Engaging the next generation and promoting local stewardship: Partnerships in Archaeology

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Although K-12 archaeology events are not rare, often these involve simulated excavations or artifact show-and-tell displays that provide examples of archaeological materials, but seldom try to explain how such examples are incorporated into research programs. We have undertaken a variety of archaeology events for young participants that emphasize cooperative engagement in question-driven field exercises that focus on experiential learning about the research process and collection of primary archaeological field data. Examples of student participant projects include 1) recording surface artifacts (glass beads) to evaluate hypotheses about how archaeological assemblage of unknown age was created; 2) learning about thermal fracture properties and stone boiling as introduction for documenting and interpreting spatial patterns of prehistoric fire cracked rock scatters; 3) investigating the role of non-human agents (harvester ants) in assessing site formation and long-term landscape dynamics. An underlying goal has been to highlight humans as complex participatory components of ecological systems..

QUESTIONS, OBSERVATIONS, INTERPRETATIONS

Archaeology programs for K-12 groups are common and are often engaging, entertaining, and fun. However, many times these archaeology events give much greater emphasis to experiential activities than to education on fundamental archaeological processes. It's easy to have fun throwing an atlatl (Figure 1). It's much more challenging sharing the excitement of basic research.

Examples of several activity based programs that stress that archaeology is a way of learning – a research field – and that learning to ask questions and develop methods to seek answers is more important than discovery of objects, and can even be almost as much fun as an atlatl. We contend that we can do better than show and tell.

Ultimately our goals in presenting the events shown here have not been only to introduce kids to archaeology, but to use archaeological examples to: 1) learn to ask questions and explore data collection to help find answers; 2) explore thinking about humans as just another, albeit a very high impact, participant in ecosystem processes, and; 3) to encourage stewardship of the biological, physical, as well as the cultural components of landscapes and foster an understanding of the interrelationships among these components.

Figure 1. Participating in archaeological fun – atlatl.

EXPLORING CULTURAL DYNAMICS

Figure 2. Mapping glass beads and modern features – learning context, provenience, and geometry.

Glass Beads, Context, and Hypotheses

Why do we do archaeology?

Archaeology is a research tool to answer questions about the past. Join PCHPC in seeking to answer questions about glass beads found at an archaeological site. Two hypotheses to be evaluated by 2016 research at 48PA551 are:

- *The beads are recent, lost by someone doing craft beading while camping here, or;*
- *The beads represent a previously unknown 19th century use of the site.*

Figure 3. One of the handouts provided to students (as are the data in Table 1, and Figure 4.

Table 1. Comparison of 48PA551 glass bead colors to 48PA3135 colors.

Munsell Bead Color Name	48PA551 Bead Color Abbreviation							TOTAL
	N	B	PK	G	Y	R	W	
dark green				1				1
white							1	1
light blue								0
translucent						1		1
turquoise					1			1
dark blue								0
olive green	1			1				2
dusty green	1							1
teal								0
grey green				1				1
medium blue								0
red grey				1				1
dark grey	1							1
amber					1			1
dark green								0
dusty red						4		4
dark blue		1						1
warm						1		1
dark blue	1							1
smoky red						2		2
turquoise		1						1
red grey								0
white								0
dark grey	1							1
	4	2	0	3	2	8	1	21

48PA3135 Bead Color Abbreviation								TOTAL
	N	B	PK	G	Y	R	W	
dark green								0
white							1	1
light blue								0
translucent								0
turquoise								0
dark blue								0
olive green								0
dusty green								0
teal								0
grey green								0
medium blue	1							1
red grey								0
dark grey								0
amber								0
dark green								0
dusty red								0
dark blue								0
warm								0
dark blue								0
smoky red								0
turquoise								0
red grey								0
white								0
dark grey								0
	1	0	0	0	0	0	1	2

48PA551	48PA3135
58	2

Use the RGB equivalents to Munsell colors; consult *Munsell Bead Color Book* for accurate colors

In a project used with Middle School students, we present them with a basic interpretive challenge and explore asking questions, developing models, and the importance of context. A cluster of glass beads are found in association with a picnic table in a Forest campsite. Are these recent, or prehistoric? What hypotheses can we develop about why they are there? Why are their locations so important? What other data sources might we use to help understand this assemblage? Students participate in surveying, mapping, collecting, measuring, and describing beads and their surroundings. They are given some information from other sites to use as comparison, and asked to think about how the data relates to model evaluation and to brainstorm about what sorts of additional research could help answer the 'are they old or not' question.

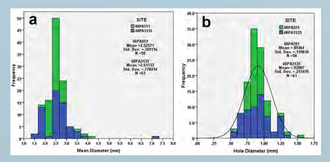


Figure 4. Comparisons of mean diameters (a) and mean hole diameters (b) for beads from 48PA551 (Dead Indian Creek) and 48PA3135 (Dooley Site) – data provided students.

Table 2. Bead and assemblage attribute assessment of possible age/cultural affiliation.

Evidence/Attribute	Assessment: Historic <----> Recent	Comments
Context, associated features		Directly under picnic table and metal fire ring suggests an association, but also the increase scuffing and trampling in the area could have exposed near-surface buried material.
Context, geomorphology		Stream terrace about 1.5 m above stream channel is comparable to other Late Prehistoric occupations at the site.
Bead colors		The range of colors is atom-alous in comparison to other sites, but perhaps not outside the range of LP/Late bead colors.
Bead surface condition		In comparison to 48PA3135, these beads are less frosted and pitted, which may indicate shorter exposure time, but need more work on bead taphonomy.
Bead morphology		Although two size classes are present, within each size class, beads are fairly uniform in shape. May indicate more standardize, recent production and shorter periods of bead accumulation.
Bead homogeneity		All of the beads are type IIa, there are no composite beads, faceted beads, or blown beads. Other archaeological assemblages tend to have greater bead type diversity.

This exercise deals mostly with thinking about cultural components of landscapes. Key concepts include:

- Observation versus interpretation
- Hypotheses
- Data collection
- Context
- Provenience
- Method development
- Models versus theory
- Each puzzle piece is important

Figure 5. Middle School student mapping bead locations.

What is that? Exploring ways to link modern observations with prehistoric patterns

EXPLORING INTERACTIONS BETWEEN CULTURAL & PHYSICAL DYNAMICS

Another type of project has been effective with diverse ages (ranging from pre-K through Middle School). Here we work with the interactions between physical processes (thermal heating, cooling) and human cooking/processing. In the first step, students participate in stone boiling. Rocks are heated in an open fire, dumped in water, and something is boiled. All fun things. But then, the by-products are examined and described allowing the "fire-cracked rock (FCR)" to have visual, tactile, and dynamic meaning. Equipped with this new recognition skill, student then learn to systematically locate, map, and describe FCR on surface archaeological sites.

This exercise deals mostly with thinking about interactions between human actions, physical processes, and archaeological by-products on landscapes. Key concepts/skills include:

- Dynamics and statics
- Thermal fracture
- Inventory techniques
- Artifact identification
- Attribute based mapping
- Provenience
- Context

Figure 6. Students enjoy stone-boiling, which provides them a first-hand experience of dynamics of thermal fractures (creation of FCR).

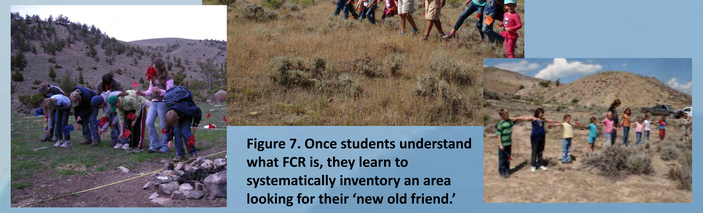


Figure 7. Once students understand what FCR is, they learn to systematically inventory an area looking for their 'new old friend.'

Figure 8. Students using GNSS receivers to capture artifact locations and enter item attributes. Learning that data are not easy to come by.

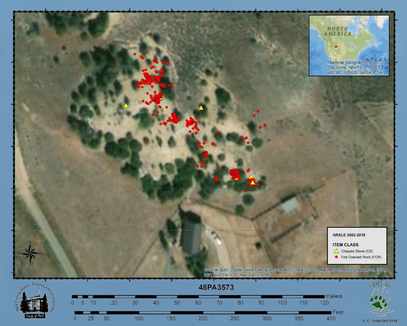


Figure 9. Student-engaged inventory, identification, and mapping produced the basic data for this site map that was made accessible by a private landowner.

How do you know that? Thinking about formational dynamics

In a third example of an archaeological learning exercise, students of a wide variety of ages participate in collection of small data sets relating to a larger, longer term study of harvester ant's role in archaeological site formation (Figure 10).

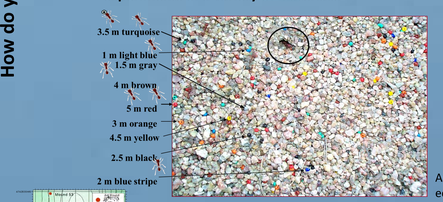
EXPLORING INTERPLAY BETWEEN CULTURAL, BIOLOGICAL, AND PHYSICAL DYNAMICS

Students are given and introduction to harvester ant foraging behaviors, life histories, and mound construction and maintenance. The fact that small objects of archaeological and paleontological interest sometimes are found in mounds is introduced and students asked whether they think the mounds contents most likely came only from below ground. We then talk about designing experiments to evaluate the idea that "stuff in mound means buried stuff below."

This exercise deals mostly with thinking about interactions between human materials, actions of other biological actors, and their use of archaeological materials as part of their architecture. Key concepts/skills include:

- Dynamics and statics
- Unexpected interactions
- Experiment design
- Plains ecology
- Provenience
- Context

Figure 10. Students study ant mound geometry and content as well as participate in mound construction material transport experiments of a variety of materials.



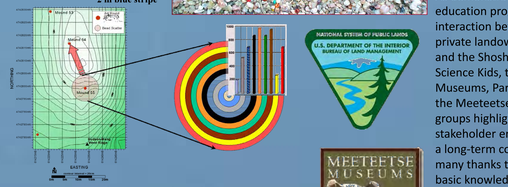


Figure 11. Students use data from previous experiments to identify topics for additional investigation and to think about how current statics are linked to past dynamics

HUMAN CONNECTEDNESS

While the on-the-ground topics discussion are things like beads, FCR, ants, and archaeology, the conceptual underpinnings of each of these student exercise is one of Landscape Taphonomy, in which today's landscapes are viewed as part of a long-term trajectory of a variety of interacting cultural, biological, and physical co-dominant processes. Human action is one of many operating and encoding information into landscapes, and translating the contemporary results of those long-term processes requires the input of many fields of study. Not just archaeology, biology, geology, zoology, forestry, and the full list of 'ologies,' that partition landscapes into small more-easily managed segment. Done correctly, archaeological education may help students think at a landscape scale rather than at a disciplinary or species scale.

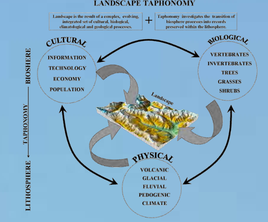


Figure 12. Basic components of the Landscape Taphonomy model that is the foundation of our archaeology events.

ARCHAEOLOGY AS GATEWAY TO LANDSCAPE STEWARDSHIP

Events summarized here provide hands-on research engagement with human components of northwestern Wyoming's ecosystems, the hope is that the basic message of environmental stewardship comes across – the idea that humans are fully enmeshed within ecosystems as one-among-many participating stakeholders, rather than being a species with unquestioned dominion. On the off chance that can get a few students to internalize that our species is not entitled to damage the record of our own species, we certainly are not entitled to unilaterally alter the habitats of the many other, non-human stakeholders of the landscapes. Stewardship is inclusive.

Figure 13. Although the literal take-home message is that it's not OK to damage the archaeological record, our hope is that the message that it's also not OK to engage in acts of mindless human-centered damage to other aspects of the landscape.

ACKNOWLEDGEMENTS

As demonstrated by the range of authors of this poster – the education program summarized here is a richly cooperative interaction between local, state, Federal, public groups, and private landowners. Key partners have been the Cody BLM and the Shoshone National Forest. Other facilitators include: Science Kids, the Buffalo Bill Center of the West, Meeteetse Museums, Park County Historic Preservation Commission, and the Meeteetse Recreation Districts. The interactions of these groups highlights the message of cross-disciplinary, multi-stakeholder engagement of the work. Becky Thomas has been a long-term co-participant in all of these activities. Finally, many thanks to the students whose efforts have added to our basic knowledge of the Big Horn Basin and its archaeology, ecology, and future.

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