Grade 4
Phenomena Tracker

Egg Racers

Blue: SEP Orange: DCI Green: CCC

Anchor Phenomenon: Race cars slow down quickly when they drive over gravel traps.
What happens to energy when objects collide?

SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 1: What is energy and how is it transferred from one thing to another?				
Building on students' prior knowledge of forces, these lessons introduce students to the concept of energy and how to identify evidence that energy is being transferred. Students distinguish between forces and energy and investigate ways of transferring energy to objects. Teacher Edition Twig Book	**Driving Question** **4-PS3-1** Use evidence to construct an explanation relating the speed of an object to the energy of that object **4-PS3-2** Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents **Anchor Phenomenon** **4-PS3-1, 4-PS3-3**	• Almost every object that does something has to have energy to be able to do it. • Humans, animals, plants, and non-living objects all use energy to do things. • Energy cannot be created and does not get used up—it only ever moves from place to place. • The energy gained by one object always comes at the loss of energy from somewhere else.	• Explore the phenomenon of energy • Work in a team to build a model car • Find evidence of energy and energy transfer • Transfer energy to my model car in different ways.	• Students engage with the Anchor Phenomenon by watching a video. They then generate questions about the Anchor Phenomenon (see example in Lesson 2). • Students investigate the Anchor Phenomenon by collecting and organizing data about an object's energy (see example in Lesson 4). • Students evaluate the Anchor Phenomenon in a class discussion and answer questions about energy and speed (see example in Lesson 5).
Driving Question 2: How can I increase my car's energy?				
Students continue to use their physical models to understand energy transfers: through a series of investigations, they explore the relationship between how much energy is transferred to an object and its speed. Teacher Edition Twig Book	**Driving Question** **4-PS3-1** Use evidence to construct an explanation relating the speed of an object to the energy of that object	• When something is faster, it has more energy. • When something is brighter, it is transferring more energy. • When something is louder, it is transferring more energy. • When something is warmer, it is transferring more energy.	• Transfer more energy to my car to make it go faster • Conduct fair tests like an engineer • Explain how to make the car gain energy.	

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SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 3: How does the energy of a moving object change during a collision?				
Students explore the idea that energy is transferred when objects collide. Students develop their own questions about collisions, design investigations to answer them, predict outcomes, and test their ideas. They apply this learning to understand how engineers use knowledge of energy transfers to design safety features for cars. Teacher Edition Twig Book	**Driving Question** **4-PS3-1** Use evidence to construct an explanation relating the speed of an object to the energy of that object **4-PS3-3** Ask questions and predict outcomes about the changes in energy that occur when objects collide **Anchor Phenomenon** **4-PS3-1, 4-PS3-3**	• When objects collide, energy is transferred. • Some energy is transferred as sound. • Some energy is transferred to the objects, resulting in a change of shape and/or a change in motion.	• Understand the energy transfers in a collision • Investigate cause and effect • Understand car safety features.	• Students investigate the Anchor Phenomenon by observing a video and collecting data in a graphic organizer (see example in Lesson 1). • Students evaluate the Anchor Phenomenon by discussing the results of the investigation (see example in Lesson 3).
Driving Question 4: How can I make my car safer so my egg is not damaged?				
Students apply recent learning to solve an engineering problem: designing safety features for their car models. As they reflect on their designs, students sum up their ideas about energy transfers, and gain an understanding of the Module Anchor Phenomenon. Teacher Edition Twig Book	**Driving Question** **4-PS3-3** Ask questions and predict outcomes about the changes in energy that occur when objects collide **3–5-ETS1-3** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved **Anchor Phenomenon** **4-PS3-1, 4-PS3-3**	• Safety measures applied to cars limit the damage caused by collisions by reducing the forces acting on passengers (seat belts, airbags).	• Evaluate engineering designs • Design and refine car safety designs • Create safety gear to save Egg in a crash.	• Students explain the Anchor Phenomenon by creating a news report about how a car's energy is changed when it enters a gravel trap (see example in Lesson 1). • Students resolve the Anchor Phenomenon by developing a model of a race track layout (see example in Lesson 5).

Grade 4
Phenomena Tracker

Sparks Energy Inc.

Blue: SEP Orange: DCI Green: CCC

Anchor Phenomenon: Some parts of the United States generate more electricity from wind power than others.
How do people produce and transfer energy for their use?

SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 1. How can people make practical use of energy transfers?				
In this Driving Question, students briefly explore how people make use of wind and water as sources of energy, before focusing on energy from the Sun. They investigate using solar power to melt ice before designing their own solar cookers using an interactive. This learning is assessed as they are asked to create an advertisement for their solar cooker. Teacher Edition Twig Book	**Driving Question** **4-PS3-2** Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents **4-PS3-4** Apply scientific ideas to design, test, and refine a device that converts energy from one form to another **4-ESS3-1** Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment **3–5-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. **Anchor Phenomenon** **4-PS3-2, 4-PS3-4, 4-ESS3-1**	• Energy cannot be created and does not get used up—it only ever moves from place to place. • The energy gained by one object always comes at the loss of energy from somewhere else. • Energy from the Sun, wind, and water can be transferred to power homes and communities.	• Explore the phenomena of energy and energy transfers • Draw models to describe energy transfers • Understand how people make use of energy from the Sun • Design my own solar cooker.	• Students engage with the Anchor Phenomenon by watching a video. Then they generate questions about the Anchor Phenomenon (see example in Lesson 2). • Students investigate the Anchor Phenomenon by watching a video and developing a model of a wind turbine system (see example in Lesson 6).

Sparks Energy Inc.

Blue: SEP **Orange:** DCI **Green:** CCC

Anchor Phenomenon: Some parts of the United States generate more electricity from wind power than others.
How do people produce and transfer energy for their use?

SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 2. How can people use energy resources to generate electricity?				
Students bridge from exploring direct use of energy from the Sun to thinking about how electricity is generated. They learn about batteries as sources of stored energy and investigate simple battery-powered circuits. They build their own working wind turbines and use them to light an LED. The Driving Question concludes with a reading about hydropower. Teacher Edition Twig Book	**Driving Question** **4-PS3-2** Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents **4-PS3-4** Apply scientific ideas to design, test, and refine a device that converts energy from one form to another **4-ESS3-1** Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment **3–5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem **Anchor Phenomenon** **4-PS3-2, 4-PS3-4**	• Energy from the Sun, wind, and water can be used to generate electricity. • Burning fossil fuels can generate electricity. • Some energy sources are renewable (Sun, wind, water). • Some energy sources are nonrenewable (fossil fuels, nuclear energy).	• Explore the phenomenon of renewable energy • Evaluate the benefits and disadvantages of different energy resources • Recognize the many ways people use electricity • Build a complete circuit that allows an electric current to flow.	• Students evaluate the Anchor Phenomenon by self assessing their wind turbine system models (see example in Lesson 7). • Students investigate the Anchor Phenomenon by collecting data about wind speed across the United States (see example in Lesson 9).
Driving Question 3. What are the main energy resources used in the United States?				
This Driving Question contrasts the renewable energy resources explored in previous lessons with nonrenewable resources like fossil fuels and nuclear power. Students prepare for and engage in a debate evaluating the advantages and disadvantages of various energy resources. For the final assessment, students write an article for the Sparks Energy, Inc. website about an energy resource of their choosing. Teacher Edition Twig Book	**Driving Question** **4-ESS3-1** Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment **Anchor Phenomenon** **4-PS3-2, 4-PS3-4, 4-ESS3-1**	• Humans use energy to power homes and businesses. • Humans generate electrical energy using renewable and nonrenewable sources. • Nonrenewable energy sources, such as fossil fuels and nuclear energy, produce harmful waste products.	• Explore the phenomenon of nonrenewable energy • Compare and contrast renewable energy resources • Understand the environmental effects of different energy resources.	• Students evaluate the Anchor Phenomenon by analyzing the wind speed data they collected (see example in Lesson 1). • Students explain the Anchor Phenomenon by writing a proposal, supported by data, for where to build their wind farms (see example in Lesson 5). • Students resolve the Anchor Phenomenon through a class discussion (see example in Lesson 6).

Grade 4
Phenomena Tracker

Time-Traveling Tour Guides

Blue: SEP Orange: DCI Green: CCC

Anchor Phenomenon: The Grand Canyon has changed in shape and size over time.
How have weathering and erosion sculpted some of Earth's most interesting landscapes?

SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 1: What makes landscapes change over time?				
Students start to explore changes over time—first in their immediate surroundings and then on a larger scale around the world. They are introduced to their role as tour guides at the Grand Canyon, and think of questions they could ask a tour guide about the changes that have taken place in the landscape. Teacher Edition Twig Book	**Driving Question** **4-ESS2-1** Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation **4-ESS2-2** Analyze and interpret data from maps to describe patterns of Earth's features **Anchor Phenomenon** **4-ESS1-1, 4-ESS2-1**	• Landscapes change over time. • Water, wind, and ice cause landscapes to change shape over time.	• Explore the phenomena of erosion and weathering • Identify landscape changes in the schoolyard and in an interactive • Use texts to learn about causes and effects of weathering and erosion on structures.	• Students engage with the Anchor Phenomenon by observing images of the Grand Canyon. They define and generate questions about the Anchor Phenomenon (see example in Lesson 4).
Driving Question 2: Why do we see different rock layers in the Grand Canyon?				
In this Driving Question, students study the layers and fossils in the Grand Canyon by making models, reading texts, and watching videos. Teams create Claim-Evidence-Reasoning statements to assess their learning. Teacher Edition Twig Book	**Driving Question** **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 **Anchor Phenomenon** **4-ESS1-1**	• The Grand Canyon is formed from rock layers. • Fossils in the rock layers can tell us when the rock formed. • Fossils can tell us what the land used to be like. • The rock layers in the Grand Canyon represent different geological time periods.	• Explore the phenomena of rock layers • Read texts, watch videos, and use models to learn about rock layers and fossils in the Grand Canyon • Use claims, evidence, and reasoning to explain why we see different rock layers in the Grand Canyon.	• Students investigate the Anchor Phenomenon by collecting data about rock layers and fossils in the Grand Canyon (see example in Lesson 1). • Students evaluate the Anchor Phenomenon by providing evidence of landscape changes over time (see example in Lesson 3).

Time-Traveling Tour Guides

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Anchor Phenomenon: The Grand Canyon has changed in shape and size over time.
How have weathering and erosion sculpted some of Earth's most interesting landscapes?

SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 3: How did the Colorado River sculpt the Grand Canyon?				
This Driving Question starts with students considering what happened to the rocks that once filled the Grand Canyon. To answer this question, they create stream trays and plan and investigate a chosen variable. They test the effect it has on weathering and erosion, and how the landscape changes. Teacher Edition Twig Book	**Driving Question** **4-ESS2-1** Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation **4-ESS2-2** Analyze and interpret data from maps to describe patterns of Earth's features **Anchor Phenomenon** **4-ESS1-1, 4-ESS2-1, 4-ESS2-2**	• Models can help scientists figure out Earth processes. • The Grand Canyon was carved by the Colorado River over millions of years.	• Use a stream tray to investigate how water can change a landscape • Become a Grand Canyon tour guide and work with a partner to present my knowledge.	• Students evaluate the Anchor Phenomenon by describing the effects of weathering and erosion on the Grand Canyon (see example in Lesson 3). • Students explain the Anchor Phenomenon by creating a sign for visitors to the Grand Canyon (see example in Lesson 4).
Driving Question 4: What other amazing landscapes have been sculpted by weathering and erosion?				
Students broaden their understanding by exploring other landscapes that have changed over time. Through hands-on activities, they study the effects of glaciers, wind, and flooding, and design ways to protect buildings from wind and flooding in particular. Teacher Edition Twig Book	**Driving Question** **4-ESS2-1** Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation **4-ESS2-2** Analyze and interpret data from maps to describe patterns of Earth's features **4-ESS3-2** Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans **3–5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem **3–5-ETS1-3** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved **Anchor Phenomenon** **4-ESS1-1, 4-ESS2-1**	• Wind and ice can change the shape of the land. • Engineers can design ways to reduce the effects of erosion on humans.	• Explore the effects of ice, wind, sand, and water on landscapes • Use what I have learned in previous lessons to design an engineering solution to protect a community from flooding.	• Students resolve the Anchor Phenomenon through a class discussion (see example in Lesson 5).

Grade 4
Phenomena Tracker

Earthquake Engineering

Blue: SEP Orange: DCI Green: CCC

Anchor Phenomenon: San Francisco City Hall and the Transamerica Pyramid suffered different levels of damage in the 1989 Loma Prieta earthquake.

How can we reduce the damage caused by earthquakes?

SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 1: How are waves involved in earthquakes?				
Students investigate and model wave motion, amplitude, and wavelength. Using an interactive, they explore how waves move objects. Students then make connections between wave amplitude and earthquake magnitude. Teacher Edition Twig Book	**Driving Question** **4-PS4-1** Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move **3–5-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 **Anchor Phenomenon** **4-PS4-1, 4-ESS3-2**	• Waves cause objects to move. • Earthquakes are caused by waves of energy called seismic waves. • The amount of energy in waves can be measured by recording their amplitude. Waves of a bigger amplitude have more energy	• Explore the phenomena of waves • Watch a demonstration and draw a diagram to understand how waves form when an object is dropped in water • Use a rope model to show how the wavelength and amplitude of waves is affected by energy transfer • Use an app and read a text to understand that earthquakes release energy in the form of waves.	• Students engage with the Anchor Phenomenon by reading an article about the effects of the Loma Prieta earthquake (see example in Lesson 1). • Students generate questions about the Anchor Phenomenon (see example in Lesson 1). • Students investigate the Anchor Phenomenon by collecting data about the Loma Prieta earthquake and drawing models of its wave pattern (see example in Lesson 5).
Driving Question 2: How can patterns help us predict where earthquakes and volcanoes will occur?				
Students collect and interpret data from the Earth Explorer interactive to make sense of core ideas about patterns in the location of tectonic plates, volcanoes, and earthquakes. Teacher Edition Twig Book	**Driving Question** **4-ESS2-2** Analyze and interpret data from maps to describe patterns of Earth's features **Anchor Phenomenon** **4-PS4-1, 4-ESS2-2**	• Earthquakes occur in patterns along the boundaries between tectonic plates. Identifying patterns in information helps scientists predict future earthquake events. • Areas near plate boundaries are at higher risk of experiencing earthquakes.	• Explore the phenomenon of plate tectonics • Use an interactive to explore earthquakes and volcanoes, and interpret data to understand the relationship between earthquakes and tectonic plates • Read and analyze informational texts about earthquakes, and use gathered data to produce a news report.	• Students evaluate the Anchor Phenomenon by comparing their earthquake wave models (see example in Lesson 4).

Earthquake Engineering

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How can we reduce the damage caused by earthquakes?

SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 3: How can building materials and shapes affect the severity of earthquake damage?				
Through a series of investigations, students build understanding of how the shape, structure, and properties of materials affect buildings' ability to withstand forces. Teacher Edition Twig Book	**Driving Question** **3–5-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 **3–5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem **3–5-ETS1-3** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved **Anchor Phenomenon** **4-ESS3-2, 3-5-ETS1-1, 3-5-ETS1-2**	• Engineers design, build, and test earthquake resistant structures. • Some materials are better at withstanding earthquakes than others.	• Explore the phenomena of loads and forces • Build different model buildings and test their stability by applying different forces and loads • Watch a video and read informational texts to compare and contrast the effects of earthquakes in different locations.	• Students investigate the Anchor Phenomenon by observing and comparing informational resources about the two buildings (see example in Lesson 4).
Driving Question 4: How can our understanding of earthquakes and materials help us build safer buildings?				
Students design, build, and test their first earthquake-resistant structures. Teacher Edition Twig Book	**Driving Question** **4-ESS3-2** Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans **3–5-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 **3–5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem **3–5-ETS1-3** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved **Anchor Phenomenon** **4-ESS3-2, 3–5-ETS1-1, 3–5-ETS1-2**	• Engineers apply what they know about waves and the properties of materials to design earthquake-resistant structures.	• Work in a team to plan and build an earthquake-resistant structure, and test it using an earthquake simulator.	• Students evaluate the Anchor Phenomenon by describing how the features of the two buildings affect their resistance to earthquakes (see example in Lesson 1).

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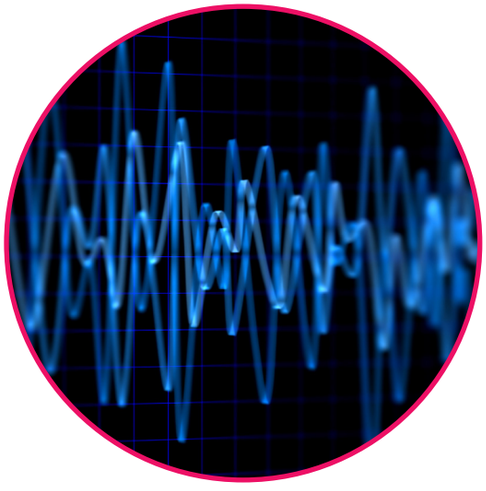
How can we reduce the damage caused by earthquakes?

SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 5: What can we learn from engineers that will help us revise our designs?				
Students discuss and make sense of observations and information obtained from their investigations with physical models, as well as informational texts and videos that explore real engineering solutions from around the world. Teacher Edition Twig Book	**Driving Question** **4-ESS3-2** Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans **Anchor Phenomenon** **4-PS4-1, 4-ESS3-2**	• Engineers apply what they know about waves and the properties of materials to design earthquake-resistant structures. • Earthquakes can harm structures and people.	• Further explore the phenomena of natural hazards • Identify earthquake hazards • Read texts and watch a video to learn how engineers solve problems and make their buildings safer.	• Students explain the Anchor Phenomenon by designing posters about the different levels of damage suffered by the two buildings (see example in Lesson 4).
Driving Question 6: How can we redesign our buildings to make them safer during earthquakes?				
In the final presentation of their engineering designs, students explain how decisions about building characteristics, such as materials' flexibility, shape, and symmetry), address the Module Investigative Problem. Teacher Edition Twig Book	**Driving Question** **4-ESS3-2** Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans **3–5-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 **3–5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem **3–5-ETS1-3** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved **Anchor Phenomenon** **4-PS4-1, 3–5-ETS1-1, 3-5-ETS1-2**	• Engineers use models to test their designs and make improvements.	• Use what I have learned in previous lessons to build a new and improved earthquake-proof model • Present my model and use what I have learned about earthquakes and engineering to explain my design.	• Students resolve the Anchor Phenomenon by suggesting how San Francisco City Hall could be redesigned to withstand earthquakes in the future (see example in Lesson 1).



Grade 4
Phenomena Tracker

Super Survivors

Blue: SEP Orange: DCI Green: CCC

Anchor Phenomenon: Humans can use their senses to avoid bear attacks.

How do the many parts of my body work together to help me live in the world? Communication involves transferring information through waves or signals.

SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 1: How do internal and external structures work together to help plants and animals live and survive?				
In this Driving Question, students consider the internal and external structures of plants and animals. As they investigate plants, they focus on stems for water transport and the internal structures of flowers. When they turn their attention to animals, the focus is on respiratory systems and structures for eating and drinking. Students also begin to explore the phenomenon of predator–prey relationships. Teacher Edition Twig Book	**Driving Question** **4-LS1-1** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction **Anchor Phenomenon** **4-LS1-1, 4-LS1-2, 4-PS4-2**	• Plants have internal and external structures that help them to get food and water. • Internal structures move the food and water around to all parts of the plants. • Flowers enable plants to reproduce. • Animals have external and internal parts to help them eat and digest food. • Animals have features that help them survive.	• Make observations and use them to form a claim supported by evidence • Use texts and videos to gather information about the structures of plants and animals.	• Students engage with the Anchor Phenomenon by reading a short text about two bear encounters. Then they generate questions about the Anchor Phenomenon (see example in Lesson 1). • Students investigate the Anchor Phenomenon by collecting information on human structures (see example in Lesson 7).
Driving Question 2: How do humans and other animals sense and respond to the environment?				
In this Driving Question, students learn about senses, and how an animal perceives sensory input (sound, touch, smell, and vision). Teacher Edition Twig Book	**Driving Question** **4-LS1-1** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction **4-LS1-2** Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways **Anchor Phenomenon** **4-LS1-1, 4-LS1-2**	• Hearing and learning sounds helps animals escape danger. • Different animals have different organs that sense touch. • Smell helps people and animals survive because it helps animals to detect food and can alert us to danger. • Our senses work together with our brain to understand the world around us. They alert us to danger and help us find food. • Our senses help us survive.	• Participate in group activities to investigate the structures and functions of body systems related to different senses • Deduce animal behavior based on photographs of different animal parts.	• Students evaluate the Anchor Phenomenon by discussing the ways that body structures can help humans avoid a bear attack (see example in Lesson 4).

Super Survivors

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Anchor Phenomenon: Humans can use their senses to avoid bear attacks.

How do the many parts of my body work together to help me live in the world? Communication involves transferring information through waves or signals.

SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 3: How do humans and other animals take in visual information?				
This Driving Question narrows the investigation of sensory input to focus solely on vision, or more precisely, how light is needed in order to see. Students study how light travels in a straight line and how light reflects off objects before entering the eye. Teacher Edition Twig Book	**Driving Question** **4-PS4-2** Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen **Anchor Phenomenon** **4-PS4-2**	• Our eyes and our brain help us see. Light reflects off an object and into your eyes—that is how we see. The more light there is, the easier it is to see.	• Build a model and use it to investigate scientific claims about light and vision • Predict and test how model modifications impact the investigation • Draw a representation of what I learned about the way light travels.	• Students investigate the Anchor Phenomenon by determining the effect of light on our ability to see objects (see example in Lesson 3). • Students evaluate the Anchor Phenomenon by writing about ways that sight might help a human to avoid a bear (see example in Lesson 5).
Driving Question 4. How does the brain make sense of and respond to information?				
This Driving Question moves from sensory organs to the brain's processing of sensory information. Students study "extra" senses, such as a bee's ability to sense when a flower has nectar, and work with stimuli that signal a specific message to illustrate how prey sometimes respond to predators. Teacher Edition Twig Book	**Driving Question** **4-LS1-2** Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways **4-PS4-2** Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen **Anchor Phenomenon** **4-ESS3-2, 3–5-ETS1-1, 3–5-ETS1-2**	• Bees use their brains to make sense of their senses. They can sense which flowers have the most food and this helps them survive. • Our senses detect something and send a message to the brain. • The brain processes that message and sends a message to the part of the body that needs to react.	• Build a model and use it to investigate scientific claims about light and vision • Predict and test how model modifications impact the investigation • Draw a representation of what I learned about the way light travels.	• Students evaluate the Anchor Phenomenon by discussing and modeling how humans process information during the day and at night (see example in Lesson 4). • Students explain the Anchor Phenomenon by writing a guide on how to avoid bear attacks (see example in Lesson 5). • Students begin to resolve the Anchor Phenomenon through a class discussion (see example in Lesson 6).

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Anchor Phenomenon: Humans can use their senses to avoid bear attacks.

How do the many parts of my body work together to help me live in the world? Communication involves transferring information through waves or signals.

SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 5. How do waves affect our ability to communicate?				
This Driving Question moves on from perception of sensory information to communication, specifically the transmission of waves that can be perceived by our senses. Students explore sound and visualize sound as waves. They then look at waves in the ocean, learning the difference between waves at the coast and waves in the open ocean. Teacher Edition Twig Book	**Driving Question** **4-PS3-2** Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents **4-PS4-1** Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move	• Our ability to hear a sound is affected by the distance we are from the source. • Vibrations make sound. Sounds travel in waves in all directions from the source, and dissipate over distance. • Sound waves can travel through solids, liquids, and gases.	• Complete a design engineering challenge, implementing both criteria and constraints • Use an interactive to understand the behavioral patterns of ocean waves, both in an open ocean and closer to shore.	
Driving Question 6. How can we transfer information over long distances?				
Students complete an Engineering Design Challenge in which they create a device for sending a distress signal when stranded at sea. After learning about binary code and digitized information, students revise their designs. Teacher Edition Twig Book	**Driving Question** **4-PS4-1** Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move **4-PS4-3** Generate and compare multiple solutions that use patterns to transfer information **3–5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem **3–5-ETS1-3** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved **Anchor Phenomenon** **4-LS1-1, 4-LS1-2, 4-PS4-2**	• Information can be digitized and moved from one place to another. • Animals obtain information through their senses. • Digitized information can be sent over long distances and does not lose its meaning.	• Build a communication device transmitting information via waves, a pattern, or a code • Plan and conduct a group presentation, which explains my findings • Improve my ideas through feedback.	• Students resolve the Anchor Phenomenon through a class discussion (see example in Lesson 10).