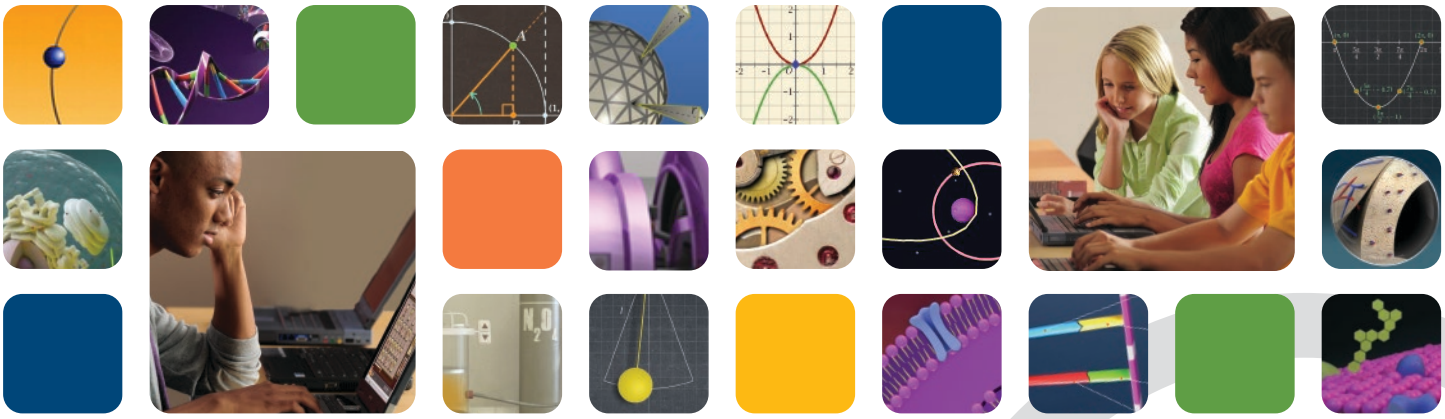
adaptive curriculum™

ac / TEKS Alignment

Dynamic, Interactive Learning



Readiness and Supporting Standards

Readiness Standards

These standards are considered essential for success in the current grade or course. They support college and career readiness as well as address broad, deep ideas with in-depth instruction.

Supporting Standards

These standards play a role in preparing students for the next grade though not a central role. They address more narrowly defined ideas and may be emphasized in a subsequent or previous year.

AC Science Activity Objects consist of five different types:

1. Concept Development

These activities introduce concepts through engaging, real-world scenarios and develop these concepts using an inquiry-based approach.

2. Experiment

These activities engage learners in a virtual lab environment to develop inquiry skills.

3. Skills Application

These activities help learners apply rules and procedures to strengthen computational skills.

4. Problem Solving

These activities engage learners with a guided problem-solving process to apply and enhance their science understanding.

5. Dynamic Modeling

These activities provide learners the opportunity to manipulate variables and observe dynamic changes with interactive 3D objects.

adaptive curriculum™

ac / TEKS Integrated Physics and Chemistry Alignment

High School Integrated Physics and Chemistry - Introduction

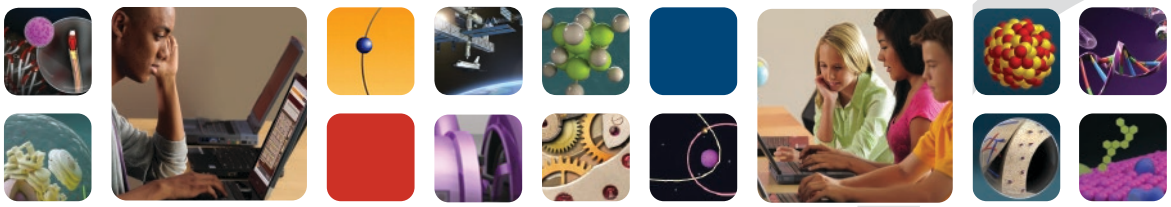
(1) Integrated Physics and Chemistry. In Integrated Physics and Chemistry, students conduct laboratory and field investigations, use scientific methods during investigation, and make informed decisions using critical thinking and scientific problem solving. This course integrates the disciplines of physics and chemistry in the following topics: force, motion, energy, and matter.

(2) Nature of science. Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process." This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not scientifically testable.

(3) Scientific inquiry. Scientific inquiry is the planned and deliberate investigation of the natural world. Scientific methods of investigation are experimental, descriptive, or comparative. The method chosen should be appropriate to the question being asked.

(4) Science and social ethics. Scientific decision making is a way of answering questions about the natural world. Students should be able to distinguish between scientific decision-making methods (scientific methods) and ethical and social decisions that involve science (the application of scientific information).

(5) Science, systems, and models. A system is a collection of cycles, structures, and processes that interact. All systems have basic properties that can be described in space, time, energy, and matter. Change and constancy occur in systems as patterns and can be observed, measured, and modeled. These patterns help to make predictions that can be scientifically tested. Students should analyze a system in terms of its components and how these components relate to each other, to the whole, and to the external environment.



HIGH SCHOOL INTEGRATED PHYSICS AND CHEMISTRY

Texas Knowledge and Skills (TEKS)

State ID	TEKS	Student Expectation	Content	Activity Object	Animation
1.A	(1) Scientific processes. The student, for at least 40% of instructional time, conducts laboratory and field investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:	(A) demonstrate safe practices during laboratory and field investigations; and	Laboratory Safety	●	
1.B	(1) Scientific processes. The student, for at least 40% of instructional time, conducts laboratory and field investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:	(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.	Laboratory Safety	●	
2.A	(2) Scientific processes. The student uses scientific methods during laboratory and field investigations. The student is expected to:	**(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section;**	What is Science?		●
			Particle Nature of Light		●
2.B	(2) Scientific processes. The student uses scientific methods during laboratory and field investigations. The student is expected to:	(B) plan and implement investigative procedures, including asking questions, formulating testable hypotheses, and selecting equipment and technology;	Free Fall	●	
			Period of a Pendulum	●	
			Newton's Law of Universal Gravitation	●	
			Projectiles Launched Horizontally	●	
			Projectiles Launched Vertically	●	
			Photoelectric Effect	●	
			Designing an Electric Motor	●	
2.C	(2) Scientific processes. The student uses scientific methods during laboratory and field investigations. The student is expected to:	(C) collect data and make measurements with precision;	Using Solubility to Identify Substances	●	
2.D	(2) Scientific processes. The student uses scientific methods during laboratory and field investigations. The student is expected to:	(D) organize, analyze, evaluate, make inferences, and predict trends from data; and	Using Solubility to Identify Substances	●	
			Atomic Radius in the Periodic Table	●	
2.E	(2) Scientific processes. The student uses scientific methods during laboratory and field investigations. The student is expected to:	(E) communicate valid conclusions.	Applying and Communicating Scientific Information		●
			Using Solubility to Identify Substances	●	
			Scientific Hypotheses and Theories		●

Readiness Standard ●

Supporting Standard ▼

HIGH SCHOOL INTEGRATED PHYSICS AND CHEMISTRY

Texas Knowledge and Skills (TEKS)

State ID	TEKS	Student Expectation	Content	Activity Object	Animation
3.A	(3) Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;	Newton's Second Law of Motion	●	
			Newton's Law of Universal Gravitation	●	
			Applications of Ohm's Law on Closed Circuits	●	
			Concept of Inertia	●	
			Photoelectric Effect	●	
			Light Intensity and Distance from the Source	●	
			Bohr's Atomic Model		●
			Particle Nature of Light		●
			History of the Atomic Model: From Rutherford to Bohr	●	
			Scientific Hypothesis and Theories		●
			Coulomb's Law	●	
			Heat Conduction	●	
			Conservation of Mass in Chemical Reactions	●	
			Conservation of Mechanical Energy	●	
			The Density of Marbles	●	
3.B	(3) Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	**(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials;**	Applying and Communicating Scientific Information		●
3.C	(3) Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(C) draw inferences based on data related to promotional materials for products and services;	Evaluating Products and Services		●
3.D	(3) Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(D) evaluate the impact of scientific research on society and the environment;	The Impact of Scientific Advances on Science and Society		●

Readiness Standard ●

Supporting Standard ▼

HIGH SCHOOL INTEGRATED PHYSICS AND CHEMISTRY

Texas Knowledge and Skills (TEKS)

State ID	TEKS	Student Expectation	Content	Activity Object	Animation
3.E	(3) Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	(E) describe connections between physics and chemistry and future careers; and	Physics and Future Careers		●
4.A	(4) Science concepts. The student knows concepts of force and motion evident in everyday life. The student is expected to:	(A) describe and calculate an object's motion in terms of position, displacement, speed, and acceleration;	Position-Time Graph of Uniform One Dimensional Motion		●
			Position, Displacement and Velocity		●
			Uniform Circular Motion		●
			Uniform Linear Motion	●	
			Motion Under Constant Acceleration	●	
			Velocity-Time Graph of One Dimensional Motion and Displacement		●
			Graphs of Projectile Motion	●	
4.B	(4) Science concepts. The student knows concepts of force and motion evident in everyday life. The student is expected to:	**(B) measure and graph distance and speed as a function of time using moving toys;**	Motion Under Constant Acceleration	●	
			Velocity-Time Graph of One Dimensional Motion and Displacement		●
			Uniform Linear Motion	●	
4.C	(4) Science concepts. The student knows concepts of force and motion evident in everyday life. The student is expected to:	(C) investigate how an object's motion changes only when a net force is applied, including activities and equipment such as toy cars, vehicle restraints, sports activities, and classroom objects;	Balanced and Unbalanced Forces	●	
			Exploring Friction	●	
			Solving Problems With Newton's Second Law	●	
4.D	(4) Science concepts. The student knows concepts of force and motion evident in everyday life. The student is expected to:	(D) assess the relationship between **force, mass, and acceleration, noting the relationship is independent of the nature of the force,** using equipment such as dynamic carts, moving toys, vehicles, and falling objects;	Solving Problems With Newton's Second Law	●	
4.E	(4) Science concepts. The student knows concepts of force and motion evident in everyday life. The student is expected to:	**(E) apply the concept of conservation of momentum using action and reaction forces such as students on skateboards;**	Conservation of Momentum in One Dimension	●	

Readiness Standard ●

Supporting Standard ▼

HIGH SCHOOL INTEGRATED PHYSICS AND CHEMISTRY

Texas Knowledge and Skills (TEKS)

State ID	TEKS	Student Expectation	Content	Activity Object	Animation
4.F	(4) Science concepts. The student knows concepts of force and motion evident in everyday life. The student is expected to:	**(F) describe the gravitational attraction between objects of different masses at different distances, including satellites; and**	Newton's Law of Universal Gravitation	●	
4.G	(4) Science concepts. The student knows concepts of force and motion evident in everyday life. The student is expected to:	**(G) examine electrical force as a universal force between any two charged objects and compare the relative strength of the electrical force and gravitational force.**	Coulomb's Law	●	
			Calculation of Coulomb's Law		●
			Force Between Charges: Coulomb's Law		●
			Newton's Law of Universal Gravitation	●	
5.A	(5) Science concepts. The student recognizes **multiple forms of energy** and knows the impact of energy transfer and **energy conservation** in everyday life. The student is expected to:	**(A) recognize and demonstrate that objects and substances in motion have kinetic energy such as vibration of atoms, water flowing down a stream moving pebbles, and bowling balls knocking down pins;**	Roller Coaster Design: Gravitational Potential and Kinetic Energy	●	
			Conservation of Mechanical Energy	●	
			Thermal and Kinetic Energy		●
			Sound Energy		●
			Temperature Measurements		●
			Macroscopic Properties of Thermodynamic Systems		●
5.B	(5) Science concepts. The student recognizes **multiple forms of energy** and knows the impact of energy transfer and **energy conservation** in everyday life. The student is expected to:	**(B) demonstrate common forms of potential energy, including gravitational, elastic, and chemical, such as a ball on an inclined plane, springs, and batteries;**	Gravitational Potential Energy: Seeing the Impact in the Sand	●	
			Elastic Potential Energy		●
			Concept of Bonding		●
			Electronegativity and Chemical Bonding	●	
			Crystal Lattice	●	
			Chemical Compounds: Ionic Bonding	●	
			Durability of Ionic Bonds		●
			Covalent Bonding and Molecules		●
			Bond Length and Bond Energy		●
			Energy in Chemical Systems		●
			Conservation of Mechanical Energy	●	
			Roller Coaster Design: Gravitational Potential Energy and Kinetic Energy	●	

Readiness Standard ●
Supporting Standard ▼

HIGH SCHOOL INTEGRATED PHYSICS AND CHEMISTRY

Texas Knowledge and Skills (TEKS)

State ID	TEKS	Student Expectation	Content	Activity Object	Animation
5.C	(5) Science concepts. The student recognizes **multiple forms of energy** and knows the impact of energy transfer and **energy conservation** in everyday life. The student is expected to:	(C) demonstrate that moving **electric charges produce magnetic forces and moving magnets produce electric forces;**	Magnetic Force on a Current Carrying Wire	●	
			Magnetic Field of a Current-Carrying Infinity Wire	●	
			Designing an Electric Motor	●	
			Electric Motor	●	
			Induced Current		●
5.D	(5) Science concepts. The student recognizes **multiple forms of energy** and knows the impact of energy transfer and energy conservation in everyday life. The student is expected to:	(D) Investigate the law of conservation of energy;	Conservation of Mechanical Energy	●	
5.E	(5) Science concepts. The student recognizes **multiple forms of energy** and knows the impact of energy transfer and **energy conservation** in everyday life. The student is expected to:	(E) investigate and demonstrate the **movement of thermal energy** through **solids, liquids, and gases by convection, conduction, and radiation** such as in weather, living, and mechanical systems;	Reflection of Light from Plane Mirrors	●	
			Conduction, Convection and Radiation		●
			Radiation		●
			Black-Body Radiation and Light Quantas		●
			Light Intensity and Distance from Source	●	
			Heat Conduction	●	
			Brightness and Resistance		●
5.F	(5) Science concepts. The student recognizes **multiple forms of energy** and knows the impact of energy transfer and **energy conservation** in everyday life. The student is expected to:	(F) **evaluate the transfer of electrical energy** in series and parallel circuits and **conductive materials;**	Brightness and Resistance		●
			The Purpose of the Utilization of Conduction and Insulation		●
			Conductivity and Insulation		●
			Applications of Ohm's Law on Closed Circuits	●	
			Building Circuits: Light Bulbs in Series	●	
			Building Circuits: Light Bulbs in Parallel	●	

Readiness Standard ●

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HIGH SCHOOL INTEGRATED PHYSICS AND CHEMISTRY
Texas Knowledge and Skills (TEKS)

State ID	TEKS	Student Expectation	Content	Activity Object	Animation
5.G	(5) Science concepts. The student recognizes **multiple forms of energy** and knows the impact of energy transfer and **energy conservation** in everyday life. The student is expected to:	(G) explore the characteristics and behaviors of energy transferred by waves, **including acoustic, seismic, light, and waves on water as they superpose on one another, bend around corners, reflect off surfaces, are absorbed by materials, and change direction when entering new materials;**	Acoustic Environments		●
			Sound Reflection		●
			Sound Energy		●
			The Formation of Echoes		●
			Listing Reflection Laws		●
			Sound Absorption		●
			Different Objects Absorb Sound in a Different Manner		●
			The Interaction of Sound with Objects		●
			Seismic Waves		●
			Light Interference		●
			Reflection of Light from Plane Mirrors	●	
			Light Reflection Puzzles	●	
			Light Intensity and Distance from Source	●	
			Refraction of Light and Snell's Law	●	
			Interference of Water Waves	●	
			Diffraction of Water Waves		●
			Reflection of Water Waves from Different Obstacles		●
			Refraction of Water Waves	●	
			Refraction of Light	●	
5.H	(5) Science concepts. The student recognizes **multiple forms of energy** and knows the impact of energy transfer and **energy conservation** in everyday life. The student is expected to:	(H) analyze energy conversions such as those from radiant, nuclear, and geothermal sources; fossil fuels such as coal, gas, oil; and the movement of water or wind; and	Batteries, Chemicals, and Potential Difference	●	
			Conservation of Mechanical Energy	●	
			Roller Coaster Design: Gravitational Potential and Kinetic Energy	●	
			Energy Conversions in a Power Plant	●	
			Fossil Fuels and Renewable Energy Resources		●
			Nonrenewable Energy Sources	●	
			Renewable Energy Sources	●	
			Solar Energy: Design a Solar Car	●	
			The Impact of Energy Resources		●
			Nuclear Energy: Fission	●	

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HIGH SCHOOL INTEGRATED PHYSICS AND CHEMISTRY
Texas Knowledge and Skills (TEKS)

State ID	TEKS	Student Expectation	Content	Activity Object	Animation
5.I	(5) Science concepts. The student recognizes **multiple forms of energy** and knows the impact of energy transfer and **energy conservation** in everyday life. The student is expected to:	(I) critique the **advantages and disadvantages** of various energy sources and their impact on society and the environment.	Nonrenewable Energy Sources	●	
			Renewable Energy Sources	●	
			Nuclear Energy: Fission	●	
			Solar Energy: Design a Solar Car	●	
			The Impact of Energy Resources		●
			Fossil Fuels and Renewable Energy Sources		●
6.A	(6) Science concepts. The student knows that relationships exist between the structure and properties of matter. The student is expected to:	(A) examine differences in **physical properties of solids, liquids, and gases** as explained by the **arrangement and motion of atoms, ions, or molecules** of the substances **and the strength of the forces of attraction between those particles;**	Properties of Solids, Liquids and Gasses	●	
			Reciprocating and Vibration Motion		●
			Plasma and Plasma Types		●
			Melting and Boiling Points: Different Materials, Different Amounts	●	
			Particle Structure and Bond Strength		●
			Solid, Liquid, Gas States of Matter		●
6.B	(6) Science concepts. The student knows that relationships exist between the structure and properties of matter. The student is expected to:	**(B) relate chemical properties of substances to the arrangement of their atoms or molecules;**	Crystal Lattice	●	
			Comparing Ionic and Covalent Compounds	●	
6.C	(6) Science concepts. The student knows that relationships exist between the structure and properties of matter. The student is expected to:	**(C) analyze physical and chemical properties of elements and compounds such as color, density, viscosity, buoyancy, boiling point, freezing point, conductivity, and reactivity;**	Physical Properties of Substances	●	
			Physical Properties and the Periodic Table	●	
			The Density of Marbles	●	
			Buoyancy and Archimedes' Principle	●	
			Properties of Liquids: Viscosity		●
			Physical Properties	●	
			Electron Configuration and the Tendency to Gain or Lose Electrons	●	
			Melting and Boiling Points: Heating Curves	●	
			Ionization Energy on the Periodic Table	●	
			Electronegativity on Periodic Table	●	
			Endothermic and Exothermic Reactions	●	
			Factors Affecting the Rate of Chemical Reactions	●	
			Melting and Boiling Points: Different Materials, Different Amounts	●	

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HIGH SCHOOL INTEGRATED PHYSICS AND CHEMISTRY

Texas Knowledge and Skills (TEKS)

State ID	TEKS	Student Expectation	Content	Activity Object	Animation
6.D	(6) Science concepts. The student knows that relationships exist between the structure and properties of matter. The student is expected to:	(D) relate the physical and chemical behavior of an element, **including bonding and classification**, to its placement on the Periodic Table; and	Properties of s-Block Elements		●
			Properties of d-Block Elements		●
			Properties of f-Block Elements		●
			Properties of Group 3A Elements		●
			Properties of Group 4A Elements		●
			Properties of Group 5A Elements		●
			Properties of Group 6A Elements		●
			Properties of Group 7A Elements		●
			Properties of Group 8A Elements		●
			General Structure of Periodic Table		●
			Electronegativity and Chemical Bonding	●	
6.E	(6) Science concepts. The student knows that relationships exist between the structure and properties of matter. The student is expected to:	(E) relate the structure of water to its function as a solvent and investigate the properties of solutions and factors affecting gas and solid solubility, including nature of solute, temperature, pressure, pH, and concentration.	Using Solubility to Identify Substances	●	
			Molecular Interactions and Solubility	●	
			Factors Affecting the Solubility of Gases	●	
7.A	(7) Science concepts. The student knows that changes in matter affect everyday life. The student is expected to:	(A) investigate changes of state as it relates to the **arrangement of particles of matter and energy transfer;**	Properties of Solids, Liquids, and Gases	●	
			Heating Curves	●	
			Melting and Boiling Points: Different Materials, Different Amounts	●	
			Specific Heat	●	
			Endothermic and Exothermic Reactions	●	
			Physical Properties of Substances	●	
7.B	(7) Science concepts. The student knows that changes in matter affect everyday life. The student is expected to:	(B) recognize that chemical changes can occur when substances react to form different substances and that these **interactions are largely determined by the valence electrons;**	Precipitation Reactions	●	
			Physical and Chemical Changes	●	
			Electron Configuration and the Tendency to Gain or Lose Electrons	●	
7.C	(7) Science concepts. The student knows that changes in matter affect everyday life. The student is expected to:	(C) demonstrate that mass is conserved when substances undergo chemical change and that the number and kind of atoms are the same in the reactants and products;	Conservation of Mass in Chemical Reactions	●	
			Writing and Balancing Chemical Equations	●	
			Elements and Compounds		●

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Supporting Standard ▼

HIGH SCHOOL INTEGRATED PHYSICS AND CHEMISTRY
Texas Knowledge and Skills (TEKS)

State ID	TEKS	Student Expectation	Content	Activity Object	Animation
7.D	(7) Science concepts. The student knows that changes in matter affect everyday life. The student is expected to:	(D) analyze energy changes that accompany chemical reactions such as those occurring in heat packs, cold packs, and glow sticks and classify them as exothermic or endothermic reactions;	Endothermic and Exothermic Reactions	●	
7.E	(7) Science concepts. The student knows that changes in matter affect everyday life. The student is expected to:	(E) describe types of nuclear reactions such as fission and fusion and their roles in applications such as medicine and energy production; and	Nuclear Energy: Fission	●	
7.F	(7) Science concepts. The student knows that changes in matter affect everyday life. The student is expected to:	(F) research and describe the environmental and economic impact of the end-products of chemical reactions such as those that may result in acid rain, degradation of water and air quality, and ozone depletion.	Energy Conversions in a Power Plant	●	
			Nonrenewable Energy Sources	●	
			Renewable Energy Sources	●	
			Nuclear Energy: Fission	●	
			Acid Rain		●

Readiness Standard ●
Supporting Standard ▼

Adaptive Curriculum's math and science solutions are used by millions of students in the United States, Europe and Asia and are available in multiple languages. World-wide experts in math, science and online learning theory contribute to the content and design of the interactive activities for both Adaptive Curriculum and its parent company, Sebit Inc.

In the United States, Adaptive Curriculum has partnered with Arizona State University's Technology Based Learning Research Center, which provides pedagogical research, multi-disciplinary expertise and content collaboration. The company headquarters is located in the ASU SkySong Center for Innovation, Technology and Imagination.

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