

Grade 6

Phenomena Tracker

BioTech Systems Worldwide

Blue: SEP Orange: DCI Green: CCC

Anchor Phenomenon: A patient who experiences heart failure can recover if their heart is replaced.
How do human body systems and subsystems work together?

SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
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Driving Question 1: How do human body systems function?

This Driving Question defines the concept of a system, how different parts make up a system, and how systems in the human body work together. Students study the digestive system, muscular system, nervous system, respiratory system, circulatory system, and excretory system.

Teacher Edition

Twig Book

Driving Question
MS-LS1-3 Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells
MS-LS1-8 Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories
Anchor Phenomenon
MS-LS1-1, MS-LS1-2, MS-LS1-3

- The human body has many structures, and each has a particular function to help us survive.
- The human body is a system made up of many smaller systems, which interact.
- The brain and nervous system interact with other body systems so that they can work effectively.
- Memories are created in the brain when sense receptors send messages.

- Explore the phenomena of human body systems
- Analyze texts, watch videos, and create models to study different body systems, and understand how they work together
- Investigate sources and use research to evaluate the credibility and validity of a text
- Examine scientific data and research to conclude that the body is a system of systems.

- Students engage with the Anchor Phenomenon by reading a text about a person whose heart is failing. Then they generate questions about the Anchor Phenomenon (see example in Lesson 2).
- Students investigate the Anchor Phenomenon by reading a text about heart failure and completing a graphic organizer (see example in Lesson 13).

Driving Question 2: How can technology replace and enhance the functions of human organs?

In this Driving Question, students delve deeper into systems by exploring organs and tissues. They learn that organs wear out and can be replaced by either organ donation or artificial organs. All this information is synthesized as students create a poster and display it to the rest of the class.

Teacher Edition

Twig Book

Driving Question
MS-LS1-3 Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells
Anchor Phenomenon
MS-LS1-3

- Human organs are made up of tissues.
- Tissues are made up of cells.
- Cells, tissues, and organs have specific functions.
- Organs sometimes fail or do not work properly.
- Organs and parts of organs can be replaced with donor or artificial organs.
- Scientists and engineers work together to improve organ replacement and artificial organs.

- Use scientific texts and videos to research and produce an informational poster for BioTech Systems Worldwide, with detailed information about organs and their replacement parts.

- Students evaluate the Anchor Phenomenon by describing how the circulatory system would be affected by a failing heart (see example in Lesson 1).
- Students evaluate the Anchor Phenomenon by describing how different body systems would be affected by a failing heart (see example in Lesson 3).

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Driving Question 3: What things are made of cells?				
<p>This Driving Question takes students deeper into organs and tissues by introducing them to cells. Using an interactive that simulates a microscope, students discover that tissues are made of smaller parts and that only living things are made of cells (or a single cell). Students realize that cells are miniature systems, but also parts of a larger system.</p> <p>Teacher Edition</p> <p>Twig Book</p>	<p>Driving Question 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 Anchor Phenomenon MS-LS1-1, MS-LS1-2, MS-LS1-3</p>	<ul style="list-style-type: none"> Living things are made of cells. Cells have specific functions. Tissues are made of cells. Microscopes help us to see cell structures. Cells are made up of smaller parts, which have specific functions. Plant and animal cells have different structures. Models can help us understand the different structures in plant and animal cells. 	<ul style="list-style-type: none"> Explore the phenomena of cells Use a microscope interactive to investigate and conclude that living things are made of cells, and non-living things are not Draw a model to explain how a cell functions Make a claim, then use evidence and reasoning to support my claim. 	<ul style="list-style-type: none"> Students investigate the Anchor Phenomenon by comparing healthy and unhealthy heart cells (see example in Lesson 5). Students evaluate the Anchor Phenomenon by assessing how a heart transplant would help a patient with heart failure (see example in Lesson 6). Students explain the Anchor Phenomenon by developing a model of a healthy heart and constructing an argument for the patient to receive a heart transplant (see example in Lesson 7).
Driving Question 4: How can we design and build a prosthetic hand to pick up a water bottle?				
<p>For this module's Engineering Design Challenge, students are challenged to build a prosthetic hand that can pick up a water bottle, within a specific budget. Teams design, build, test, refine, and present their work.</p> <p>Teacher Edition</p> <p>Twig Book</p>	<p>Driving Question MS-LS1-3 Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells 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 that may limit possible solutions MS-ETS1-2 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem Anchor Phenomenon MS-LS1-2, MS-LS1-2, MS-LS1-3</p>	<ul style="list-style-type: none"> Human hands rely on many subsystems to function. The skeletal system helps us to move. Prosthetic limbs have to function just like the limbs they replace. Engineers use prototypes to test and refine their designs. 	<ul style="list-style-type: none"> Use knowledge gained on how body systems work together to design and create a model of a prosthetic hand Evaluate designs to assess how they meet criteria and constraints. 	<ul style="list-style-type: none"> Students resolve the Anchor Phenomenon through a class discussion (see example in Lesson 2).

Grade 6

Phenomena Tracker

Destination Everywhere!

Blue: SEP Orange: DCI Green: CCC

Anchor Phenomenon: Quito is not far from Cayambe, but Quito is warm all year round and the summit of Cayambe is always covered in snow. Even though it is cold every day at Cayambe's summit, it only snows on some days.

Weather and climate vary around the world, but we can use science and past trends to predict them.

SUMMARY

PERFORMANCE EXPECTATIONS

KEY INVESTIGATIVE PHENOMENA

I CAN... STUDENT LEARNING OBJECTIVES

ANCHOR PHENOMENON TOUCHPOINT

Driving Question 1: What claims can be made about climate?

Students use an interactive map and readings to recognize patterns in factors that affect climate. Factors include latitude, altitude, proximity to the coast, ocean currents, and precipitation. Students begin work on their Destination Guide by gathering climate data for a specific location of their choice.

Teacher Edition

Twig Book

Driving Question

MS-ESS2-6 Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates

Anchor Phenomenon

MS-ESS2-5, MS-ESS2-6, MS-ESS2-4

- Weather is the condition of the atmosphere at a given place and time.
 - Locations at higher altitudes are colder than those at lower altitudes.
 - The climate at the Equator is the same all year round.
 - Areas near the coast have less variation in temperature throughout the year.
 - There is more precipitation in locations near the equator.
 - Climate is a region's average weather over a long period of time.
 - There are five climate zones across the Earth.
 - Global wind patterns move cold air from the poles and warm air from the Equator.
- Use an interactive to make claims about the effects of different geographical factors, such as latitude and coastal proximity, on the climate of a region
 - Use maps and videos to learn about global patterns, including the movement of ocean currents and prevailing winds.
- Students engage with the Anchor Phenomenon by gathering information about two locations with different climates. Then they generate questions about the Anchor Phenomenon (see example in Lesson 1).
 - Students investigate the Anchor Phenomenon by collecting and organizing data about the longitude, latitude, and altitude of Quito and the summit of Cayambe (see example in Lesson 3).
 - Students evaluate the Anchor Phenomenon by identifying patterns in latitude, altitude, and temperature of Quito and Cayambe summit (see example in Lesson 6).

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Driving Question 2: What is the effect of the Sun shining onto the Earth?

Students are introduced to the phenomenon of the water cycle. They compare how quickly different materials heat up and cool down, examine convection currents and how the Sun’s energy influences ocean currents and air masses. Students then learn about climate zones and create climate models for their Destination Guide.

Teacher Edition

Twig Book

Driving Question

MS-ESS2-4 Develop a model to describe the cycling of water through Earth’s systems driven by energy from the sun and the force of gravity

MS-ESS2-5 Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions

MS-ESS2-6 Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates

MS-PS3-4 Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample

MS-PS3-5 Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object

Anchor Phenomenon

MS-ESS2-6, MS-ESS2-4

- All water on Earth is constantly cycled.
- Processes involved in the water cycle include evaporation, transpiration, condensation, and precipitation.
- The Sun’s energy drives the water cycle.
- The Sun’s energy heats the air, land, and water.
- Land heats more quickly than water.
- At higher temperatures, air pressure increases. At cold temperatures, air pressure decreases.
- Analyzing data helps scientists to understand systems.
- Differences in density, temperature, and salinity cause water to rise or sink.
- There are seven main types of air masses.
- Temperature differences and the rotation of the Earth contribute to patterns of wind and precipitation.

- Conduct experiments to understand the phenomenon of the water cycle, and create a model of the water cycle
- Plan and carry out an investigation to discover whether water and land heat and cool at the same rate
- Relate what I have learned about factors including altitude and climate zone to my Destination Guide location.

- Students evaluate the Anchor Phenomenon by completing a graphic organizer and discussing their results (see example in Lesson 8).
- Students evaluate the Anchor Phenomenon by describing how air movement in Ecuador relates to global atmospheric circulation (see example in Lesson 14).

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I CAN... STUDENT LEARNING OBJECTIVES

ANCHOR PHENOMENON TOUCHPOINT

Driving Question 3: Can we design a house that uses the Sun's energy to keep people warm?

Students take part in an Engineering Design Challenge: design a home that is heated by passive solar radiation. Students experiment with various materials to discover their heat capacity, then apply this knowledge to their home design.

Teacher Edition

Twig Book

Driving Question

MS-PS3-4 Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample

MS-PS3-5 Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object

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 that may limit possible solutions

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 to better meet the criteria for success

- The Sun warms the surface of the Earth.
- The Sun's energy can be used to heat and power homes.
- Some materials heat more quickly than others.
- Some materials are good insulators.

- Build, test, and revise a model for a home that uses the Sun's energy to keep people warm
- Conduct experiments to learn how different materials change temperature during the day and night, and create a spreadsheet and graph of the results
- Use what I have learned about materials to create and present a final design for my passive solar home.

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Driving Question 4: How can we predict the weather?				
<p>Students define and differentiate the phenomena of weather and climate. By studying air pressure maps, students learn the effects of high and low pressure on weather, which leads into a study of wind, weather fronts and air masses. Applying this learning, students try to predict the weather, then complete their Destination Guides.</p> <p>Teacher Edition</p> <p>Twig Book</p>	<p>Driving Question MS-ESS2-5 Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions</p> <p>MS-ESS2-6 Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates</p> <p>Anchor Phenomenon MS-ESS2-5, MS-ESS2-6, MS-ESS2-4</p>	<ul style="list-style-type: none"> • Climate is a region's average weather over a long period of time. • Weather is the condition of the atmosphere at a given place and time. • Air pressure varies and influences weather and climate. • Calm weather appears in areas of high pressure. • Rainy and stormy weather appears in areas of low pressure. • Air is always trying to move from high pressure to low pressure to equalize. When air pressure changes, there is wind. • Meteorologists analyze data and make weather predictions based on the evidence. 	<ul style="list-style-type: none"> • Use diagrams, models, and videos to learn about air pressure and air masses, and understand how these factors affect the weather • Create and present a Destination Guide to demonstrate my understanding of the weather and climate in my chosen location. 	<ul style="list-style-type: none"> • Students investigate the Anchor Phenomenon by collecting and organizing data about pressure systems (see example in Lesson 3). • Students evaluate the Anchor Phenomenon by predicting the weather on the summit of Cayambe (see example in Lesson 4). • Students explain the Anchor Phenomenon by writing a Destination Guide for Quito and Cayambe (see example in Lesson 7). • Students resolve the Anchor Phenomenon through a class discussion (see example in Lesson 9).

Grade 6

Phenomena Tracker

The Red List

Blue: SEP Orange: DCI Green: CCC

Anchor Phenomenon: Sea otters in California have been protected by laws since 1913 but their population levels have not changed enough to take them off the endangered species list.

How do the environment and genetics affect animals and plants?

SUMMARY

PERFORMANCE EXPECTATIONS

KEY INVESTIGATIVE PHENOMENA

I CAN... STUDENT LEARNING OBJECTIVES

ANCHOR PHENOMENON TOUCHPOINT

Driving Question 1: How do animal behaviors and plant structures affect their survival and reproduction?

Students are introduced to their role as ecologists, and choose an endangered species to study during the module. They focus on things that increase the likelihood of successful reproduction, including courtship rituals and parenting behaviors in animals, and pollination and seed dispersal methods in plants.

Teacher Edition

Twig Book

Driving Question

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-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 that may limit possible solutions

Anchor Phenomenon

MS-LS3-2, MS-LS1-4, MS-LS1-5

- Scientists evaluate information carefully to ensure it is relevant and accurate.
- Endangered species are at risk of becoming extinct in the wild.
- Plants and animals have structures and behaviors that help them to reproduce.
- Some plants and animals engage in behaviors that help their offspring to survive.

- Explore the phenomena of plant and animal reproduction
- Research an endangered species and learn about why it is at risk
- Use videos and texts to learn how different plants and animals successfully reproduce
- Write a scientific argument explaining how animal behaviors and plant structures increase the probability of successful reproduction.

- Students engage with the Anchor Phenomenon by reading a text about sea otters. Then they generate questions about the Anchor Phenomenon (see example in Lesson 1).
- Students investigate and evaluate the Anchor Phenomenon by reading an article and collecting information in a graphic organizer (see example in Lesson 10).

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Driving Question 2: How do species reproduce?

Students learn about sexual and asexual reproduction, genetics, and heredity—including traits, genes, and chromosomes. Using genotypes and phenotypes, students create a genetic model of a butterfly. They learn how parents pass traits to their offspring in both sexual and asexual reproduction. Students apply this learning to the endangered species they are studying in the module.

[Teacher Edition](#)

[Twig Book](#)

Driving Question
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-LS3-2 Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation

Anchor Phenomenon
 MS-LS3-2, MS-LS1-5

- Plants and animals have structures and behaviors that help them to reproduce.
- Sexual reproduction requires male and female structures.
- Asexual reproduction results in identical offspring.
- Sexual reproduction results in offspring with genetic variation.
- Genetic information is inherited from an organism's parents.
- Genes, chromosomes, and alleles determine what traits an organism has.
- Genotypes and phenotypes determine variation in traits.
- Species with more variation among their members are more successful in surviving.

- Explore the phenomena of sexual and asexual reproduction
- Create models to show my understanding of genes and chromosomes
- Use texts and models to learn how genes determine an individual's traits
- Identify whether different species rely on sexual or asexual reproduction.

- Students investigate the Anchor Phenomenon by exploring the genetic traits of sea otters that affect survival (see example in Lesson 4).
- Students evaluate the Anchor Phenomenon by recording data on the trait of disease resistance in sea otters (see example in Lesson 7).
- Students evaluate the Anchor Phenomenon by modeling the inheritance of disease resistance in sea otters (see example in Lesson 9).

Driving Question 3: How do environmental and genetic factors influence the growth of an organism?

Students analyze results from scientific studies showing how environmental factors affect growth in populations. They study examples including lettuce, lake sturgeon, chickens, and fruit.

[Teacher Edition](#)

[Twig Book](#)

Driving Question
MS-LS1-5 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms

MS-LS3-2 Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation

Anchor Phenomenon
 MS-LS3-2, MS-LS1-5

- Environmental factors influence how many of a species will survive.
- Environmental factors can influence the traits a species will develop.
- Analyzing experimental data helps us to see how traits have changed in a species over time.

- Explore the phenomenon of genetics
- Analyze and interpret data from scientific studies
- Explain how environmental and genetic factors influence the growth of organisms.

- Students investigate the Anchor Phenomenon by collecting and organizing data about environmental and genetic factors that affect sea otter populations (see example in Lesson 3).
- Students evaluate the Anchor Phenomenon by recording information about factors that affect sea otter populations (see example in Lesson 7).

Grade 6

Phenomena Tracker

The Red List

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How do the environment and genetics affect animals and plants?

SUMMARY

PERFORMANCE EXPECTATIONS

KEY INVESTIGATIVE PHENOMENA

I CAN... STUDENT LEARNING OBJECTIVES

ANCHOR PHENOMENON TOUCHPOINT

Driving Question 4: How do we protect endangered species?

Students are introduced to species conservation plans and recovery plans. Students develop conservation plans for their chosen species.

Teacher Edition

Twig Book

Driving Question

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-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 that may limit possible solutions

MS-ETS1-2 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem

Anchor Phenomenon

MS-LS3-2, MS-LS1-5, MS-LS1-4

- Human impacts on the natural environment have caused many species to become endangered.
- Conservation projects can help increase the population of endangered species in the wild.
- Encouraging endangered species to reproduce will help to increase their populations.

- Use my learning to devise ways to protect my chosen endangered species and help its population increase
- Write and present a conservation plan for my chosen species.

- Students explain the Anchor Phenomenon by writing a speech about sea otter populations (see example in Lesson 4).
- Students resolve the Anchor Phenomenon through a class discussion (see example in Lesson 5).



Grade 6

Phenomena Tracker

Cities of the Future

Blue: SEP Orange: DCI Green: CCC

Anchor Phenomenon: New York City's energy resources have changed over the past 400 years. The city plans to continue changing the types of resources it uses.

How can we reduce harmful impacts on the environment in the places where people live?

SUMMARY

PERFORMANCE EXPECTATIONS

KEY INVESTIGATIVE PHENOMENA

I CAN... STUDENT LEARNING OBJECTIVES

ANCHOR PHENOMENON TOUCHPOINT

Driving Question 1: How do humans impact the environment?

This Driving Question explores the ways that human activities affect Earth systems. Students research different environmental problems and present their findings to the class, and then focus on the issue of water pollution. Students examine three environmental impact studies and are introduced to the module project: designing a new community with a low environmental impact.

[Teacher Edition](#)

[Twig Book](#)

Driving Question

MS-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment

MS-ESS3-3 , MS-ESS3-5

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| <ul style="list-style-type: none"> • Human activities can have a negative impact on the environment. • Human activity causes land pollution, air pollution, water pollution, and scarcity of natural resources. • Biomonitoring is a way to measure pollution levels. • High levels of phosphates in water means that there is high levels of pollution. | <ul style="list-style-type: none"> • Research and present an environmental topic • Recognize how humans impact every Earth system • Relate human activities to their impacts on the environment. | <ul style="list-style-type: none"> • Students engage with the Anchor Phenomenon by reading an article about New York City (see example in Lesson 1). • Students investigate and evaluate the Anchor Phenomenon by identifying the cause-and-effect relationship between human activities and their impact on the environment (see example in Lesson 6). |
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Driving Question 2: What does the evidence tell us about climate change?

Through investigation of various factors that may affect Earth's climate, students look for evidence that supports or refutes the claim "climate change is happening." They review and analyze graphs showing global temperature and greenhouse gas levels over time, examine data from videos and texts, and develop a final argument about the causes of climate change.

Teacher Edition

Twig Book

Driving Question
MS-ESS3-5 Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century
Anchor Phenomenon
MS-ESS3-3 , MS-ESS3-5

- More frequent severe weather events, floods, melting glaciers, rising sea levels, and shrinking lakes are all evidence of climate change.
 - There is a correlation between the increase in carbon dioxide emissions and the increase in global temperatures.
 - Carbon dioxide gas in the atmosphere causes a rise in temperature at the Earth's surface.
 - Human activity has caused the amount of carbon dioxide in the atmosphere to increase.
 - Volcanoes, the Sun, and other natural phenomena also contribute to climate change.
- Explore the phenomenon of climate change
 - Evaluate the reliability of evidence used to support a scientific claim
 - Extract information about the impact of climate change from videos, texts, and different types of graphs
 - Compare historical and current patterns of climate change.
- Students investigate the Anchor Phenomenon by comparing data between New York City and the world and identifying patterns (see example in Lesson 4).
 - Students evaluate the Anchor Phenomenon by identifying correlations in data (see example in Lesson 5).
 - Students evaluate the Anchor Phenomenon by identifying and discussing patterns between population, carbon emissions, and sea level (see example in Lesson 9).

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I CAN... STUDENT LEARNING OBJECTIVES

ANCHOR PHENOMENON TOUCHPOINT

Driving Question 3: How does climate change affect living things?

This Driving Question focuses on the impact of climate change on the biosphere. Students synthesize information from graphs, texts, and maps in order to understand the impact of climate change on organisms and food webs. They write and revise a claim about how climate change is likely to affect living things.

Teacher Edition

Twig Book

Driving Question

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

Anchor Phenomenon

MS-ESS3-5, MS-ESS3-3

- Climate change affects the health of ecosystems and the organisms that live there.
- Making observations of changes in ecosystems provides evidence of how environmental changes affect living things.
- Changing one thing in a food web impacts every organism.

- Predict the effects of climate change on plants, animals, and humans
- Evaluate the validity of an information source.

- Students evaluate the Anchor Phenomenon by discussing initiatives to address some of the causes of increasing temperatures (see example in Lesson 5).

Driving Question 4: How can we design solutions to reduce our impact on the environment?

Students explore how communities create solutions to reduce harmful impacts on the environment. They design a new community that meets a set of criteria and constraints that they have defined.

Teacher Edition

Twig Book

Driving Question

MS-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment

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 that may limit possible solutions

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-ETS1-4 Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved

Anchor Phenomenon

MS-ESS3-3, MS-ESS3-5

- A carbon footprint is the amount of carbon dioxide released into the atmosphere as a result of the activities of an individual, organization, or community.
- Individuals, communities, and organizations can reduce their impact on the environment.

- Estimate my carbon footprint and find ways to limit my carbon emissions
- Explore ways to limit human impacts on the environment
- Create a design for a new community with a reduced environmental impact.

- Students explain the Anchor Phenomenon in a series of social media posts (see example in Lesson 7).
- Students resolve the Anchor Phenomenon through a class discussion (see example in Lesson 10).

