



## Unit 1

### Environments and Living Things

#### Essential Question

*This question guides the student experience throughout the unit and is open-ended and enduring.*

How do organisms survive in their environments, and what can fossils tell us about how environments and living things have changed over time?

#### Unit Summary

*This summary provides high-level information about the main learning outcomes within this unit.*

Students are introduced to the unit's anchoring phenomenon of paleontologists discovering mammoth fossils across North and Central America. To understand more about these fossils, in this unit, students explore environments and living things. Students examine where organisms live and how living in a group helps some animals to survive. Students analyze how environments change and what happens to organisms in changing environments, including taking a look at what fossils of extinct organisms show about past environments. Acting as Natural History Museum junior paleontologists, can students explain why Columbian Mammoths died off thousands of years ago by using the clues the mammoths' fossils give about their environment?

#### Guiding Questions

*At the end of this unit, students should be able to respond to these questions as they demonstrate understanding of key concepts, skills and relevance to their own lives.*

#### Content

- What kind of environment did Columbian Mammoths live in?
- Why did some animals, like mammoths, live in groups?
- How do fossils help scientists learn about animals and environments from the past?

#### Process

- How can you use evidence from fossils to describe where and how an animal lived?
- What clues would help you figure out if an organism could survive in a changing environment?

- What steps would scientists take to learn about extinct animals like the Columbian Mammoth?

### **Reflective**

- What do you think it would have been like to live in the time of the Columbian Mammoth?
- Why is it important for scientists to study fossils and extinct animals?
- What did you learn about how living things and environments can change over time that surprised you?

### **Power Standards**

*These state standards have been identified as critical to students' long-term learning progression in this discipline. They are assessed within the scope of this unit.*

- **3-LS2-1** Construct an argument that some animals form groups that help members survive.
- **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.
- **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.



## **Unit 2**

### **Forces and Motion**

#### **Essential Question**

*This question guides the student experience throughout the unit and is open-ended and enduring.*

How do different forces affect the way objects move, and how can we use those patterns to predict and control motion?

#### **Unit Summary**

*This summary provides high-level information about the main learning outcomes within this unit.*

Students are introduced to the unit's anchoring phenomenon of how a carnival swing ride spins slow and fast, and how when the ride spins faster, the riders swing higher. In this unit, students explore forces and motion. They find out what happens when forces are balanced or unbalanced, how to predict patterns of motion, and what magnetic and electric forces do. Students examine the swing ride and other carnival phenomena as they investigate how forces affect the motion of objects in a carnival game. Using their knowledge of forces and motion, can students implement magnets to design a new carnival game?

#### **Guiding Questions**

*At the end of this unit, students should be able to respond to these questions as they demonstrate understanding of key concepts, skills and relevance to their own lives.*

#### **Content**

- What is a force, and how can it change the motion of an object?
- What is the difference between balanced and unbalanced forces?
- How do magnetic and electric forces affect objects?

#### **Process**

- How can you tell when a force is acting on an object, like a swing or a magnet?
- What clues help you predict how an object will move after a force is applied?
- What steps would you take to test how magnetic or electric forces move different objects?

## Reflective

- What is something new you learned about how forces make things move?
- Have you ever felt a force that changed your movement, like on a swing or ride? What did you notice?
- Why do you think it's important to understand forces and motion in everyday life?

## Power Standards

*These state standards have been identified as critical to students' long-term learning progression in this discipline. They are assessed within the scope of this unit.*

- **3-PS2-1** Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
- **3-PS2-2** Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.
- **3-PS2-3** Ask questions to determine cause-and-effect relationships of electric or magnetic interactions between two objects not in contact with each other.
- **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.



## **Unit 3**

### **Weather and Climate**

#### **Essential Question**

*This question guides the student experience throughout the unit and is open-ended and enduring.*

How do we measure and predict weather, and how can people design buildings to stay safe and comfortable in different climates?

#### **Unit Summary**

*This summary provides high-level information about the main learning outcomes within this unit.*

Students are introduced to the unit's anchoring phenomenon of how buildings are designed differently to suit the climate in different places. This unit is divided into two parts. In the first part of the unit, students examine what makes weather and how it is predicted, and compare how temperature, wind, rain, and snow are measured. Next, students explore weather and climate in different places and determine how weather and climate are related. In the second part of the unit, students find out about extreme weather, how it affects people, and how people can reduce extreme weather damage. Students use graphs to predict weather conditions during a particular season and review design solutions that reduce the impacts of weather-related hazards. Using their knowledge, how can students design a house that can withstand a snowstorm?

#### **Guiding Questions**

*At the end of this unit, students should be able to respond to these questions as they demonstrate understanding of key concepts, skills and relevance to their own lives.*

#### **Content**

- What tools do we use to measure temperature, wind, rain, and snow?
- How is climate different from weather?
- What types of damage can extreme weather cause to buildings?

#### **Process**

- How can you predict what kind of weather might happen next?
- What features make a building safer in high wind or heavy rain?
- What steps would you take to design a home that fits your local climate?

## Reflective

- How does the weather where you live affect the way homes and buildings are built?
- Have you ever experienced extreme weather? What did you notice about how people and buildings responded?
- What ideas do you have to help make buildings safer during storms or other weather events?

## Power Standards

*These state standards have been identified as critical to students' long-term learning progression in this discipline. They are assessed within the scope of this unit.*

- **3-ESS2-1** Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.
- **3-ESS2-2** Obtain and combine information to describe climates in different regions of the world.
- **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.
- **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.



## **Unit 4**

### **Life Cycles and Traits**

#### **Essential Question**

*This question guides the student experience throughout the unit and is open-ended and enduring.*

How do inherited traits, the environment, and life cycles help plants and animals grow, survive, and change over time?

#### **Unit Summary**

*This summary provides high-level information about the main learning outcomes within this unit.*

Students are introduced to the unit's anchoring phenomenon of how two frogs may look the same, but one of them is poisonous. In this unit, students explore the traits of diverse organisms and how those traits are affected by both inheritance and the environment. This unit is split into two parts: traits and survival of species, and life cycles of plants and animals. First, students take a look at traits to understand inherited traits and how the environment can affect traits. Students also explore the survival abilities of certain species. Next, students examine the life cycles of plants, vertebrates, and invertebrates. Based on what they know about life cycles and traits, what will students report in their findings for an article and infographic for Science Monthly?

#### **Guiding Questions**

*At the end of this unit, students should be able to respond to these questions as they demonstrate understanding of key concepts, skills and relevance to their own lives.*

#### **Content**

- What traits do offspring inherit from their parents?
- How does the environment affect the traits of living things like frogs?
- What are the main stages in the life cycle of a frog?

#### **Process**

- How can you tell if a trait comes from inheritance or the environment?
- What clues help you identify which animals are better suited to survive in their environments?
- How can you compare the life cycles of plants, animals with backbones, and animals without backbones?

## Reflective

- What traits do you share with your family members, and which might come from your environment?
- Why do you think some animals survive better than others in the wild?
- What did you find interesting or surprising about how animals grow and change through their life cycles?

## Power Standards

*These state standards have been identified as critical to students' long-term learning progression in this discipline. They are assessed within the scope of this unit.*

- **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-LS3-2** Use evidence to support the explanation that traits can be influenced by the environment.
- **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.