

ROKET TEK Integrated Lesson Spectral Analysis of Pictographs in Snake River Drainage Area

Subject(s): Physical Science-Chemistry-Physics Grade: 9-12 # of Days: 4

Teacher(s): Tami Church School: Lapwai High School

World Knowledge

TEK Infusion

1. Common Core/Next Generation Learning Standard(s) Addressed:
Standard 5: Personal and Social Perspectives; Technology
Students understand that science and technology interact and impact both society and the environment.

Interrelationships between living and non-living things—Centering of all things on mother earth

2. Learning Target(s): (What will students know & be able to do as a result of this lesson?)

Spectral analysis of pictographs of the Snake River/Hell’s Canyon drainage in central Idaho comparing absorption spectra of iron III oxide mineral dyes will be used to analyze and recreate the composition of the dye mixtures.

Petroglyphs were damaged by vandals during the fall of 2010 causing irreparable damage in the eyes of most elders.

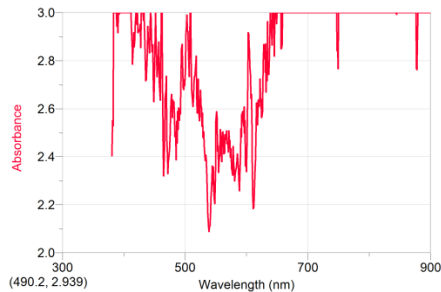
3. Relevance/Rationale: (Why are the outcomes of this lesson important in the real world? Why are these outcomes essential for future learning?)

Dyes and their used—how to find a mordant that allows for longevity of dyes and engineer the non-running /non-leaching viscosity dye that would allow for the best durability..

Damage by vandals has limited the availability of archeological sites to all people at National Parks. The people of Greece have vowed to recreate their national treasures—that option should be available to Native peoples if that is what they want to do in a traditional manner. Using common Native dyes mixed with other indigenous compounds to recreate a dye that has lasted for 1300 years or more—would be detrimental to our Native society.

4. Formative Assessment Criteria for Success: (How will you & your students know if they have successfully met the outcomes? What specific criteria will be met in a successful product/process? What does success on this lesson’s outcomes look like?)

Comparison of the spectral reflectance of new basketry compared to old basketry of the same materials could indicate the age of the basket and the conditions in which the baskets were preserved and honored. Dyes fade over time and can indicate age if careful measurements are taken at creation.



Spectral reflectance using a spectrophotometer will tell the students whether the dye is fading or lasting. Measurements can be taking over several weeks or months and compare to the original. This lab could last centuries if allowed to go to completion.

Having the spectrum change very little over time, would be the ideal. Different iron III oxide compound change at different rates, but finding the perfect combination is the key.

<p>5. Activities/Tasks: (What learning experiences will students engage in? How will you use these learning experiences or their student products as formative assessment opportunities?)</p> <p>Most dyes require a mordant that allows the dye to adhere to a surface. Iron metal has its own mordant properties but adhering to a smooth surface such as a rock face proves to be more difficult for durability and longevity. Natural compounds such as animal urine, fish oil, blackberries, and other compounds that were readily available 8,000 years ago will be mixed with the iron III oxide to examine if it helps its adhesion properties.</p>	<p>Students will gather materials that were readily available centuries ago to mix with the iron III oxide dye to test its color-safe attributes. Only natural Native materials will be tested.</p>
<p>6. Resources/Materials: (What texts, digital resources, & materials will be used in this lesson?)</p> <p>Spectro-vis, absorption wand, research materials from tribal entities, elders,</p>	<p>Elders will be helpful with dye information especially using iron III oxide and basketry—they might be able to give incite.</p>
<p>7. Access for All: (How will you ensure that all students have access to and are able to engage appropriately in this lesson? Consider all aspects of student diversity.)</p> <p>This lesson lends itself to bio-diversity. It will be very interesting to see what compounds students come up with after visiting with elders and relatives. I feel all levels of students can participate and add to the research value of the experiment.</p>	
<p>8. Modifications/Accommodations: (What curriculum modifications and/or classroom accommodations will you make for Students with Disabilities in your class? Be as specific as possible.)</p> <p>NO accommodations needed at this time — will add them if needed.</p>	

TEK Alignment

TEK Introduction(Why is this important to the student and their culture? Use stories, elders, traditional foods/tools, art, music—this should be the WOW factor!) Where are you getting this material?

TEK is infused throughout this whole activity. I plan on letting students share as we brainstorm their mordant ideas. I really think it will add a scientific twist to a very important dilemma in the tribe—to recreate what was lost or to lose it forever.....

How can students share other traditional ecological knowledge if they want?

Sharing will be encouraged and part of their assessments will be their discussion with an elder as to their thoughts of how this tragedy should be handled. I also will be asking elders and men to bring us in large basalt boulders to paint their concoctions on.

Which levels of Bloom's Revised Taxonomy are targeted? Check one or more.

	Remembering	x	Analyzing
x	Understanding	x	Evaluating
x	Applying	x	Creating