Grade 5
Phenomena Tracker

GRADE 5
MODULE 1

Matter Mysteries Hotline

Blue: SEP Orange: DCI Green: CCC

Anchor Phenomenon: Two mystery substances are mixed in two different containers, both covered by a balloon. One mixture has no reaction, but the other causes the balloon to inflate.

What is matter made of?

SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 1: What are the properties of different materials?				
Students plan and conduct investigations to identify mystery materials according to their properties, before being challenged to design a backpack with certain properties. Teacher Edition Twig Book	**Driving Question** **5-PS1-3** Make observations and measurements to identify materials based on their properties **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** **5-PS1-1, 5-PS1-3, 5-PS1-4**	• Different materials have different properties. • The properties of materials can be tested, observed, and measured. • Materials can be identified based on their properties. • Different materials are used for different purposes based on their properties.	• Plan and conduct fair tests • Plan investigations to observe the properties of materials • Analyze texts to learn about the properties of materials.	• Students engage with the Anchor Phenomenon by observing a guided investigation. Then, they generate questions about the Anchor Phenomenon. (see example in Lesson 1).
Driving Question 2: How can we identify a mystery substance?				
Students apply learning from the previous Driving Question as they plan and carry out investigations involving fair tests to identify a set of mystery substances, and then carry out further tests to investigate a mystery mixture's properties. They analyze their data, make claims, and write scientific explanations about what substances make up the mystery mixture. Teacher Edition Twig Book	**Driving Question** **5-PS1-3** Make observations and measurements to identify materials based on their properties **5-PS1-4** Conduct an investigation to determine whether the mixing of two or more substances results in new substances **Anchor Phenomenon** **5-PS1-1**	• Materials can be identified based on their properties.	• Plan and conduct investigations to observe chemical reactions • Identify the properties of a mystery mixture to identify substances.	• Students investigate the Anchor Phenomenon by identifying the two solids and the liquid used in the video or in the demonstration (see example in Lesson 4).

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Driving Question 3: What can cause substances to change?				
Students measure and record the mass and other properties of substances before and after mixing and heating. They graph and analyze their data to determine whether a chemical reaction occurs when substances are combined. Teacher Edition Twig Book	**Driving Question** **5-PS1-1** Develop a model to describe that matter is made of particles too small to be seen **5-PS1-2** Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved **5-PS1-4** Conduct an investigation to determine whether the mixing of two or more substances results in new substances **Anchor Phenomenon** **5-PS1-3, 5-PS1-4**	• Some substances undergo reversible changes when they are heated. • Some substances undergo irreversible changes when they are heated. • When some substances are mixed together, they react chemically to form a new substance. • When substances are mixed in a chemical reaction, their total weight stays the same.	• Measure and record the mass and other properties of substances • Write a scientific explanation using evidence • Use graphs to record and analyze data.	• Students evaluate the Anchor Phenomenon by discussing and modeling the interactions between the substances (see example in Lesson 5).
Driving Question 4: How can we design a substance with certain properties?				
Students are challenged to design a clay with certain properties. They are introduced to engineering practices and employ them as they work through the design process. They are introduced to design arguments and write a design argument describing how well their designs met the criteria. Teacher Edition Twig Book	**Driving Question** **5-PS1-4** Conduct an investigation to determine whether the mixing of two or more substances results in new substances **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	• Substances can be mixed together to make a new substance with useful properties.	• Use a design process to plan an investigation • Use knowledge of properties of materials to design a clay recipe that meets the criteria • Write a design argument.	

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Driving Question 5: How are solids, liquids, and gases the same, and how are they different?				
Through reading, students learn that all materials consist of matter, which is made of particles. They investigate whether gases exert a force, have mass, and take up space, in order to determine whether they are made of matter. Teacher Edition Twig Book	**Driving Question** **5-PS1-1** Develop a model to describe that matter is made of particles too small to be seen **5-PS1-3** Make observations and measurements to identify materials based on their properties	• Matter is made from smaller particles. • Particles in solids, liquids, and gases behave in different ways.	• Analyze a text to understand that matter is made of particles that are too small to be seen • Carry out investigations and make observations of solids, liquids, and gases.	
Driving Question 6: How can we model solids, liquids, and gases?				
Students conceptualize and develop models of each state of matter at the particle level. As a final task, students develop three-dimensional models that show their ideas about solids, liquids, and gases at the particle level. Teacher Edition Twig Book	**Driving Question** **5-PS1-1** Develop a model to describe that matter is made of particles too small to be seen **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** **5-PS1-1, 5-PS1-3, 5-PS1-4**	• Matter is made from smaller particles. • Particles in solids, liquids, and gases behave in different ways.	• Plan and build a three-dimensional model to demonstrate particles of matter • Use presentation skills in a gallery walk to teach others about matter.	• Students evaluate the Anchor Phenomenon by discussing and modeling how gas particles caused the balloon to inflate (see example in Lesson 2). • Students explain the Anchor Phenomenon by writing instructions of how to complete the investigation and an explanation of their findings (see example in Lesson 3). • Students resolve the Anchor Phenomenon through a class discussion (see example in Lesson 4).

Grade 5
Phenomena Tracker

GRADE 5
MODULE 2

Yellowstone: Uncovered

Blue: SEP **Orange:** DCI **Green:** CCC

Anchor Phenomenon: Between 1996 and 1999, the beaver population in Yellowstone National Park's Northern Range was made up of only 1 beaver colony. Over the following decade, the number of beaver colonies in the park rose steadily, and by 2009 there were 12 beaver colonies recorded in the Northern Range.

How do matter and energy move through an ecosystem?

SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 1: What do plants need to grow?				
Students reflect on prior ideas about what plants need in order to grow. They plan and set up two investigations to gather evidence in support of their ideas about what plants need to grow and where they get their matter. Teacher Edition Twig Book	**Driving Question** **5-LS1-1** Support an argument that plants get the materials they need for growth chiefly from air and water **Anchor Phenomenon** **5-LS2-1, 5-PS3-1**	• Plants need water, air, and sunlight to grow.	• Explore the phenomenon of plant growth • Understand that plants need water, air, sunlight, and soil to grow • Set up an investigation that provides evidence to support my claim.	• Students engage with the Anchor Phenomenon by analyzing data about beaver populations (see example in Lesson 1). • Students generate questions about the Anchor Phenomenon (see example in Lesson 1).
Driving Question 2: What do animals need in order to grow and heal?				
Students model the movement of matter through a food chain and a food web. They also create an ecosystem model that includes plants, soil, water, and animals. Teacher Edition Twig Book	**Driving Question** **5-LS2-1** Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment **5-PS3-1** 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** **5-LS2-1**	• Animals get their energy and matter from the food they eat. • Animals use energy to grow, move, and heal. • Energy in food webs originally comes from the Sun. • Energy and matter flow through a food web. If one organism is removed, the whole food web is affected.	• Explore the phenomena of food chains and food webs • Make careful observations, and communicate and expand on these observations • Understand how matter flows through a food web.	• Students investigate the Anchor Phenomenon by collecting and organizing data about the movement of matter in an ecosystem (see example in Lesson 3). • Students evaluate the Anchor Phenomenon by producing a food web showing matter moving through an ecosystem (see example in Lesson 5).

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Driving Question 3: Where do plants get their matter?				
Students review and analyze data from the investigations they started in Driving Question 1 and draw conclusions about plants' needs and where plants get their matter. A text and a model introduce students to the process by which plants make their own "food." Teacher Edition Twig Book	**Driving Question** **5-LS1-1** Support an argument that plants get the materials they need for growth chiefly from air and water **5-LS2-1** Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment **5-PS3-1** 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	• Plants get their matter from air and water. • Plants use energy from the Sun to make their own food from air and water. This process is called photosynthesis.	• Explore the phenomenon of matter cycling • Understand where plants get their matter • Explain the importance of water, air, sunlight, and soil in relation to the body matter of plants.	
Driving Question 4: Where do organisms get the energy they need to grow, heal, move and maintain their body temperature?				
Students use a text, an interactive, and kinesthetic models to investigate and communicate ideas about how energy moves through the organisms in an ecosystem. Teacher Edition Twig Book	**Driving Question** **5-LS2-1** Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment **5-PS3-1** 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** **5-LS2-1, 5-PS3-1**	• Energy from the Sun moves through organisms in ecosystems. • A food web is a useful model to show how energy and matter flow through an ecosystem.	• Explore the phenomenon of energy flow • Understand the relationships between organisms in the Antarctic Ocean • Understand why the decline of one organism in a food web affects others in the same web.	• Students evaluate the Anchor Phenomenon by analyzing population and growth data, then identifying relationships between organisms (see example in Lesson 3).

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Driving Question 5: What happens to matter in an ecosystem?				
Through field observation, controlled experiment, and informational text, students investigate what happens to the matter that makes up organisms when they die. Students apply their learning about decomposers as they develop a model showing the cycling of matter in a food chain. Teacher Edition Twig Book	**Driving Question** **5-LS1-1** Support an argument that plants get the materials they need for growth chiefly from air and water **5-LS2-1** Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment	• Decomposers, such as bacteria and fungi, break down dead and waste matter, and recycle nutrients back into the ecosystem.	• Explore the phenomenon of decomposition • Investigate where dead matter goes in an ecosystem • Understand the movement of matter through a marine ecosystem.	
Driving Question 6: How can ecosystems change?				
Students investigate what can happen if changes are made to the organisms in an ecosystem. Students model their ideas using an interactive and further explore the concepts through reading and discussing an informational text. Teacher Edition Twig Book	**Driving Question** **5-LS2-1** Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment **Anchor Phenomenon** **5-LS2-1, 5-PS3-1**	• Changing one factor in an ecosystem can affect the organisms that live there. • Keystone species affect the survival of all species in an ecosystem.	• Predict what might happen if a part of an ecosystem is changed • Understand the positive impact that one keystone animal can have on an ecosystem.	• Students explain the Anchor Phenomenon using evidence from their food web models and datasets (see example in Lesson 1). • Students resolve the Anchor Phenomenon by producing an informational flyer or poster for visitors to Yellowstone (see example in Lesson 2).

Grade 5
Phenomena Tracker

GRADE 5
MODULE 3

H2O Response Team

Blue: SEP Orange: DCI Green: CCC

Anchor Phenomenon: The Pacific Ocean is providing San Diego County with an increasing amount of fresh water.
Why do some places lack fresh water and what can we do to protect it?

SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 1. How much fresh water is on Earth?				
Students use models to investigate the types and amounts of water available on Earth and communicate their findings with graphs. They investigate and model ideas about numerous topics related to the hydrosphere, such as the importance of water to different organisms, the uneven distribution of water, and the effect of human activities on water. Teacher Edition Twig Book	**Driving Question** **5-ESS2-2** Describe and graph the amounts of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth **5-ESS2-1** Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact **Anchor Phenomenon** **5-ESS3-1, 5-ESS2-2, 5-ESS2-1**	• Fresh water makes up only three percent of the water on Earth. • Two percent of the Earth's fresh water is stored in glaciers. • Humans and animals need fresh water to survive.	• Read and analyze informative texts to understand the relationship between living things and water • Use decimals and fractions to represent collected data about water on Earth.	• Students engage with the Anchor Phenomenon by observing how fresh water sources have changed in San Diego County, then generate questions about the Anchor Phenomenon (see example in Lesson 3). • Students investigate the Anchor Phenomenon by creating a graph to show how San Diego County's fresh water sources have changed over time (see example in Lesson 5).
Driving Question 2. How do humans work to protect the hydrosphere?				
Students investigate the ways in which communities take action to protect the hydrosphere. They obtain and evaluate information from articles and synthesize their learning to generate new ideas about the topic. Teacher Edition Twig Book	**Driving Question** **55-ESS2-1** Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact **5-ESS3-1** Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment **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 **Anchor Phenomenon** **5-ESS2-2, 5-ESS3-1**	• Many freshwater sources have been polluted. • Human activity causes water pollution. • Communities can use science and engineering to reduce human impacts such as water pollution.	• Design and build a model to learn about water pollution • Use a graphic organizer to collect information gathered during my own research.	• Students evaluate the Anchor Phenomenon by identifying patterns in San Diego County's use of water sources over time (see example in Lesson 1).

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Driving Question 3. Why are some places in California drier than others?				
Students investigate the sphere interactions that cause clouds to form and rain to fall. They also investigate the interactions that can prevent rain in certain areas. Students use direct field observations, models, and informational text to investigate these phenomena. Teacher Edition Twig Book	**Driving Question** **5-ESS2-1** Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact	• The geosphere, hydrosphere, and atmosphere interact, causing precipitation. • Landforms, such as mountains, can affect the amount of rain that falls in areas nearby. • Lack of rainfall can cause drought and water shortages.	• Explore the phenomena of sphere interactions • Explain how rain is formed and how different spheres like the hydrosphere and biosphere interact • Use new knowledge to write a scientific explanation.	
Driving Question 4. Why are oceans salty?				
Students continue their investigation of sphere interactions as they work to understand what causes oceans to become salty. They use models to investigate and show their ideas. Teacher Edition Twig Book	**Driving Question** **5-ESS2-1** Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact **Anchor Phenomenon** **5-ESS3-1, 5-ESS2-2, 5-ESS2-1**	• Salt in the oceans comes from the breakdown of rocks into minerals by rainwater.	• Explore the phenomenon of ocean salinity • Build a model to understand what makes seawater salty • Name system interactions that make seawater salty based on information from texts and videos.	• Students investigate the Anchor Phenomenon by reading an article about desalination and completing a graphic organizer (see example in Lesson 5). • Students evaluate the Anchor Phenomenon through a class discussion about desalination in San Diego County (see example in Lesson 6). • Students explain the Anchor Phenomenon by creating a poster about the changes to fresh water sources in San Diego County (see example in Lesson 7).

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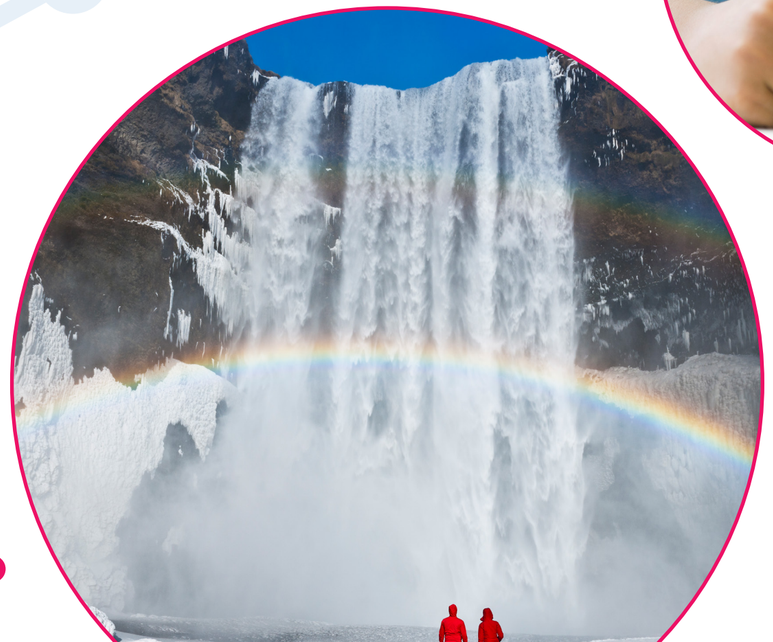
Driving Question 5. How can we design a solution to a hydrosphere problem?				
Students identify the criteria and constraints that will define a design project—a water-conservation campaign targeted at the school community. They test and iterate their designs and present their campaigns to the school community. Teacher Edition Twig Book	**Driving Question** **5-ESS3-1** Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment **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** **5-ESS3-1, 5-ESS2-2, 5-ESS2-1**	• The effects of droughts and water shortages can be minimized by conservation efforts. • Reducing water waste is important in reducing the impacts of drought.	• Use an interactive to test water-saving solutions • Work with classmates to design a campaign and deliver it to an audience.	• Students resolve the Anchor Phenomenon through a class discussion (see example in Lesson 5).



Grade 5
Phenomena Tracker

GRADE 5
MODULE 4

Galactic Guidebook

Blue: SEP Orange: DCI Green: CCC

Anchor Phenomenon: We can use the constellation of Orion to help us navigate at certain times of year.
What patterns do we notice when we observe the sky?

SUMMARY	PERFORMANCE EXPECTATIONS	KEY INVESTIGATIVE PHENOMENA	I CAN... STUDENT LEARNING OBJECTIVES	ANCHOR PHENOMENON TOUCHPOINT
Driving Question 1. How can we investigate patterns in the sky?				
Students use digital interactives to investigate and collect data on the length of day throughout the year and the location of stars throughout multiple years. Students analyze data and begin to notice patterns. Teacher Edition Twig Book	**Driving Question** **5-ESS1-2** Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky **Anchor Phenomenon** **5-ESS1-2**	• Objects in the sky change position according to regular yearly patterns. • The Sun's position in the sky changes over the course of the day.	• Explore the phenomenon of day and night • Use models to observe and visualize objects in the Solar System • Conduct an investigation to measure the changing position of a shadow • Collect and analyze data about shadows and constellations to identify patterns.	• Students engage with the Anchor Phenomenon by observing a video. Then they generate questions about the Anchor Phenomenon (see example in Lesson 1). • Students investigate and evaluate the Anchor Phenomenon by observing and graphing data about Orion (see example in Lesson 4).
Driving Question 2. Why is the Sun the brightest star?				
Students use models to investigate the distances of various stars from Earth and from each other. They observe that apparent size and brightness can be affected by the distance of a star. Teacher Edition Twig Book	**Driving Question** **5-ESS1-1** Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from the Earth **Anchor Phenomenon** **5-ESS1-2, 5-ESS1-1**	• The Sun is the brightest star because it is the closest star to the Earth.	• Explore the phenomenon of star brightness • Use models to visualize the locations of stars relative to the Earth • Gather evidence and make observations about sizes and locations of stars relative to the Earth • Write a scientific argument to explain why the Sun appears brighter than other stars.	• Students evaluate the Anchor Phenomenon by comparing models of Orion (see example in Lesson 2).

Galactic Guidebook

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Driving Question 3. Why do we see the Sun during the day and the stars at night?				
Students use an interactive to observe and collect constellation data, which they review to look for patterns. Students then explore and use models that demonstrate why it is difficult to see the stars during the day, what causes day and night, and what one might see from a certain point on Earth. Teacher Edition Twig Book	**Driving Question** **5-ESS1-1** Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from the Earth **5-ESS1-2** Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky **Anchor Phenomenon** **5-ESS1-2, 5-ESS1-1**	• We only see stars in the night sky because the light from the Sun overpowers the light from the stars during the day.	• Collect information from texts • Determine the size, shape, and location of the Sun and the Earth • Write a scientific argument to explain why we only see stars at night.	• Students investigate the Anchor Phenomenon by observing patterns in the movement and position of Orion in the night sky (see example in Lesson 3). • Students evaluate the Anchor Phenomenon by discussing their observations of Orion and completing a graphic organizer (see example in Lesson 6).
Driving Question 4. Why don't we fall off the Earth?				
Students design and conduct investigations to determine what happens to different objects as they are dropped. They then observe a brief demonstration and conclude that objects are always being pulled toward the ground. An informational text introduces this force as the phenomenon of gravity. Teacher Edition Twig Book	**Driving Question** **5-PS2-1** Support an argument that the gravitational force exerted by Earth on objects is directed down	• Gravity is a pulling force that keeps objects from falling off the surface of the Earth.	• Explore the phenomenon of gravity • Conduct an investigation and make observations about how different objects fall when dropped • Determine the direction in which objects on Earth fall • Write a scientific argument to explain why humans don't fall off the Earth.	

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What patterns do we notice when we observe the sky?

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Driving Question 5. Why do the stars seem to move?				
Students investigate the causes for the patterns they have observed by modeling Earth's orbit around the Sun and its spin on its axis. They then create their final project: a Galactic Guidebook, which synthesizes their learning from the whole module and communicates astronomical data from throughout the year. Teacher Edition Twig Book	**Driving Question** **5-ESS1-2** Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky **Anchor Phenomenon** **5-ESS1-2, 5-ESS1-1**	• The Earth's rotation, and its orbit around the Sun, causes the stars to change position in the night sky. • Earth rotation causes the Sun to rise, set, and change position over the course of 24 hours. • Objects in the sky change position according to patterns that can be observed.	• Explore the phenomenon of the Earth's movement • Collect and analyze data to identify patterns in the positions of constellations • Write a scientific argument to explain why the stars seem to move and return to the same place each year • Analyze graphs and data to identify patterns in shadows and how the Earth's movement causes changes in shadows.	• Students explain the Anchor Phenomenon by developing a model to show how Orion can be used for navigation (see example in Lesson 3). • Students resolve the Anchor Phenomenon through a class discussion (see example in Lesson 4).