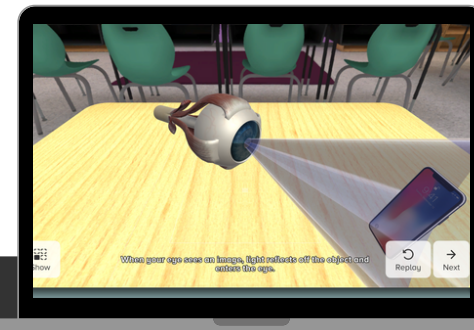
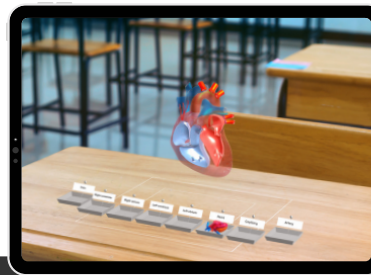


MCGRAW HILL AR ALIGNMENT TO CALIFORNIA NEXT GEN SCIENCE STANDARDS (NGSS)



ACTIVITY	CA NGSS
Simple Machines	3-PS2-1: Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. 3-PS2-2: Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. 3-3-ETS1-1: Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
Bird Beak Bonanza	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, and reproducing. 3-LS4-3: Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. 4-LS1-1: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction
Big Dig	3-LS4-1: Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. 4-ESS1-1: Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time
Human Eye	4-PS4-2.B Electromagnetic Radiation An object can be seen when light reflected from its surface enters the eyes allows objects to be seen. MS-PS4-2.B 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 frequency (color) of the light. The path that light travels can be traced as straight lines, except at surfaces between different transparent materials (e.g., air and water, air and glass) where the light path bends. A wave model of light is useful for explaining brightness, color, and the frequency-dependent bending of light at a surface between media. However, because light can travel through space, it cannot be a matter wave, like sound or water waves. HS-PS4-3.B Electromagnetic Radiation Electromagnetic radiation (e.g., radio, microwaves, light) can be modeled as a wave of changing electric and magnetic fields or as particles called photons. The wave model is useful for explaining many features of electromagnetic radiation, and the particle model explains other features. When light or longer wavelength electromagnetic radiation is absorbed in matter, it is generally converted into thermal energy (heat). Shorter wavelength electromagnetic radiation (ultraviolet, X-rays, gamma rays) can ionize atoms and cause damage to living cells. Photoelectric materials emit electrons when they absorb light of a high-enough frequency.
Circulatory System	4-LS1.A Structure and Function Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. MS-LS1-3.A Structure and Function In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. HS-LS1.A Structure and Function Systems of specialized cells within organisms help them perform the essential functions of life. HS-LS1-2.A Structure and Function Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. HS-LS1-3.A Structure and Function Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system.
Respiratory System	4-LS1.A Structure and Function Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. MS-LS1-3.A Structure and Function In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. HS-LS1.A Structure and Function Systems of specialized cells within organisms help them perform the essential functions of life. HS-LS1-2.A Structure and Function Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. HS-LS1-3.A Structure and Function Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system.

ACTIVITY	CA NGSS
Photosynthesis	5-LS1-1.C Organization for Matter and Energy Flow in Organisms Plants acquire their material for growth chiefly from air and water. MS-LS1-6 Energy in Chemical Processes and Everyday Life The chemical reaction by which plants produce complex food molecules (sugars) requires an energy input (i.e., from sunlight) to occur. In this reaction, carbon dioxide and water combine to form carbon-based organic molecules and release oxygen. MS-LS1-7.C Organization for Matter and Energy Flow in Organisms Within individual organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules, to support growth, or to release energy. MS-LS1-7 Energy in Chemical Processes and Everyday Life Cellular respiration in plants and animals involve chemical reactions with oxygen that release stored energy. In these processes, complex molecules containing carbon react with oxygen to produce carbon dioxide and other materials. HS-LS1-5.C Organization for Matter and Energy Flow in Organisms The process of photosynthesis converts light energy to stored chemical energy by converting carbon dioxide plus water into sugars plus released oxygen. HS-LS1-6.C Organization for Matter and Energy Flow in Organisms The sugar molecules thus formed contain carbon, hydrogen, and oxygen: their hydrocarbon backbones are used to make amino acids and other carbon-based molecules that can be assembled into larger molecules (such as proteins or DNA), used for example to form new cells. HS-LS2-3.B Cycles of Matter and Energy Transfer in Ecosystems Photosynthesis and cellular respiration (including anaerobic processes) provide most of the energy for life processes. (HS-LS2-3)
Glacier	5-ESS2-1.A: Earth Materials and Systems Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. 5-ESS2-2.C The Roles of Water in Earth's Surface Processes Nearly all of Earth's available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. MS-ESS2-1.A Earth's Materials and Systems All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms. MS-ESS2-2.A Earth's Materials and Systems The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future. MS-ESS2-2.C The Roles of Water in Earth's Surface Processes Water's movements—both on the land and underground—cause weathering and erosion, which change the land's surface features and create underground formations. HS-ESS2.A Earth Materials and Systems Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes. HS-ESS2-4.A Earth Materials and Systems The geological record shows that changes to global and regional climate can be caused by interactions among changes in the sun's energy output or Earth's orbit, tectonic events, ocean circulation, volcanic activity, glaciers, vegetation, and human activities. These changes can occur on a variety of time scales from sudden (e.g., volcanic ash clouds) to intermediate (ice ages) to very long-term tectonic cycles. HS-ESS2-5.C The Roles of Water in Earth's Surface Processes The abundance of liquid water on Earth's surface and its unique combination of physical and chemical properties are central to the planet's dynamics. These properties include water's exceptional capacity to absorb, store, and release large amounts of energy, transmit sunlight, expand upon freezing, dissolve and transport materials, and lower the viscosities and melting points of rocks.
Tornado Factory	MS-ESS2-5: Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions. MS-ESS3-2: Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
Fibonacci Forest Quest	MS-LS1-4: Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. MS-LS1-5: Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms MS-LS4-6: Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. CCSS Math Standards: 5.OA.B Analyze patterns and relationships
Sonic Shapes	MS-PS4-1: Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave. MS-PS4-2: Waves and Their Applications in Technologies for Information Transfer: Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.

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Seismic Shake	MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment. MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution. MS-ESS3-2. Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
Animal Cell Lab	MS-LS1-1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. MS-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
v8 Engine	MS.PS3-4.B Conservation of Energy and Energy Transfer The amount of energy transfer needed to change the temperature of a matter sample by a given amount depends on the nature of the matter, the size of the sample, and the environment. HS-PS3-4: Energy Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics). HS-PS3.4.B: Conservation of Energy and Energy Transfer Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems. Uncontrolled systems always evolve toward more stable states—that is, toward more uniform energy distribution (e.g., water flows downhill, objects hotter than their surrounding environment and cool down.)
Periodic Table	HS-PS1-1: Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy shell of atoms.
Law of Reflection	PS4.B 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 frequency (color) of the light. (MS-PS4-2) The path that light travels can be traced as straight lines, except at surfaces between different transparent materials (e.g., air and water, air and glass) where the light path bends. (MS-PS4-2) HS-PS4-3.B Electromagnetic Radiation Electromagnetic radiation (e.g., radio, microwaves, light) can be modeled as a wave of changing electric and magnetic fields or as particles called photons. The wave model is useful for explaining many features of electromagnetic radiation, and the particle model explains other features.
Fireworks Factory	HS-PS1-1. Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. HS-PS1-3. Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles. HS-PS1-4. Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.
Electric Escape	HS-PS3-2: 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). HS-PS3-3: Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy. HS-PS3-5: Energy: Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction

