

THE MATHEMATICIAN AND THE ARCHAEOLOGIST

ART AND MATH

GRADE LEVEL: 4–6

BASED ON

Jordan (Nabatean), *Eagle and Serpent on Wreath*, 1st century B.C., Museum Purchase, 1939.222

CONCEPT

Math will be applied in the very natural setting of archeology (as in Petra) as students consider the difficulty of identifying and piecing together found artifacts and writing the discoveries in mathematical terms understandable by the host country and European members of the team.

MATERIALS

markers for each student
paper and pencil for each student
page of suggested designs for each student (optional)
small clay pots, one for each student
one pillowcase for each group of four students
One hammer for each group of four students
scotch tape, Tacky Glue for each group
metric measuring tape
Tootsie Rolls for prizes

VOCABULARY

| | |
|---------------|--------------|
| archeology | magnetometer |
| total station | trowel |
| Nabataeans | Edomites |
| metric system | meter |
| kilometer | centimeter |
| millimeter | estimates |

OBJECTIVE

Students will make estimates with the metric system (as would be done in Jordan).

Students will consider problems archeologists face in piecing artifacts together.

GUIDING QUESTIONS

Why would archeologists find pottery but not clothing or paintings?

Why do archeologists divide the site into 1-by-1-meter grids?

What tools are used to find what is underground and to measure location?

For what clues does an archeologist look in determining which pieces belong together?

What kind of information does an archeologist track as he/she finds something in a dig?

Where is Jordan? What system of measurement do people in Europe and the Middle East use?

BACKGROUND

Nabataeans wrote in a form of Aramaic thought to be the precursor to Arabic. Most Nabataean writings on leather and papyrus are gone, and existing inscriptions on stone are mainly signatures of builders, worshippers, or the names of people buried in tombs. Why are these writings so limited? Robert Irwin gives us some insights into classical Arabic literature in his *Night & Horses & the Desert*. He says that before the coming of Islam (A.D. 622), “literature from the Arabian Peninsula was designed to be recited, committed to memory by the audience, then orally transmitted from generation to generation.” He says, “Even after the widespread use of paper in the ninth century... literature was intended to be read aloud to an audience”.

Many nonArabs find it difficult to grasp the culturally rich literature of the Near East. For example, Westerners often see the classical ode or qasida as a limited form of poetry because it focuses on nomadic life, like that of the early Nabataeans. Irwin says that the Arabic qasida was expected to “evoke nostalgia, erotic longing, or pride in battle”, while using a specific literary format. As English translators interpreted these odes, they often omitted obscure desert locations and meaningful references to local flora and fauna, believing the edited version would be easier to appreciate.

CLASS EXPERIENCE

PROCEDURE

1. Review Petra artifacts from around A.D. 100. Discuss briefly archeological procedure. Challenge students with the difficulty archeologists have in piecing together history through investigation of artifacts
2. Demonstrate decorations that would be found on Nabataean pottery. Pass out pattern ideas (optional), paper, and pencil and have students choose a design/pattern.
3. Students decorate pots, knowing some may choose to have their pots broken and glued back together.
4. Teacher accepts student clay-pot donations and/or supplies some decorated pots as needed.
5. Each group of four or five students puts a pot inside a pillowcase and breaks it with a hammer. They then try to tape/glue it together.
6. Students discuss the difficulty of piecing the pottery together. (If it was too easy, combine pillowcases!) Discuss the importance of keeping a journal for archeologists as they list, measure, and identify each piece.
7. Review the metric system—a comparison chart on board would be helpful—then place restored pots around the room. Shows metric measuring tape and help students make logical guesses as to metric distance. Ask metric questions for prizes.
8. Small Tootsie Rolls are tossed to students with best metric estimates to distance questions from the teacher.

ASSESSMENT

Five-point quiz determines grade. One point extra credit is added for classroom participation. Five correct is an A, 4 correct is a B, 3 correct is a C, 2 Correct is a D, 1 or less correct is an F

1. What was the group name of the inhabitants of Petra who made the artifacts?
A. Romans B. Nabataeans C. Persians (B--Nabataeans)
2. Which is smallest?
A. kilometer B. meter C. centimeter D. millimeter (D. millimeter)
3. Which instrument measures the position and depth of artifacts?
A. magnetometer B. total station C. trowel (B. total station)
4. Which unit of the metric system would you use to measure an eraser?
A. kilometer B. centimeter C. millimeter (B. centimeter)
5. Which unit of the metric system would you use to measure a period at the end of a sentence?
A. kilometer B. meter C. centimeter D. millimeter (D. millimeter)

NATIONAL STANDARDS: MATHEMATICS

Relate the number of units to the size of the units used to measure an object: for example, compare the number of cups it takes to fill a pitcher to the number of quarts to fill the same pitcher.

Make simple unit conversions within a measurement system: for example, inches to feet, kilograms to grams, quarts to gallons.

Develop and explain strategies for performing computations mentally.

Use mathematical strategies to solve problems that relate to other curriculum areas and the real world: for example, use a timeline to sequence events, use symmetry in artwork.

Describe, identify, and model reflections, rotations, and translations, using physical materials.

RESOURCES

<http://ology.amnh.org>. This is provided by the American Museum of Natural History and has additional activities and information of interest to children.

Nabataea.net This site gives information about Petra in particular, including photos and details about the area.