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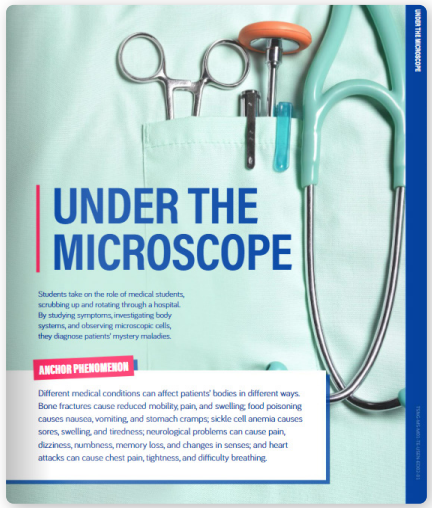
Pilot Modules

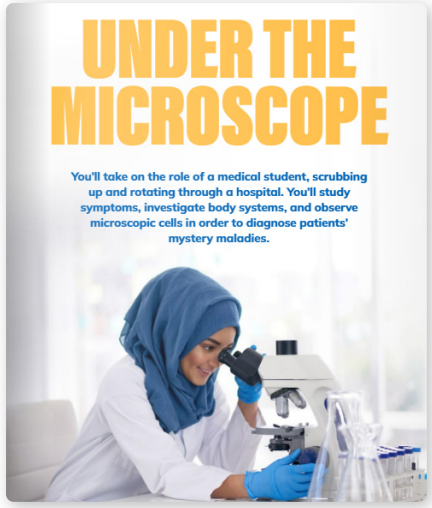
Middle School



Grade 6

Volume and Module Name	Module Outcomes
Volume 1, Module: Under the Microscope	**By the end of this module students will be able to:** • Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. • Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. • Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.





Anchor Phenomenon/Engineering Design Challenge

Anchor Phenomenon: Different medical conditions can affect patients' bodies in different ways. Bone fractures cause reduced mobility, pain, and swelling; food poisoning causes nausea, vomiting, and stomach cramps; sickle cell anemia causes sores, swelling, and tiredness; neurological problems can cause pain, dizziness, numbness, memory loss, and changes in senses; and heart attacks can cause chest pain, tightness, and difficulty breathing

Storyline and Trailer Video

Students take on the role of medical students, scrubbing up and rotating through a hospital. By studying symptoms, investigating body systems, and observing microscopic cells, they diagnose patients' mystery maladies.

Watch the Module Trailer now

Volume and Module Name	Module Outcomes

Volume 1, Module:
CreATe Network





By the end of this module students will be able to:

- 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.
- Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- 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.
- 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.
- Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.*

*Partially addressed in this module.

Anchor Phenomenon/Engineering Design Challenge

Engineering Design Challenge: Some people need support with tasks that require fine motor skills, such as writing or fastening buttons. Other people need support with holding or grasping objects, or with movement.

Storyline and Trailer Video

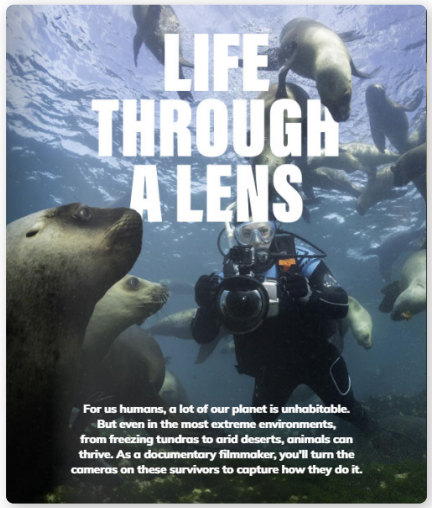
Inspired by the platform "CreATe Network," students identify the assistive technology needs of people with disabilities. Designing and testing their devices, students strive to engineer the perfect solution.

Watch the Module Trailer now

Volume and Module Name

Volume 2, Module:
Life Through a Lens





Module Outcomes

By the end of this module students will be able to:

- Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.
- 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.
- 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.
- Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.*
- 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.*
- Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.*
- 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.*
- 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.*

*Partially addressed in this module.

Anchor Phenomenon/Engineering Design Challenge

Anchor Phenomenon: Animals that live in hot environments have different habits, traits, and features than animals that live in cold environments. In hot environments, many animals spend their time underground or sheltering in burrows or caves during the day. Many desert reptiles can be found basking on rocks or river banks. In cold environments, many of the animals have thick fur or feathers, and a layer of blubber under their skin. There are no reptiles or amphibians in cold environments in our data sample.

Storyline and Trailer Video

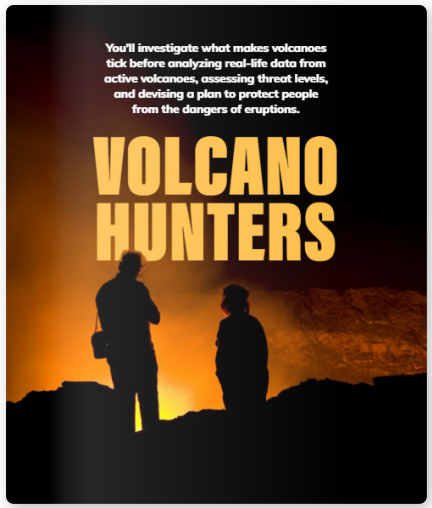
For us humans, a lot of our planet is uninhabitable. But even in the most extreme environments, from freezing tundras to arid deserts, animals can thrive. As documentary filmmakers, students turn the cameras on these survivors to capture how they do it.

Watch the Module Trailer now

Grade 7

Volume and Module Name	Module Outcomes
Volume 6, Module: Volcano Hunters	**By the end of this module students will be able to:** • Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. • Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. • Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.* • Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.* *Partially addressed in this module.





Anchor Phenomenon/Engineering Design Challenge

Anchor Phenomenon: The residents of Kathmandu, Bougainville Island, Auckland, and Yogyakarta all live in the shadow of hills and mountains. Three of the locations are near the ocean, and three have similar rocks. Some locations have experienced devastating volcanic eruptions in the past that have affected local residents. Sometimes local residents are able to be protected.

Storyline and Trailer Video

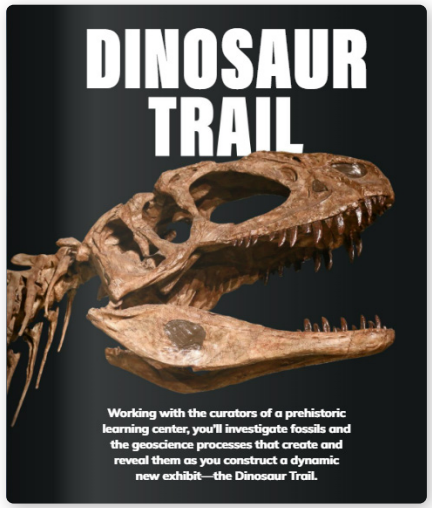
Students investigate what makes volcanoes tick before analyzing real-life data from active volcanoes, assessing threat levels, and devising a plan to protect people from the dangers of eruptions.

Watch the Module Trailer now

Volume and Module Name	Module Outcomes

Volume 6, Module:
Dinosaur Trail





By the end of this module students will be able to:

- Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
- Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.
- Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.*
- Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.*

*Partially addressed in this module.

Anchor Phenomenon/Engineering Design Challenge

Anchor Phenomenon: There are many different kinds of fossils: for example, dinosaurs, fish, shellfish, plants, footprints, and even coprolites. They are found at the Earth's surface all around the world in rocks that make up cliffs, canyons, and other rocky outcrops.

Storyline and Trailer Video

Working with the curators of a prehistoric learning center, students investigate fossils and the geoscience processes that create and reveal them as they construct a dynamic new exhibit—the Dinosaur Trail.

Watch the Module Trailer now

Volume and Module Name	Module Outcomes

Volume 8, Module:
A Place Called Home





By the end of this module students will be able to:

- Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
- Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
- Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
- Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
- Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
- Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.*
- Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.*

*Partially addressed in this module.

Anchor Phenomenon/Engineering Design Challenge

Anchor Phenomenon: Rain forests are diverse ecosystems that are home to many different plant and animal species. However, rain forest ecosystems are changing. The size of our rain forests are decreasing, and the numbers and types of species found there are decreasing too.

Storyline and Trailer Video

Students join scientists at the SAFE Project in Borneo to explore how changes to ecosystems can affect living things, and discover how to manage and repair an altered ecosystem.

Watch the Module Trailer now

Grade 8

Volume and Module Name	Module Outcomes

Volume 10, Module:
Collision Course





By the end of this module students will be able to:

- Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.
- Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- 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.
- 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.*
- 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.*
- Use arguments supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.*

*Partially addressed in this module.

Anchor Phenomenon/Engineering Design Challenge

Engineering Design Challenge: If you play sports, there is a risk that you will collide with the ground, other objects, or other players. These collisions can cause injuries.

Storyline and Trailer Video

What happens when two players collide? Students study sports injuries to understand the science behind collisions, using models and analyzing data to design customized helmets that minimize the risk of concussions and keep athletes safe.

Watch the Module Trailer now

Volume and Module Name	Module Outcomes

Volume 10, Module:
Movie Magic





By the end of this module students will be able to:

- Ask questions about data to determine the factors that affect the strength of electrical and magnetic forces.
- Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.
- Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.
- Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.
- Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.*
- Analyze and interpret data to determine scale properties of objects in the solar system.*

*Partially addressed in this module.

Anchor Phenomenon/Engineering Design Challenge

Anchor Phenomenon: In one scene, we see a person on a hoverboard, defying the effects of gravity as they hover along the street chasing a helicopter. The helicopter has a car hanging beneath it, also suspended in the air. In another scene, astronauts are setting up a base on Mars. They are able to move pieces of equipment around easily. In the last scene, we see two stuntpeople leaping safely from a tall bridge to the ground. One is falling faster than the other when they hit the ground.

Storyline and Trailer Video

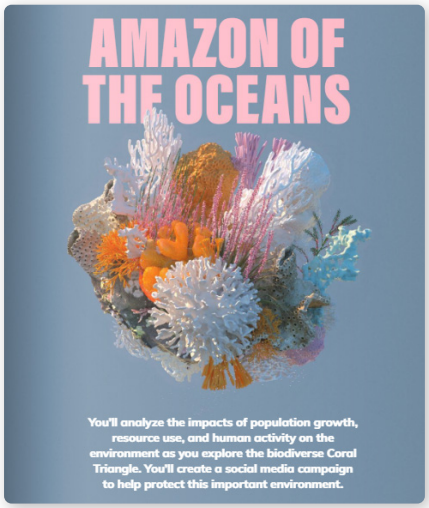
Lights, camera, action! Students work as science advisers with a movie production company, designing hoverboards, modeling football on Mars, and crafting the perfect stunt fall—creating movie magic that's rooted in real-world physics.

Watch the Module Trailer now

Volume and Module Name	Module Outcomes

Volume 12, Module:
Amazon of the Oceans





By the end of this module students will be able to:

- Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
- Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.*
- Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.*

*Partially addressed in this module.

Anchor Phenomenon/Engineering Design Challenge

Anchor Phenomenon: Countries in the Coral Triangle have bustling cities, fascinating temples, spectacular beaches, and easy access to diverse reef ecosystems, making them popular tourist destinations. This has led to the number of tourists increasing in recent years, as more people seek out the sun, sea, and surf at newly built coastal resorts. However, the reef ecosystems and wider environment are also changing as a result of human activity.

Storyline and Trailer Video

Students analyze the impacts of population growth, resource use, and human activity on the environment as they explore the biodiverse Coral Triangle. They create a social media campaign to help protect this important environment.

Watch the Module Trailer now



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