twig SCIENCE

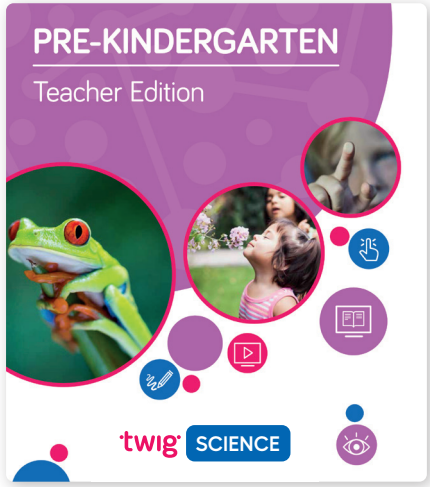
Pilot Modules

Pre-K–Grade 5



Module Name

Pre-K, Module 2:
How to Build a Human



Watch the Module Trailer now

Module Outcomes

Through an exploration of the human body, students will:

- Observe and describe observable phenomena (objects, materials, organisms, and events).
- Engage in scientific talk.
- Compare and categorize observable phenomena
- Ask questions, gather information, and make predictions

Anchor Phenomenon

My body is made of different parts that work together.

Storyline

Ever wondered what's going on inside your body?
Welcome to the Twig Science How to Build a Human Body module!

In this module, students build their own life-size human body in 2-D, complete with body systems.

Through games, models, and song, students develop an understanding of the parts of their bodies that work together to keep them alive. They explore the phenomena of heartbeats and breathing, investigate why we have skeletons, and follow food on its roller-coaster journey through the digestive system. They play games to demonstrate the power of the human brain. By the end of the module, students will have an understanding of some of the body's most important systems and how they all work together to keep us alive.

It's time to get building!

Module Name

Kindergarten, Module 1:
My Big Nature Adventure



Watch the Module Trailer now

Module Outcomes

By completing My Big Nature Adventure, students will be able to:

- Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.
- Use observations to describe patterns of what plants and animals (including humans) need to survive.

Anchor Phenomenon

Throughout this module students observe that:

- Different plants and animals live in different places.

They use their observations to explain why:

- Some sunflowers are healthy and have yellow flowers, but other sunflowers are droopy and dying.

Storyline

Hold on tight—you're going on an adventure!
Welcome to the Twig Science My Big Adventure module!

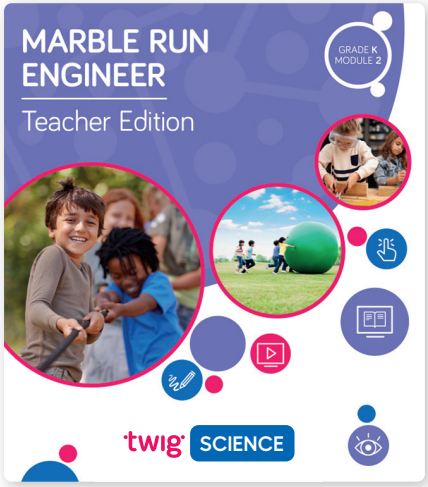
In this module, students travel the world looking at different environments—including deserts, grasslands, cities, and even their very own schoolyard. They observe some of the plants and animals that live in these places, and discover that each environment provides living things with everything they need to survive.

Through hands-on exploration, videos, and books, students also learn that all living things share the same basic needs—whether you're a plant, a human, or a dung beetle!

Let the adventure begin!

Module Name

Kindergarten, Module 2:
Marble Run Engineer



Watch the Module Trailer now

Module Outcomes

By completing Marble Run Engineer, students will be able to:

- Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
- Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.
- Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

Anchor Phenomenon

Throughout this module students observe:

- What happens when we push, pull, and drop objects.
- How we can change their speed and direction.

They use their observations to explain why:

- There are different ways to move the marble toward the 10-point cup. Some ways will get the marble in the cup and other ways will not.

Storyline

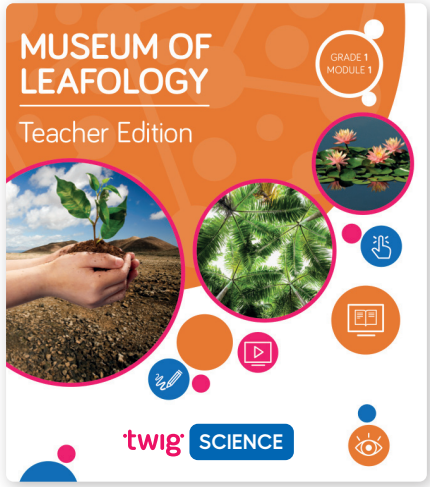
Hold on tight—you're going on an adventure!
Welcome to the Twig Science Marble Run Engineer module!

In this module, students explore forces by becoming Marble Run Engineers. They begin by observing and analyzing what happens when they push and pull different objects. They then use tools to alter and measure how far they can push a marble, and how precisely they can control its direction. Finally, students put their knowledge into practice by designing, building, observing, and analyzing fun (and functional!) marble run tracks.

Let's roll!

Module Name

Grade 1, Module 1:
Museum of Leafology



Watch the Module Trailer now

Module Outcomes

By completing Museum of Leafology, students will be able to:

- Make observations at different times of year to relate the amount of daylight to the time of year.
- Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.
- Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.
- Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.
- Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
- Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Anchor Phenomenon

Throughout this module students observe:

- How all plants are alike, and how they are different.

They use their observations to explain why:

- The thistle plants look alike, but not exactly the same.

Storyline

What can we learn from the amazing world of plants?
Welcome to the Twig Science Museum of Leafology module!

Over the course of the module, students create and curate their very own Museum of Leafology, capturing everything they know about plants in a series of themed rooms.

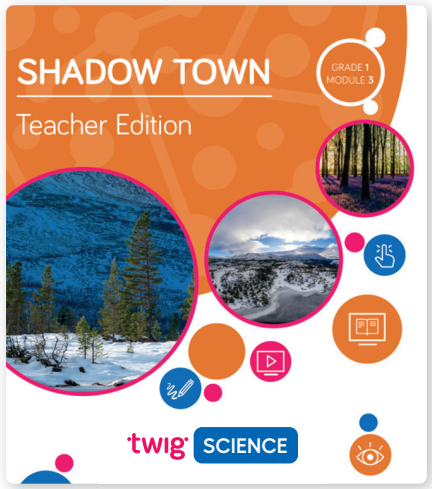
Through hands-on investigation and nature exploration, including growing plants from seed, students gain understanding of the different parts of plants and their shapes and functions. At the same time, they develop valuable skills in making observations and comparisons, and identifying patterns.

Friends and family are invited to visit the Museum of Leafology, so students can show off what they have learned. Finally, students prepare a celebratory “Plant Parts Salad” using all the different parts of a plant.

Yum!

Module Name

Grade 1, Module 3:
Shadow Town



Watch the Module Trailer now

Module Outcomes

By completing Shadow Town, students will be able to:

Make observations to construct an evidence-based account that objects can be seen only when illuminated.

- Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light.
- Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Anchor Phenomenon

Throughout this module students observe:

- Why the town of Rjukan is in a shadow.

They use their observations to explain why:

- During the fall, even in the daytime, the town of Rjukan is in the dark.

Storyline

What would you do if you lived in a shadow?
Welcome to the Twig Science Shadow Town module!

The town of Rjukan, Norway, spends half the year with no direct sunlight. Why? And how can students help the town's residents get some sunlight?

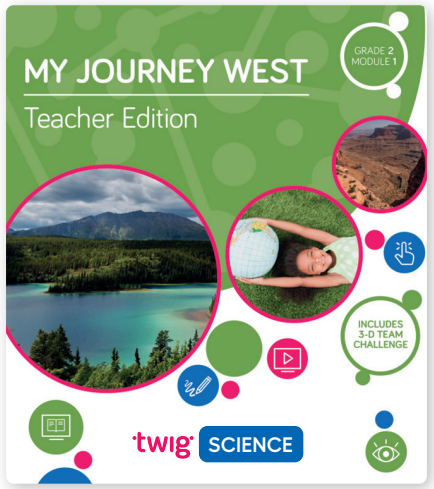
Over the course of the module, students investigate light, shadow, transparency, and reflection. They learn about light sources, shadow puppets, why some things are see-through, and how mirrors work.

Finally, students use all their knowledge to design and test a solution to the problem...

How will students bring light to Rjukan?

Module Name

Grade 2, Module 1
My Journey West



Watch the Module Trailer now

Module Outcomes

By completing My Journey West, students will be able to:

- Develop a model to represent the shapes and kinds of land and bodies of water in an area.
- Obtain information to identify where water is found on Earth and that it can be solid or liquid.

Anchor Phenomenon

Throughout this module students observe:

- How we can understand and describe the land and water on Earth.

They use their observations to explain why:

- We can use models to help us find Ruthie's new home in the San Francisco Bay Area.

Storyline

It's time to hit the road...
Welcome to the Twig Science My Journey West module!

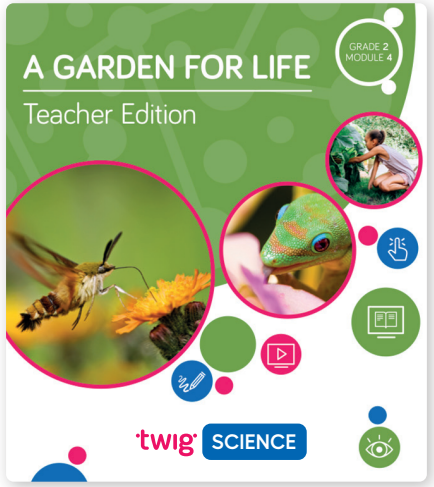
In this module, students discover a time capsule buried in the 1930s by seven-year-old Ruthie, detailing her family's journey across the United States. Through diary entries, videos, images and audio clips, students follow Ruthie from the dust bowl of Oklahoma to the new life in California, learning about the landscape along the way.

Students explore the many amazing landforms that Ruthie passes through and build their own model landscapes out of clay. They find out how water influences the physical environment, whether it's in the form of rushing rivers or frozen ice. Students also learn all about maps, what they look like, how they work, and what they can show us. Then, they make maps of their own!

There's a lot of ground to cover, so let's go!

Module Name

Grade 2, Module 4
A Garden for Life



Watch the Module Trailer now

Module Outcomes

By completing A Garden For Life, students will be able to:

- Plan and conduct an investigation to determine if plants need sunlight and water to grow.
- Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.
- Make observations of plants and animals to compare the diversity of life in different habitats.
- Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
- Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Anchor Phenomenon

Throughout this module students observe:

- How living things in an environment depend on one another and what they need to grow.

They use their observations to explain why:

- In this garden, bees are more likely to visit some flowers and butterflies are more likely to visit other flowers.

Storyline

Plant a seed for the future...
Welcome to the Twig Science A Garden for Life module!

In this module, students create a vibrant habitat for plants and animals by designing a school pollinator garden!

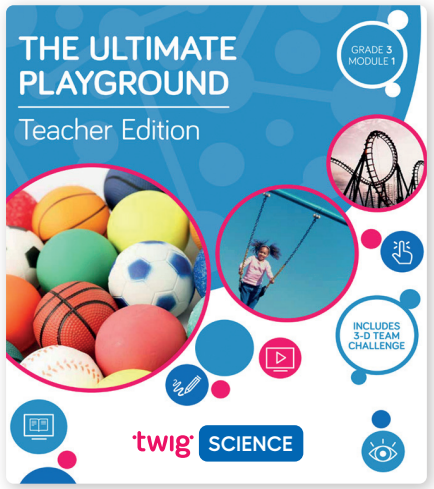
Students are introduced to the concept of biodiversity and compare the biodiversity in their own schoolyard with that of other habitats around the world. Students then plan and carry out investigations into what plants need to grow and use the findings to inform their garden designs.

Students also discover the way flowering plants and pollinators such as bees depend on each other and model the process of pollination in the classroom. Using their new knowledge, students ensure their garden will be the perfect place for pollinators and plants to live and thrive.

Let it grow!

Module Name

Grade 3, Module 1:
The Ultimate Playground



Watch the Module Trailer now

Module Outcomes

By completing The Ultimate Playground, students will be able to:

- Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
- Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.
- Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.
- Define a simple design problem that can be solved by applying scientific ideas about magnets.
- Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- 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.
- 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

Throughout this module students observe:

- How objects are affected by the forces of push and pull.

They use their observations to explain why:

- The Dragon Ride can be moved without a person touching it.

Storyline

What would your ultimate playground look like?
Welcome to Twig Science Ultimate Playground module!

In this module, students investigate forces and use what they learn to design the most incredible playground ever. As well as regular playground equipment like swings and slides, students incorporate fairground attractions like test-your-strength games, and even amusement park rides like roller coasters!

Through hands-on investigations, texts and videos, students learn how forces make things move-whether it's making carousels spin or skydivers fall. They investigate how magnets can exert a force without contact—enough to make the train levitate! Students also build their own model swings and dumbbells, and even take part in games of miniature tug-of-war.

Hold on tight—it's going to be quite a ride!

Module Name

Grade 3, Module 2:
Welcome to the Biodome



Watch the Module Trailer now

Module Outcomes

By completing Welcome to the Biodome, students will be able to:

- Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.
- Construct an argument that some animals form groups that help members survive.
- 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.
- 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

Throughout this module students observe:

- How plants' and animals' life cycles help them survive.

They use their observations to explain why:

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

Storyline

Can't visit the rain forest? Then let the rain forest come to you!
Step inside the Twig Science Welcome to the Biodome module!

In this module, students enter the Biodome—a state-of-the-art greenhouse that mimics a tropical rain forest environment. The aim of the Biodome project is to educate people about the rain forest ecosystem, to show how important it is and encourage its protection. Since most people are not able to easily visit a real rain forest, the Biodome brings it to them!

In their new roles, students become environmental experts and discover the wide variety of life that rain forests contain. They look after plants in the Biodome's nursery, and nurture and observe real butterflies throughout their life cycle.

Students also study the life cycles of other organisms, and look at the traits that animals of the same species share and inherit. Students then take a detour to the African savanna, to experience a very different kind of environment and get acquainted with some of the animals that live there. There's a lot to explore—out there, and in here!

Module Name

Grade 4, Module 1:
Egg Racers



Watch the Module Trailer now

Module Outcomes

By completing Egg Racers, students will be able to:

- 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.
- Use evidence to construct an explanation relating the speed of an object to the energy of that object.
- Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
- Ask questions and predict outcomes about the changes in energy that occur when objects collide.

Anchor Phenomenon

Throughout this module students observe:

- What happens to energy when objects collide.

They use their observations to explain why:

- Race cars slow down quickly when they drive over gravel traps.

Storyline

Wham! Bang! Crash!
Welcome to the Twig Science Egg Racers module!

Students learn all about collisions, impacts, and safety by building their own race cars. But can they design and build a car that's safe enough to protect an egg during a crash?

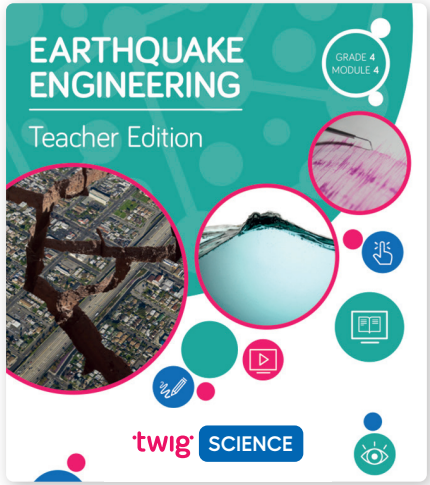
To succeed, students must first understand energy, and what happens when objects collide. They then explore what shock absorption is and how it works, and apply this knowledge to their final designs.

Will their egg racers survive the race track, or get scrambled? There's only one way to find out!

Good luck—and have an eggcellent time!

Module Name

Grade 4, Module 4:
Earthquake Engineering



Watch the Module Trailer now

Module Outcomes

By completing Earthquake Engineering, students will be able to:

Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

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.

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.

Analyze and interpret data from maps to describe patterns of Earth's features.

Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.

Generate and compare multiple solutions that use patterns to transfer information.

Anchor Phenomenon

Throughout this module students observe:

- How we can reduce the damage caused by earthquakes.

They use their observations to explain why:

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

Storyline

As cities get bigger, buildings get taller, and bridges get longer, they all have to be able to withstand whatever our planet throws at them...
Welcome to the Twig Science Earthquake Engineering module!

Earthquakes can strike without warning, bringing massive destruction.

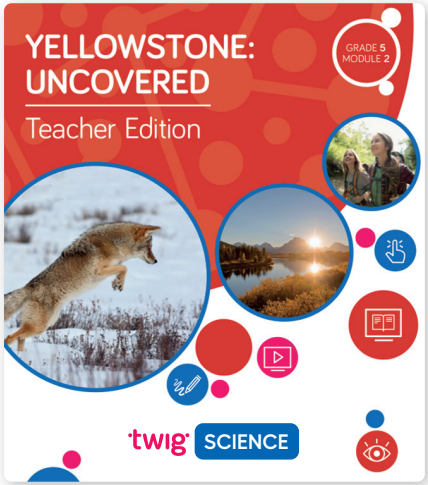
But what causes earthquakes, and how can we prepare for them?

Movements inside our planet create mountains and release incredible forces of nature. Over the next few weeks, we'll peel back the Earth's surface to help your students explore what's inside—right under their feet.

Just like real engineers, students will travel around the world to map real-life earthquakes as they happen, investigate how to minimize the damage caused by natural disasters, and use that knowledge to design and build their own earthquake-proof buildings.

Module Name

Grade 5, Module 2:
Yellowstone Uncovered



Watch the Module Trailer now

Module Outcomes

By completing Yellowstone Uncovered, students will be able to:

- Support an argument that plants get the materials they need for growth chiefly from air and water.
- Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.
- Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.

Anchor Phenomenon

Throughout this module students observe:

- How energy and matter moves through an ecosystem.

They use their observations to explain why:

- In 1996 there was only one beaver colony in Yellowstone National Park, but by 2009 there were 12 colonies in the park.

Storyline

Discover a whole new side to nature...
Welcome to the Twig Science Yellowstone: Uncovered module!

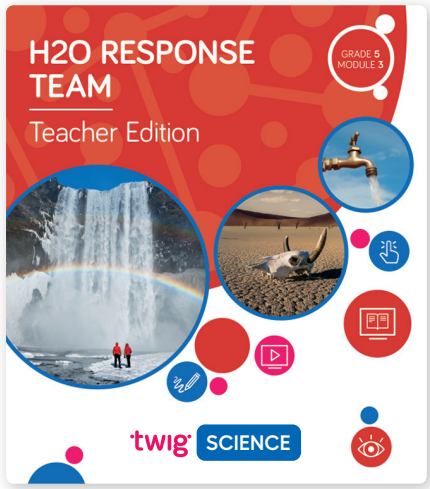
Yellowstone is one of the United States' largest and wildest national parks—and you're about to see a side of it that isn't on the tourist trail!

Students become park rangers to investigate how matter and energy move through systems. They observe predators hunting prey, discover the organisms that recycle the dead, and learn how plants create food out of sunlight, water, and air.

As students explore the relationships between the plants and animals that live in Yellowstone, they discover how even small changes to an environment can have big impacts.

Module Name

Grade 5, Module 3:
H2O Response Team



Watch the Module Trailer now

Module Outcomes

By completing H2O Response Team, students will be able to:

Performance Expectations:
Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

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.

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.

Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.

Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

Anchor Phenomenon

Throughout this module students observe:

- Why some places lack fresh water and what we can do to protect it.

They use their observations to explain why:

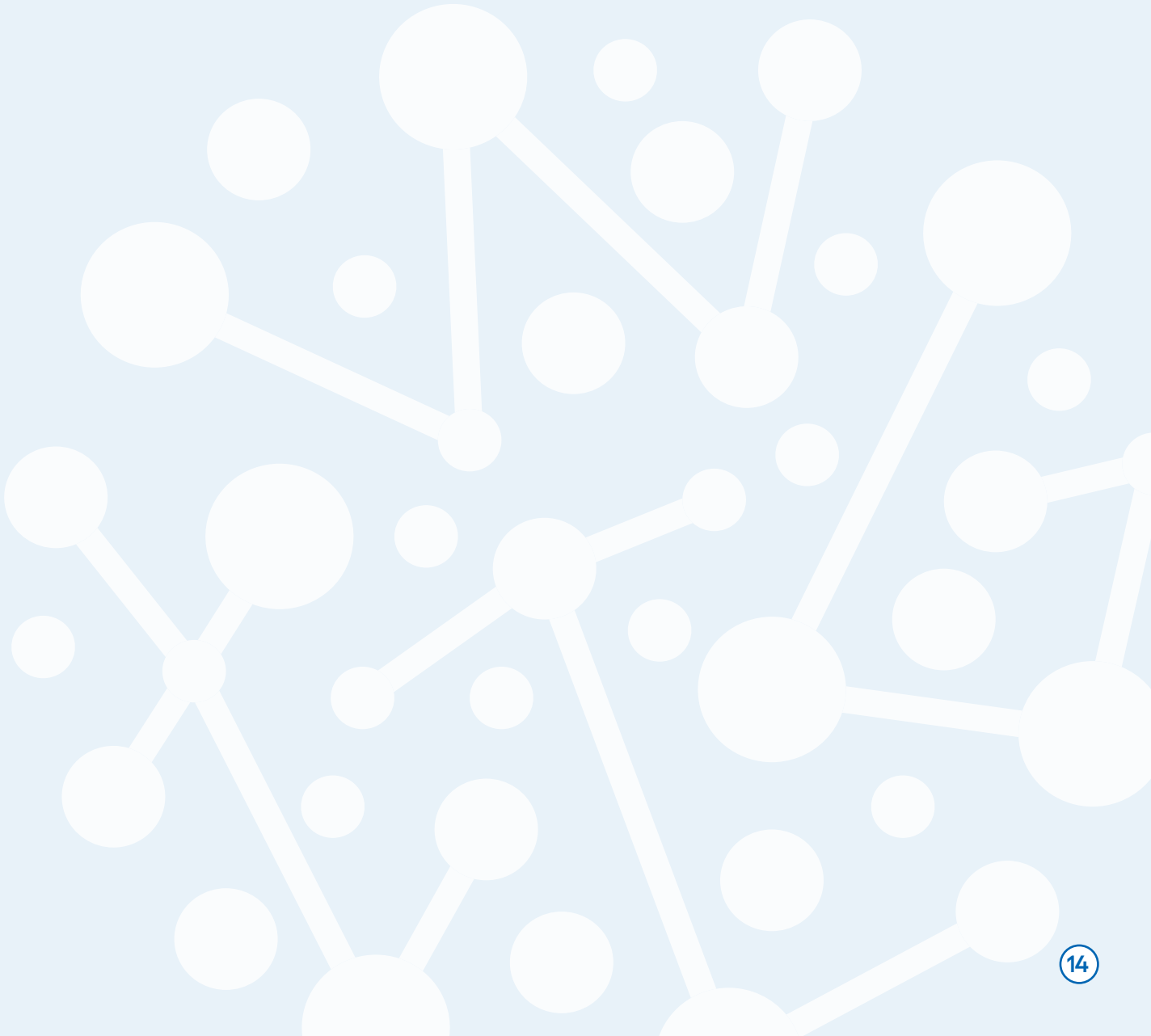
- The Pacific Ocean is providing San Diego County with an increasing amount of fresh water.

Storyline

Water, water, everywhere...
Welcome to the Twig Science H2O Response Team module!

In this module, students become hydrologists, tasked with investigating the growing issue of water scarcity. Students explore where water is found around the world and discover just how little of it is accessible and drinkable. They find out how the interactions between the hydrosphere, geosphere and atmosphere affect the distribution of water, and investigate the ocean's saltiness

By exploring the many ways we use water, students consider the threat posed by water shortages—including the droughts that frequently impact California. They examine the issue of water pollution, investigate a controversial technique for making seawater drinkable, and design a water filtration system to provide clean water. Finally, they use what they've learned about sustainability to design and implement a campaign that presents a range of local solutions to a particular water challenge.





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