develop		

and apply to a life situation.	relationships among variables		
	based on data/observations to		
3.1.7.E Identify change as a	design models as solutions.		
variable in describing natural and			
physical systems.	S8.A.2.2.1 Describe the		
 Describe fundamental science 	appropriate use of instruments		
and technology concepts that	and scales to accurately and		
could solve practical problems.	safely measure time, mass,		
 Explain how ratio is used to 	distance, volume, or		
describe change.	temperature under a variety of		
 Describe the effect of making a 	conditions.		
change in one part of a system on			
the system as a whole.	S8.A.2.2.2 Apply appropriate		
	measurement systems (e.g.,		
3.2.7.A Explain and apply scientific	time, mass, distance, volume,		
and technological knowledge.	temperature) to record and		
 Distinguish between a scientific 	interpret observations under		
theory and a belief.	varying conditions.		
 Answer "What if" questions 			
based on observation, inference	S8.A.2.2.3 Describe ways		
or prior knowledge or experience.	technology (e.g., microscope,		
 Explain how skepticism about an 	telescope, micrometer,		
accepted scientific explanation led	hydraulics, barometer) extends		
to a new understanding.	and enhances human abilities		
 Explain how new information 	for specific purposes.		
may change existing theories and			
practice.	S8.A.3.1.1 Describe a system		
	(e.g., watershed, circulatory		
3.2.7.B Apply process knowledge	system, heating system,		
to make and interpret	agricultural system) as a group		
observations.	of related parts with specific		
 Measure materials using a 	roles that work together to		
variety of scales.	achieve an observed result.		
 Describe relationships by 			

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	king inferences and	S8.A.3.1.2 Explain the concept		
	dictions.	of order in a system [e.g., (first		
	ommunicate, use space / time	to last: manufacturing steps,		
	itionships, define	trophic levels); (simple to		
oper	erationally, raise questions,	complex: cell, tissue, organ,		
form	nulate hypotheses, test and	organ system)].		
expe	eriment,			
• De	esign controlled experiments,	S8.A.3.1.3 Distinguish among		
reco	ognize variables, and	system inputs, system		
man	nipulate variables.	processes, system outputs, and		
● Int	terpret data, formulate	feedback (e.g., physical,		
moc	dels, design models, and	ecological, biological,		
proc	duce solutions.	informational).		
3.2.	7.C Identify and use the	S8.A.3.1.4 Distinguish between		
elen	ments of scientific inquiry to	open loop (e.g., energy flow,		
solv	ve problems.	food web) and closed loop		
• Ge	enerate questions about	(e.g., materials in the nitrogen		
-	ects, organisms and/or events	and carbon cycles, closed-		
that	t can be answered through	switch) systems.		
scie	entific investigations.			
• Ev	valuate the appropriateness of	S8.A.3.1.5 Explain how		
que	stions.	components of natural and		
• De	esign an investigation with	human-made systems play		
limit	ted variables to investigate a	different roles in a working		
que	estion.	system.		
• Co	onduct a two-part experiment.			
● Ju [,]	idge the significance of	S8.A.3.2.1 Describe how		
expe	erimental information in	scientists use models to		
ansv	wering the question.	explore relationships in natural		
• Cc	ommunicate appropriate	systems (e.g., an ecosystem,		
cond	clusions from the experiment.	river system, the solar system).		
3.2.	7.D Know and use the	S8.A.3.2.2 Describe how		

technological design process to	engineers use models to	
solve problems.	develop new and improved	
 Define different types of 	technologies to solve	
problems.	problems.	
 Define all aspects of the 		
problem, necessary information	S8.A.3.2.3 Given a model	
and questions that must be	showing simple cause and-	
answered.	effect relationships in a natural	
 Propose the best solution. 	system, predict results that can	
 Design and propose alternativ 	e be used to test the	
methods to achieve solutions.	assumptions in the model (e.g.,	
Apply a solution.	photosynthesis, water cycle,	
• Explain the results, present	diffusion, infiltration).	
improvements, identify and infe	r i i i i i i i i i i i i i i i i i i i	
the impacts of the solution.	S8.B.3.1.1 Explain the flow of	
	energy through an ecosystem	
3.5.7.A Describe earth features	(e.g., food chains, food webs).	
and processes.		
Describe major layers of the	S8.B.3.1.2 Identify major	
earth.	biomes and describe abiotic	
Describe the processes involve	ed and biotic components (e.g.,	
in the creation of geologic	abiotic: different soil types, air,	
features (e.g., folding, faulting,	water sunlight; biotic: soil	
volcanism, sedimentation) and	microbes, decomposers).	
that these processes seen today		
(e.g., erosion, weathering crusta	I S8.B.3.3.1 Explain how human	
plate movement) are similar to	activities may affect local,	
those in the past.	regional, and global	
 Describe the processes that 	environments.	
formed Pennsylvania geologic		
structures and resources include	ng S8.B.3.3.2 Explain how	
mountains, glacial formations,	renewable and nonrenewable	
water gaps and ridges.	resources provide for human	
Explain how the rock cycle	needs (i.e., energy, food,	

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affected rock formations in the	water, clothing, and shelter).		
state of Pennsylvania.			
 Distinguish between examples 	S8.B.3.3.3 Describe how waste		
of rapid surface changes (e.g.,	management affects the		
landslides, earthquakes) and slow	environment (e.g., recycling,		
surface changes (e.g.,	composting, landfills,		
weathering).	incineration, sewage		
 Identify living plants and animals 	treatment).		
that are similar to fossil forms.			
	S8.D.1.3.1 Describe the water		
3.5.7.C Describe basic elements of	cycle and the physical		
meteorology.	processes on which it depends		
 Explain weather forecasts by 	(i.e., evaporation,		
interpreting weather data and	condensation, precipitation,		
symbols.	transpiration, runoff,		
 Explain the oceans' impact on 	infiltration, energy inputs, and		
local weather and the climate of a	phase changes).		
region.			
 Identify how cloud types, wind 	S8.D.1.3.2 Compare and		
directions and barometric	contrast characteristics of		
pressure changes are associated	freshwater and saltwater		
with weather patterns in different	systems on the basis of their		
regions of the country.	physical characteristics (i.e.,		
 Explain and illustrate the 	composition, density, and		
processes of cloud formation and	electrical conductivity) and		
precipitation.	their use as natural resources.		
 Describe and illustrate the major 			
layers of the earth's atmosphere.	S8.D.1.3.3 Distinguish among		
 Identify different air masses and 	different water systems (e.g.,		
global wind patterns and how	wetland systems, ocean		
they relate to the weather	systems, river systems,		
patterns in different regions of	watersheds) and describe their		
the U.S.	relationships to each other as		
	well as to landforms.		

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	3.5.7.D Explain the behavior and	
	impact of the earth's water	
	systems.	
	• Explain the water cycle using the	Essential Knowledge/Skills:
	processes of evaporation and	
	condensation.	All Earth processes are the
	 Describe factors that affect 	result of energy flowing and
	evaporation and condensation.	matter cycling within and
	• Distinguish salt from fresh water	among the planet's systems.
	(e.g., density, electrical	The energy is derived from the
	conduction).	sun and the earth's interior.
	 Compare the effect of water 	These flows and cycles
	type (e.g., polluted, fresh, salt	produce chemical and physical
	water) and the life contained in	changes in Earth's materials
	them.	and living organisms.
	 Identify ocean and shoreline 	
	features, (e.g., bays, inlets, spit,	Water continually cycles
	tidal marshes).	among geosphere,
		hydrosphere, biosphere, and
	PA Core Standards:	atmosphere via transpiration,
	Reading for Science and Technical	evaporation, condensation,
	Subjects, 6-12	and precipitation.
	3.5 Reading Informational Text	
	Students read, understand, and	Human activities influence
	respond to informational text-	Earth's global temperature,
	with emphasis on comprehension,	and these effects can be
	making connections among ideas	mitigated through applying
	and between texts with focus on	knowledge of climate science,
	textual evidence.	engineering, etc.
	PA Core Standards: Writing for	Human activities have
	Science and Technical Subjects, 6-	significantly altered the
	12	biosphere and geosphere,
	3.6 Writing	sometimes damaging or
		sometimes damaging of

Students write for different purposes and audiences. Students write clear and focused text to convey a well-defined perspective and appropriate content.	 destroying natural habitats and causing the extinction of other species. Construct and analyze models to describe systems interactions among the geosphere, hydrosphere, atmosphere, and biosphere. Investigate water systems to identify seasonal and annual variations in precipitation and streamflow and the causes of those variations. Assess the physical characteristics of a stream to determine the types of organisms found within the stream environment. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. 			
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Vocabulary:AtmosphereBiosphereGeosphereHydrosphereFlow rateOcean systemsRiver systemsWatershed	
WetlandBiological diversityStreamTributaryAtmosphere BiosphereCarbon dioxide (CO2)ClimateGlobal warming	

General Topic	Anchor Descriptor	Eligible Content,	Resources & Activities	Assessments	Suggested
	PA Academic and Core Standards	Essential Knowledge, Skills & Vocabulary			Time (In Days)
Resources and the	Anchor Descriptor:	Eligible Content:	Teacher made	Teacher prepared	15 Days
Environment	S8.A.1.1 Explain, interpret, and	S8.A.2.1.6 Identify a design	documents	tests, quizzes, etc.	
	apply scientific, environmental, or	flaw in a simple technological			
Nonrenewable	technological knowledge	system and devise possible	Teacher prepared labs	Series available	
Energy Sources	presented in a variety of formats	working solutions.		assessments online.	
	(e.g., visuals, scenarios, graphs).		Chromebooks	(Optional)	
Renewable Energy		S8.B.3.3.1 Explain how human	Google Classroom		
Sources	S8.A.1.2 Identify and explain the	activities may affect local,	Google Drive		
	impacts of applying scientific,	regional, and global	Google Form		
The Earth's	environmental, or technological	environments.	Google Sheets		
processes affect	knowledge to address solutions to		Lab Kit on Renewable		
and are affected	practical problems.	S8.B.3.3.2 Explain how	Energy Sources		
by human		renewable and nonrenewable	Newsela website		
activities.	S8.A.1.3 Identify and analyze	resources provide for human	Prezi online slideshow		
	evidence that certain variables	needs (i.e., energy, food,	Print out of notes for		
The Earth is a	may have caused measurable	water, clothing, and shelter).	students		
complex and	changes in natural or human-		Promethean Board		
dynamic set of	made systems.	S8.C.2.2.1 Describe the Sun as	Summative Assessment		
interconnected		the major source of energy	Vocabulary		
systems (e.g.	S8.A.2.1 Apply knowledge of	that impacts the environment.	Worksheet on		
geosphere,	scientific investigation or		Renewable Energy		
hydrosphere,	technological design in different	S8.C.2.2.2 Compare the time	Sources Lab		
atmosphere,	contexts to make inferences to	span of renewability for fossil	youTube class review		
biosphere) that	solve problems.	fuels and the time span of	videos		
interact over a		renewability for alternative			
wide range of	S8.A.2.2 Apply appropriate	fuels.			
temporal and	instruments for a specific purpose				
spatial scales.	and describe the information the	S8.C.2.2.3 Describe the waste			
	instrument can provide.	(i.e., kind and quantity) derived			

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	from the use of renewable and		
S8.A.3.1 Explain the parts of a	nonrenewable resources and		
simple system, their roles, and	their potential impact on the		
their relationships to the system	environment.		
as a whole. Explain the parts of a			
simple system, their roles, and	S8.D.1.2.1 Describe a product's		
their relationships to the system	transformation process from		
as a whole.	production to consumption		
	(e.g., prospecting, propagating,		
S8.A.3.2 Apply knowledge of	growing, maintaining,		
models to make predictions, draw	adapting, treating, converting,		
inferences, or explain	distributing, disposing) and		
technological concepts.	explain the processes potential		
	impact on Earth's resources.		
S8.B.3.2 Identify evidence of			
change to infer and explain the	S8.D.1.2.2 Describe potential		
ways different variables may	impacts of human made		
affect change in natural or	processes (e.g., manufacturing,		
human-made systems.	agriculture, transportation,		
	mining) on Earth's resources,		
S8.B.3.3 Explain how renewable	both nonliving (i.e., air, water,		
and nonrenewable resources	or earth materials) and living		
provide for human needs or how	(i.e., plants and animals).		
these needs impact the			
environment.	S8.D.1.3.2 Compare and		
	contrast characteristics of		
S8.C.2.2 Compare the	freshwater and saltwater		
environmental impact of different	systems on the basis of their		
energy sources chosen to support	physical characteristics (i.e.,		
human endeavors.	composition, density, and		
	electrical conductivity) and		
PA Academic Standards: Science	their use as natural resources.		
3.1.7.A Explain the parts of a			
 simple system and their			

and a three determined and the		<u> </u>
relationship to each other.	Essential Knowledge/Skills:	
Describe a system as a gro		
related parts that work toge	•	
to achieve a desired result (e		
digestive system).	living things for many	
Explain the importance of	order different resources.	
in a system.		
 Distinguish between syste 	m Minerals, fresh water, and	
inputs, system processes and	living resources are limited,	
system outputs.	and many are not renewable	
Distinguish between open	loop or replaceable over human	
and closed loop systems.	lifetimes.	
Apply systems analysis to	solve	
problems.	Human activities have	
	significantly altered the	
3.1.7.D Explain scale as a wa	•	
relating concepts and ideas t		
another by some measure.	destroying natural habitats	
Apply various applications		
size and dimensions of scale	÷	
scientific, mathematical, and	•	
technological applications.	Describe a product's	
Describe scale as a form of		
and apply to a life situation.	process from production to	
	consumption.	
3.1.7.E Identify change as a	consumption.	
variable in describing natura	l and Use maps and other data to	
physical systems.	explain how geologic processes	
Describe fundamental scie		
and technology concepts tha		
could solve practical problem		
• Explain how ratio is used to		
describe change.	Construct an argument	
Describe the effect of make	ing a supported by evidence for how	

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	in one part of a system on	increases in human population		
the syste	em as a whole.	and per-capita consumption of		
		natural resources impact		
	Explain and apply scientific	Earth's systems.		
	nnological knowledge.			
-	guish between a scientific	Apply scientific principles to		
	and a belief.	design a method for		
• Answe	er "What if" questions	monitoring and minimizing a		
based or	n observation, inference	human impact on the		
or prior	knowledge or experience.	environment		
• Explair	n how skepticism about an			
accepted	d scientific explanation led	Vocabulary:		
to a new	v understanding.	Atmosphere		
• Explair	n how new information	Consumption		
may cha	inge existing theories and	Geosphere		
practice		Hydrosphere		
		Natural resources		
3.2.7.B A	Apply process knowledge	Nonrenewable resources		
to make	and interpret	Ore Production		
observat	tions.	Renewable resources		
• Measu	are materials using a	Climate		
variety o	of scales.			
• Descri	be relationships by			
making i	inferences and			
predictio	ons.			
• Comm	iunicate, use space / time			
relations	ships, define			
operatio	onally, raise questions,			
formulat	te hypotheses, test and			
experim	ent,			
• Design	n controlled experiments,			
-	ze variables, and			
-	ate variables.			
• Interp	ret data, formulate			

models, design models, and		
produce solutions.		
P		
3.2.7.C Identify and use the		
elements of scientific inquiry to		
solve problems.		
Generate questions about		
objects, organisms and/or events		
that can be answered through		
scientific investigations.		
• Evaluate the appropriateness of		
questions.		
 Design an investigation with 		
limited variables to investigate a		
question.		
 Conduct a two-part experiment. 		
 Judge the significance of 		
experimental information in		
answering the question.		
 Communicate appropriate 		
conclusions from the experiment.		
3.2.7.D Know and use the		
technological design process to		
solve problems.		
Define different types of		
problems.		
Define all aspects of the problem processory information		
problem, necessary information		
and questions that must be answered.		
 Propose the best solution. Design and propose alternative 		
 Design and propose alternative methods to achieve solutions. 		
methous to achieve solutions.		

	a Apply a colution		
	Apply a solution.		
	• Explain the results, present		
	improvements, identify and infer		
	the impacts of the solution.		
	3.5.7.A Describe earth features		
	and processes.		
	 Describe major layers of the 		
	earth.		
	 Describe the processes involved 		
	in the creation of geologic		
	features (e.g., folding, faulting,		
	volcanism, sedimentation) and		
	that these processes seen today		
	(e.g., erosion, weathering crustal		
	plate movement) are similar to		
	those in the past.		
	Describe the processes that		
	formed Pennsylvania geologic		
	structures and resources including		
	mountains, glacial formations,		
	water gaps and ridges.		
	• Explain how the rock cycle		
	affected rock formations in the		
	state of Pennsylvania.		
	Distinguish between examples		
	of rapid surface changes (e.g.,		
	landslides, earthquakes) and slow		
	surface changes (e.g.,		
	weathering).		
	 Identify living plants and animals 		
	that are similar to fossil forms.		
	3.5.7.B Recognize earth resources		
L	O		

	d how they affect everyday life.	
•	dentify and locate significant	
e	rth resources (e.g., rock types,	
0	, gas, coal deposits) in	
P	nnsylvania.	
•	Explain the processes involved	
ir	the formation of oil and coal in	
P	nnsylvania.	
•	Explain the value and uses of	
d	ferent earth resources (e.g.,	
Se	lected minerals, ores, fuel	
SC	urces, agricultural uses).	
•	Compare the locations of human	
Se	ttlements as related to available	
re	sources.	
P	Core Standards:	
	ading for Science and Technical	
S	bjects, 6-12	
	5 Reading Informational Text	
	udents read, understand, and	
	spond to informational text-	
	th emphasis on comprehension,	
	aking connections among ideas	
	d between texts with focus on	
te	xtual evidence.	
	Core Standards: Writing for	
	ience and Technical Subjects, 6-	
1		
	5 Writing	
	udents write for different	
-	rposes and audiences.	
S	udents write clear and focused	

Γ	text to convey a well-defined		
	perspective and appropriate		
	content.		

General Topic	Anchor Descriptor	Eligible Content,	Resources & Activities	Assessments	Suggested
	PA Academic and Core Standards	Essential Knowledge, Skills & Vocabulary			Time (In Days)
Earth History	Anchor Descriptor:	Eligible Content:	Teacher made documents	Teacher prepared	58 Days
	S8.A.1.1 Explain, interpret, and	S8.D.1.1.1 Explain the rock		tests, quizzes, etc.	
Minerals	apply scientific, environmental, or	cycle as changes in the solid	Teacher prepared labs		
	technological knowledge	earth and rock types (igneous –		Series available	
Earth is a Rock	presented in a variety of formats	granite, basalt, obsidian,	Chromebooks	assessments	
	(e.g., visuals, scenarios, graphs).	pumice; sedimentary –	DVD Birth of Earth	online. (Optional)	
Weathering and		limestone, sandstone, shale,	DVD Grand Canyon		
Erosion	S8.A.1.2 Identify and explain the	coal; and metamorphic – slate,	DVD PBS Making America		
	impacts of applying scientific,	quartzite, marble, gneiss).	FOSS Lab		
Deposition	environmental, or technological		Workbook/Worksheets		
	knowledge to address solutions to	S8.D.1.1.2 Describe natural	FOSS online		
Fossils and Past	practical problems.	processes that change Earth's	animations/digital		
Environments		surface (e.g., landslides,	content		
	S8.A.1.3 Identify and analyze	volcanic eruptions,	FOSS Reference Book		
Rock Cycle	evidence that certain variables	earthquakes, mountain	Google Classroom		
•	may have caused measurable	building, new land being	Google Drive		
Plate Tectonics,	changes in natural or human-	formed, weathering, erosion,	Google Form		
Volcanoes, and	made systems.	sedimentation, soil formation).	Google Sheets		
Earthquakes	,		Lab activity comparing		
•	S8.A.2.1 Apply knowledge of	S8.D.1.1.3 Identify soil types	rocks from two locations		
The Earth is a	scientific investigation or	(i.e., humus, topsoil, subsoil,	at the Grand Canyon		
complex and	technological design in different	loam, loess, and parent	Lab activity identifying		
dynamic set of	contexts to make inferences to	material) and their	limestone, sandstone, and		
, interconnected	solve problems.	characteristics (i.e., particle	shale		
systems (e.g.		size, porosity, and	Lab model formation of		
geosphere,	S8.A.2.2 Apply appropriate	permeability) found in	Grand Canyon and steam		
hydrosphere,	instruments for a specific purpose	different biomes and in	table		
atmosphere,	and describe the information the	Pennsylvania, and explain how	Lab activity on types of		
biosphere) that	instrument can provide.	they formed.	sand		

interact over a			Lab activity making	
wide range of	S8.A.3.1 Explain the parts of a	S8.D.1.1.4 Explain how fossils	sedimentary rock layers	
temporal and	simple system, their roles, and	provide evidence about plants	Lab activity on calcium	
spatial scales.	their relationships to the system	and animals that once lived	carbonate and lime water	
	as a whole.	throughout Pennsylvania's	Lab activity crystals size	
		history (e.g., fossils provide	and formation	
	S8.A.3.2 Apply knowledge of	evidence of different	Lab activity igneous and	
	models to make predictions, draw	environments).	metamorphic rocks	
	inferences, or explain		Lab Kit on Plate Tectonics	
	technological concepts.		Newsela website	
			PBS Worksheet on deep	
	S8.B.3.2 Identify evidence of	Essential Knowledge/Skills:	time	
	change to infer and explain the		Prezi online slideshow	
	ways different variables may	All Earth processes are the	Print out of notes for	
	affect change in natural or	result of energy flowing and	students	
	human-made systems.	matter cycling within and	Promethean Board	
		among the planet's systems.	Summative Assessment	
	S8.D.1.1 Describe constructive	The energy is derived from the	Video worksheet	
	and destructive natural processes	sun and the earth's interior.	Video on weathering and	
	that form different geologic	These flows and cycles	erosion	
	structures and resources.	produce chemical and physical	Vocabulary	
		changes in Earth's materials	Worksheet on Plate	
	PA Academic Standards: Science	and living organisms.	Tectonics Lab	
	2.4.7.4 Events in the nexts of a		youTube class review	
	3.1.7.A Explain the parts of a	Major events in Earth's history	videos	
	simple system and their	leave evidence in the geologic		
	relationship to each other.	record that allow the		
	Describe a system as a group of	construction of a geologic		
	related parts that work together	time scale based on relative		
	to achieve a desired result (e.g., digestive system).	ages.		
	• Explain the importance of order			
	in a system.	The Earth's systems interact on various time and size		
	 Distinguish between system 			
		scales. These interactions		

		•	1	1	T
inputs, system processes and	have shaped Earth's history				
system outputs.	and will determine its future.	ļ			
 Distinguish between open loop 					
and closed loop systems.	Plate tectonics is the unifying				
 Apply systems analysis to solve 	theory that explains the past,				
problems.	and current, and future				
	movements of the rocks at				
3.1.7.D Explain scale as a way of	Earth's surface and provides a				
relating concepts and ideas to one	framework for understanding				
another by some measure.	its geological history. Tectonic				
• Apply various applications of	processes continually				
size and dimensions of scale to	generate new ocean seafloor				
scientific, mathematical, and	at ridges and destroy old				
technological applications.	seafloor at trenches.				
• Describe scale as a form of ratio					
and apply to a life situation.	Some natural hazards such as				
,	volcanic eruptions and severe				
3.1.7.E Identify change as a	weather may be preceded by				
variable in describing natural and	phenomena that allow for				
physical systems.	reliable prediction. Others				
Describe fundamental science	such as earthquakes occur				
and technology concepts that	suddenly with no notice and				
could solve practical problems.	are not yet predictable.				
• Explain how ratio is used to	,	l			
describe change.	Evolution is shaped by Earth's				
• Describe the effect of making a	varying geological and				
change in one part of a system on	environmental conditions.	l			
the system as a whole.	Sudden changes in conditions	l			
	(e.g., meteor impacts, major				
3.2.7.A Explain and apply scientific	volcanic eruptions) have				
and technological knowledge.	caused mass extinctions, but				
Distinguish between a scientific	these changes, as well as more				
theory and a belief.	gradual ones, have ultimately	l			
Answer "What if" questions	allowed other life forms to				

based on observation, inference	flourish.		
or prior knowledge or experience			
 Explain how skepticism about a 			
accepted scientific explanation le	-		
to a new understanding.	and many are not renewable		
 Explain how new information 	or replaceable over human		
may change existing theories and	lifetimes.		
practice.			
	Classify rocks as one of three		
3.2.7.B Apply process knowledge	different types and explain the		
to make and interpret	interrelationship of the rock		
observations.	types as part of the rock cycle.		
 Measure materials using a 	(e.g., igneous: granite, basalt,		
variety of scales.	obsidian, pumice; sedimentary:		
 Describe relationships by 	limestone, sandstone, shale,		
making inferences and	coal; and metamorphic: slate,		
predictions.	quartzite, marble, gneiss).		
Communicate, use space / time			
relationships, define	Plan and carry out		
operationally, raise questions,	investigations that investigate		
formulate hypotheses, test and	models of the chemical and		
experiment,	physical processes that cycle		
 Design controlled experiments 	earth materials and form		
recognize variables, and	rocks.		
manipulate variables.			
 Interpret data, formulate 	Compare and contrast various		
models, design models, and	soil types and their		
produce solutions.	characteristics found in		
	different biomes (e.g,		
3.2.7.C Identify and use the	regionally, nationally, globally)		
elements of scientific inquiry to	and explain how they were		
solve problems.	formed.		
 Generate questions about 			
objects, organisms and/or events	Use geologic evidence to		

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that can be answered through	construct patterns and		
scientific investigations.	determine the relative ages		
• Evaluate the appropriateness of	and sequence of geologic		
questions.	events in Earth's 4.6 billion		
 Design an investigation with 	year history.		
limited variables to investigate a			
question.	Construct an explanation		
• Conduct a two-part experiment.	based on evidence for how		
 Judge the significance of 	various processes have		
experimental information in	changed Earth's surface at		
answering the question.	varying time and spatial scales		
Communicate appropriate	(e.g., short-term deposition vs.		
conclusions from the experiment.	mountain building; short-term		
	weathering and erosion vs.		
3.2.7.D Know and use the	canyon or valley formation).		
technological design process to			
solve problems.	Develop and use models of		
• Define different types of	past plate motions to support		
problems.	explanations of existing		
 Define all aspects of the 	patterns in the fossil record,		
problem, necessary information	rock record, continental		
and questions that must be	shapes and seafloor structures.		
answered.			
 Propose the best solution. 	Incorporate a variety of data		
• Design and propose alternative	including geological evidence		
methods to achieve solutions.	from maps and		
Apply a solution.	representations of current		
• Explain the results, present	plate motions to predict future		
improvements, identify and infer	plate motions.		
the impacts of the solution.			
	Use models to explain how the		
3.4.7.B Relate energy sources and	flow of energy (convection of		
transfers to heat and	heat) drives the cycling of		
temperature.	matter between Earth's		

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 Identify and describe sound 	surface and deep interior.		
changes in moving objects.			
 Know that the sun is a major 	Investigate or develop a map		
source of energy that emits	of the past and present natural		
wavelengths of visible light,	hazards in a region to		
infrared and ultraviolet radiation.	demonstrate an understanding		
 Explain the conversion of one 	of forecasting the likelihood of		
form of energy to another by	future events and to inform		
applying knowledge of each form	designs for development of		
of energy.	technologies to mitigate their		
• Explain the parts and functions	effects.		
in an electrical circuit.			
	Use evidence from the rock		
3.4.7.D Describe essential ideas	and fossil records to construct		
about the composition and	arguments that explain how		
structure of the universe and the	past changes in earth's		
earth's place in it.	conditions have caused major		
 Compare various planets' 	extinctions of some life forms		
characteristics.	and allowed others to flourish.		
 Describe basic star types and 			
identify the sun as a star type.	Use maps and other data to		
 Describe and differentiate 	explain how geologic processes		
comets, asteroids and meteors.	have led to the uneven		
 Identify gravity as the force that 	distribution of Earth's natural		
keeps planets in orbit around the	resources.		
sun and governs the rest of the			
movement of the solar system			
and the universe.	Vocabulary:		
 Illustrate how the positions of 	Abrasion		
stars and constellations change in	Absolute age		
relation to the Earth during an	Anthropocene		
evening and from month to	Asthenosphere		
month.	Basin		
 Identify equipment and 	Beach		

instruments that explore the	Bedding
universe.	Biome
Identify the accomplishments	Calcite
and contributions provided by	Canyon
selected past and present	Cenozoic
scientists in the field of	Chalk
astronomy.	Composition
Identify and articulate space	Constructive processes
program efforts to investigate	Continent
possibilities of living in space and	Continental drift
on other planets.	Convection
	Convergence
3.5.7.A Describe earth features	Coquina
and processes.	Core
Describe major layers of the	Correlate
earth.	Cross-bedding
Describe the processes involved	Cross-section
in the creation of geologic	Crust
features (e.g., folding, faulting,	Crust
volcanism, sedimentation) and	Crystal
that these processes seen today	Debris fan
(e.g., erosion, weathering crustal	Delta
plate movement) are similar to	Deposition
those in the past.	Destructive processes
 Describe the processes that 	Divergence
formed Pennsylvania geologic	Dune
structures and resources including	Earthquake
mountains, glacial formations,	Ecology
water gaps and ridges.	Energy flow
 Explain how the rock cycle 	Eon
affected rock formations in the	Epoch
state of Pennsylvania.	Era
 Distinguish between examples 	Erosion
of rapid surface changes (e.g.,	Eruption

landslides, earthquakes) and slow	Exposure		
surface changes (e.g.,	Extinction		
weathering).	Extrusive		
Identify living plants and animals	Fault		
that are similar to fossil forms.	Flood		
	Floodplain		
3.5.7.B Recognize earth resources	Formation		
and how they affect everyday life.	Fossil		
 Identify and locate significant 	Fossil record		
earth resources (e.g., rock types,	Frosted		
oil, gas, coal deposits) in	Geologic time		
Pennsylvania.	Geological time		
 Explain the processes involved 	Geology		
in the formation of oil and coal in	Geoscientist		
Pennsylvania.	Geosphere		
 Explain the value and uses of 	Headwaters		
different earth resources (e.g.,	Historical geology		
selected minerals, ores, fuel	Igneous rock		
sources, agricultural uses).	Index		
Compare the locations of human	Index fossils		
settlements as related to available	Inner core		
resources.	Intrusive		
	Journal		
PA Core Standards:	Landform		
Reading for Science and Technical	Lava		
Subjects, 6-12	Law of fossil succession		
3.5 Reading Informational Text	Law of superposition		
Students read, understand, and	Layer		
respond to informational text-	Lithification		
with emphasis on comprehension,	Lithosphere		
making connections among ideas	Magma		
and between texts with focus on	Mantle		
textual evidence.	Mass		
	Matrix		

PA Core Standards: Writing for	Mesozoic
Science and Technical Subjects, 6-	Metamorphic rock
12	Meteor impact
3.6 Writing	Mineral
Students write for different	Molten
purposes and audiences.	Monocline
Students write clear and focused	Mountain
text to convey a well-defined	Natural
perspective and appropriate	Öolith
content.	Outcrop
	Outer core
	Oxidation
	Paleontologist
	Paleontology
	Paleozoic
	Period
	Plain
	Plate motion
	Plate tectonics
	Plateau
	Precambrian
	Rapids
	Reef limestone
	Relative age
	Resources
	Rock
	Rock cycle
	Rock record
	Salol
	Sample
	Scale
	Seafloor Spreading
	Sediment
	Sedimentary rock

Soil horizons	
Solution	
Sorting	
Stalactite	
Stalagmite	
Strata	
Stratigraphy	
Superposition	
Travertine	
Tsunami	
Tufa	
Uniformitarianism	
Uplift	
Valley	
Volcanic	
Volcanoes	
Weathering	

General Topic	Anchor Descriptor	Eligible Content,	Resources & Activities	Assessments	Suggested
	PA Academic and Core Standards	Essential Knowledge,			Time
		Skills & Vocabulary			(In Days)
Weather and	Anchor Descriptor:	Eligible Content:	Teacher made documents	Teacher prepared	63 Days
Water	S8.A.1.1 Explain, interpret, and	S8.A.2.2.1 Describe the		tests, quizzes, etc.	
	apply scientific, environmental, or	appropriate use of instruments	Teacher prepared labs		
Where's the Air?	technological knowledge	and scales to accurately and		Series available	
	presented in a variety of formats	safely measure time, mass,	Chromebooks	assessments	
Air Pressure and	(e.g., visuals, scenarios, graphs).	distance, volume, or	Climate Change Video	online. (Optional)	
Wind		temperature under a variety of	worksheet		
	S8.A.1.2 Identify and explain the	conditions.	DVD Brain Games In		
Convection	impacts of applying scientific,		Living Color		
	environmental, or technological	S8.A.2.2.2 Apply appropriate	DVD Climate Change Nat		
Radiation	knowledge to address solutions to	measurement systems (e.g.,	Geo Bill Nye		
	practical problems.	time, mass, distance, volume,	FOSS Lab		
Conduction		temperature) to record and	Workbook/Worksheets		
	S8.A.1.3 Identify and analyze	interpret observations under	FOSS online		
Air Flow	evidence that certain variables	varying conditions.	animations/digital		
	may have caused measurable		content		
Water in the Air	changes in natural or human-	S8.A.2.2.3 Describe ways	FOSS Reference Book		
	made systems.	technology (e.g., microscope,	Google Classroom		
Oceans	,	telescope, micrometer,	Google Drive		
	S8.A.2.1 Apply knowledge of	hydraulics, barometer) extends	Google Form		
Human Caused	scientific investigation or	and enhances human abilities	Google Sheets		
Climate Change	technological design in different	for specific purposes.	IR Thermal Camera		
	contexts to make inferences to		Lab activity gas in		
Meteorology	solve problems.	S8.A.3.1.1 Describe a system	syringe		
		(e.g., watershed, circulatory	Lab activity does air have		
The universe is	S8.A.2.2 Apply appropriate	system, heating system,	mass using balloons		
composed of a	instruments for a specific purpose	agricultural system) as a group	Lab activity pressure in a		
variety of different	and describe the information the	of related parts with specific	jar		
objects which are	instrument can provide.	roles that work together to	Lab activity hard boiled		
organized into	instrument can provide.	achieve an observed result.	egg in a glass bottle		
systems, each of	S8.A.3.1 Explain the parts of a		Lab activity layering salt		
systems, each of		<u> </u>	Lab activity layering salt		

which develops	simple system, their roles, and	S8.A.3.1.2 Explain the concept	solutions	
according to	their relationships to the system	of order in a system [e.g., (first	Lab activity layering hot	
accepted physical	as a whole.	to last: manufacturing steps,	and cold water	
processes and		trophic levels); (simple to	Lab demonstration	
laws.	S8.A.3.2 Apply knowledge of	complex: cell, tissue, organ,	convection chamber	
	models to make predictions, draw	organ system)].	Lab Kit on Physical	
The Earth is a	inferences, or explain		Oceanography sections 2,	
complex and	technological concepts.	S8.A.3.2.1 Describe how	3, 8, & 10	
dynamic set of		scientists use models to	Lab activity solar	
interconnected	S8.A.3.3 Describe repeated	explore relationships in natural	radiation heating the	
systems (e.g.	processes or recurring elements in	systems (e.g., an ecosystem,	Earth	
geosphere,	natural, scientific, and	river system, the solar system).	Lab activity on Radiation	
hydrosphere,	technological patterns.		and Energy Transfer	
atmosphere,		S8.A.3.2.2 Describe how	Sun and Seasons	
biosphere) that	S8.C.2.1 Describe energy sources,	engineers use models to	animated graphic	
interact over a	transfer of energy, or conversion	develop new and improved	Direct Solar Energy	
wide range of	of energy.	technologies to solve	demonstration	
temporal and		problems.	Lab activity on	
spatial scales.	S8.C.2.2 Compare the		Conduction Aluminum	
	environmental impact of different	S8.A.3.2.3 Given a model	and Steel in hot water	
The Earth's	energy sources chosen to support	showing simple cause and-	Lab on relative humidity	
processes affect	human endeavors.	effect relationships in a natural	Lab activity on	
and are affected		system, predict results that can	condensation and dew	
by human	S8.D.1.3 Describe characteristic	be used to test the	point	
activities.	features of Earth's water systems	assumptions in the model (e.g.,	Lab activity Charles Law	
	or their impact on resources.	photosynthesis, water cycle,	Lab activity making a	
		diffusion, infiltration).	Cloud in a bottle	
	S8.D.2.1 Explain how pressure,		Prezi online slideshow	
	temperature, moisture, and wind	S8.A.3.3.1 Identify and	Print out of notes for	
	are used to describe atmospheric	describe patterns as repeated	students	
	conditions that affect regional	processes or recurring	Promethean Board	
	weather or climate.	elements in human-made	Summative Assessment	
		systems (e.g., trusses, hub-	Vocabulary	
	S8.D.3.1 Explain the relationships	and-spoke system in	Volume Metric Flask	

between and among the objects		WORKShoot on Universi		
	communications and transportation systems	Worksheet on Physical		
or our solar system.		• • •		
PA Academic Standards: Science	C	•		
TA Actuacióne Standards. Science	systemsy.	Videos		
3.1.7.A Explain the parts of a	S8.A.3.3.2 Describe repeating			
	-			
• Describe a system as a group of	crystals, water waves) or			
related parts that work together	periodic patterns (e.g., daily,			
to achieve a desired result (e.g.,	monthly, annually).			
digestive system).				
• Explain the importance of order	S8.C.2.1.1 Distinguish among			
in a system.	forms of energy (e.g.,			
-	electrical, mechanical,			
, ,				
	energy)			
problems.				
	-			
	conduction, or radiation.			
- · ·	SPC 2 2 1 Describe the Sur			
-				
	S8 D 1 3 1 Describe the water			
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	· · · · ·			
	related parts that work togetherto achieve a desired result (e.g.,digestive system).Explain the importance of order	PA Academic Standards: Sciencefeedback controls in regulated systems).3.1.7.A Explain the parts of a simple system and their relationship to each other. 	PA Academic Standards: Sciencefeedback controls in regulated systems).youTube class review videos3.1.7.A Explain the parts of a simple system and their relationship to each other.S8.A.3.3.2 Describe repeating structure patterns in nature (e.g., veins in a leaf, tree rings, crystals, water waves) or periodic patterns (e.g., daily, monthly, annually).• Describe a system as a group of related parts that work together to achieve a desired result (e.g., digestive system).S8.C.2.1.1 Distinguish among forms of energy (e.g., electrical, mechanical, chemical, light, sound, nuclear) and closed loop systems. • Apply systems analysis to solve problems.S8.C.2.1.2 Explain how energy is transferred from one place to another through convection, conduction, or radiation.3.1.7.B Describe the use of models as an application of scientific or technological concepts. • Identify and describe different types of models and their functions. • Apply models to predict specific results and observations (e.g., population growth, effects of infectious organisms). • Explain systems by outlining aS8.D.1.3.1 Describe the water cycle and the physical processes on which it depends (i.e., evaporation,	PA Academic Standards: Sciencefeedback controls in regulated systems).youTube class review videos3.1.7.A Explain the parts of a simple system and their relationship to each other.S8.A.3.3.2 Describe repeating structure patterns in nature (e.g., veins in a leaf, tree rings, crystals, water waves) or periodic patterns (e.g., daily, monthly, annually).S8.A.2.1.10 Explain the importance of order in a system.S8.C.2.1.1 Distinguish among forms of energy (e.g., electrical, mechanical, chemical, light, sound, nuclear) and cources of energy (i.e., renewable and norrenewable energy)S8.C.2.1.2 Explain how energy is transferred from one place to another through convection, conduction, or radiation.3.1.7.B Describe the use of models as an application of scientific or technological concepts.S8.C.2.1.1 Describe the Sun as the major source of energy that impacts the environment.• Identify and describe different functions.S8.C.2.1.1 Describe the Sun as the major source of energy that impacts the environment.• Apply models to predict specific results and observations (e.g., population growth, effects of infectious organisms).S8.D.1.3.1 Describe the water cycle and the physical processes on which it depends (i.e., exaporation, cycle and the physical processes on which it depends

[
-	irpose and/or designing a model	transpiration, runoff,		
tha	at illustrates its function.	infiltration, energy inputs, and		
		phase changes).		
	1.7.C Identify patterns as			
rej	peated processes or recurring	S8.D.1.3.2 Compare and		
ele	ements in science and	contrast characteristics of		
tee	chnology.	freshwater and saltwater		
• 1	dentify different forms of	systems on the basis of their		
ра	tterns and use them to group	physical characteristics (i.e.,		
an	d classify specific objects.	composition, density, and		
• 1	dentify repeating structure	electrical conductivity) and		
ра	tterns.	their use as natural resources.		
•	dentify and describe patterns			
that	at occur in physical systems	S8.D.1.3.3 Distinguish among		
(e.	.g., construction, manufacturing,	different water systems (e.g.,		
tra	ansportation), informational	wetland systems, ocean		
sys	stems and biochemical-related	systems, river systems,		
sys	stems.	watersheds) and describe their		
		relationships to each other as		
3.1	1.7.D Explain scale as a way of	well as to landforms.		
rel	lating concepts and ideas to one			
an	other by some measure.	S8.D.1.3.4 Identify the physical		
• 4	Apply various applications of	characteristics of a stream and		
siz	e and dimensions of scale to	how these characteristics		
sci	ientific, mathematical, and	determine the types of		
teo	chnological applications.	organisms found within the		
• [Describe scale as a form of ratio	stream environment (e.g.,		
an	d apply to a life situation.	biological diversity, water		
		quality, flow rate, tributaries,		
3.1	1.7.E Identify change as a	surrounding watershed).		
va	riable in describing natural and			
ph	ysical systems.	S8.D.2.1.1 Explain the impact		
• [Describe fundamental science	of water systems on the local		
an	d technology concepts that	weather or the climate of a		

could solve practical problems.	region (e.g., lake effect snow,			
 Explain how ratio is used to 	land/ocean breezes).			
describe change.				
• Describe the effect of making a	S8.D.2.1.2 Identify how global			
change in one part of a system on	patterns of atmospheric			
the system as a whole.	movement influence regional			
	weather and climate.			
3.2.7.A Explain and apply scientific				
and technological knowledge.	S8.D.2.1.3 Identify how cloud			
• Distinguish between a scientific	types, wind directions, and			
theory and a belief.	barometric pressure changes			
• Answer "What if" questions	are associated with weather			
based on observation, inference	patterns in different regions of			
or prior knowledge or experience.	the country.			
• Explain how skepticism about an				
accepted scientific explanation led	S8.D.3.1.1 Describe patterns of			
to a new understanding.	earth's movements (i.e.,			
• Explain how new information	rotation and revolution) in			
may change existing theories and	relation to the moon and sun			
practice.	(i.e., phases, eclipses, and			
	tides)			
3.2.7.B Apply process knowledge				
to make and interpret				
observations.	Essential Knowledge/Skills:			
Measure materials using a				
variety of scales.	Earth's spin axis is fixed in			
Describe relationships by	direction and tilted relative to			
making inferences and	its orbit around the sun. The			
predictions.	seasons are a result of the			
Communicate, use space / time	Earth's tilt on its axis and are			
relationships, define	caused by the differential			
operationally, raise questions,	-			
formulate hypotheses, test and	intensity of sunlight on different areas of Earth			
experiment,				
caperinient,	throughout the year.			

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• Design controlled experiments,			
recognize variables, and	Water continually cycles		
manipulate variables.	among geosphere,		
Interpret data, formulate	hydrosphere, biosphere, and		
models, design models, and	atmosphere via transpiration,		
produce solutions.	evaporation, condensation,		
	and precipitation.		
3.2.7.C Identify and use the			
elements of scientific inquiry to	Weather and climate are		
solve problems.	influenced by interactions		
 Generate questions about 	involving sunlight, the ocean,		
objects, organisms and/or events	the atmosphere, ice,		
that can be answered through	landforms, and living things.		
scientific investigations.	These interactions vary with		
• Evaluate the appropriateness of	latitude, altitude and local and		
questions.	regional geography resulting		
 Design an investigation with 	in complex patterns that are		
limited variables to investigate a	predicted with varying		
guestion.	degrees of reliability.		
• Conduct a two-part experiment.			
 Judge the significance of 	The ocean and other large		
experimental information in	bodies of water exert a major		
answering the question.	influence on weather and		
Communicate appropriate	climate by absorbing energy		
conclusions from the experiment.	from the sun, releasing it over		
	time, and globally		
3.2.7.D Know and use the	redistributing it through ocean		
technological design process to	currents that are driven by		
solve problems.	differences in density relative		
•	-		
Define different types of	to temperature and salinity.		
problems.			
• Define all aspects of the	Human activities influence		
problem, necessary information	Earth's global temperature,		
and questions that must be	and these effects can be		

 answered.	mitigated through applying	
Propose the best solution.	knowledge of climate science,	
 Design and propose alternative 	engineering, etc.	
methods to achieve solutions.	chgineering, etc.	
Apply a solution.	Human activities have	
• Explain the results, present	significantly altered the	
improvements, identify and infer	biosphere and geosphere,	
the impacts of the solution.	sometimes damaging or	
the impacts of the solution.	destroying natural habitats	
3.4.4.D Describe the composition	and causing the extinction of	
and structure of the universe and	other species.	
the earth's place in it.		
• Recognize earth's place in the	Use models of Earth's	
solar system.	orientation and motion to	
• Explain and illustrate the causes	explain how changes in	
of seasonal changes.	intensity and duration of daily	
• Identify planets in our solar	sunlight lead to seasons.	
system and their general		
characteristics.	Identify and explain the	
• Describe the solar system	position and orientation of the	
motions and use them to explain	Earth as it orbits the Sun.	
time (e.g., days, seasons), major		
lunar phases and eclipses.	Develop models for the	
	movement of water within the	
3.4.7.D Describe essential ideas	Earth's spheres (i.e.,	
about the composition and	geosphere, hydrosphere,	
structure of the universe and the	biosphere, atmosphere).	
earth's place in it.		
 Compare various planets' 	Compare and contrast	
characteristics.	characteristics	
 Describe basic star types and 	of freshwater and saltwater	
identify the sun as a star type.	systems	
Describe and differentiate	on the basis of their physical	
 comets, asteroids and meteors.	characteristics.	

Identify gravity as the force that			
keeps planets in orbit around the	Investigate water systems to		
sun and governs the rest of the	identify seasonal and annual		
movement of the solar system	variations in precipitation and		
and the universe.	streamflow and the causes of		
 Illustrate how the positions of 	those variations.		
stars and constellations change in			
relation to the Earth during an	Assess the physical		
evening and from month to	characteristics of a stream to		
month.	determine the types of		
 Identify equipment and 	organisms found within the		
instruments that explore the	stream environment.		
universe.			
 Identify the accomplishments 	Collect data and generate		
and contributions provided by	evidence to show how changes		
selected past and present	in weather conditions result		
scientists in the field of	from the movement,		
astronomy.	interactions, and area of origin		
 Identify and articulate space 	of air masses (e.g., cold, dry		
program efforts to investigate	Canadian air mass vs. warm,		
possibilities of living in space and	moist southern air mass).		
on other planets.			
	Construct and use models to		
3.5.7.C Describe basic elements of	support the explanation of		
meteorology.	how the uneven distribution of		
Explain weather forecasts by	solar energy affects global		
interpreting weather data and	patterns in atmospheric and		
symbols.	oceanic circulation.		
 Explain the oceans' impact on 			
local weather and the climate of a	Analyze weather patterns		
region.	using cloud types, wind		
 Identify how cloud types, wind 	directions, and barometric		
directions and barometric	pressure.		
pressure changes are associated			

with weather patterns in different	-		
regions of the country.	models of oceanic and		
 Explain and illustrate the 	atmospheric circulation, and		
processes of cloud formation and	for the development of local		
precipitation.	and regional climates.		
 Describe and illustrate the majo 			
layers of the earth's atmosphere.	Ask questions to clarify		
Identify different air masses and	evidence of the factors that		
global wind patterns and how	have caused the rise in global		
they relate to the weather	temperatures over the past		
patterns in different regions of	century.		
the U.S.			
	Apply scientific principles to		
3.5.7.D Explain the behavior and	design a method for		
impact of the earth's water	monitoring and minimizing a		
systems.	human impact on the		
• Explain the water cycle using the	environment.		
processes of evaporation and			
condensation.			
 Describe factors that affect 	Vocabulary:		
evaporation and condensation.	Absorb		
Distinguish salt from fresh wate	Air		
(e.g., density, electrical	Air mass		
conduction).	Air pressure		
Compare the effect of water	Altimeter		
type (e.g., polluted, fresh, salt	Altitude		
water) and the life contained in	Anemometer		
them.	Aneroid barometer		
 Identify ocean and shoreline 	Anthropocene		
features, (e.g., bays, inlets, spit,	Aphelion		
tidal marshes).	Atmosphere		
	Atom		
PA Core Standards:	Axis		
Reading for Science and Technica	Barometer		

Subjects, 6-12	Bimetallic strip]
3.5 Reading Informational Text	Biosphere	
Students read, understand, and	Blizzard	
respond to informational text-	Carbon dioxide (CO2)	
with emphasis on comprehension,		
making connections among ideas	Climate	
and between texts with focus on	Climatology	
textual evidence.	Cloud	
	Compass	
PA Core Standards: Writing for	Condensation	
Science and Technical Subjects, 6-	Condensation nucleus	
12	Conduction	
 3.6 Writing	Contract	
Students write for different	Convection	
purposes and audiences.	Convection cell	
Students write clear and focused	Coriolis effect	
text to convey a well-defined	Cumuliform	
perspective and appropriate	Cumulus	
content.	Cyclical pattern	
	Density	
	Dew	
	Dew point	
	Downburst	
	Drought	
	Dust devil	
	Dust storm	
	Earth	
	Energy	
	Equinox	
	Evaporation	
	Exosphere	
	Expand	
	Eye	
	Flash flood	

Flood
Flow rate
Fluid
Freshwater
Frost
Geography
Glacier
Global warming
Global wind
Greenhouse effect
Groundwater
Hail
Heat
Humidity
Hurricane
Hydrosphere
Hygrometer
Icecap
Infiltration
Ionosphere
Kinetic energy
Land breeze
Latitude
Lightning
Liquid crystal
Local wind
Mass
Matter
Mesosphere
Meteorologist
Meteorology
Methane
Microburst
Millibar

Molecule
Nitrogen
Ocean systems
Oceanic circulation
Orbit
Orientation
Oxygen
Ozone
Perihelion
Permanent gas
Photosynthesis
Position
Precipitation
Prevailing wind direction
Radiant energy
Radiation
Radiosonde
Ray
Relative humidity
Reradiate
Revolution
River systems
Rotation
Runoff
Salinity
Saltwater
Saturated
Sea breeze
Season
Solar energy
Solstice
Step leader
Straight-line wind
Stratiform

StratusTemperatureTempometerThermosphereThunderThunderstormTittTornadoTranspirationTributaryToposphereTyphoonVariable gasVolumeWater cycleWater systemWaterspoutWaterspoutWater systemWater systemWater systemWater systemWater spoutWater fortherWater spoutWater fortherWater spoutWater fortherWater fortherWater spoutWater fortherWeatherWeather factorsWeather FrontWetindWindstormWindstorm	Stratosphere	
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Thermosphere Thunder Thunderstorm Tilt Tornado Transfer Transfer Transpiration Troposphere Typhoon Variable gas Volume Water cycle Water system Water system Water sport Watersport Watersport Watersport Watersport Watersport Watersport Watersport Watersport Watersport Weather Front Wetland Wind		
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TributaryTroposphereTyphoonVariable gasVolumeWater cycleWater SystemWater spoutWater spoutWaterspoutWaterspoutWeatherWeather factorsWeather FrontWetlandWind		
TroposphereTyphoonVariable gasVolumeWater cycleWater SystemWater vaporWaterspoutWaterspoutWeatherWeather factorsWeather FrontWeather FrontWetlandWind		
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Variable gasVolumeWater cycleWater SystemWater vaporWater spoutWaterspoutWaterspoutWeatherWeather factorsWeather FrontWeather FrontWetlandWind		
VolumeVolumeWater cycleWater SystemWater SystemWater vaporWater vaporWatershedWaterspoutWaterspoutWeather palloonWeather balloonWeather factorsWeather factorsWeather FrontWeather FrontWeather FrontWetlandWindWind		
Water cycleWater SystemWater vaporWater vaporWatershedWaterspoutWaterspoutWeatherWeather balloonWeather factorsWeather FrontWeather FrontWetlandWind		
Water SystemWater vaporWater vaporWater vaporWatershedWaterspoutWaterspoutWeatherWeather balloonWeather factorsWeather FrontWeather FrontWetlandWetlandWindWind		
Water vaporWatershedWaterspoutWaterspoutWeatherWeather balloonWeather factorsWeather FrontWeather FrontWetlandWind		
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Weather Front Wetland Wind		
Wetland Wind		
Wind		

General Topic	Anchor Descriptor	Eligible Content,	Resources & Activities	Assessments	Suggested
	PA Academic and Core Standards	Essential Knowledge,			Time
		Skills & Vocabulary			(In Days)
Origins the Sun,	Anchor Descriptor:	Eligible Content:	Teacher made	Teacher prepared	14 Days
the Solar System,	S8.A.1.1 Explain, interpret, and	S8.A.2.2.1 Describe the	documents	tests, quizzes, etc.	
and our Moon	apply scientific, environmental, or	appropriate use of instruments			
	technological knowledge	and scales to accurately and	Teacher prepared labs	Series available	
What is our Cosmic	presented in a variety of formats	safely measure time, mass,		assessments online.	
Address?	(e.g., visuals, scenarios, graphs).	distance, volume, or	Chromebooks	(Optional)	
		temperature under a variety of	Google Classroom		
The Big Bang	S8.A.1.2 Identify and explain the	conditions.	Google Drive		
Theory	impacts of applying scientific,		Google Form		
	environmental, or technological	S8.A.2.2.2 Apply appropriate	Google Sheets		
Origins of the Sun	knowledge to address solutions to	measurement systems (e.g.,	Lab on Relativity and		
	practical problems.	time, mass, distance, volume,	Gravity		
How have		temperature) to record and	Lab on stars and outer		
observations made	S8.A.1.3 Identify and analyze	interpret observations under	solar system		
by scientists in the	evidence that certain variables	varying conditions.	Video on the Sun with		
past contributed to	may have caused measurable		worksheet		
our understanding	changes in natural or human-	S8.A.2.2.3 Describe ways	Activities and		
of the Sun and the	made systems.	technology (e.g., microscope,	demonstrations with		
Universe?		telescope, micrometer,	Telescope		
	S8.A.2.1 Apply knowledge of	hydraulics, barometer) extends	Activity with the phases		
What is the Sun's	scientific investigation or	and enhances human abilities	of the Moon		
structure and	technological design in different	for specific purposes.	Video on the Moon with		
source of energy?	contexts to make inferences to		worksheet		
	solve problems.	S8.C.1.1.2 Use characteristic			
How did the Moon		physical or chemical properties			
from?	S8.A.2.2 Apply appropriate	to distinguish one substance			
	instruments for a specific purpose	from another (e.g., density,			
What are the	and describe the information the	thermal			
Moon's	instrument can provide.	expansion/contraction,			
properties?		freezing/melting points, streak			
	S8.A.3.1 Explain the parts of a	test).			

The universe is	simple system, their roles, and			
composed of a	their relationships to the system	S8.C.2.1.1 Distinguish among		
variety of different	as a whole.	forms of energy (e.g.,		
objects, which are		electrical, mechanical,		
organized into	S8.A.3.2 Apply knowledge of	chemical, light, sound, nuclear)		
systems, each of	models to make predictions, draw	and sources of energy (i.e.,		
which develops	inferences, or explain	renewable and nonrenewable		
according to	technological concepts.	energy) radiation.		
accepted physical				
processes and	S8.A.3.3 Describe repeated	S8.C.2.1.3 Describe how one		
laws.	processes or recurring elements in	form of energy (e.g., electrical,		
	natural, scientific, and	mechanical, chemical, light,		
	technological patterns.	sound, nuclear) can be		
		converted into a different form		
	S8.C.1.1 Explain concepts about	of energy.		
	the structure and properties			
	(physical and chemical) of matter.	S8.C.3.1.1 Describe forces		
		acting on objects (e.g., friction,		
	S8.C.2.1 Describe energy sources,	gravity, balanced versus		
	transfer of energy, or conversion	unbalanced).		
	of energy.			
		S8.D.3.1.1 Describe patterns of		
	S8.C.3.1 Describe the effect of	earth's movements (i.e.,		
	multiple forces on the movement,	rotation and revolution) in		
	speed, or direction of an object.	relation to the moon and sun		
		(i.e., phases, eclipses, and		
	S8.D.3.1 Explain the relationships	tides)		
	between and among the objects			
	of our solar system.	S8.D.3.1.2 Describe the role of		
		gravity as the force that		
	PA Academic Standards: Science	governs the movement of the		
		solar system and universe.		
	3.1.7.A Explain the parts of a			
	simple system and their	S8.D.3.1.3 Compare and		

relationship to each other.	contrast characteristics of		
 Describe a system as a group of 	celestial bodies found in the		
related parts that work together	solar system (e.g., moons,		
to achieve a desired result (e.g.,	asteroids, comets, meteors,		
digestive system).	inner and outer planets).		
 Explain the importance of order 			
in a system.			
 Distinguish between system 	Essential Knowledge/Skills:		
inputs, system processes and	•		
system outputs.	The phases of the Moon are		
 Distinguish between open loop 	caused by the orbit of the		
and closed loop systems.	moon around the Earth.		
 Apply systems analysis to solve 			
problems.	Observable patterns and		
	changes in tides are caused by		
3.1.7.B Describe the use of models	the Earth-Moon-Sun system.		
as an application of scientific or			
technological concepts.	Earth's spin axis is fixed in		
 Identify and describe different 	direction and tilted relative to		
types of models and their	its orbit around the sun. The		
functions.	seasons are a result of the		
 Apply models to predict specific 	Earth's tilt on its axis and are		
results and observations (e.g.,	caused by the differential		
population growth, effects of	intensity of sunlight on		
infectious organisms).	different areas of Earth		
 Explain systems by outlining a 	throughout the year.		
system's relevant parts and its			
purpose and/or designing a model	Earth and its solar system are		
that illustrates its function.	part of the Milky Way Galaxy,		
	which is one of many galaxies		
3.1.7.C Identify patterns as	in the universe.		
repeated processes or recurring			
elements in science and	Identify and explain monthly		
technology.	patterns in the phases of the		

 Identify different forms of 	Moon.		
patterns and use them to group			
and classify specific objects.	Use a model of the relative		
 Identify repeating structure 	positions of the sun, earth and		
patterns.	moon to explain the phases of		
 Identify and describe patterns 	the moon.		
that occur in physical systems			
(e.g., construction, manufacturing	, Use models of the Earth-Sun-		
transportation), informational	Moon system to support		
systems and biochemical-related	explanations and predict the		
systems.	cyclic patterns of tides.		
3.1.7.D Explain scale as a way of	Use models of the Earth-Sun-		
relating concepts and ideas to on	e Moon system to support		
another by some measure.	explanations and predict the		
 Apply various applications of 	cyclic patterns of eclipses.		
size and dimensions of scale to			
scientific, mathematical, and	Use models of Earth's		
technological applications.	orientation and motion to		
 Describe scale as a form of ratio 	explain how changes in		
and apply to a life situation.	intensity and duration of daily		
	sunlight lead to seasons.		
3.2.7.A Explain and apply scientif			
and technological knowledge.	Identify and explain the		
 Distinguish between a scientific 	position and orientation of the		
theory and a belief.	Earth as it orbits the Sun.		
 Answer "What if" questions 			
based on observation, inference	Construct and use scale models		
or prior knowledge or experience	to describe the relationship of		
 Explain how skepticism about a 	Earth to the rest of the solar		
accepted scientific explanation le	d system, the Milky Way Galaxy,		
to a new understanding.	and the universe.		
 Explain how new information 			
may change existing theories and	Vocabulary:		

Γ	aractica	altitude		
	practice.			
		asteroid		
	3.2.7.B Apply process knowledge	asteroid belt		
	to make and interpret	atmosphere		
	observations.	Axis		
	 Measure materials using a 	biosphere		
	variety of scales.	bird's-eye view		
	 Describe relationships by 	comet		
	making inferences and	complex crater		
	predictions.	core		
	 Communicate, use space / time 	cosmos		
1	relationships, define	crater		
	operationally, raise questions,	crescent		
f	formulate hypotheses, test and	crescent Moon		
6	experiment,	crust		
	 Design controlled experiments, 	Cyclical pattern		
1	recognize variables, and	diameter		
1	manipulate variables.	Earth		
	 Interpret data, formulate 	ejecta		
1	models, design models, and	elevation		
	produce solutions.	equator		
		equinox		
	3.2.7.C Identify and use the	first-quarter Moon		
	elements of scientific inquiry to	flooded crater		
	solve problems.	frame of reference		
	 Generate questions about 	full Moon		
	objects, organisms and/or events	Galaxy		
	that can be answered through	geosphere		
	scientific investigations.	gibbous		
	• Evaluate the appropriateness of	Gravity		
	questions.	gravity		
	 Design an investigation with 	highlands		
	limited variables to investigate a	hydrosphere		
	question.	impact		

 Conduct a two-part experiment. 	interacting
 Judge the significance of 	latitude
experimental information in	light-year (ly)
answering the question.	Local Group
 Communicate appropriate 	location
conclusions from the experiment.	longitude
	lunar
3.2.7.D Know and use the	Lunar Eclipse
technological design process to	Magellanic Cloud
solve problems.	mantle
 Define different types of 	mare (maria)
problems.	meteor
 Define all aspects of the 	meteorite
problem, necessary information	meteoroid
and questions that must be	Milky Way
answered.	model
 Propose the best solution. 	Moon
 Design and propose alternative 	Neap tide
methods to achieve solutions.	nebula (nebulae)
 Apply a solution. 	new Moon
 Explain the results, present 	North Star
improvements, identify and infer	Oort Cloud
the impacts of the solution.	Orbit
	Orientation
3.4.4.D Describe the composition	Pattern
and structure of the universe and	Penumbra
the earth's place in it.	Phase
 Recognize earth's place in the 	planet
solar system.	point of view
• Explain and illustrate the causes	Position
of seasonal changes.	ray
 Identify planets in our solar 	regolith
system and their general	Revolution
characteristics.	rille

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	Describe the solar system	Rotation		
	motions and use them to explain	rotation		
	time (e.g., days, seasons), major	Satellite		
	lunar phases and eclipses.	scaling factor		
		Season		
	3.4.7.D Describe essential ideas	simple crater		
	about the composition and	solar		
	structure of the universe and the	solar angle		
	earth's place in it.	Solar Eclipse		
	 Compare various planets' 	solar system		
	characteristics.	solstice		
	 Describe basic star types and 	Spring tide		
	identify the sun as a star type.	star		
	 Describe and differentiate 	subsystem		
	comets, asteroids and meteors.	system		
	 Identify gravity as the force that 	third-quarter Moon		
	keeps planets in orbit around the	Tide System		
	sun and governs the rest of the	Tilt		
	movement of the solar system	Umbra		
	and the universe.	Universe		
	 Illustrate how the positions of 	Waning		
	stars and constellations change in	Waxing		
	relation to the Earth during an	-		
	evening and from month to			
	month.			
	 Identify equipment and 			
	universe.			
	 Identify the accomplishments 			
	•			
	 and the universe. Illustrate how the positions of stars and constellations change in relation to the Earth during an evening and from month to month. Identify equipment and instruments that explore the 	Universe Waning		

program efforts to investigate		
possibilities of living in space and		
on other planets.		
PA Core Standards:		
Reading for Science and Technical		
Subjects, 6-12		
3.5 Reading Informational Text		
Students read, understand, and		
respond to informational text-		
with emphasis on comprehension,		
making connections among ideas		
and between texts with focus on		
textual evidence.		
PA Core Standards: Writing for		
Science and Technical Subjects, 6-		
12		
3.6 Writing		
Students write for different		
purposes and audiences.		
Students write clear and focused		
text to convey a well-defined		
perspective and appropriate		
content.		

General Topic	Anchor Descriptor	Eligible Content,	Resources & Activities	Assessments	Suggested
	PA Academic and Core Standards	Essential Knowledge,			Time
		Skills & Vocabulary			(In Days)
The Planets, Solar	Anchor Descriptor:	Eligible Content:	Teacher made	Teacher prepared	11 Days
System, and Life	S8.A.1.1 Explain, interpret, and	S8.A.2.2.1 Describe the	documents	tests, quizzes, etc.	
Cycle of Stars	apply scientific, environmental, or	appropriate use of instruments			
	technological knowledge	and scales to accurately and	Teacher prepared labs	Series available	
How are the inner	presented in a variety of formats	safely measure time, mass,		assessments online.	
planets alike?	(e.g., visuals, scenarios, graphs).	distance, volume, or	Google Classroom	(Optional)	
		temperature under a variety of	Google Drive		
How are the outer	S8.A.1.2 Identify and explain the	conditions.	Google Form		
planets alike?	impacts of applying scientific,		Google Sheets		
	environmental, or technological	S8.A.2.2.2 Apply appropriate	Lab Kit on Plantes		
What are some	knowledge to address solutions to	measurement systems (e.g.,	Lab on spectroscopy		
characteristics of	practical problems.	time, mass, distance, volume,	Newsela website		
planetary moons?		temperature) to record and	Prezi online slideshow		
	S8.A.1.3 Identify and analyze	interpret observations under	Print out of notes for		
What other objects	evidence that certain variables	varying conditions.	students		
are part of the	may have caused measurable		Promethean Board		
solar system?	changes in natural or human-	S8.A.2.2.3 Describe ways	Summative Assessment		
	made systems.	technology (e.g., microscope,	Vocabulary		
What are the		telescope, micrometer,	youTube class review		
phases of a star's	S8.A.2.1 Apply knowledge of	hydraulics, barometer) extends	videos		
life cycle?	scientific investigation or	and enhances human abilities			
	technological design in different	for specific purposes.			
Ordinary baryonic	contexts to make inferences to				
matter makes up	solve problems.	S8.C.1.1.2 Use characteristic			
less than 5% of the		physical or chemical properties			
Universe, so what	S8.A.2.2 Apply appropriate	to distinguish one substance			
is the rest?	instruments for a specific purpose	from another (e.g., density,			
	and describe the information the	thermal			
The universe is	instrument can provide.	expansion/contraction,			
composed of a		freezing/melting points, streak			
variety of different	S8.A.3.1 Explain the parts of a	test).			

objects, which are organized intosimple system, their roles, and their relationships to the systemS8.C.2.1.1 Distinguish among forms of energy (e.g., electrical, mechanical, chemical, light, sound, nuclear)systems, each of which developsas a whole.forms of energy (e.g., electrical, mechanical, chemical, light, sound, nuclear)according to accepted physical processes andS8.A.3.2 Apply knowledge of inferences, or explainchemical, light, sound, nuclear) renewable and nonrenewable	
systems, each of which develops according toas a whole.forms of energy (e.g., electrical, mechanical, chemical, light, sound, nuclear)accopted physical processes andS8.A.3.2 Apply knowledge of inferences, or explainchemical, light, sound, nuclear) and sources of energy (i.e., renewable and nonrenewable	
which developselectrical, mechanical, chemical, light, sound, nuclear)according toS8.A.3.2 Apply knowledge ofchemical, light, sound, nuclear)accepted physicalmodels to make predictions, drawand sources of energy (i.e.,processes andinferences, or explainrenewable and nonrenewable	
according toS8.A.3.2 Apply knowledge ofchemical, light, sound, nuclear)accepted physicalmodels to make predictions, drawand sources of energy (i.e.,processes andinferences, or explainrenewable and nonrenewable	
accepted physical processes andmodels to make predictions, draw inferences, or explainand sources of energy (i.e., renewable and nonrenewable	
processes and inferences, or explain renewable and nonrenewable	
laws. technological concepts. energy) radiation.	
S8.A.3.3 Describe repeated S8.C.2.1.3 Describe how one	
processes or recurring elements in form of energy (e.g., electrical,	
natural, scientific, and mechanical, chemical, light,	
technological patterns. sound, nuclear) can be	
converted into a different form	
S8.C.1.1 Explain concepts about of energy.	
the structure and properties	
(physical and chemical) of matter. S8.C.3.1.1 Describe forces	
acting on objects (e.g., friction,	
S8.C.2.1 Describe energy sources, gravity, balanced versus	
transfer of energy, or conversion unbalanced).	
of energy.	
S8.D.3.1.1 Describe patterns of	
S8.C.3.1 Describe the effect of earth's movements (i.e.,	
multiple forces on the movement, rotation and revolution) in	
speed, or direction of an object. relation to the moon and sun	
(i.e., phases, eclipses, and	
S8.D.3.1 Explain the relationships tides)	
between and among the objects	
of our solar system. S8.D.3.1.2 Describe the role of	
gravity as the force that	
PA Academic Standards: Science governs the movement of the	
solar system and universe.	
3.1.7.A Explain the parts of a	
simple system and their S8.D.3.1.3 Compare and	

1		· · ·	г	
	relationship to each other.	contrast characteristics of		
	 Describe a system as a group of 	celestial bodies found in the		
	related parts that work together	solar system (e.g., moons,		
t	to achieve a desired result (e.g.,	asteroids, comets, meteors,		
C	digestive system).	inner and outer planets).		
•	 Explain the importance of order 			
i	in a system.			
	 Distinguish between system 	Essential Knowledge/Skills:		
i	inputs, system processes and			
S	system outputs.	Earth and its solar system are		
	 Distinguish between open loop 	part of the Milky Way Galaxy,		
	and closed loop systems.	which is one of many galaxies		
	 Apply systems analysis to solve 	in the universe.		
	problems.			
		Our solar system is a		
3	3.1.7.B Describe the use of models	collection of objects, including		
	as an application of scientific or	planets, their moons, and		
	technological concepts.	asteroids that are held in orbit		
	 Identify and describe different 	around the Sun by its		
	types of models and their	gravitational pull on them.		
	functions.	gravitational puil on them.		
	 Apply models to predict specific 	Construct and use scale models		
	results and observations (e.g.,	to describe the relationship of		
	population growth, effects of	Earth to the rest of the solar		
	infectious organisms).			
	 Explain systems by outlining a 	system, the Milky Way Galaxy,		
	system's relevant parts and its	and the universe.		
	purpose and/or designing a model			
		Construct and use scale models		
t	that illustrates its function.	of the solar system to support		
		the explanation of the role of		
	3.1.7.C Identify patterns as	gravity in the motions of the		
	repeated processes or recurring	planets of the observed		
	elements in science and	system.		
t	technology.			

	Identify different forms of	Analyze and interpret data to		
•	atterns and use them to group	determine scale properties (i.e.		
	nd classify specific objects.	distance from sun, diameter,		
	Identify repeating structure	etc.) of objects in the solar		
	atterns.	system.		
	Identify and describe patterns			
	nat occur in physical systems	Vocabulary:		
	e.g., construction, manufacturing,	absorption line		
	ansportation), informational	accretion		
sy	stems and biochemical-related	anthropocene		
sy	/stems.	Asteroids		
		astronomical unit (AU)		
3.	1.7.D Explain scale as a way of	atmosphere		
re	elating concepts and ideas to one	barycenter		
ar	nother by some measure.	big bang theory		
•	Apply various applications of	binary star		
siz	ze and dimensions of scale to	bird's-eye view		
sc	cientific, mathematical, and	black hole		
te	echnological applications.	Doppler shift		
•	Describe scale as a form of ratio	dwarf planet		
ar	nd apply to a life situation.	ecosystem		
		electromagnetic spectrum		
3.	2.7.A Explain and apply scientific	emission line		
ar	nd technological knowledge.	emit		
•	Distinguish between a scientific	exoplanet		
th	neory and a belief.	fossil fuel		
•	Answer "What if" questions	fracking		
	ased on observation, inference	Galaxy		
	r prior knowledge or experience.	Gravity		
	Explain how skepticism about an	greenhouse gas		
	ccepted scientific explanation led	Kuiper Belt		
	a new understanding.	light signature		
	Explain how new information	light-year (ly)		
	ay change existing theories and	Local Group		

practice.	Magellanic Cloud
	meteorite
3.2.7.B Apply process knowledge	Milky Way
to make and interpret	Moon
observations.	nebula (nebulae)
 Measure materials using a 	nonrenewable
variety of scales.	Orbit
 Describe relationships by 	orbital period
making inferences and	orbital radius
predictions.	orrery
Communicate, use space / time	planetesimal
relationships, define	plutoid
operationally, raise questions,	radiometer
formulate hypotheses, test and	red giant
experiment,	renewable
Design controlled experiments,	
recognize variables, and	Satellite Solar system
manipulate variables.	Solar system
 Interpret data, formulate 	spectroscope
models, design models, and	spectrum
produce solutions.	star cluster
	supernova
3.2.7.C Identify and use the	transit
elements of scientific inquiry to	Universe
solve problems.	visible light
Generate questions about	wavelength
objects, organisms and/or events	
that can be answered through	wobble method
scientific investigations.	
Evaluate the appropriateness or	
questions.	
Design an investigation with	
limited variables to investigate a	
question.	

		1
Conduct a two-part experiment.		
 Judge the significance of 		
experimental information in		
answering the question.		
Communicate appropriate		
conclusions from the experiment.		
3.2.7.D Know and use the		
technological design process to		
solve problems.		
Define different types of		
problems.		
Define all aspects of the		
problem, necessary information		
and questions that must be		
answered.		
Propose the best solution.		
Design and propose alternative		
methods to achieve solutions.		
Apply a solution.		
• Explain the results, present		
improvements, identify and infer		
the impacts of the solution.		
3.4.4.D Describe the composition		
and structure of the universe and		
the earth's place in it.		
 Recognize earth's place in the 		
solar system.		
Explain and illustrate the causes		
of seasonal changes.		
Identify planets in our solar		
system and their general		
characteristics.		

Describe the solar system		
motions and use them to explain		
time (e.g., days, seasons), major		
lunar phases and eclipses.		
3.4.7.D Describe essential ideas		
about the composition and		
structure of the universe and the		
earth's place in it.		
 Compare various planets' 		
characteristics.		
 Describe basic star types and 		
identify the sun as a star type.		
 Describe and differentiate 		
comets, asteroids and meteors.		
 Identify gravity as the force that 		
keeps planets in orbit around the		
sun and governs the rest of the		
movement of the solar system		
and the universe.		
 Illustrate how the positions of 		
stars and constellations change in		
relation to the Earth during an		
evening and from month to		
month.		
 Identify equipment and 		
instruments that explore the		
universe.		
 Identify the accomplishments 		
and contributions provided by		
selected past and present		
scientists in the field of		
astronomy.		
 Identify and articulate space 		

program offerts to investigate	
program efforts to investigate	
possibilities of living in space and	
on other planets.	
PA Core Standards:	
Reading for Science and Technical	
Subjects, 6-12	
3.5 Reading Informational Text	
Students read, understand, and	
respond to informational text-	
with emphasis on comprehension,	
making connections among ideas	
and between texts with focus on	
textual evidence.	
PA Core Standards: Writing for	
Science and Technical Subjects, 6-	
12	
3.6 Writing	
Students write for different	
purposes and audiences.	
Students write clear and focused	
text to convey a well-defined	
perspective and appropriate	
content.	

General Topic	Anchor Descriptor	Eligible Content, Essential Knowledge, Skills & Vocabulary	Resources & Activities	Assessments	Suggested Time (In Days)
Review and Final Exam					4 Days

PA Core Standards:

Reading for Science and Technical Subjects, 6-12

3.5 Reading Informational Text

Students read, understand, and respond to informational text-with emphasis on comprehension, making connections among ideas and between texts with focus on textual evidence.

Grades 6-8

CC.3.5.6-8.A.

Cite specific textual evidence to support analysis of science and technical texts.

CC.3.5.6-8.B.

Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

CC.3.5.6-8.C.

Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

CC.3.5.6-8.D.

Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.

CC.3.5.6-8.E.

Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.

CC.3.5.6-8.F.

Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.

CC.3.5.6-8.G.

Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

CC.3.5.6-8.H.

Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

CC.3.5.6-8.I.

Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

CC.3.5.6-8.J.

By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.

PA Core Standards:

Writing for Science and Technical Subjects, 6-12

3.6 Writing

Students write for different purposes and audiences. Students write clear and focused text to convey a well-defined perspective and appropriate content.

Grades 6-8

CC.3.6.6-8.A.

Write arguments focused on discipline-specific content.

- Introduce claim(s) about a topic or issue, acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically.
- Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.
- Use words, phrases, and clauses to create cohesion and clarify the relationships among claims), counterclaims, reasons, and evidence.
- Establish and maintain a formal style.
- Provide a concluding statement or section that follows from and supports the argument presented.

CC.3.6.6-8.B. *

Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

- Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.
- Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.
- Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.
- Use precise language and domain-specific vocabulary to inform about or explain the topic.
- Establish and maintain a formal style and objective tone.
- Provide a concluding statement or section that follows from and supports the information or explanation presented.

CC.3.6.6-8.C.

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CC.3.6.6-8.D.

With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.

CC.3.6.6-8.E.

Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

CC.3.6.6-8.F.

Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

CC.3.6.6-8.G.

Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

CC.3.6.6-8.H.

Draw evidence from informational texts to support analysis reflection, and research.

CC.3.6.6-8.J.I.

Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

	Append	lix: A		
IEP Enhancements				
General Topic:	Specially designed instruction:	Additional Vocabulary:	Assessments/Suggested Time:	
Earth as a System What is Earth system science? What are the Earth system's four spheres, and how do they affect one another? What are cycles and how do they work? The Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales. The Earth's processes affect and are affected by human activities.	 Preferential Seating Directions read aloud Additional textbook sent home Extra time to complete assignments Additional textbook sent home if used Enlarged Text Use of Closed Caption Manipulatives Visual Aids Notes Provided Class review before tests and quizzes Use of Calculator Use of Computer Modified assignments (examples but not limited to: reduction on questions/answers, larger print on typed worksheets) Multi-modality instruction including modeling, explicit instruction, repetition, rephrasing, visual cues, and chunking of material 		Assessments: • Extended time to complete • Adapted assessments in accordance with student's IEP Suggested Time: 15 days as specified in the curriculum and additional time as needed per individual student	
Resources and the Environment Nonrenewable Energy Sources Renewable Energy Sources The Earth's processes affect and are affected by human activities. The Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.	 Preferential Seating Directions read aloud Additional textbook sent home Extra time to complete assignments Additional textbook sent home if used Enlarged Text Use of Closed Caption Manipulatives Visual Aids Notes Provided Class review before tests and quizzes Use of Calculator Use of Computer Modified assignments (examples but not limited to: reduction on questions/answers, larger print on typed worksheets) Multi-modality instruction including modeling, explicit instruction, repetition, rephrasing, visual cues, and chunking of material 		Assessments: • Extended time to complete • Adapted assessments in accordance with student's IEP Suggested Time: 15 days as specified in the curriculum and additional time as needed per individual student	

General Topic:	Specially designed instruction:	Additional Vocabulary:	Assessments/Suggested Time:
Earth History	Preferential Seating Directions read aloud		Assessments: • Extended time to complete
Minerals	Additional textbook sent home		Adapted assessments in accordance with student's IEP
Earth is a Rock	 Extra time to complete assignments Additional textbook sent home if used 		Suggested Time:
Weathering and Erosion	Enlarged Text Use of Closed Caption		58 days as specified in the curriculum and additional time as needed per individual student
Deposition	Manipulatives Visual Aids		
Fossils and Past Environments	 Notes Provided Class review before tests and quizzes 		
Rock Cycle	Use of Calculator Use of Computer		
Plate Tectonics, Volcanoes, and Earthquakes	 Modified assignments (examples but not limited to: reduction on questions/answers, larger print on typed worksheets) 		
The Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that	 Multi-modality instruction including modeling, explicit instruction, repetition, rephrasing, visual cues, and chunking of material 		
interact over a wide range of temporal and spatial scales.			

General Topic:	Specially designed instruction:	Additional Vocabulary:	Assessments/Suggested Time:
Weather and Water Where's the Air?	 Preferential seating Directions read aloud Additional textbook sent home 		Assessments: • Extended time to complete • Adapted assessments in accordance with student's
Air Pressure and Wind	 Extra time to complete assignments Additional textbook sent home if used Enlarged Text 		IEP Suggested Time:
Convection	Use of Closed Caption		63 days as specified in the curriculum and additional time
Radiation	Manipulatives Visual Aids		as needed per individual student
Conduction	 Notes Provided Class review before tests and quizzes 		
Air Flow	Use of calculator Use of computer		
Water in the Air	 Modified assignments (examples but not limited to: reduction on questions/answers, larger print on typed 		
Oceans	worksheets)Multi-modality instruction including modeling, explicit		
Human Caused Climate Change	instruction, repetition, rephrasing, visual cues, and chunking of material		
Meteorology			
The universe is composed of a variety of different objects which are organized into systems, each of which develops according to accepted physical processes and laws.			
The Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.			
The Earth's processes affect and are affected by human activities.			

General Topic:	Specially designed instruction:	Additional Vocabulary:	Assessments/Suggested Time:
Origins the Sun, the Solar System, and our MoonWhat is our Cosmic Address?The Big Bang TheoryOrigins of the SunHow have observations made by scientists in the past contributed to our understanding of the Sun and the Universe?What is the Sun's structure and source of energy?How did the Moon from?What are the Moon's properties?The universe is composed of a variety of different objects, which are organized into systems, each of which develops according to accepted physical processes and laws.	 Preferential seating Directions read aloud Additional textbook sent home Extra time to complete assignments Additional textbook sent home if used Enlarged Text Use of Closed Caption Manipulatives Visual Aids Notes Provided Class review before tests and quizzes Use of calculator Use of computer Modified assignments (examples but not limited to: reduction on questions/answers, larger print on typed worksheets) Multi-modality instruction including modeling, explicit instruction, repetition, rephrasing, visual cues, and chunking of material 		Assessments: • Extended time to complete • Adapted assessments in accordance with student's IEP Suggested Time: 14 days as specified in the curriculum and additional time as needed per individual student

General Topic:	Specially designed instruction:	Additional Vocabulary:	Assessments/Suggested Time:
The Planets, Solar System, and Life Cycle of Stars How are the inner planets alike? How are the outer planets alike? What are some characteristics of planetary moons? What other objects are part of the solar system? What are the phases of a star's life cycle? Ordinary baryonic matter makes up less than 5% of the Universe, so what is the rest? The universe is composed of a variety of different objects, which are organized into systems, each of which develops according to accepted physical processes and laws.	 Preferential seating Directions read aloud Additional textbook sent home Extra time to complete assignments Additional textbook sent home if used Enlarged Text Use of Closed Caption Manipulatives Visual Aids Notes Provided Class review before tests and quizzes Use of Calculator Use of Computer Modified assignments (examples but not limited to: reduction on questions/answers, larger print on typed worksheets) Multi-modality instruction including modeling, explicit instruction, repetition, rephrasing, visual cues, and chunking of material 		Assessments: • Extended time to complete • Adapted assessments in accordance with student's IEP Suggested Time: 11 days as specified in the curriculum and additional time as needed per individual student
Review and Final Exam	As listed as above		