Grade 3
Phenomena Tracker

The Ultimate Playground

Blue: SEP Orange: DCI Green: CCC

Anchor Phenomenon: The Dragon Ride can be moved without a person touching it.
How are objects affected by the forces of push and pull?

SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 1: What happens when several different forces push or pull on an object at once?				
This Driving Question introduces the module challenge of designing the Ultimate Playground. Students study forces and changes in motion as cause and effect. They focus on roller coaster (gravity-based) rides and kicking a ball as the first elements of their Ultimate Playground. Teacher Edition Twig Book	**Driving Question** **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 **Anchor Phenomenon** **3-PS2-1, 3-PS2-3**	• Unbalanced forces cause an object's motion to change. • Unbalanced forces cause an object to slow down or stop. • Unbalanced forces cause an object to change direction.	• Explore the phenomena of forces • Observe how playground objects use forces • Investigate how the size and direction of forces can change a ball's motion • Use models to show how forces act on and change the motion of objects.	• Students engage with the Anchor Phenomenon by watching a video about a fairground ride (see example in Lesson 3). • Students generate questions about the Anchor Phenomenon (see example in Lesson 3).
Driving Question 2: How can an object be pushed or pulled but not move?				
This Driving Question uses tug-of-war as an introduction to and example of balanced and unbalanced forces. Students use this concept to further design and test their Ultimate Playground. Teacher Edition Twig Book	**Driving Question** **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 **Anchor Phenomenon** **3-PS2-1**	• If the forces acting on an object are balanced, there will be no change to its motion.	• Explore the phenomena of forces and motion • Work well in a team • Identify whether forces are balanced or unbalanced based on an object's motion.	• Students investigate the Anchor Phenomenon by exploring how push and pull forces affect the movement of the Dragon Ride (see example in Lesson 3). • Students evaluate the Anchor Phenomenon by discussing the data they collected in their previous investigation and describing the forces involved (see example in Lesson 4).

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Driving Question 3: What do we need to know to predict the motion of objects?				
Students learn to recognize patterns and use them to make predictions. Students study swings and create models, realizing that models are useful to the design process. Teams build models of both one-rope and two-rope swings, look for patterns, and decide which type of swing to include in their Ultimate Playground. Teacher Edition Twig Book	**Driving Question** **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 **3–5-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	• We can predict the motion of an object based on previous patterns and prior knowledge of how unbalanced forces affect motion.	• Plan a fair test • See patterns in the motion of a swing • Use patterns to predict how a swing will move.	
Driving Question 4: How can some objects push or pull one another without even touching?				
Students explore more forces. Students already know about gravity; now, they learn about static electricity and magnetism. Students begin to design a magnetism game for the Ultimate Playground. Teacher Edition Twig Book	**Driving Question** **3-PS2-3** Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other **Anchor Phenomenon** **3-PS2-1, 3-PS2-3**	• Static electricity produces a force that can move objects, even when they don't touch. • Gravity, static electricity, and magnetism can all cause forces between objects without the objects touching. • When magnets get closer to an object, the force is stronger. When two magnets interact, the force can be a push or a pull.	• Explore the phenomenon of magnetism • Ask questions about cause and effect • Identify the effects of gravity, static electricity, and magnetism between objects that are not touching.	• Students investigate the Anchor Phenomenon by finding out how to move the Dragon Ride without touching it (see example in Lesson 3). • Students evaluate the Anchor Phenomenon by discussing and answering questions about their investigation into magnetic forces (see example in Lesson 4).

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SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 5: How can we solve a design problem by using magnets?				
Students are introduced to an industrial application of magnets: maglev trains, and then go on to design a tabletop game that uses magnets, and a model for a Dragon Ride, the centerpiece of the Ultimate Playground. Teacher Edition Twig Book	**Driving Question** **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-PS2-4** Define a simple design problem that can be solved by applying scientific ideas about magnets **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** **3-PS2-1, 3-PS2-3, 3-PS2-2, 3-PS2-4**	• Engineers use magnets to solve design problems.	• Define a problem to be solved • Work within constraints • Provide a design solution that meets specific criteria.	• Students explain the Anchor Phenomenon by creating posters to advertise the Dragon Ride (see example in Lesson 1). • Students resolve the Anchor Phenomenon by writing diary entries about designing two fairground rides (see example in Lesson 8).


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Grade 3
Phenomena Tracker

Welcome to the Biodome

Blue: SEP Orange: DCI Green: CCC

Anchor Phenomenon: Two painted lady butterflies have similarities and differences as they grow and change, but only one of them is eaten by a bird.

How do plants' and animals' life cycles help them survive?

SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 1: In what ways are the life cycles of living things the same or different?				
Students begin their study of life cycles by learning about eggs, learning to classify them and studying the life cycles of egg-laying animals such as birds, reptiles, fish, and amphibians. They begin the ongoing Tropical Rain Forest Biodome project and start two observational experiments to study painted lady butterflies and two kinds of plants. They also study the life cycle of flowering plants and learn the traits that mammals have. Teacher Edition Twig Book	**Driving Question** **3-LS1-1** Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death **Anchor Phenomenon** **3-LS1-1, 3-LS4-2**	• Every living thing has a life cycle. • Some animals go through metamorphosis, in which their body structures change dramatically. • An egg is the first stage in the life cycle of amphibians, reptiles, birds, fish, and insects. • A seed is the first stage in the life cycle of plants.	• Explore the phenomena of plant and animal life cycles • Observe and record data about the life cycles of butterflies and plants • Find patterns in the life cycles of different types of organisms • Predict and make models of stages in organisms' life cycles.	• Students engage with the Anchor Phenomenon by observing a visual story about the life of two painted lady butterflies. Then they generate questions about the Anchor Phenomenon (see example in Lesson 3). • Students investigate the Anchor Phenomenon by observing the patterns of change in the painted lady butterflies' life cycle (see example in Lesson 11).
Driving Question 2: Do plants and animals inherit traits from their parents?				
This Driving Question continues the study of traits, focusing especially on the traits that parents and offspring share. Students predict the traits of offspring based on traits of the parents. Students also look at stripes on zebras and how that trait varies but is similar among siblings and families. Teacher Edition Twig Book	**Driving Question** **3-LS1-1** Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death **3-LS3-1** Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms **Anchor Phenomenon** **3-LS1-1**	• Young plants and animals are similar, but not identical, to their parents. • An offspring's traits are inherited from their parents.	• Explore the phenomena of traits • Match plants and animals to their offspring • Identify patterns in traits between parents and offspring • Explain that many features of living things are inherited from their parents.	• Students evaluate the Anchor Phenomenon by comparing the order of their cards to their life cycle models (see example in Lesson 7).

Welcome to the Biodome

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How do plants' and animals' life cycles help them survive?

SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 3: Do some traits provide individuals with survival advantages?				
In this Driving Question, students look at how trait variation can provide individuals with survival advantages. Students focus on camouflage (leaf-tailed geckos) and reproduction (plants). Teacher Edition Twig Book	**Driving Question** **3-LS1-1** Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death **3-LS3-1** Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms **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 **Anchor Phenomenon** **3-LS1-1, 3-LS4-2**	• Variation in traits, such as skin color and wing patterns, provide species with survival advantages.	• Observe trait variation in painted lady butterflies and two varieties of plant • Explain why variation in the trait of skin color can help leaf-tailed geckos survive • Explain how trait variation can help birds produce more offspring.	• Students evaluate the Anchor Phenomenon through a discussion. Then they develop a model of how a painted lady butterfly's life cycle and its traits help it to survive (see example in Lesson 4). • Students explain the Anchor Phenomenon by constructing an explanation about why one butterfly survived and the other did not (see example in Lesson 5).
Driving Question 4: Why do some animals live alone while others live in large groups?				
This Driving Question focuses on animals that live in groups and the reasons they do so. Students learn about leafcutter ants, bison, savanna herbivores (wildebeest and zebras), and birds. Teacher Edition Twig Book	**Driving Question** **3-LS2-1** Construct an argument that some animals form groups that help members survive **Anchor Phenomenon** **3-LS1-1, 3-LS4-2**	• Animals, such as leafcutter ants, zebras, bison, and lions, form groups that help members survive. Lions hunt together to increase the chances of catching prey. Zebras protect each other from predators.	• Explore the phenomenon of social interaction among animals • Make a claim about how some animals form groups to survive • Use evidence from articles and videos to support my claims about how animals form groups to survive • Write about how monarch butterflies form groups to survive in winter and explain why.	• Students resolve the Anchor Phenomenon through a class discussion (see example in Lesson 5).

Grade 3
Phenomena Tracker

How to Survive an Ice Age

Blue: SEP Orange: DCI Green: CCC

Anchor Phenomenon: Some types of squirrel can survive in the Arctic, while other types cannot.
What is the relationship between an organism and its environment?

SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 1: How does the environment affect the traits of plants and animals?				
Students study the seeds of the plants they planted in Module 2. Students are introduced to the concept that humans can influence traits through selective breeding. Teams plan an investigation they will conduct throughout the module that explores the influence of a single environmental variable on traits. Teacher Edition Twig Book	**Driving Question** 3-LS3-2 Use evidence to support the explanation that traits can be influenced by the environment **Anchor Phenomenon** 3-LS4-3, 3-LS3-2	• Humans can use selective breeding to influence the traits of plants and animals. • Some trait variations (such as eye color) are inherited, while others (such as weight) are environmental. • Environmental variables can influence the traits of plants and animals. • Changing one condition in a plant's environment can influence that plant's traits.	• Explore the phenomenon of the inheritance of traits • Observe that an organism's traits are influenced by their parents and by the environment • Plan an investigation into an environmental influence on plants.	• Students engage with the Anchor Phenomenon by observing images and information about two different types of squirrel. Then they generate questions about the Anchor Phenomenon (see example in Lesson 3).
Driving Question 2: What do an organism's traits tell us about how likely it is to survive in a particular environment?				
Students compare and contrast the traits of animals from the Ice Age with present-day animals. Students learn about various environments, the traits of organisms that live in each, and consider how those traits help organisms to survive in that environment. Teacher Edition Twig Book	**Driving Question** 3-LS3-2 Use evidence to support the explanation that traits can be influenced by the environment 3-LS4-1 Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago 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 **Anchor Phenomenon** 3-LS4-3, 3-LS3-2	• Fossils provide evidence of the environment in which a plant or animal lived. • A plant or animal's traits can help it survive in a given environment. • A plant or animal's traits can tell us in what environment that plant or animal is likely to live.	• Analyze fossils to compare the traits of Ice Age animals to present-day animals • Read informational texts and share key information with my team • Write about what I have learned about traits and environments.	• Students investigate the Anchor Phenomenon by interpreting information about the squirrels' traits and the environmental conditions in the Arctic (see example in Lesson 4). • Students evaluate the Anchor Phenomenon by determining which squirrel could survive in the Arctic (see example in Lesson 7).

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What is the relationship between an organism and its environment?

SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 3: What happens to organisms when the environment changes?				
Students examine what happens when an organism's environment changes. With the help of an interactive, they study how two species of herbivore adapted to changing environmental conditions, and conclude their plant experiment. Teacher Edition Twig Book	**Driving Question** **3-LS3-2** Use evidence to support the explanation that traits can be influenced by the environment **3-LS4-1** Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago **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 **Anchor Phenomenon** **3-LS4-3**	• Plants and animals can adapt to changing environmental conditions. • The end of the last ice age was marked by the mass extinction of megafauna. • Human hunting and warming temperatures contributed to this mass extinction.	• Explore the phenomenon of variation of traits • Compare and contrast present-day mammals • Use a computer model to explore how Ice Age species were affected by warmer temperatures.	• Students evaluate the Anchor Phenomenon by comparing Ice Age animals to the squirrels to determine which traits would help them survive in the Arctic (see example in Lesson 3).
Driving Question 4: How can we solve problems caused by changes to the environment?				
The final Driving Question in this module focuses on changes to the environment that were caused by humans, including the introduction of invasive species to an environment. Students work in teams to propose solutions to the problems caused by an invasive species in California. Teacher Edition Twig Book	**Driving Question** **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 **3-LS4-4** Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change **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 **Anchor Phenomenon** **3-LS4-3, 3-LS3-2**	• Environments can have native, non-native, and invasive species. • By introducing invasive species to an environment, humans can negatively change that environment. • Scientists use evidence to evaluate solutions.	• Explain why some plant and animal species survive in human-built environments • Predict how invasive plants and animals affect other organisms in an environment • Develop and evaluate solutions to a problem.	• Students explain the Anchor Phenomenon by creating an infographic (see example in Lesson 1). • Students resolve the Anchor Phenomenon through a class discussion (see example in Lesson 3).

Grade 3
Phenomena Tracker

Weather Warning HQ

Blue: SEP Orange: DCI Green: CCC

Anchor Phenomenon: It is warm in Sydney, Australia, on New Year's Day.
What is the weather like around the world?

SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 1: What are the weather patterns in our local region, and how do they change between seasons?				
Students explore the phenomenon of weather. They then learn to measure weather conditions—namely, temperature, precipitation, and wind (speed and direction). They also detect seasonal patterns in local weather data from the past year. Teacher Edition Twig Book	**Driving Question** **3-ESS2-1** Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season **Anchor Phenomenon** **3-ESS2-1, 3-ESS2-2**	• Tools like thermometers measure temperature. • Tools like wind vanes measure wind direction and tools like anemometers measure wind speed. • Temperature, precipitation, and wind are all types of weather conditions. • The weather in a given area has seasonal patterns.	• Explore the phenomena of weather patterns • Explain how scientists measure different aspects of weather • Show weather patterns by creating bar graphs for temperature, wind, and precipitation • Read wind vanes to tell wind direction.	• Students engage with the Anchor Phenomenon by watching a video. They then generate questions about the Anchor Phenomenon (see example in Lesson 3).
Driving Question 2: How do the weather patterns in our local region compare to patterns in other areas in the United States?				
Students compare the local data from the previous Driving Question with data from Yuma, Arizona; Minneapolis, Minnesota; and Mobile, Alabama. A fictional family considers moving to the various cities, and students study weather data to make recommendations to the family based on the data and patterns in the data. Teacher Edition Twig Book	**Driving Question** **3-ESS2-1** Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season **Anchor Phenomenon** **3-ESS2-1, 3-ESS2-2**	• Weather data can help us make predictions about seasonal weather patterns in a given area. • Data can be represented in graphs.	• Write a weather forecast that shows weather patterns in different seasons • Use an interactive to present weather data in the form of bar graphs.	• Students investigate the Anchor Phenomenon by examining temperature data (see example in Lesson 4). • Students evaluate the Anchor Phenomenon by creating a bar graph of Sydney temperature data and comparing this to data from other regions, including their own (see example in Lesson 5).

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SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 3: What are the weather patterns in climates around the world?				
In this Driving Question, the focus turns from weather in specific locations to the phenomenon of global climate. Students learn about three main climate zones: tropical, temperate, and polar. Teacher Edition Twig Book	**Driving Question** **3-ESS2-2** Obtain and combine information to describe climates in different regions of the world **Anchor Phenomenon** **3-ESS2-1, 3-ESS2-2**	• The Earth has three major climate zones. • The climate in the Earth's three climate zones is determined by their proximity to the equator.	• Explore the phenomenon of climate zones • Collect data about different climates from informational texts • Compare and contrast climates from around the world.	• Students investigate the Anchor Phenomenon by using world maps to identify the climate zones of Sydney and where they live (see example in Lesson 3). • Students evaluate the Anchor Phenomenon by engaging in a class discussion and answering questions about the weather in Sydney (see example in Lesson 4). • Students explain the Anchor Phenomenon by writing a script in response to the Weather Warning HQ question about Sydney (see example in Lesson 5).
Driving Question 4: How can we reduce hazards from lightning?				
This Driving Question focuses on the phenomena of hazardous weather. Students' final project is to create a poster about the dangers of lightning and wildfires. Teacher Edition Twig Book	**Driving Question** **3-ESS3-1** Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard **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 **Anchor Phenomenon** **3-ESS2-1, 3-ESS2-2**	• Severe weather, like lightning, can be hazardous to humans. • We can use different techniques to stay safe in a thunderstorm. • Lightning, weather, and climate can contribute to wildfires.	• Explore the phenomenon of severe weather • Understand the risks of severe weather and how to stay safe • Design and create an educational poster about how to stay safe during lightning storms and wildfires.	• Students resolve the Anchor Phenomenon through a class discussion (see example in Lesson 1).