

# SCIENCE CURRICULUM

# **SEVENTH GRADE**

Board Approval Date: pending May 2024

## 7 Science: Force and Motion

	Overview						
Grade: 6							
Quarter(s): 1	- 2						
Pacing: 9 wee	ks						
Unit Power Standard(s) Unit Power Standard(s) Description Code							
6-8.PS2.A.1	A.1 APPLY <u>physics principles</u> to DESIGN a <u>solution</u> that minimizes the <u>forces</u> of an object during a <u>collision</u> and DEVELOP an EVALUATION of the <u>solution</u> .						
Below Grade,	/Course Connected Standard(s	)	Above Grade/Course Connected Standard(s)				
<b>4.PS2.A.1</b> Make observa object's motic	ations and/or measurements of a	an ttern	Students who go on to take physical science will engage with: 9-12.PS2.A.1 Analyze data to support and verify the				
can be used to predict future motion.			concepts expressed by Newton's 2nd law of motion, as it describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.				
Unit Supporting Standards Code	Unit Sup	porting	Standards Description				
6-8.PS2.A.2	Plan and conduct an investigat object's motion depends on th the object.	tion to p le sum o	rovide evidence that the change in an f the forces on the object and the mass of				
	Unpacke	d Sta	andard(s)				
Power Standard(s) Code	Power Standard(s) Description	DOK (s)	DESE Expectation(s) Unwrapped				
6-8.PS2.A.1	Apply physics principles to design a solution that minimizes the forces of an object during a collision and develop an evaluation of the solution.	3	<ul> <li><u>SCIENCE AND ENGINEERING</u></li> <li><u>PRACTICES</u></li> <li><u>Constructing Explanations &amp; Designing</u></li> <li>Solutions         <ul> <li>Apply scientific ideas or principles to design an object, tool, process, or system</li> </ul> </li> <li><u>CROSSCUTTING CONCEPTS</u></li> <li>Systems and System Models         <ul> <li>Models can be used to represent systems and their interactions, such as inputs, processes and</li> </ul> </li> </ul>				

			outputs, and er	nergy and matter
			flow within a sy	ystem.
			<b>DISCIPLINARY CORE</b>	IDEAS
			Forces and Motion	
			• For any pair of	interacting objects,
			the force exert	ed by the first object
			on the second	object is equal in
			strength to the	force that the
			second object e	exerts on the first
			but in an oppos	site direction
			(Newton's 3rd	Law)
	Students observe a video of two a	astron	hauts on the Internation	nal Space Station
	(ISS) demonstrating a scientific p	rincipl	le. The ISS is in a microg	gravity environment.
	That means that astronauts expe	rience	e weightlessness in the	ISS. The students
	observe one astronaut push on th	he sec	ond astronaut's back w	hile both are
	floating near each other. As a resu	ult of t	the push, both astronau	uts move away from
	each other in opposite directions	. Figur	re	-
	1 shows the astronauts inside the	e ISS	Figure 1	Figure 2
	floating near each other. Figure 2	show	s 🗿	
	the astronauts moving away from	n each		
	other	reach		
	other.		The s	the per
	To bottor understand the ISS		> 💟	
	domonstration the students			-
	demonstration, the students	الم ما با	· · · ·	
	constructed two cars from wood	DIOCK	S.	
	A hole was drilled into a side of ea	ach blo	OCK. A spring attached i	to a pin was inserted
DESE	into one block and used to exert a	an init	ial force after the cars v	were released. The
Questions	setup is shown in Figure 3.			
Examples:				
	Figure 3			
	Car X Spring Car Y			
		0		
	Drilled hole			
	0000			
		-0		
	The student is in the state of	- 1- 1		i di sette de la companya de la comp
	The students changed some varia	adies a	and repeated the invest	igation several
	times. Table 1 shows the average	data d	collected.	

#### Table 1: Observed Data

Trial (k		ass g)	Dista (n	ance n)
	Car X	Car Y	Car X	Car Y
1	0.15	0.15	1.50	1.50
2	0.15	0.30	1.80	0.75
3	0.30	0.15	0.75	1.80
4	0.30	0.30	0.75	0.75

- 1. Identify the key parts of the system.
- 2. At this point, which trial demonstrates the best solution to minimize the impacts of the collision?
- 3. What would happen in this system if you increase the surface friction?
- 4. What would happen in this system if you increase the stiffness in the spring?
- 5. What would happen in this system if you added oil on the wheels?

"Unwrapped" Content ( <u>nouns</u> ) (students need to know)	"Unwrapped" Skills (VERBS) (students need to be able to do/possible evidence)	"Unwrapped" Understanding (students need to understand/big ideas)
	Given a problem involving a collision between objects, students would:	
<ul> <li>physics principles</li> <li>solution</li> <li>forces</li> <li>collision</li> <li>solution</li> </ul>	<ul> <li>a solution that would minimize the force of an object.</li> <li>DESCRIBE and/or IDENTIFY:         <ul> <li>Criteria</li> <li>Constraints</li> <li>Physics principles involved in determining the solution to the given problem</li> </ul> </li> </ul>	DISCIPLINARY CORE IDEAS Forces and Motion • For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first but in an opposite direction (Newton's 3rd Law)
	<ul><li>EVALUATE:</li><li>A possible solution</li></ul>	

	New Acade	mic Vocabulary	Scaffolded (	Review) Academic
<ul> <li>Collision</li> <li>Minimize</li> <li>Criteria</li> <li>Constraint</li> <li>Force</li> </ul>			<ul><li>Solution</li><li>Evaluate</li></ul>	cadulary
		Asses	sment	
	Common	Summative Assessment	/Demonstration of Und	erstanding
Com     Links to	mon Unit A student ex	ssessment to be comple cample of summative ass	ited in the 2024-2025 So sessments/demonstration	chool Year. on of understanding
		-		
Sco	re 4	Score 3	Score 2	Score 1
Example		Example	Example	Example
				-
		Proficier	ncy Scale	
4	Student has no errors w • To b	mastered understandir hen asked to demonstra e completed in the 2024	ng of the entire standarc te and apply their learn I-2025 School Year	l(s) and makes little to ing.
3	Student cor with few er	nsistently shows underst rors when asked to dem	tanding for most compo onstrate and apply thei	nents of the standard(s) <sup>r</sup> learning.
2	• Student car standard(s), upon.	n sometimes show under , yet there are a few aspe	standing for some of the ects that they are still le	e components of the arning and improving
	• Student rar	ely shows understandin	g for any component of	the standard(s) and are
	still needing •	significant teaching to	apply their learning.	
		Additional	nformation	
Profes	sional Reso	ource Suggestions	Instructior	nal Resources
DESE • <u>MO</u> • <u>Item</u> • <u>Scier</u>	Performanc Specificatic nce Curricul	<u>e Level Descriptors</u> ons um Hub	District Provided: • Savvas Topic 1 • Gizmos • Fan Ph • Crump Other: • MO Leap Bloc	0 ysics le Zones <u>ks</u>
Unit Designer Notes	Content • T d <u>Clarifica</u>	Limits/Assessment Bour asks should be limited to irection tionStatement:	 <u>ndaries:</u> vertical or horizontal in	teractions in one

• Newton's third law of motion states that for every action, there is an equal but opposite action. Using this principle, design a solution that would

minimize the force of an object during a collision and evaluate the
proposed solution. (Examples include collisions between cars,between a
car and a stationary object, etc.)

# SCIENCE: ENERGY

		Over	/iew		
Grade: 7					
Quarter(s): 2					
Pacing: 9 week	S				
Unit Power Standard(s) Unit Power Standard(s) Description Code					
6-8.PS3.A.4	PLAN and CONDUCT an <u>investigation</u> to DETERMINE the <u>relationship</u> among <u>energy transferred</u> , the type of <u>matter</u> , the <u>mass</u> , and the change in <u>temperature</u> of the sample.				
Below Grade/C	Course Connected S	Standard(s)	Above Grade/Course Connected Standard(s)		
<b>4.PS3.A.1</b> Use evidence to construct an explanation relating the speed of an object to the energy of that object.			Students who take high school Physical Science will be engaged with: 9-12.PS3.A2 Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy		
			associated with the motions of particles (objects) and energy associated with the relative position of particles (objects).		
Unit Supporting Standards Code		Unit Support	ing Standards Description		
6-8.PS3.A.1	Construct and inte of kinetic energy t	erpret graphical to the mass of ar	displays of data to describe the relationships nobject and to the speed of an object.		
6-8.PS3.A.2	Develop a model t at a distance chan system.	to describe that ges, different ar	when the arrangement of objects interacting nounts of potential energy are stored in the		
6-8.PS3.A.3	Apply scientific pr minimizes or max	inciples to desig	gn, construct, and test a device that either energy transfer.		
	Unj	oacked S	tandard(s)		
Power Standard(s) Code	Power Standard(s) Description	DOK(s)	DESE Expectation(s) Unwrapped		
	Plan and		SCIENCE AND ENGINEERING PRACTICES		
6-8.PS3.A.4	conduct an investigation to determine the relationship among energy transferred, the type of matter, the mass, and the change in	3	<ul> <li>Planning and Carrying Out Investigations</li> <li>Plan an investigation, and in the design, identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how much data are needed to support a claim.</li> </ul>		

	temperature of	<u></u>	SCIPL	NARY CORE IDEAS
	the sample.	De	finitio	ns of Energy
			• Te	emperature is a measure of the
			av	verage kinetic energy of particles of
			m	atter. The relationship between the
			te	mperature and the total energy of a
			sy	rstem depends on the types, states,
			ar	nd amounts of matter present.
		Co	nserva	tion of Energy and Energy Transfer
			• Tł	ne amount of energy transfer
			ne	eeded to change the temperature of
			a	matter sample by a given amount
			de	epends on the nature of the matter
			ar	nd the size of the sample.
				DITING CONCEPTS
		50	ale, Pro	is evitical to recognize what is
			• IL	Is critical to recognize what is
			re	evant at different measures of size,
			tii :	me, and energy and now it changes
			in tu	scale and proportions affect the
	A sussian of studious		tr	ansier of energy.
	from the Sup The	its want to create a t		nat will cook lood using energy
	cooking Figure 1	chows the material	solar o wailah	lo to the students which include
	newsnaper plasti	shows the material a	il black	construction paper and a pizza
	hox	c wrap, aluminum to	n, blach	construction paper, and a pizza
	<b>DOX.</b>			
	Figure 1: Available Mate	rials		
	NEWS D			
DECE				
DESE				
Examples:				
Examples				
	-			
	1 M/batmaa	ouromonte would th	ovmal	ve to determine the dependent
	I. VVIIdLIIIEd	isurements would th	eymai	to determine the dependent
	2 When test	ting how onorgy is tr	ancfor	rad within the calar cooker the
	2. When test	ing now energy is the		f the air in the cooker increases
	students r	kly than the tempera	nure o	f the food in the cooker M/bat
	factors of	the matter being me		I cause this phonomenon?
		"I Inwrapped" Si	rille	
		(VFRBS)		"Unwrapped" Understanding
"Unwrapped"	Content ( <u>nouns</u> )	(students need to	o be	(students need to understand/big
(students r	need to know)	able to do/possi	ble	ideas)
		evidence)		

					DISCIPLIN	NARY CORE IDEAS	
			Students DES	SIGN an	Definition • Te	<b>is of Energy</b> mperature is a measure	
			investigation that DESCRIBES the data to be collected and the evidence to be derived from the data including: • Initial and final		of the average kinetic		
					energy of particles of matter. The relationship between the temperature		
					an	d the total energy of a	
• Inv	estigation				sv <sup>e</sup>	stem depends on the	
• Re	ationship ergy transferr	ad			tvi	pes states and amounts	
• Ma	atter	eu	the materials		of	matter present	
• Ma	iss		used in the		Conserva	tion of Energy and	
• Ter	mperature		invest	igation	Energy Tr	ansfer	
			<ul> <li>Types</li> </ul>	of matter	• Th	e amount of energy	
			used i	n the	tra	e amount of chergy	
			invest	igation	th	e temperature of a	
			Mass	of matter	m	e temperature or a	
			used in the		200	ount depends on the	
			Invest	igation	n1 1	ture of the matter and	
					th	e size of the sample	
		:-)/b	l	Castfold		A so domio Ma solution :	
● Inv	New Academ	ic vocadu	lary	Scarroid	ed (Review)	Academic vocabulary	
• Ene	ergy Transfer	red		• Re	elationship		
• De	termine			• le	mperature		
• Ma	atter				an anduct		
• Ma	ass				Jinduct		
			Assess	sment			
	Common	Summativ	e Assessment/	Demonstrat	tion of Und	erstanding	
• Co	mmon Unit A	ssessmen	t to be complet	ed in the 20	24-2025 So	chool Year.	
Links	to student ex	ample of s	summative asso	essments/de	emonstratio	on of understanding	
Sc	ore 4	S	core 3	Scor	e 2	Score 1	
Example		Example		Example		Example	
						J	
		F	Proficien	icy Sca	le		
	Student has	mastered	understanding	g of the enti	re standard	(s) and makes little to	
4	no errors w	hen asked	to demonstrat	e and apply	their learni	ing.	
	• To be	e complet	ed in the 2024	2025 Schoo	ol Year.		
	Student con	sistently	shows underst	anding for m	nost compo	nents of the standard(s)	
3	with few er	rors when	asked to demo	onstrate and	apply their	learning.	
	•						
	Student can	sometime	es show unders	standing for	some of the	e components of the	
standard(s), yet there are a few aspects that they a			A A MA Attill LA	a sur the as a set of the second states at			
1 2	stanuaru(s),	yet there	are a few aspe	cts that the	y are still le	arning and improving	
2	upon.	yet there	are a few aspe	cts that they	y are still le	arning and improving	

St 1 st	Ident rarely shows understanding for any component of the standard(s) and are Il needing significant teaching to apply their learning.					
	•					
	Additional In	formation				
Professi	ional Resource Suggestions	Instructional Resources				
DESE	C	District Provided:				
• <u>MO Pe</u>	erformance Level Descriptors	Savvas				
• <u>Item S</u>	pecifications	<ul> <li>Topic 3</li> </ul>				
• <u>Scienc</u>	e Curriculum Hub	<ul> <li>Topic 4</li> </ul>				
		Gizmos				
		<ul> <li>Energy Conversions</li> </ul>				
		<ul> <li>Potential Energy on Shelves</li> </ul>				
		• Energy Conversion in a System				
		)ther·				
		MO Leap Blocks				
		<u> </u>				
	Content Limits/Assessment Bound	daries:				
	<ul> <li>Tasks should not require stu</li> </ul>	udents to calculate the total amount of				
	thermal energy transferred	l.				
	Tasks should limit calculation	ons to proportionate thinking				
Unit Designer	ClarificationStatement:					
Notes	Examples of experiments co	ould include comparing final water				
	temperatures after differer	nt masses of ice melted in the same volume of				
	water with the same initial	temperature, the temperature change of				
	samples of different materia	als with the same mass as they cool or heat in				
	the environment, or the san	ne material with different masses when a				
	specific amount of energy is added.					

## 7 SCIENCE: WAVES AND ELECTROMAGNETIC RADIATION

Overview				
Grade: 7				
Quarter(s): 3				
Pacing: 9 wee	ks			
Unit Power Standard(s) Unit Power Standard(s) Description Code				
<b>6-8.PS4.A.2</b> DEVELOP and USE a <u>model</u> to DESCRIBE that <u>waves</u> are r <u>eflected</u> , <u>absorbed</u> , or <u>transmitted</u> through various <u>materials</u> .				
Below Grade/	Course Connec	ted Standard(s)	Above Grade/Course Connected Standard(s)	
<b>5.PS4.A.1</b> Develop a more be seen only w or when they	del to describe t vhen light is refl produce their ov	hat objects can ected off them wn light.	<ul> <li>Students who go on to take Physical Science will be engaged with:</li> <li>9-12.PS4.A2 Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.</li> <li>9-12.PS4.A1 Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.</li> <li>9-12.PS4.B1 Communicate technical information about how electromagnetic radiation interacts with matter.</li> </ul>	
Unit Supporting Standards Code		Unit Supp	porting Standards Description	
6-8.PS4.A.1	Use mathemat how the amplit	ical representatior tude of a wave is re	ns to describe a simple model for waves that includes lated to the energy in a wave.	
		Unpacked	Standard(s)	
Power Standard(s) Code	Power Standard(s) Description	DOK(s)	DESE Expectation(s) Unwrapped	
6-8.PS4.A.2	Develop and use a model to describe that waves are reflected, absorbed, or transmitted through	3	<ul> <li>SCIENCE AND ENGINEERING PRACTICES</li> <li>Developing and Using Model         <ul> <li>Develop and use a model to describe phenomena.</li> </ul> </li> <li>DISCIPLINARY CORE IDEAS         <ul> <li>Wave Properties</li> <li>A sound wave needs a medium through</li> </ul> </li> </ul>	

	various	;		w	ich it is transmitted.
	materia	als.		Electroma	gnetic Radiation
				• W	hen light shines on an object it is
					Jactod absorbad or transmitted through
				ie ii	
				th	e object, depending on the object's
				ma	aterial and the frequency (color) of the
				lig	ht.
				● Th	e path that light travels can be traced as
				sti	aight lines excent at surfaces between
				dit	ferent transparent materials (e.g. air and
				un	tor of and along ) where the light path
				Wa	iter, air and glass,) where the light path
				be	nds
				● Ho	wever, because light can travel through
				sp	ace, it cannot be considered to only move
				th	ough matter, like sound or water waves
				CROSSCI	ITTING CONCEPTS
				Structure	and Function
				• St	fuctures can be designed to serve
				ра	rticular functions by taking into account
				pr	operties of different materials and how
				ma	iterials can be shaped and used.
			Table 1		
		Madia	Velocity of Sound in Various Me	ia Volocity (m(r)	
		Air	1.	343.0	
		Pure Water	1,000.0	1,493.0	
		Glass	2,600.0	4,540.0	
DESE		Iron	7,870.	5,130.0	
Ouestions		Lead	11,350.	1,156.0	
Examples:					
·	1.	Using t	he data above, dev	elop a mod	el which explains why the speed of sound
		is faste	er in solids and liqui	ds than gas	ses.
	2.	Descri	be the organizatior	s of particl	es and how the spatial relationships
		matter	for behavior and fu	unction.	
			"Unwrapped" Ski	ills (VERBS	
"Unwrappe	ed" Cont	ent	(students need to	o be able to	" "Unwrapped" Understanding
( <u>no</u>	<u>uns</u> )		oh		entrapped enderstanding
(students ne					(students need to understand)
	eed to kn	iow)	& DOk	()(	(students need to understand)
	eed to kn	iow)	& DOK	()	(students need to understand) DISCIPLINARY CORE IDEAS
	eed to kn	iow)	& DOK DEVELOP model	() s to	(students need to understand) DISCIPLINARY CORE IDEAS Wave Properties
	eed to kn	iow)	& DOK DEVELOP model IDENtIFY relevan	() s to nt	(students need to understand) <u>DISCIPLINARY CORE IDEAS</u> Wave Properties A sound wave people a modium
Mode	eed to kn	iow)	& DOK DEVELOP model IDENtIFY relevan components:	K) s to nt	(students need to understand) DISCIPLINARY CORE IDEAS Wave Properties • A sound wave needs a medium
• Model	eed to kn	iow)	& DOK DEVELOP model IDENtIFY relevan components: • Type of wa	() s to nt aves and	(students need to understand) DISCIPLINARY CORE IDEAS Wave Properties • A sound wave needs a medium through which it is transmitted.
<ul> <li>Model</li> <li>Waves</li> <li>Peffect</li> </ul>	eed to kn	iow)	& DOK DEVELOP model IDENtIFY relevan components: • Type of wa their amp	() s to nt aves and litude and	(students need to understand) DISCIPLINARY CORE IDEAS Wave Properties • A sound wave needs a medium through which it is transmitted. Electromagnetic Radiation
<ul> <li>Model</li> <li>Waves</li> <li>Reflect</li> <li>Absor</li> </ul>	eed to kn	iow)	& DOK DEVELOP model IDENtIFY relevan components: • Type of wa their amp frequency	() s to nt aves and litude and ':	(students need to understand) DISCIPLINARY CORE IDEAS Wave Properties • A sound wave needs a medium through which it is transmitted. Electromagnetic Radiation • When light shines on an object,
<ul> <li>Model</li> <li>Waves</li> <li>Reflect</li> <li>Absor</li> </ul>	eed to kn	iow)	& DOK DEVELOP model IDENtIFY relevant components: • Type of way their amp frequency • M	s to nt aves and litude and r: atter	(students need to understand) DISCIPLINARY CORE IDEAS Wave Properties • A sound wave needs a medium through which it is transmitted. Electromagnetic Radiation • When light shines on an object, it is reflected, absorbed or
<ul> <li>Model</li> <li>Waves</li> <li>Reflect</li> <li>Absor</li> <li>Transr</li> <li>Motor</li> </ul>	eed to kn s s t b nit	iow)	& DOK & DOK DEVELOP model IDENtIFY relevan components: • Type of way their amp frequency • M • Lig	() s to nt aves and litude and r: atter ght	(students need to understand) DISCIPLINARY CORE IDEAS Wave Properties • A sound wave needs a medium through which it is transmitted. Electromagnetic Radiation • When light shines on an object, it is reflected, absorbed or transmitted through the
<ul> <li>Model</li> <li>Waves</li> <li>Reflect</li> <li>Absor</li> <li>Transr</li> <li>Mater</li> </ul>	eed to kn I s t b mit ial	iow)	& DOK & DOK DEVELOP model IDENtIFY relevan components: • Type of way their amp frequency • M • Lig • Various m	s to nt aves and litude and ': atter ght aterials	(students need to understand) DISCIPLINARY CORE IDEAS Wave Properties • A sound wave needs a medium through which it is transmitted. Electromagnetic Radiation • When light shines on an object, it is reflected, absorbed or transmitted through the object, depending on the
<ul> <li>Model</li> <li>Waves</li> <li>Reflect</li> <li>Absor</li> <li>Transr</li> <li>Mater</li> </ul>	eed to kn l s t b mit ial	iow)	& DOK & DOK DEVELOP model IDENtIFY relevan components: • Type of way their amp frequency • M • Lig • Various m through w	s to nt aves and litude and r: atter ght aterials r/hich waves	(students need to understand) DISCIPLINARY CORE IDEAS Wave Properties • A sound wave needs a medium through which it is transmitted. Electromagnetic Radiation • When light shines on an object, it is reflected, absorbed or transmitted through the object, depending on the object's material and the
<ul> <li>Model</li> <li>Waves</li> <li>Reflect</li> <li>Absor</li> <li>Transr</li> <li>Mater</li> </ul>	eed to kn s st b mit ial	now)	& DOK & DOK DEVELOP model IDENtIFY relevan components: • Type of way their amp frequency • M • Lig • Various m through w are reflect	() s to nt aves and litude and r: atter ght aterials r/hich waves ted,	(students need to understand) DISCIPLINARY CORE IDEAS Wave Properties • A sound wave needs a medium through which it is transmitted. Electromagnetic Radiation • When light shines on an object, it is reflected, absorbed or transmitted through the object, depending on the object's material and the

	absorbed, or transmittedRelevant characteristics of the wave after it has interacted with a material (frequency, amplitude, wavelength)Position of the source of the waveUSE models: • To describe why materials with certain properties are well suited for particular functions (e.g lenses and mirrors, sound absorbers in concert halls, colored light filter, sound barriers next to highways,)New Academic VocabularyScaffol • Dev • Castfolabsorb • transmit • reflect• Dev • Des • Des		r I I I I I I I I I I I I I I I I I I I	The path that lij be traced as str except at surface different transp (e.g. air and wate glass,) where the bends However, becaute travel through so be considered to through matter water waves	ght travels can aight lines, ces between barent materials cer, air and he light path use light can space, it cannot to only move ; like sound or	
•	amplitude					
	- 6	Asses	sment			
•	Commor Common Unit As	summative Assessment sessment to be complete	d in the 2024-2025	Understanding School Year.		
L	inks to student e	xample of summative as	sessments/demonst	ration of under	standing	
		• •				
	Score 4	Score 3	Score 2	5	Score 1	
Example	Example Example		Example	Example		
	Proficiency Scale					
4	Student has may when asked to d	stered understanding of lemonstrate and apply th	the entire standard neir learning.	s) and makes lit	tle to no errors	
	IO De CO	ently shows understand	ng for most compor	ents of the star	ndard(s) with	
3	3 few errors when asked to demonstrate and apply			ing.		
	•					

	Student can sometimes show understanding for some of the components of the					
2	standard(s), yet there are a few aspects that they are still learning and improving upon.					
1	Student rarely shows understanding to apply	for any component of the standard(s) and are still their learning.				
	Additional Information					
Pro	Professional Resource Suggestions Instructional Resources					
DESE •	MO Performance Level Descriptors Item Specifications Science Curriculum Hub	District Provided: • Savvas • Topic 5 • Gizmos • Waves • Ripple Tank • Color Absorption • Laser Reflection • Basic Prism Other: • MO Leap Blocks				
Unit Designer Notes	<ul> <li>Content Limits/Assessment Bone</li> <li>Tasks should be limited to mechanical waves.</li> <li>ClarificationStatement:         <ul> <li>Emphasis is on both lightonic drawings, simulation</li> </ul> </li> </ul>	<u>undaries:</u> o qualitative applications pertaining to light and t and mechanical waves. Examples of models could tions, and written descriptions.				

# 7 SCIENCE: ELECTRICITY AND MAGNETISM

Overview					
Grade: 7					
Quarter(s): 4					
Pacing: 9 week	S				
Unit Power Standard(s) Code	Unit Power Standard(s) Unit Power Standard(s) Description Code				
6-8.PS2.B.3	CONDUCT an <u>investiga</u> PROVIDE <u>evidence</u> tha exerting <u>forces</u> on each	a <u>tion</u> and E It <u>electric a</u> other eve	VALUATE the <u>experimental design</u> to and magnetic fields exist between <u>objects</u> n though the objects are not in <u>contact</u> .		
Below Grade/C	Course Connected Stand	ard(s)	Above Grade/Course Connected Standard(s)		
3.PS2.B.1			Students who go on to take physical science will be engaged with:		
Plan and condu the cause and e magnetic intera in contact with	ct investigations to deter ffect relationship of elec actions between two obje each other.	<b>9-12.PS2.B.2</b> Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current			
Unit Supporting Standards Code	Unit Supporting Standards Description				
6-8.PS2.B.1	Analyze diagrams and collect data to determine the factors that affect the strength of electric and magnetic forces.				
	Unpac	ked S	tandard(s)		
Power Standard(s) Code	Power Standard(s) Description	DOK(s )	DESE Expectation(s) Unwrapped		
			SCIENCE AND ENGINEERING PRACTICES		
6-8.PS2.B.3	Conduct an investigation and evaluate the experimental design to provide evidence that electric and magnetic fields exist between objects exerting forces on each other even though the objects are not in contact.	3	<ul> <li>Planning and Carrying Out Investigations</li> <li>Conduct an investigation and evaluate the experimental design (identify variables and controls, what tools are needed, how measurements are taken and recorded, how many trials are needed) to provide evidence that electric and magnetic fields exist between objects.</li> <li>DISCIPLINARY CORE IDEAS Types of Interactions         <ul> <li>Forces that act a distance (e.g. electric, magnetic) can be explained by fields that extend through space</li> </ul> </li> </ul>		

					and can	be mapp	ped by their effect	on
					a test ob	ject (e.g	, a charged object	,
					ball)			
				<u>CROS</u>	SCUTTIN	<u>G CONO</u>	<u>CEPTS</u>	
				Cause	e and Effec	t		
				•	May be ι	used to p	predict phenomen	ia in
					natural o	or design	ned systems (i.e.	
					electrica	and mag	netic fields)	
	Magnet a	nd Paperclip I	nvestigatio	n				
	Magnet	number of	distance fr	om				
	widghet	paper clips	the clips (c	m)				
				,				
	X	4	1.0					
	Y	9	0.5					
DESE	A student	did a short in	vestigation	regar	ding the po	ower of I	magnets. The data	a 🛛
Questions	from the i	nvestigation i	s listed in tl	he tabl	e above.			
Examples:								
	1. Us	sing the data t	able, evalu	ate the	e investigat	tion		
	2. Id	entify the foll	owing varia	ables fo	ound in this	s investi	gation	
		a. Indepen	dent Varial	ble				
		•						
		b. Depend	ent Variabl	е				
		b. Depend c. Constar	ent Variabl its	e				
		<ul><li>b. Depend</li><li>c. Constar</li><li>d. Possibly</li></ul>	ent Variabl its Hypothesi	e				
	3. De	b. Depend c. Constar d. Possibly escribe how y	ent Variabl its <sup>,</sup> Hypothesi ou can test	e is wheth	er distanc	e or typ	e of magnet cause	s
	3. De th	b. Depend c. Constar d. Possibly escribe how y e difference i	ent Variabl Its Hypothesi ou can test I the numb	e is wheth er of p	ier distanc aperclips p	e or typo bicked u	e of magnet cause p.	s
	3. De th	b. Depend c. Constar d. Possibly escribe how yo e difference in	ent Variabl hts Hypothesi ou can test h the numb "Unwra	e is wheth er of p apped	ier distanc aperclips p " Skills	e or type bicked u	e of magnet cause p.	S
"1100.000000	3. De th	b. Depend c. Constar d. Possibly escribe how y e difference in	ent Variabl Its Hypothesi ou can test Ithe numb "Unwr (N	e s wheth er of p apped VERBS	ier distanc aperclips p " Skills ;)	e or type bicked u	e of magnet cause p. "Unwrapped"	S
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<ul> <li>"Unwrappe (student)</li> <li>investig</li> <li>experint</li> <li>evident</li> <li>electrict</li> <li>objects</li> <li>forces</li> <li>contact</li> </ul>	3. De the ed" Content ts need to ke gation nental desi ce c and magne	b. Depend c. Constar d. Possibly escribe how ye e difference in t ( <u>nouns</u> ) t ( <u>nouns</u> ) t (now)	ent Variabl its Hypothesi ou can test in the numb "Unwra (\ (studen able to ev Students investiga DEMONS • th be ex or ev co ea (e	e wheth er of p apped VERBS ots nee odo/po vidence vidence tion to STRAT hat field etweer kerting n each ven wh ontact ach oth lectric agneti	er distanc aperclips p "Skills of to be ossible e) DUCT an E: d exist n objects forces other en not in with her /	e or type bicked u Unde need <u>DISCII</u> <u>IDEAS</u> Types •	e of magnet cause p. "Unwrapped" erstanding (studed d to understand/b ideas) PLINARY CORE of Interactions Forces that act a distance (e.g. electric, magnetic can be explained fields that extend through space ar can be mapped b their effect on a object (e.g. a charged object b	s nts nig ic) l by d nd iyy test
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New Academic Vocabulary			Scaffolded (Review	) Academic Vocabulary		
<ul> <li>Investigation</li> <li>Experimental design</li> <li>Evidence</li> <li>Electric Field</li> <li>Magnetic Field</li> <li>Magnetic</li> <li>Contact</li> </ul>			<ul> <li>Electric</li> <li>Forces</li> <li>Object</li> <li>Experimental</li> <li>Evidence</li> </ul>	design		
		Asses	sment			
	Common	Summative Assessment/	Demonstration of Und	erstanding		
• Cor Links	mmon Unit A to student ex	ssessment to be complet cample of summative ass	ted in the 2024-2025 So essments/demonstratio	chool Year. on of understanding		
Sc	ore 4	Score 3	Score 2	Score 1		
Example		Example	Example	Example		
		Proficier	ncy Scale			
<ul> <li>Student has mastered understanding of the entire standard(s) and makes little to no errors when asked to demonstrate and apply their learning.</li> <li>To be completed in the 2024-2025 School Year.</li> </ul>						
3	Student consistently shows understanding for most components of the standard(s) with few errors when asked to demonstrate and apply their learning.					
2	• Student can sometimes show understanding for some of the components of the standard(s), yet there are a few aspects that they are still learning and improving upon.					
	•	- l l		the standard(s) and suc		
1	still needing	significant teaching to a	apply their learning.	the standard(s) and are		
	•	Additional	nformation			
Drof	Additional Information					
<ul> <li>Professional Resource Suggestions</li> <li>DESE <ul> <li><u>MO Performance Level Descriptors</u></li> <li><u>Item Specifications</u></li> <li><u>Science Curriculum Hub</u></li> </ul> </li> </ul>			District Provided: • Savvas Topic 6 • Gizmos • Magnetism • Circuit Builder • Circuits Other: • MO Leap Blocks			
Unit Design Notes	Unit Designer       Content Limits/Assessment Boundaries:         • Tasks should be limited to electric and magnetic fields.         • Tasks should be limited to qualitative evidence for the existence electrical magnetic fields.					

ClarificationStatement:		
<ul> <li>Examples of this phenomenon could include the interactions of magnets, electrically-charged strips of tape, and electrically-charged pith balls.</li> <li>Examples of investigations could include first-hand experiences for simulations</li> </ul>		