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CRC NA Life Science Supporting module: *SEPUP* Ecology	In sixth grade students develop an understanding of how energy from the Sun is transferred through ecosystems. The ecosystem to focus on is the Sonoran Desert. Lessons in the CR Indigenous/Native American viewpoint will align with the Teaching Indigenous Science Framework.

Core Ideas for Knowing Science	**Core Ideas for Using Science**
L2: Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms. -	U1: Scientists explain phenomena using evidence obtained from observations and or scientific investigations. Evidence may lead to developing models and/or theories to make sense of phenomena. As new evidence is discovered, models and theories can be revised. U3: Applications of science often have both positive and negative ethical, social, economic, and/or political implications.

Science & Engineering Practices	**Anchoring Phenomena**	**Crosscutting Concepts**
Ask questions and define problems **Develop and use models** Plan and carry out investigations Analyze and interpret data Use mathematics and computational thinking **Construct explanations** and design solutions **Engage in argument from evidence** Obtain, evaluate, and communicate information	Biome in a Bottle Different biomes atop Babad Do'ag vs. Lower desert (Tohono O'odham) Saguaros as nurse plants under trees like palo verdes High Biodiversity in the Sonoran Desert Increase in the number and acreage of fires in Arizona Drop in water levels, aquifers	**Patterns** Cause and Effect Structure and Function **Systems and System Models** Stability and Change **Scale, Proportion, and Quantity** **Energy and Matter**

2018 Arizona Grade 6 Life Science Standards	
6.L2U3.11	**Use evidence** to **construct an argument** regarding the impact of human activities on the environment and how they positively and negatively affect the competition for energy and resources in ecosystems.
6.L2U3.12	**Engage in argument from evidence** to support a claim about the factors that cause species to change and how humans can impact those factors.

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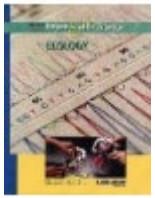
6.L2U1.13	**Develop and use models** to demonstrate the interdependence of organisms and their environment including biotic and abiotic factors.
6.L2U1.14	**Construct a model** that shows cycling of matter and flow of energy in ecosystems.

Social Justice Standards		
6-8 Anchor Standards and Grade Level Outcomes and Scenarios		
Identity	ID.6-8.1	I know and like who I am and can comfortably talk about my family and myself and describe our various group identities.
Diversity	DI.6-8.6	I interact with people who are similar to and different from me, and I show respect to all people.
Justice	JU.6-8.11	I relate to people as individuals and not representatives of groups, and I can name some common stereotypes I observe people using.
Action	AC.6-8.16	I am concerned about how people (including myself) are treated and feel for people when they are excluded or mistreated because of their identities.

Adopted Texts & Materials	
 SEPUP: Ecology, 1st edition Note: The text is available in print, not digital. To fully address the life science standards, supplemental resources will be used **Sixth Grade Life Science Supplemental Resources**	**Indigenous Books & Articles Aligned with Native American Unifying Concept:** For Teachers- What Not to Teach, Native Circle Buxton, James H. Creatures of the Desert World. Los Angeles: Intervisual Communications, Inc., 1987. Gibbons, Gail. Deserts. New York: Holiday House, 1996. Reading, Susan. Desert Plants. New York: Facts on File, Inc. 1990. Mc Carthy, C. Eyewitness Books: Desert. New York: Alfred A. Knopf, 1991. (Many other books in the Eyewitness series contain information on desert species.) Rivera-Ashford, Roni. My Tata's Remedies / Los Remedios de Mi Tata. Texas: Cinco Puntos Press, 2015 .

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	Keoke, Emory Dean, and Porterfield, Kay Marie. American Indian Contributions to the World: Science and Technology. Facts on File, Inc: New York. 2005.

Indigenous & Culturally Responsive Connections	
Culturally Responsive Teaching TUSD SPARKS Manual for Culturally Responsive Teaching SPARKS Strategies Learning for Justice	**Indigenous Science Connections:** Biomes & Communities of the Sonoran Desert Region: Arizona Sonoran Desert Museum U of A School Community Garden Curriculum: Native Plants and Desert Biomes Center for Biological Diversity: Sonoran Desert Social Justice Youth Participatory Action Research San Xavier Coop : Tohono O'odham farming and harvesting Yaqui epistemology on the sun Desert Biome Food Chain PDF Desert Food Chain Video Saguaro National Park Day in the Desert

Instructional & Assessment Guides	**Instructional Resources**
Arizona Department of Education Science Resources • A New Vision for Science Education • What to look for in a 3-Dimensional Science Classroom • Vertical Progression of Crosscutting Concepts • Vertical Progression of Science & Engineering Practices • Distribution of Core Ideas • FOSS: Science Notebooks in Middle School	**Sixth Grade Life Science Supplemental Resources** Wonder of Science: Phenomena by grade level & standards Cooper Center (Camp Cooper) – Virtual field trips & outdoor education Climate Kids (NASA) Middle School Units — Arizona Science Teachers Association (azsta.org) Arizona Science Center: Educator Resources NSTA Classroom Resources

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	Phenomena for NGSS The STEMAZing Project Wonderopolis PhET Simulations Exploratorium: lessons, video demos, & activities Sustainable Bioeconomy Arid Regions Lesson Plans The Mystery of the Missing Bees Google Earth time-lapse Life Inside of Biosphere 2- Panel Discussion with Jane Poynter and Taber MacCallum

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Earth & Space Science Supporting module: Astronomy *The Universe at Your Fingertips*	In sixth grade students develop an understanding of the scale and properties of objects in the solar system and how forces (gravity) and energy cause observable patterns in the Sun-Earth-Moon system. Lessons in the CR Native American viewpoint will align with the Teaching Indigenous Science Framework.

Core Ideas for Knowing Science	**Core Ideas for Using Science**
E1: The composition of the Earth and its atmosphere and the natural and human processes occurring within them shape the Earth's surface and its climate. E2: The Earth and our solar system are a very small part of one of many galaxies within the Universe.	U1: Scientists explain phenomena using evidence obtained from observations and or scientific investigations. Evidence may lead to developing models and/or theories to make sense of phenomena. As new evidence is discovered, models and theories can be revised.

Science & Engineering Practices	**Anchoring Phenomena**	**Crosscutting Concepts**
Ask questions and define problems **Develop and use models** Plan and **carry out investigations** **Analyze and interpret data** **Use mathematics and computational thinking** **Construct explanations** and design solutions Engage in argument from evidence Obtain, evaluate, and communicate information	Humans are connected to the original energy of light Star Trails (time lapse) Vs. Patterns of Observation over years (seasons) Living Solar Calendar at Chaco Canyon Sun Dagger Calender at Chaco Canyon Sun, Corn and the Mayan Calender Astronomical observatory on top of Chichén Itzá Aztec Calendar and calculations of length of the year Mexica New Year | Nahuatl Tlahtocan Seasons and Growing Calendars Tohono O'Odham Alignment of dates in the year with the San Francisco Peaks (Hopi sacred land) Used to determine planting season Cholla Bay Tides	**Patterns** Cause and Effect Structure and Function **Systems and System Models** Stability and Change **Scale, Proportion, and Quantity** **Energy and Matter**

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2018 Arizona Grade 6 Earth and Space Science Standards	
6.E1U1.6	**Investigate and construct an explanation** demonstrating that radiation from the Sun provides energy and is absorbed to warm the Earth's surface and atmosphere.
6.E2U1.7	Use ratios and proportions to **analyze and interpret data** related to scale, properties, and relationships among objects in our solar system.
6.E2U1.8	**Develop and use models** to explain how constellations and other night sky patterns appear to move due to Earth's rotation and revolution.
6.E2U1.9	**Develop and use models to construct an explanation** of how eclipses, moon phases, and tides occur within the Sun-Earth-Moon system. Solar/Lunar Eclipse- be mindful that many Native American/Indigenous people were told not to look at any solar or lunar eclipse, so including images of these events can be harmful to the students. This is traditionally a time for reflection and prayer. Some students will be instructed to stay indoors or to not attend school.
6.E2U1.10	**Use a model** to show how the tilt of the Earth's axis causes variations in the length of the day and gives rise to seasons.

Social Justice Standards		
6-8 Anchor Standards and Grade Level Outcomes and Scenarios		
Identity	ID.6-8.3	I know that overlapping identities combine to make me who I am and that none of my group identities on their own fully defines me or any other person.
Diversity	DI.6-8.6	I interact with people who are similar to and different from me, and I show respect to all people.
Diversity	DI.6-8.9	I know I am connected to other people and can relate to them even when we are different or when we disagree.
Justice	JU.6-8.12	I can recognize and describe unfairness and injustice in many forms including attitudes, speech, behaviors, practices and laws.
Action	AC.6-8.18	I can respectfully tell someone when his or her words or actions are biased or hurtful.

Adopted Texts & Materials	
 **ASP: The Universe at Your Fingertips** The Universe at your Fingertips is a DVD-ROM with 100+ learning activities, articles, and videos. *DVD-ROM Materials will be uploaded on Sharepoint in Spring 2021.* **Note:** Some standards will require supplemental resources	**Indigenous Books & Articles Aligned with Native American Unifying Concept:** For Teachers- What Not to Teach, Native Circle Coyote and the Sky: How the Sun, Moon, and Stars Began. (G 4). Emmett Garcia. (IL: 3-6, RL: 5.5)

	Sunpainters: Eclipse of the Navajo Sun. Baje Whitethorne Sr., ISBN-10 1893354334 Keoke, Emory Dean, and Porterfield, Kay Marie. American Indian Contributions to the World: Science and Technology. Facts on File, Inc: New York. 2005.

Indigenous & Culturally Responsive Connections	
Culturally Responsive Teaching TUSD SPARKS Manual for Culturally Responsive Teaching SPARKS Strategies Learning for Justice	**Indigenous Science Connections:** "Indigenous Astronomy – Best Practices and Protocols for Including Indigenous Astronomy in the Planetarium Setting" Annette S. Lee, Nancy Maryboy, David Begay, Wilfred Buck, Yasmin Catricheo, Duane Hamacher, Jarita Holbrook, Ka'iu Kimura, Carola Knockwood, Te Kahuratai Painting, Milagros Varguez (Teacher Resource) Chaco Canyon Native Voices on Fracking Preserving scientific site of solar Calendar Indigenous Star Stories: This article links to many resources • Native Skywatchers • Star Stories: A Video Series by the Smithsonian Museum of the American Indian • Indigenous Star Maps and Stories • Relearning the Star Stories of Indigenous Peoples • Unreserved: We Come From the Stars – Indigenous Astronomy, Astronauts and Star Stories The link includes star stories from the Cree and Lakota nations. It is recommended to seek astronomers from regional tribes. The website could be working with tribal government or colleges to attain star stories and star maps on a local level. Winter Tohono Odham stories, excerpt of the Milky Way Creation Two Eyed Seeing in Science (Teacher Reading)

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	Indigenous Perspective on Eclipses from Smithsonian Magazine (This is thoughtful information related to what many tribes can or cannot do when observing eclipses. It is not representative of all tribes. Simulation, videos, diagrams and other text features will help in leui of observance.) Solar/Lunar Eclipse- be mindful that many Native American/Indigenous people were told not to look at any solar or lunar eclipse, so including images of these events can be harmful to the students. This is traditionally a time for reflection and prayer. Some students will be instructed to stay indoors or to not attend school. (TUSD NASS) "Indigenous Astronomy – Best Practices and Protocols for Including Indigenous Astronomy in the Planetarium Setting"

Assessment	Instructional Resources
Arizona Department of Education Science Resources • A New Vision for Science Education • What to look for in a 3-Dimensional Science Classroom • Vertical Progression of Crosscutting Concepts • Vertical Progression of Science & Engineering Practices • Distribution of Core Ideas • FOSS: Science Notebooks in Middle School	**Sixth Grade Earth Science Supplemental Resources** Wonder of Science: Phenomena by grade level & standards Arizona Science Center: Educator Resources NSTA Classroom Resources Space Math @# NASA NASA Space Place NOAA Kids Phenomena for NGSS The STEMAZing Project Wonderopolis PhET Simulations Exploratorium: lessons, video demos, & activities

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Physical Science Supporting module: Chemical Building Blocks	In sixth grade students develop an understanding of forces and energy and how energy can transfer from one object to another or be converted from one form to another. They also develop an understanding of the nature of matter. Lessons in the CR Native American viewpoint will align with the Teaching Indigenous Science Framework.

Core Ideas for Knowing Science	**Core Ideas for Using Science**
P1: All matter in the Universe is made of very small particles. P2: Objects can affect other objects at a distance. P4: The total amount of energy in a closed system is always the same but can be transferred from one energy store to another during an event.	U1: Scientists explain phenomena using evidence obtained from observations and or scientific investigations. Evidence may lead to developing models and/or theories to make sense of phenomena. As new evidence is discovered, models and theories can be revised. U2: The knowledge produced by science is used in engineering and technologies to solve problems and/or create products.

Science & Engineering Practices	**Anchoring Phenomena**	**Crosscutting Concepts**
Ask questions and define problems Develop and use models Plan and carry out investigations Analyze and interpret data Use mathematics and computational thinking Construct explanations and design solutions Engage in argument from evidence Obtain, evaluate, and communicate information	The Space Age Food Product Cultivated by the Incas The Mpemba Effect Zooming into the world of atoms America's First Polymer Scientists: Rubber Processing, Use, and Transport in Mesoamerica One-Pager: How Aztecs Played Their Rubber Matches The Chemistry of Pottery The Awesome Atlatl	**Patterns** Cause and Effect Structure and Function **Systems and System Models** Stability and Change **Scale, Proportion, and Quantity** **Energy and Matter**

2018 Arizona Grade 6 Physical Science Standards	
6.P1U1.1	**Analyze and interpret data** to show that changes in states of matter are caused by different rates of movement of atoms in solids, liquids, and gases (Kinetic Theory).
6.P1U1.2	**Plan and carry out investigation** to demonstrate that variations in temperature and/or pressure affect changes in state of matter.
6.P1U1.3	**Develop and use models** to represent that matter is made up of smaller particles called atoms.
6.P2U1.4	**Develop and use a model** to predict how forces act on objects at a difference.
6.P4U2.5	**Analyze** how humans use technology to store (potential) and/or use (kinetic) energy.

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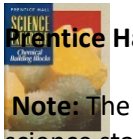
Social Justice Standards		
6-8 Anchor Standards and Grade Level Outcomes and Scenarios		
Identity	ID.6-8.3	I know that overlapping identities combine to make me who I am and that none of my group identities on their own fully defines me or any other person.
Diversity	DI.6-8.6	I interact with people who are similar to and different from me, and I show respect to all people.
Diversity	DI.6-8.9	I know I am connected to other people and can relate to them even when we are different or when we disagree.
Justice	JU.6-8.12	I can recognize and describe unfairness and injustice in many forms including attitudes, speech, behaviors, practices and laws.
Action	AC.6-8.19	I will speak up or take action when I see unfairness, even if those around me do not, and I will not let others convince me to go along with injustice.

Adopted Texts & Materials	
 **Prentice Hall**: Chemical Building Blocks **Note:** The text is available in print, not digital. To fully address the life science standards, supplemental resources will be used. **Sixth Grade Physical Science Supplemental Resources**	**Indigenous Books & Articles Aligned with Native American Unifying Concept:** For Teachers- What Not to Teach, Native Circle

Indigenous & Culturally Responsive Connections	
Culturally Responsive Teaching TUSD SPARKS Manual for Culturally Responsive Teaching SPARKS Strategies Learning for Justice	**Indigenous Science Connections** Indigenous knowledge and science revisited (Teacher resource)

Assessment	Instructional Resources
Arizona Department of Education Science Resources • A New Vision for Science Education • What to look for in a 3-Dimensional Science Classroom • Vertical Progression of Crosscutting Concepts • Vertical Progression of Science & Engineering Practices	**Sixth Grade Physical Science Supplemental Resources** Wonder of Science: Phenomena by grade level & standards Middle School Units — Arizona Science Teachers Association (azsta.org) Arizona Science Center: Educator Resources

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• Distribution of Core Ideas • FOSS: Science Notebooks in Middle School	NSTA Classroom Resources Phenomena for NGSS The STEMAZing Project Wonderopolis PhET Simulations Exploratorium: lessons, video demos, & activities