Unit Name	Atomic Structure, Periodic Table, & LOCOM	Classification & Properties of Matter	Energy Forms & Transformations	Thermal Energy & Phase Changes	Waves	Non-Contact Forces	Motion & Newton's Laws	Aviation Capstone
CAPSTONE Connective Theme	Elements in Flight	Sustainable Fuel Sources for Aviation	Energy Forms & Transformations in Aircraft	Effects of Temperature on Aircraft Performance	Aeronautical Applications of Waves	Magnetic, Electrical, & Gravitational Fields in Aviation	Forces in Flight	Science in Aviation: Curating A Collection for an Aviation Museum
Time Frame	5 Weeks	4 Weeks	4 weeks	4 Weeks	5 Weeks	4 Weeks	4 Weeks	3 Weeks
Standards	S8P1. c.,d.,e.	S8P1.a.,d.,f.	S8P2.a.,b.,c.	S8P1.b/S8P2.d	S8P4.a., b., c., d., e., f., g.	S8P5.a., b., c.	S8P3.a., b., c.	S8P1 - S8P5
Gifted Standards	S2A, S4D	S1C, S2B, S2D, S5E	S3A, S3C, S5A, S6A,	S1A, S1B, S4A	S4B, S4C, S4E, S5D	S2C, S3B, S6E	S5B, S5C, S6C, S6D	S1B, S1C, S4E, S6B
Science & Engineering Practices	Students will: Develop models (e.g., atomic level models, including drawings, and computer representations) by analyzing patterns within the periodic table that illustrate the structure, composition, and characteristics of atoms (protons, neutrons, electrons) and simple molecules. Plan and carry out investigations to compare and contrast chemical (i.e., reactivity, combustibility) and physical (i.e., density, melting point, boiling	Students will: Develop and use a model to compare and contrast pure substances and mixtures. Construct an argument based on observational evidence to support the claim that when a change in a substance occurs, it can be classified as either chemical or physical. Construct an explanation based on evidence to describe conservation of matter in a chemical reaction	Students will: Analyze and interpret data to create graphical displays that illustrate the relationships of kinetic energy to mass and speed and potential energy to mass and height of an object. Plan and carry out an investigation to explain the transformation between kinetic and potential energy within a system (e.g. roller coasters, pendulums, rubber bands, etc.). Construct an argument to support a claim about the type of energy transformations within a system [e.g., lighting a match	Students will: Develop and use models to describe the movement of particles in solids, liquids, gasses, and plasma states when thermal energy is added or removed. Plan and carry out investigations on the effects of heat transfer on molecular motion as it relates to the collision of atoms (conduction), through space (radiation), or in currents in a liquid or gas (convection).	Students will: Ask questions to develop explanations about the similarities and differences between electromagnetic and mechanical waves. Construct an explanation using data to illustrate the relationship between the electromagnetic spectrum and energy. Design a device to illustrate the practical applications of the electromagnetic spectrum (e.g., communication, medical, military). Develop and use a model to compare and contrast how light and sound waves are	Students will: Construct an argument using evidence to support the claim that fields (i.e., magnetic fields, gravitational fields, and electric fields) exist between objects exerting forces on each other even when the objects are not in contact. Plan and carry out investigations to demonstrate the distribution of charge in	Students will: Analyze and interpret data to identify patterns in the relationships between speed and distance, and velocity and acceleration. Construct an explanation using Newton's Laws of Motion to describe the effects of balanced and unbalanced forces on the motion of an object. Construct an argument from evidence to support the claim that the amount of force needed to accelerate an	Students will have the opportunity to engage in one or more of the following:

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	point) properties of matter. Construct an argument based on observational evidence to support the claim that when a change in a substance occurs, it can be classified as either chemical or physical.	including the resulting differences between products and reactants.	(light to heat), turning on a light (electrical to light).		reflected, refracted, absorbed, diffracted, or transmitted through various materials. Develop and use a model (e.g., simulations, graphs, illustrations) to predict and describe the relationships between wave properties (e.g., frequency, amplitude, and wavelength) and energy. Develop and use models to demonstrate the effects that lenses have on light (i.e. formation of an image) and their possible technological applications.	conductors and insulators. Plan and carry out investigations to identify the factors (e.g., distance between objects, magnetic force produced by an electromagnet with varying number of wire turns, varying number or size of dry cells, and varying size of iron core) that affect the strength of electric and	object is proportional to its mass (inertia)	
Approaches	Critical Thinking	Communication	Salf Management	Communications	Critical Thinking:	magnetic forces. Critical Thinking:	Research: Collect	Creative Thinking
Approaches To Learning	Critical Thinking:	Communication:	Self-Management:	Communication:	Use models and			Creative Thinking:
Instructional	Identify trends and	Make inferences	Organization: Bring	Read critically and	simulations to	Make logical, reasonable	and analyze data to	Generating novel
Strategies	forecast possibilities	and draw conclusions.	necessary equipment	for	explore complex		identify solutions and/or make	ideas and considering
0	Reflection: Consider	CONCIUSIONS.	and supplies to class.	comprehension.	systems and issues.	judgments and create arguments	informed decisions.	new perspectives. Transfer skills:
	content:	Communication:	Self-Management:	Communication:	systems and issues.	to support them.	inioinieu decisions.	Combine knowledge,
	-What did I learn	Negotiate ideas and	Affective: Practice focus	Take effective	Collaboration:	to support them.	Critical Thinking:	understanding and
	about today?	knowledge with	and concentration.	notes in class.	Work effectively	Social:	Consider	skills to create
	-What don't I	peers and teachers.		1.0103 111 0.1033.	with others.	Collaboration:	consequences to	products or solutions.
	understand?	- 30.0 a teachers.	Research: Collect and	Research: Collect		Delegate and take	events.	p. 50.0000 51 5010010101
	-What questions do I	Research: Collect	analyze data to identify	and analyze data	Research: Collect and	responsibility as		Research: Collect and
	have now?	and analyze data to	solutions and/or make	to identify	analyze data to	appropriate.	Research: Collect	analyze data to
		identify solutions	informed decisions.	solutions and/or	identify solutions		and analyze data to	identify solutions and
		and/or make		make informed	and/or make informed	Research: Collect	identify solutions	make informed
		informed decisions.		decisions	decisions.	and analyze data		decisions.

						to identify	and/or make	
						solutions and/or	informed decisions.	Communication:
						make informed		Collaborate with
						decisions.		peers and experts
								using a variety of
								digital environments
								and media.
Statement	Scientific and technical	Scientists and	Scientific and technical	Scientific and	Advances in science and	Scientific and	Scientific and	Scientific and technica
of Inquiry	advancements enable	technical innovations	advancements have led	technical innovations	technology have	technical	technical	innovations have
	scientists to understand	allow us to visualize,	to the development of	enable us to use	developed humans'	innovations allow us	advancements have	enhanced the
	relationships and	model, and explain	multiple systems that	thermal energy	understanding of the	to understand the	led to the	development of
	patterns that exist	properties of and	facilitate energy	changes for practical	uses, behaviors, and	relationships	development of a	aviation by capitalizing
	related to the structure	changes in systems of	transformations.	applications.	effects of	between objects in	variety of models that	on the relationships
	and function of	matter.			electromagnetic and	magnetic,	can be used to	and interactions
	elements in our natural		Aviation Phenomena :	<u>Aviation</u>	mechanical energy.	gravitational, and	demonstrate changes	between chemistry,
	world.	Aviation Phenomenon:	0,	Phenomenon:		electric fields.	in motion of balanced	physics, and
		How can chemical	and transformations	How are planes	Aviation Phenomena:		and unbalanced forces	engineering.
	Aviation Phenomena:	or physical	impact flight	designed and	How are the	<u>Aviation</u>	on objects.	
	How can the Periodic	properties of pure	operations?	manufactured to	characteristics and	Phenomena:		Aviation Phenomena:
	Table be used to	substances and		withstand extreme	properties of EM and	How do magnetic,	<u>Aviation</u>	How can we use our
	determine	mixtures help		temperature	mechanical waves	electrical, and	Phenomena:	mastery of core ideas
	characteristics of	identify sustainable		changes?	applied in	gravitational fields	How is flight possible	in physical science to
	elements that are	fuel options for			aeronautics?	support and/or	with Newton's Laws	increase community
	useful in flight?	aircraft?				impact aviation?	of Motion?	engagement in our
								local aviation
								museum?
CER	Students answer the phe	enomenon in a Claim-Evi	idence-Reasoning construct	ted response as a form	ative or summative assess	ment.		

Global	Scientific and	Scientific and	Scientific and Technical	Scientific and	Scientific and	Scientific and	Scientific and	Scientific and
Context	Technical Innovation	Technical	Innovation	Technical	Technical Innovation	Technical	Technical Innovation	Technical Innovation
	Students will explore	Innovation	Students will explore the	Innovation	Students will explore	Innovation	Students will explore	Students will explore
	the natural world and	Students will	natural world and its	Students will	the natural world and	Students will	the natural world	the natural world and
	its laws; the	explore the natural	laws; the interaction	explore the	its laws; the	explore the	and its laws; the	its laws; the
	interaction between	world and its laws;	between people and the	natural world and	interaction between	natural world and	interaction between	interaction between
	people and the	the interaction	natural world; how	its laws; the	people and the natural	its laws; the	people and the	people and the
	natural world; how	between people and	humans use their	interaction	world; how humans	interaction	natural world; how	natural world; how
	humans use their	the natural world;	understanding of	between people	use their	between people	humans use their	humans use their
	understanding of	how humans use	scientific principles; the	and the natural	understanding of	and the natural	understanding of	understanding of
	scientific principles;	their understanding	impact of scientific and	world; how	scientific principles;	world; how	scientific principles;	scientific principles;
	the impact of	of scientific	technological advances	humans use their	the impact of scientific	humans use their	the impact of	the impact of
	scientific and	principles; the	on communities and	understanding of	and technological	understanding of	scientific and	scientific and
	technological	impact of scientific	environments; the	scientific	advances on	scientific	technological	technological
	advances on	and technological	impact of environments	principles; the	communities and	principles; the	advances on	advances on
	communities and	advances on	on human activity; how	impact of	environments; the	impact of scientific	communities and	communities and
	environments; the	communities and	humans adapt	scientific and	impact of	and technological	environments; the	environments; the
	impact of	environments; the	environments to their	technological	environments on	advances on	impact of	impact of
	environments on	impact of	needs.	advances on	human activity; how	communities and	environments on	environments on
	human activity; how	environments on		communities and	humans adapt	environments; the	human activity; how	human activity; how
	humans adapt	human activity; how		environments; the	environments to their	impact of	humans adapt	humans adapt
	environments to their	humans adapt		impact of	needs.	environments on	environments to	environments to their
	needs.	environments to		environments on		human activity;	their needs.	needs.
		their needs.		human activity;		how humans		
				how humans		adapt		
				adapt		environments to		
				environments to		their needs.		
				their needs.				

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Key	Relationships (MYP)	Change (MYP/CCC)	Systems and system	Change	Development (MYP)	Relationships	Systems and system	Relationships (MYP)
Concepts	Relationships are the	Change is a	models (MYP/CCC)	(MYP/CCC)	Development is the	(MYP)	models (MYP/CCC)	Relationships are the
	connections and	conversion,	Systems are sets of	Change is a	act or process of	Relationships are	Systems are sets of	connections and
	associations between	transformation or	interacting or	conversion,	growth, progress or	the connections	interacting or	associations between
	properties, objects,	movement from one	interdependent	transformation or	evolution, sometimes	and associations	interdependent	properties, objects,
	people and ideas -	form, state, or value	components. Systems	movement from	through iterative	between	components.	people and ideas -
	including the human	to another. Inquiry	provide structure and	one form, state, or	improvements.	properties,	Systems provide	including the human
	community's	into the concept of	order in human, natural	value to another.		objects, people	structure and order	community's
	connections with the	change involves	and built environments.	Inquiry into the		and ideas -	in human, natural	connections with the
	world in which we	understanding and	Systems can be static or	concept of change		including the	and built	world in which we
	live. Any change in a	evaluating causes,	dynamic, simple or	involves		human	environments.	live. Any change in a
	relationship brings	processes and	complex.	understanding and		community's	Systems can be static	relationship brings
	consequences.	consequences.		evaluating causes,		connections with	or dynamic, simple	consequences.
				processes and		the world in which	or complex.	
				consequences.		we live. Any		
						change in a		
						relationship brings		
						consequences.		
Related	Patterns (MYP/CCC)	Models (MYP)	Energy (MYP/CCC)	Energy (MYP/CCC)	Effects (MYP)	Interaction (MYP)	Movement (MYP)	Interaction (MYP)
Concepts			Transformation (MYP)					Development (MYP)
Disciplinary	Connecting Core Ideas	Connecting Core	Connecting Core Ideas	Connecting Core	Connecting Core Ideas	Connecting Core	Connecting Core	Connecting Core
Core Ideas	 Matter (structure, 	<u>Ideas</u>	Energy	<u>Ideas</u>	 Wave Properties 	<u>Ideas</u>	<u>Ideas</u>	<u>Ideas</u>
	composition,	 Matter 	Energy	 Matter 	(frequency,	Forces	Energy	Energy
	properties)	(structure,	Transformations	(structure,	amplitude,	(friction,	 Kinetic and 	Matter
	 Chemical and 	composition,	Kinetic & Potential	composition,	wavelength, and	gravitational,	Potential	Waves
	Physical	properties)		properties)	energy)	electrical,	Force and	Fields
	Properties and	 Mixtures and 		Thermal	Energy	and	Motion	 Forces & Motion
	Changes	solutions		Energy	(electromagnetic	magnetic)	 Speed and 	
	Atomic Structure	 Elements and 		States of	spectrum)	 Force fields 	Distance	
	 Periodic Table 	compounds		Matter	 Light and Sound 	 Conductors 	 Speed and 	
		 Conservation of 			 Wave Propagation 	and	Acceleration	
		Matter			(reflection,	insulators	 Newton's Laws 	
					refraction,		of Motion	
					absorption,		 Balanced and 	
					diffraction,		Unbalanced	
					transmission)		Forces	
					Lenses			
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MYP Assessments / Performance Tasks	Common Assessments Title and Criterion: Atomic Structure & Periodic Table Unit Assessment Paper I (Science: A,D) Lab: Observing & Using Physical & Chemical Properties and Changes (Science: A,C, D) Elements on the Periodic Tablet (Science A,C,D)	Common Assessments Title and Criterion: Classification & Properties of Matter Unit Assessment Paper I and Paper II (Science: A,D) Designing a Filtration System for Clean Water (Design: A-D) Lab: Investigating Density (Science: A,C,D) DE: Boeing Future U: Boeing 360 Experience: Sustainable Aviation (Science: A,D)	Common Assessments Title and Criterion: Energy Forms and Transformations Unit Assessment Paper I (Science: A,D) Lab/SIM: Ball Drop (Science: B-D) MYP Aviation Energy Design Challenge (Design: A-D)	Common Assessments Title and Criterion: Thermal Energy & Phase Changes Unit Assessment Paper I and Paper II (Science: A,D) Lab: Investigating Boiling Ice Lab (Science: B,C) Lab/SIM: Exploring Thermal Energy Transfer Between Various Materials (Science: A-D)	Common Assessments Title and Criterion: Waves Unit Assessment Paper I (Science: A,D) Lab: Elaborating on Wave Properties (Science: A,B,C,D) Lab: Investigating Wave Behaviors (Science: A,C,D) Lab: Investigating Lenses (Science: A,C,D) Research: Electromagnetic Spectrum in Aviation (Science: A,D)	Common Assessments Title and Criterion: Non-Contact Forces Unit Assessment Paper I and Paper II (Science: A,D) Design an Electromagnet (Design: A-D) Lab: Investigating Electrostatics (Science: B,C) Research: Investigating the Impact of Non-Contact Forces in Flight (Science: A,D)	Common Assessments Title and Criterion: Motion & Newton's Laws Unit Assessment Paper I (Science: A,D) DE: Boeing Future U: Boeing 360 Experience: Flight Path/Forces of Flight Experience (Science: B,C) Lab: Using Spring Scales to Measure Force (Science: B,C)	Common Assessments Title and Criterion: Culminating Capstone Product/Presentation MYP Science A.i. MYP Science D.i iv. MYP Design A.ii. MYP Design B.i., iii., iv. MYP Design C.iv. MYP Design D.ii., iii., iv.
Differentiation For Tiered Learners	Capstone Connections Discovery Education Science Techbook NGSS Case Studies for Differentiated Learners	Capstone Connections Discovery Education Science Techbook NGSS Case Studies for Differentiated Learners	Capstone Connections Discovery Education Science Techbook Discovery Education: Boeing Future U	Capstone Connections Discovery Education Science Techbook	Capstone Connections Discovery Education Science Techbook NGSS Case Studies for Differentiated Learners	Capstone Connections Discovery Education Science Techbook	Capstone Connections Discovery Education Science Techbook Discovery Education: Boeing Future U	Culminating Capstone Product/Presentation Choice of Aviation Museum Product

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	NGSS: All Standards,		NGSS Case Studies for	Discovery	NGSS: All Standards,	NGSS Case Studies	NGSS Case Studies	
	All Students	NGSS: All Standards,	Differentiated Learners	Education: Boeing	All Students	for Differentiated	for Differentiated	
		All Students		Future U		Learners	Learners	
	Extensions -		NGSS: All Standards, All		Extensions -			
	Enrichment	Extensions -	Students	NGSS Case Studies	Enrichment	NGSS: All	NGSS: All Standards,	
	Tasks/Projects	Enrichment		for Differentiated	Tasks/Projects	Standards, All	All Students	
		Tasks/Projects	Extensions - Enrichment	Learners		Students		
			Tasks/Projects	NGSS: All			Extensions -	
				Standards, All		Extensions -	Enrichment	
				Students		Enrichment	Tasks/Projects	
				Extensions -		Tasks/Projects		
				Enrichment				
				Tasks/Projects				
Capstone	Capstone Kickoff	Capstone	Capstone Idea	Capstone	Capstone Action Plan	Capstone Action	Capstone Product	Culminating Capstone
Elements	-Introduction to	Brainstorming &	Submission	Experience: Delta	Proposal (Sections	Plan Proposal	Work	Product &
	Design Cycle	Idea Selection		Flight Museum	A-D)	(Sections E-G)		Presentations
	-Introduction to		Capstone Idea Feedback				DE: Boeing Future U:	
	Honors Science 8	Capstone		Final Capstone	Capstone Action Plan	Capstone Action	Boeing 360	Capstone Showcase
	Capstone	Experience:	MYP Aviation Energy	Idea Submission	Feedback	Plan Feedback	Experience: Flight	
		Marietta Aviation	Design Challenge				Path/Forces of Flight	
	Capstone	History &		Capstone	Electromagnetic	Capstone Product	Experience	
	Brainstorming	Technology Center		Research	Spectrum in Aviation	Work		
	Aviation Periodic Table							
		Lab/SIM: Exploring		DE: Boeing Future		Research:		
		Thermal Energy		U: Boeing 360		Investigating the		
		Transfer Between		Experience:		Impact of		
		Various Materials		Sustainable		Non-Contact		
				Aviation		Forces in Flight		
		CER: Forms of Heat						
		Transfer in Flight						

