

Implementation in Action: Grades K-5 Science and Indian Education for All Infusion Matrix

Grades K-5 Science and IEFA Infusion Matrix				
Grade Level	DCI	Montana Science Content Standard	IEFA Connection	Example Culturally Responsive and Tribally Specific Resources
K	Earth and Space Science	K-ESS 3 Earth and Human Activity: Humans use natural resources for everything they do. (K-ESS 3-1)	Natural resources gleaned from the landscape for not just survival but for thriving	<p><u>Essential Question:</u> If humans cannot go to a store and buy something already made and in a package, what exists in nature that humans could use every day to help them survive?</p> <p>Suggestion – have tactile exploration stations where stones are used as tools, water can be used to wash things, dead wood can be used to build things (shelter, fresh water, and tools to make work easier being the concepts at each station).</p> <p>Storytime suggestion: How the Buffalo Was Used</p>
1	Physical Science	1-PS 4 Waves and Their Application in Technologies for Information Transfer: Sound can make matter vibrate, and vibrating matter can make sound. (1-PS 4-1)	How can sound waves transmit information?	<p><u>Essential Questions:</u> Are there ways students can make a correlation between a drum beat and a heartbeat? If you needed to communicate something over a long distance, could you do it with a drum?</p> <p><i>About drums (from OPI's More than Just Flutes and Drums): Drumming or the use of other percussion instruments accompanied both singing and dancing. The drum often represented the heartbeat, whether that of the human heartbeat, that of an animal, or even that of the Earth as Mother.</i></p> <p><i>Drums would vary between culture regions depending on available materials. In woodland areas, logs could be used as drums; in the Southwest, pottery might form the body of a drum. Animal skins were most often used to stretch over a circular opening for a drumhead. Drums tended to be played with a stick or beater rather than played by hand(s). Drums might be held in one hand and played by one person, or larger drums would be encircled by groups of drummers playing in unison, much like contemporary powwow drum groups.</i></p>



2	Life Science	2-LS 2 Ecosystems: Interactions, Energy and Dynamics: Plants depend on animals for pollination or to move their seeds around. (2-LS 2-2)	What seeds are easiest to transport if you are an animal – using observations, collecting seeds?	<p><u>Essential Questions:</u> How are seeds transported by animals? Could watching this process help American Indians know where to harvest certain plants for food? Could knowing how the seed attached to an animal help generate ideas for tool development?</p> <p>Inquiry suggestion: Set up exploratory stations that could include experimenting with various shapes of things (e.g., like burs and how Velcro was developed based on how some burs work), and heliotropes, etc., to discover how some seeds are transported by animals and need to be transported by birds, especially eating them so they can be “scoured”.</p> <p>Suggested tribally specific (Blackfeet) resource: Nitsitapiisinni Stories and Spaces: Exploring Kanai Plants and Culture</p>
3	Earth and Space Science	3-ESS 2 Weather and Climate: Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. (3-ESS 2-1)	Seasonal Rounds: observable weather and patterns	<p><u>Essential Questions:</u> How do you know, without looking on the computer or watching the weather on the news, that the seasons are changing? What do you notice outside? What do you feel? How would you keep track of the seasons if you didn’t have a calendar or a computer? How would you teach someone else your system of keeping track? What signs do you look for outside when winter turns to spring? How would you explain those signs to someone who lives in a climate that never has snow?</p> <p>Suggested integrated and tribally specific (Salish) series of lessons: FUN-ology! Seasons Make the World Go ‘Round: A Three Lesson Unit – 3-5 Earth and Space Science: Lesson One: What can air temperature data tell us about the seasons in Montana? Lesson Two: How do seasonal rounds record weather data? Lesson Three: Connecting seasonal rounds to seasonal weather patterns and the organisms we observe</p>



4	Physical Science	4-PS 3 Energy: Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. (4-PS 3-2)	Fire: energy can be transferred	<p><u>Essential Questions:</u> How could you carry fire from place to place safely? How could you carry fire from place to place with nothing but tools and vessels you make from natural materials? What materials do you think you might need to keep the fire lit for a long period of time and not catch anything else on fire?</p> <p>Suggested tribally specific (Blackfeet) lesson: Pikunni Fire Carrier Lesson</p>
4	Life Science	4-LS 1 From Molecules to Organisms: Structures and Processes - Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction (4-LS 1-1)	Biomimicry: using animal external and internal physical features to solve engineering problems	<p><u>Essential Questions:</u> Can you think of any objects in nature that might reveal either internal or external features that might inspire you to make a tool or other useful object? How would you replicate that feature with only natural materials? How would you teach other people to use your new tool or other useful object?</p> <p>Suggested integrated Indian Education for All lessons: The Powers of Plants – 3-5 Life Science Biomimicry and Genius Inventions by Montana Tribes - 4th Grade Life Science</p>



5	Earth and Space Science	<p>5-ESS 3 Earth's Systems: obtain and combine information from various sources about ways individual communities use science ideas to protect the Earth's resources, environment, and systems and <i>describe examples of how American Indians use scientific knowledge and practices to maintain relationships with the natural world</i> (5-ESS 3-1)</p>	<p>Stewardship: Examples of more than a millennium of tribal stewardship on a landscape.</p>	<p><u>Essential Questions:</u> What are the differences with what has gone on in the past regarding the tribes' environment/ecosystems, particularly in your local area? How does the present reflect the impact of the past? What can be done to insure the best possible future for the Earth and all its creatures? What does it mean to be a good steward? Does being a good steward have the same meaning for all cultures- why or why not?</p> <p>Suggested integrated Indian Education for All lessons: Unit 1- People and Glacier Lesson 1 Stewards of the Land (for more relevant and standards aligned lessons: Work House Program online curriculum from Glacier National Park) Confederated Salish and Kootenai Tribes Learning Modules: Fire on the Land, Explore the River, and Lower Flathead River</p> <p>Land Acknowledgements: What? Why? How? and how American Indians use scientific knowledge and practices to maintain relationships with the natural world</p> <p>What Innovations Can Bring Food and Water to Millions: The Inka Empire (Smithsonian National Museum of the American Indian Native Knowledge 360 lessons)</p>
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5	Earth and Space Science	<p>5- ESS 1: Space Systems: Stars and the Solar System - graph the daily changes in the length, shape, and direction of shadows; lengths of day and night; and the seasonal appearance of select stars to communicate the patterns of the Earth's movement and describe how astronomical knowledge is used by American Indians</p> <p>(5-ESS 1-2)</p>	<p>Stars and their locations: tribes use stars to navigate and determine seasonal changes</p>	<p><u>Essential Questions:</u> How can the locations of celestial objects in the sky indicate patterns of the earth's movement? Why would this be important if you are utilizing natural resources on the landscape for survival? If one needed to travel to find certain resources, how can the placement of observable celestial objects help navigation?</p> <p>Suggested integrated Indian Education for All lessons: Celestial Motion Blackfeet and Crow Star Stories</p>
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