Unit Title: Forces and Interactions: September / October (MP 1)

Big Idea: Students will build upon the concepts of balanced and unbalanced forces by considering variables such as gravity, magnetism, friction, mass, and distance.

Investigation Questions	NGSS/ PA Core Standards	Objectives/ Lab Activities	Key Vocabulary	Reading Wonders Connection
LESSON 1: Balanced	3-PS2-1: Plan and conduct an investigation to provide	Use a beam balance model to	Balance	 Unit 1 Week 4 Inventions
Forces	evidence of the effects of balanced and unbalanced forces on	investigate balanced forces.	 Balanced forces 	 Unit 4 Week 4 Flight
	the motion of an object.		Equal	 Unit 5 Week 5 Energy
How do things become	3-PS2-2: Make observations and/or measurements of an	Determine the relative mass of	Even	
balanced?	object's motion to provide evidence that a pattern can be used	an object using a beam	Force	
	to predict future motion.	balance.	 Fulcrum 	
How can we use a balance	3-PS2-3: Ask questions to determine cause and effect		Gram	
to estimate mass?	relationships of electric or magnetic interactions between two	Define "force," and draw	 Gravity 	
	objects not in contact with each other.	connections to the forces	 Level 	
How does gravity affect	3-PS2-4: Define a simple design problem that can be solved	acting upon an object in motion	 Mass 	
balance?	by applying scientific ideas about magnets.	and an object at rest.	 Scale 	
	3-5-ETS1-1: Define a simple design problem reflecting a need			
	or a want that includes specified criteria for success and	Explain how the pull of gravity		
	constraints on materials, time, or cost.	can result in balanced forces.		
LESSON 2: Unbalanced	3-5-ETS1-2: Generate and compare multiple possible	Use models to explain the law	 Friction 	
Forces	solutions to a problem based on how well each is likely to	of inertia.	 Gram 	
	meet the criteria and constraints of the problem.		Inertia	
What is inertia?	S3.C.1.1.1: Describe matter in terms of its observable	Explain how forces are	 Isaac Newton 	
	properties (e.g., weight, mass, shape, size, color, texture,	required to change the motion	 Motion 	
How does inertia affect the	state).	of objects.	 Newton 	
motion of an object?	S3.C.1.1.2: Classify matter using observable physical		 Spring scale 	
	properties (e.g., weight, mass, shape, size, color, texture,	Identify the cause-and-effect		
Why does friction slow	state).	relationship between forces		
movement?	S3.C.2.1.1: Identify basic forms and sources of energy (e.g.,	and movement.		
	Sun, heat, light, sound).			
	S4.C.2.1.1 : Identify energy forms, energy transfer, and energy	Predict how different textures		
	examples (e.g., light, heat, electrical).	affect friction.		
	S3.C.3.1.1: Identify and describe an object's motion (e.g.,			
	start/stop, up/down, left/right, faster/slower, spinning).			

LESSON 3: Changes in	S4.C.3.1.2: Compare the relative movement of objects or	Use a model to determine how	Acceleration
Motion	describe types of motion that are evident (e.g., bouncing ball,	the strength of a force affects	Decrease
Motion	moving in a straight line, back and forth, merry-go-round).	an object's motion.	Distance
How does force affect the	S4.C.3.1.1: Describe changes in motion caused by forces	an object a motion.	Increase
motion of an object?	(e.g., magnetic, pushes or pulls, gravity, friction).	Use a model to determine how	• Load
motion of an object.	S3.C.3.1.2: Describe an object's position in terms of its	an object's mass affects its	Speed
How does mass affect the	relationship to another object or stationary background (e.g.,	ability to overcome inertia.	Strength
motion of an object?	behind, beside, on top of, above, below).	domity to evercome menta.	Cuongar
motion of an object:	S4.C.3.1.3: Describe the position of an object by locating it	Observe a magnetic force and	
How can I increase magnetic	relative to another object or a stationary background (e.g.,	investigate how its strength can	
forces?	geographic direction, left, up).	be changed.	
101000.	3.2.3.B4: Identify and classify objects and materials that are	bo shangou.	
LESSON 4: Magnetism and	conductors or insulators of electricity. Identify and classify	Make connections between	Attract
Electricity	objects and materials as magnetic or non-magnetic.	magnetism and the material an	• Charge
	3.2.4.B4: Demonstrate that magnets have poles that repel	object is made from.	Magnet
Are all metals magnetic?	and attract each other.		Magnetic field
7 to an inetale magnetic	S4.A.1.3.1: Observe and record change by using time and	Identify attractive and repulsive	Magnetism
What is a magnetic field and	measurement.	charges.	Repel
how can we see it?	S4.A.1.3.2: Describe relative size, distance, or motion.		Static electricity
	S3.A.1.1: Distinguish between fact and opinion.	Recognize attractive magnetic	,
How does the shape of a	S3.A.2.1.1, S4.A.2.1.1: Generate questions about objects,	forces as pulls and repulsive	
magnet change its magnetic	organisms, or events that can be answered through scientific	magnetic forces as pushes.	
forces?	investigations.		
	S3.A.2.1.2: Make predictions based on observations.	Plan an investigation to prove	
How do electric forces	S3.A.2.1.3: Identify the variables in a simple investigation.	that magnetic fields can differ	
compare to magnetic forces?	S4.A.2.1.2: Design and describe an investigation (a fair test)	based on the shape of the	
	to test one variable.	magnet.	
	S4.A.2.1.4: State a conclusion that is consistent with the		
	information/data.	Use a model to demonstrate	
	S3.A.2.2.1: Identify appropriate tools or instruments for	how electric forces behave	
	specific tasks, and describe the information they provide (i.e.,	similarly to magnetic forces.	
	measuring [length—ruler; mass— balance scale] and making		
	observations [hand lenses—very small objects]).		
	S3.A.3.2.1: Identify what models represent (e.g., simple maps		
	showing mountains, valleys, lakes, and rivers; dioramas).		

LESSON 5: Magnetic	3.4.4.C2: Describe the engineering design process: Define a	Reinforce previous learning	See previous
Solutions	problem. Generate ideas. Select a solution and test it. Make	and draw connections between	lessons
	the item. Evaluate the item.	forces, including gravity,	
Can you illustrate different	3.1.2.A9: Asking Questions and Defining Problems;	magnetism, and electricity.	
forces and interactions?	Developing and Using Models; Using Mathematics and		
	Computational Thinking; Constructing Explanations and	Design an efficient model of	
Can you achieve the project	Designing Solutions CCC Patterns; Cause and Effect	magnetism.	
goal by designing a model	3.1.2.A9: Asking Questions and Defining Problems;		
using magnets?	Developing and Using Models; Constructing Explanations and	Evaluate a model to identify	
	Designing Solutions CCC Patterns; Cause and Effect	patterns related to forces and	
	3.1.2.A9: Asking Questions and Defining Problems;	their interactions.	
	Developing and Using Models; Constructing Explanations and		
	Designing Solutions CCC Patterns; Cause and Effect	Evaluate learning from	
	3.1.2.A9: Asking Questions and Defining Problems; Planning	throughout the unit about	
	and Carrying Out Investigations; Constructing Explanations	forces and interactions, and	
	and Designing Solutions CCC Patterns; Cause and Effect	compare that knowledge to	
	3.1.2.A9: Asking Questions and Defining Problems; Planning	initial ideas from the beginning	
	and Carrying Out Investigations; Constructing Explanations	of the unit.	
	and Designing Solutions CCC Patterns; Cause and Effect		

Unit Title: Weather and Climate Patterns: January / February (MP 2 & 3)

Big Idea: Students will explore and learn about patterns in weather, climate, seasons and weather hazards.

Investigation Questions	NGSS/ PA Core Standards	Objectives (Lab Activities)	Key Vocabulary	Reading Wonders Connection
LESSON 1: Weather and	3-ESS2-1: Represent data in tables and graphical displays to	Recognize that weather is the	• Air	No real tie in that fits at this time in the
the Tools to Study Weather	describe typical weather conditions expected during a	conditions in the atmosphere at	 Air Pressure 	calendar, but Unit 6 Week 2 focuses on
	particular season.	a specific time and place.	 Anemometer 	weather patterns.
What do we know about	3-ESS2-2: Obtain and combine information to describe		 Atmosphere 	
weather?	climates in different regions of the world.	Identify words that can be used	 Barometer 	
	3-ESS3-1: Make a claim about the merit of a design solution	to describe weather.	 Celsius 	
What tools do we use to	that reduces the impacts of a weather-related hazard.		 Degrees 	
measure weather?	3-5-ETS1-2: Generate and compare multiple possible	Make observations about local	 Fahrenheit 	
	solutions to a problem based on how well each is likely to	weather conditions.	 Forecast 	
What is the benefit of	meet the criteria and constraints of the problem.		 Meteorologist 	
understanding patterns in	S3.C.1.1.4: Recognize and identify how water goes through	Investigate tools that measure	 Meteorology 	
weather?	phase changes (i.e., evaporation, condensation, freezing, and	weather.	 Precipitation 	
	melting).		Rain	
	S3.C.2.1.1: Identify basic forms and sources of energy (e.g.,	Analyze patterns in weather	 Rain Gauge 	
	Sun, heat, light, sound).	data to make predictions about	 Rainfall 	
	S3.D.2.1.1: Recognize that clouds have different	weather.	 Season 	
	characteristics that relate to different weather		 Technology 	
	S3.D.2.1.2: Describe how weather variables (i.e.,		 Temperature 	
	temperature, wind speed, wind direction, and precipitation) are		 Thermometer 	
	observed and measured.er conditions.		 Weather 	
	S3.D.2.1.3, S4.D.2.1.3: Identify appropriate instruments to		Wind	
	study and measure weather elements (i.e., thermometer		 Wind Vane 	
	[temperature]; wind vane [wind direction]; anemometer [wind		 Windsock 	
	speed]; rain gauge [precipitation]).			
	3.3.3.A4: Connect the various forms of precipitation to the			
	weather in a particular place and time.			
	3.3.4.A1: Identify the layers of the earth. Recognize that the			
	surface of the earth changes due to slow processes and rapid			
	processes			

LESSON 2: Analyzing	3.3.3.A5: Explain how air temperature, moisture, wind speed	Analyze and graph the daily	Average
Weather Data and Patterns	and direction, and precipitation make up the weather in a	averages for temperature and	Cloud
	particular place and time.	precipitation in an area.	Forecast model
Can I analyze and graph	S4.A.3.3.2: Predict future conditions/events based on		Satellite
weather data?	observable patterns (e.g., day/night, seasons, sunrise/sunset,	Estimate the weekly averages	
	lunar phases).	for temperature and	
Can I analyze patterns in	S4.D.2.1.1: Identify basic cloud types (i.e., cirrus, cumulus,	precipitation in an area.	
weather in various places?	stratus, and cumulonimbus) and make connections to basic		
	elements of weather (e.g., changes in temperature,	Analyze graphs of yearly	
	precipitation).	temperature and precipitation	
	S4.D.2.1.2: Identify weather patterns from data charts or	data to look for weather	
	graphs of the data (e.g., temperature, wind direction, wind	patterns.	
	speed, cloud types, precipitation).		
	S3.A.2.1.1: Generate questions about objects, organisms, or	Investigate relationships	
	events that can be answered through scientific investigations.	between weather conditions in	
	S3.A.2.1.2: Make predictions based on observations	various cities to predict typical	
	S3.A.2.2.1: Identify appropriate tools or instruments for	weather conditions during a	
	specific tasks, and describe the information they provide (i.e.,	particular season in the	
	measuring [length-ruler; mass- balance scale] and making	Northern Hemisphere.	
LESSON 3: Weather and	observations [hand lenses—very small objects]).	Describe the relationship	Altitude
Climate Connections	S3.A.3.1.2: Identify changes in natural or human-made	between weather and climate.	Biosphere
	systems		Climate
How are weather and climate	S3.A.3.2.1: Identify what models represent (e.g., simple maps	Identify the parts of Earth's	Climate zone
related?	showing mountains, valleys, lakes, and rivers; dioramas).	climate system and the factors	Equator
	S4.A.3.2.1: Identify what different models represent (e.g.,	that can affect climate.	Geosphere
What factors shape climate?	maps show physical features, directions, distances; globes		Greenhouse
	represent Earth; drawings of watersheds depict terrain;	Recognize the different climate	gases
What are patterns in climate	dioramas show ecosystems; concept maps show relationships	zones and where they are	Hydrosphere
zone?	of ideas).	located on Earth.	Polar
	3.4.4.C2: Describe the engineering design process: Define a		Temperate
	problem. Generate ideas. Select a solution and test it. Make	Discuss patterns among	 Topography
	the item. Evaluate the item.	Earth's climate system and	tropical
	3.1.3.B6: Analyzing and Interpreting Data; Constructing	climate zones.	
	Explanations and Designing Solutions CCC Patterns; Stability		
	and Change		

LESSON 4: Dangerous	3.1.3.B6: Analyzing and Interpreting Data; Obtaining,	Recognize that dangerous and	Air mass
Weather	Evaluating and Communicating Information CCC Patterns;	severe weather is generally	Hazard
	Stability and Change	caused by warm and cold air	Tropical storm
How can dangerous weather	3.1.3.B6: Analyzing and Interpreting Data; Constructing	masses meeting.	
affect an area?	Explanations and Designing Solutions; Obtaining, Evaluating	-	
	and Communicating Information CCC Patterns; Stability and	Identify types of weather	
What are examples of	Change	hazards.	
weather hazards?	3.1.3.B6: Analyzing and Interpreting Data; Obtaining,		
	Evaluating and Communicating Information CCC Patterns;	Describe patterns in climate	
	Cause and Effect; Stability and Change	and dangerous weather	
	3.1.3.B6: Constructing Explanations and Designing Solutions;		
	Engaging in Argument From Evidence; Obtaining, Evaluating	Describe the effects of a	
	and Communicating Information CCC Patterns; Cause and	specific type of dangerous	
	Effect; Stability and Change	weather, tropical storms.	
LESSON 5: Possible		Describe the impacts of	See previous
Solutions to Reduce		weather hazards on people and	lessons
Impacts of Weather		property.	
Hazards			
		Research weather hazards and	
How can we reduce the		proposed design solutions that	
impact of a weather hazard?		lessen the weather related	
		impact on people and property.	
How well does the solution			
reduce the impact of the		Present findings of research on	
weather hazard?		proposed solutions to reduce	
		the impact of weather hazards.	
How well does the solution			
reduce the impact of the		Evaluate a proposed solution to	
weather hazard?		a problem caused by weather	
		hazards and make a claim to	
		determine whether the solution	
		reduces the impact of the	
		hazard.	
		Evaluate learning from	
		throughout the unit and	
		compare that knowledge to	

	initial ideas from the beginning	
	of the unit.	

Unit Title: Life in Ecosystems: April / May: (MP4)

Big Idea: Students will be introduced to life cycles, inherited and acquired traits, adaptations, and the fossil record and how all of those things impact the diversity of life on Earth.

Investigation Questions	NGSS/ PA Core Standards	Objectives/ Lab Activities	Key Vocabulary	Reading Wonders Connection
LESSON 1: Life in Ecosystems	3-LS1-1: Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.	Distinguish between the different components that make up an ecosystem.	CommunityEcosystemEnvironment	Indicate any connection to reading/ ELA.
How do we categorize an ecosystem?	3-LS2-1: Construct an argument that some animals form groups that help members survive.3-LS3-1: Analyze and interpret data to provide evidence that	Recognize that different ecosystems are defined by	GerminatingHabitatLarvae	
What patterns exist as organisms grow and develop?	plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. 3-LS3-2: Use evidence to support the explanation that traits	their living and nonliving factors.	Life CycleOrganismPopulation	
Why do some animals live in	can be influenced by the environment. 3-LS4-1: Analyze and interpret data from fossils to provide	Provide examples of organisms and nonliving factors that can	ReproduceSpecies	
groups?	evidence of the organisms and the environments in which they lived long ago.	be found in ecosystems.	• Survive	
	3-LS4-2: Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates	Analyze images to gather evidence to support a claim that some animals survive		
	and reproducing. 3-LS4-3: Construct an argument with evidence that in a	better in groups.		
	particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.	Compare plant and animal life cycles to identify patterns in		
	3-LS4-4: Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.	birth, growth and development, reproduction, and death.		
LESSON 2: Inheritance and variation of traits	3-5-ETS1-2: Generate and compare multiple possible solutions to a problem based on how well each is likely to	Distinguish between inherited traits and acquired traits in	Acquired TraitInherited Trait	
What is a trait, and where do	meet the criteria and constraints of the problem. S.K-2.B.1.1.2 Identify a plant or animal based on a given life	organisms.	OffspringReproduce	
I get it from?	cycle stage (e.g., butterfly, frog, seed-producing plant). S3.B.1.1.1 Identify and describe the functions of basic	Investigate various traits that an offspring can inherit from its	SpeciesTrait Variation	
Are humans the only living things to pass on traits to	structures of animals and plants (e.g., animals [skeleton, heart, lungs]; plants [roots, stem, leaves]).	parents.	- Hait variation	
their offspring?	S3.B.1.1.2 Classify living things based on their similarities and differences.	Analyze variations of traits that occur among members of the		
	S3.B.1.1.3 Describe the basic needs of plants and animals and their dependence on light, food, air, water, and shelter.	same species.		
	S3.B.1.1.4 Describe how plants and animals go through life cycles.	Gather evidence to support a claim that humans are not the		
	S3.B.2.1.1 Identify adaptations of plants and animals that			

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	have helped them to survive.	only organisms to pass traits		
	S3.B.2.1.2 Identify and describe plant and animal	onto offspring.		
	characteristics that are necessary for survival.			
	S3.B.2.1.3 Identify characteristics for plant and animal	Develop models of the patterns		
	survival in different environments (e.g., desert, forest,	in growth and development of		
	ocean).	an organism's life cycle by		
	S3.B.2.2.1 Identify physical characteristics (e.g., height, hair	observing development of		
	color, eye color) that could be passed onto offspring.	Wisconsin Fast Plants® and		
	S3.B.2.2.1 Identify physical characteristics (e.g., height, hair	painted lady butterfly larvae.		
	color, eye color) that could be passed onto offspring.	painted lady batterny larvae.		
	S3.B.3.1.1 Identify the living and nonliving components of an	Analyze data to describe the		
	ecosystem (e.g., living [plants, animals]; nonliving [water, soil,	patterns of similarities in traits		
	air]).	between organisms and their		
	S3.B.3.1.2 Describe the interactions between living and	offspring to show evidence that		
	nonliving components of an ecosystem (e.g., plants [water,	traits are inherited.		
	sunlight]; animals [air, shelter]).			
LESSON 3: Adaptations	S3.B.3.2.1 Describe what happens to an animal when its	Compare behavioral and	 Adaptation 	Unit 2 Week 4
	habitat is changed.	physical adaptations.	 Behavioral 	 Describe how organisms
How do adaptations help	S3.B.3.2.2 Describe how changes in the environment (e.g.,		Adaptation	adapt or fail to adapt to
organisms survive?	fire, flood) can affect an ecosystem.	Use models to investigate the	 Camouflage 	particular environments
	3.1.3.C3 Recognize that fossils provide us with information	relationships between an	 Physical 	
How does the structure of a	about living things that inhabited the Earth long ago.	animal's adaptations and the	Adaptation	Unit 4 Week 4 and Unit 6 Week 4
bird's beak help it survive?	4.1.3.D Identify organisms that are dependent on one	food it eats.	Predator	Describe how in a particular
bild 3 beak help it survive:	another in a given ecosystem. Define habitat and explain how	lood it data.	Prey	environment, some
How can camouflage be	a change in habitat affects an organism.	Describe predator–prey	Tiey	organisms survive well,
beneficial in a predator-prey	S3.A.1.1.1 Distinguish between fact and opinion.	relationships.		some less well, and some
	S3.A.2.1.1 Generate questions about objects, organisms, or	relationships.		-
relationship?				cannot survive.
	events that can be answered through scientific	Use evidence to explain the		
	investigations.	benefits of camouflage.		
	S3.A.2.1.2 Make predictions based on observations.			
	S3.A.2.1.3 Identify the variables in a simple investigation.	Distinguish between variations		
	S3.A.3.1.2 Identify changes in natural or human-made	in adaptations that affect how		
	systems.	an organism survives in its		
	S3.A.3.2.1 Identify what models represent (e.g., simple maps	environment.		
LESSON 4: Environmental	showing mountains, valleys, lakes, and rivers; dioramas).	Identify the ways in which an	 Ancestor 	
Influences	3.1.3.B6 Developing and Using Models; Engaging in	organism's habitat supports its	Extinct	
	Argument from Evidence; Constructing Explanations and	basic needs.	Geologic Time	
How can the environment	Designing Solutions CCC Patterns; Systems and System	24010 110040.	Scale	
Influence traits?	Models	Conduct an investigation to	Influence	
minuence traits:	3.1.3.B6 Analyzing and Interpreting Data; Constructing and	gather evidence to support the	Fossil	
What are forcile tell up about	Designing Solutions; Engaging in Argument from Evidence			
What can fossils tell us about	CCC Patterns	idea that the environment plays	 Paleontology 	
past and present organisms?		a role in the patterns of growth		
	3.1.3.B6 Analyzing and Interpreting Data; Constructing and	and development of an		
	Designing Solutions; Engaging in Argument from Evidence	organism.		
I	CCC Patterns; Cause and Effect; Structure and Function			

LESSON 5: Ecosystems, Humans, and Biodiversity How do we depend on and impact ecosystems? Can we evaluate a solution to a problem impacting an ecosystem?	3.1.3.B6 Analyzing and Interpreting Data; Constructing and Designing Solutions; Engaging in Argument from Evidence CCC Patterns; Cause and Effect; Scale, Proportion, and Quantity 3.1.3.B6 Analyzing and Interpreting Data; Engaging in Argument from Evidence; Constructing Explanations and Designing Solutions CCC Patterns; Cause and Effect; Systems and System Models CC.1.1.3.D Know and apply grade-level phonics and word analysis skills in decoding words. Identify and know the meaning of the most common prefixes and derivational suffixes. Decode words with common Latin suffixes. Decode multisyllable words. Read grade-appropriate irregularly spelled words. CC.1.2.3.B Ask and answer questions about the text and make inferences from text; refer to text to support responses. CC.1.2.3.C Explain how a series of events, concepts, or steps in a procedure is connected within a text, using language that pertains to time, sequence, and cause/effect. CC.1.2.3.J Acquire and use accurately grade-appropriate conversational, general academic, and domain-specific words and phrases, including those that signal spatial and temporal relationships. CC.1.2.3.L Read and comprehend literary non-fiction and informational text on grade level, reading independently and proficiently. CC.1.4.3.A Write informative/ explanatory texts to examine a topic and convey ideas and information clearly. CC.1.4.3.B Develop the topic with facts, definitions, details, and illustrations, as appropriate. CC.1.4.3.D Create an organizational structure that includes information grouped and connected logically with a concluding statement or section. CC.1.4.3.F Demonstrate a grade-appropriate command of the conventions of standard English grammar, usage, capitalization, punctuation, and spelling. E03.C.1.1 Write opinion pieces on topics or texts supporting a point of view with reasons. CC.1.4.3.P Organize a short sequence of events, using temporal words and phrases to signal event order; provide a sense of closure.	some organisms survive well, others less well, and some not at all in an environment. Predict the results of a problem caused by environmental changes and how these changes may affect the populations of organisms that live there. Analyze fossil structures and infer which present-day organisms could have descended from them. Analyze and interpret data to draw the conclusion that organisms and the environments they live in change over time. Identify how humans depend on and impact an ecosystem. Use evidence to explain how changes to an environment affect the plants and animals that live in that environment. Predict the results of a problem caused by environmental changes and how these changes may affect the populations of organisms that live there. Evaluate a solution to a problem caused by environmental changes and determine whether the proposed solution reduces the impact of the problem.	● Ecologist ● Ecology	Unit 2 Week 1 • Understand that humans can take steps to minimize the impacts of natural hazards. Unit 5 Week 2 • Describe how changes in habitats affect the organisms living there.
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LESSON 6:	for research, 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. CC.1.5.3.B Determine the main ideas and supporting details of a text read aloud or information presented in diverse media formats, including visually, quantitatively, and orally.	
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