

What's the Big Idea?

Measuring Up to the Greeks

**An Arts-Integrated Performance Task using
Understanding by Design© by Ellen Reynolds and
Pam Bradley**



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Measuring Up to the Greeks Performance Task

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School District: Pleasant Hill School District

For: Grade 6 Visual Arts, Science, Social Studies, and Math

What's the Big Idea?

1. Topic that Leads to the Big Idea: Architectural Design Elements of the Ancient Greeks
2. The Big Idea: Students will understand how Greeks first created columns and other important fundamental elements of architecture to build their temples.
3. Knowledge, Skills and Abilities Addressed as Learner Objectives:
Students will:
 - demonstrate knowledge of scientific forces that allowed temples to hold much greater volumes of weight
 - acquire vocabulary basic to Greek architecture
 - use the Scientific Inquiry process
 - research materials used by the Greeks
 - construct a Greek temple out of clay
4. The Essential Question: How did architects of Ancient Greece use structural supports?

How Will You Know What They Are Learning?

5. Identify the performance tasks that will produce evidence of learning.

Based on the knowledge learned and experiments performed, students will design and construct a building made with Greek architectural elements which will support a roof.

What Do Students Need to Learn?

6. Show-Me Standards and Grade-Level Expectations:

Fine Arts: Visual Arts

FA 1: Product/Performance

2. Select and apply three-dimensional media, techniques, and processes to communicate ideas and solve challenging visual art problems

A. Sculpture, Ceramics, Other Media

- Combine simple forms to create a complex object/form (in-the-round)

3. Communicate ideas about subject matter and themes in artworks created for various purposes

C. Themes

- Create an original artwork that communicates ideas about the following themes:
 - World & Time(e.g., past, present, future)

Science:

SC 7: Scientific Inquiry

1. Science understanding is developed through science process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking

A. Scientific inquiry includes the ability of students to formulate a testable question and explanation; and to select appropriate investigative methods to obtain evidence relevant to the explanation

- a. formulate testable questions and hypotheses
- b. identify and describe the importance of the independent variable, dependent variables, controls of constants, and multiple trials to the design of a valid experiment
- c. design and conduct a valid experiment

B. Scientific inquiry relies upon gathering evidence from qualitative and quantitative observations

- a. make qualitative observations using the 5 senses
- b. determine the appropriate tools to gather data
- e. compare amounts/measurements
- f. judge whether measurements and computation of quantities are reasonable

C. Scientific inquiry includes evaluation of explanations

a. use quantitative and qualitative data as support for reasonable explanations (conclusion)

c. determine the possible effects of errors in observations, measurements, and calculations on the formulation of explanations (conclusion)

e. analyze whether evidence (data) and scientific principles support proposed explanation (hypotheses, laws, theories)

D. The nature of science relies upon communication of results and justification of explanations

a. communicate the procedures and results of investigations and explanations through: oral presentations; drawings and maps; data tables; graphs; and writings

Social Studies

SS 3: Missouri, United States and World History

3b. Knowledge of continuity and change in the history of the world civilizations including:

- a. Ancient Egypt in North Africa (pyramids and mathematics)
- b. Ancient Greece and Rome
- c. India (religions and culture)
- d. Mesopotamia (beginnings of civilization)

Mathematics

MA 2

2. Use visualization, spatial reasoning and geometric modeling to solve problems

B. Draw and use visual models

- draw or use visual models to represent and solve problems

Process/Performance Standards:

Goal 1: Students in Missouri public schools will acquire the knowledge and skills to gather, analyze and apply information and ideas.

Students will demonstrate within and integrate across all content areas the ability to

1. develop questions and ideas to initiate and refine research
2. conduct research to answer questions and evaluate information and ideas
3. design and conduct field and laboratory investigations to study nature and society
6. discover and evaluate patterns and relationships in information, ideas and structures
7. evaluate the accuracy of information and the reliability of its sources
8. organize data, information and ideas into useful forms (including charts, graphs, outlines) for analysis or presentation
9. identify, analyze and compare the institutions, traditions and art forms of past and present societies

Goal 2: Students in Missouri public schools will acquire the knowledge and skills to communicate effectively within and beyond the classroom.

Students will demonstrate within and integrate across all content areas the ability to

1. plan and make written, oral and visual presentations for a variety of purposes and audiences
2. review and revise communications to improve accuracy and clarity
3. exchange information, questions and ideas while recognizing the perspectives of others
4. present perceptions and ideas regarding works of the arts, humanities and sciences
5. perform or produce works in the fine and practical arts

Goal 3: Students in Missouri public schools will acquire the knowledge and skills to recognize and solve problems.

Students will demonstrate within and integrate across all content areas the ability to

1. identify problems and define their scope and elements
2. develop and apply strategies based on ways others have prevented or solved problems
3. develop and apply strategies based on one's own experience in preventing or solving problems
4. evaluate the processes used in recognizing and solving problems
5. reason inductively from a set of specific facts and deductively from general premises
6. examine problems and proposed solutions from multiple perspectives
7. evaluate the extent to which a strategy addresses the problem
8. assess costs, benefits and other consequences of proposed solutions

Goal 4: Students in Missouri public schools will acquire the knowledge and skills to make decisions and act as responsible members of society.

Students will demonstrate within and integrate across all content areas the ability to

1. explain reasoning and identify information used to support decisions
4. recognize and practice honesty and integrity in academic work and in the workplace
5. develop, monitor and revise plans of action to meet deadlines and accomplish goals
6. identify tasks that require a coordinated effort and work with others to complete those tasks
7. identify and apply practices that preserve and enhance the safety and health of self and others

How Are You Going to Make it Happen?

Describe what **the teachers**, will do:

The teachers will:

- teach the Golden Ratio to students and encourage them to explore nature to find the Golden Ratio (Mathematics)
- provide student-researched materials for experiments; facilitate students as they follow the Scientific Inquiry Process (Science)
- demonstrate how to create a template using proper measurements and use of basic hand building skills for clay (Visual Art)
- introduce the historical importance of Greek architecture, with an emphasis on the Parthenon (Social Studies)

Web sites for references and worksheets:

<http://www.greece.org/parthenon/marbles/children.htm>- Learning about the Parthenon and the Elgin Marbles

<http://www.markwahl.com/index.php?id=22>- golden ratio measurement worksheet

http://www.homeschoolmath.net/teaching/fibonacci_golden_section.php- good visual for showing Fibonacci's numbers in nature

<http://cuip.uchicago.edu/~dlnarain/golden/>- Really good site for students to work on for learning the Golden Ratio

<http://greece.mrdonn.org/columns.html>

http://www.3dancientwonders.com/3d_parthenon_virtualreality.htm- Virtual tour through 3-D model of the Parthenon

http://www.ancientgreece.co.uk/acropolis/challenge/cha_set.html- Build a temple

http://library.thinkquest.org/CR0210200/ancient_greece/sliding_puzzle2.htm-Greek Activities

Describe what the **students** will do:

1. The students will complete the activity, "Raising the Roof."

Essential Question: What necessary supports are needed to raise a roof?

Time needed: 5-10 minutes

Materials needed: bed sheet

Objective: Students will act as columns to support a raised roof.

What will students learn? Even distribution of supports is needed to raise the roof

Students number off and draw numbers to see the order of play. The first two students raise the sheet above their head with one hand at any two spots on the sheet. Of course, the majority will fall to the ground. One by one, add another student, allowing the student to strategically find his/her position. As each student steps into place, students can pull it tighter. To add to the challenge, students can also create a peaked roof.

2. Students will use the Scientific Inquiry Process to conduct a variety of experiments to determine what type of materials would best support a roof. To make this a fun activity, students will be able to use different types of foods and candies as their building materials. Students will not only need to find a supporting material, but the construction must also be pleasing to the eye and have a proportional ratio.

3. Final Project: Clay Temples

Students will:

- become architects and draw blue prints to a Greek Temple
- students will use measurements to come up with proper ratios and calculate the amount of columns needed for the design
- students will make templates based on the blue print drawings
- students will create Greek temples using clay

Scoring Guide

Criteria	Advanced	Proficient	Basic	Below Basic
Scientific Inquiry	20-25 points	16-19 points	13-15 points	12- below points
____/25	Student was able to determine a material that would support a roof; pleasing to the eye, and had a proportional ratio	Student was able to determine a material that would support a roof, but it was not pleasing to the eye or it did not have a proportional ratio	Student was able to determine a material that would support a roof, but it was not pleasing to the eye nor did it have a proportional ratio	Student was not able to determine a material that would support a roof
Blue Print	14-15 points	12-13 points	10-11 points	9-below points
____/15	Student was able to use all 5 of the architectural elements learned ___ Columns ___ Frieze ___ Pediment ___ Architrave ___ Stylobate	Student was able to use 4 of the architectural elements learned ___ Columns ___ Frieze ___ Pediment ___ Architrave ___ Stylobate	Student was able to use 3 of the architectural elements learned ___ Columns ___ Frieze ___ Pediment ___ Architrave ___ Stylobat	Student only used 2 or less of the architectural elements learned ___ Columns ___ Frieze ___ Pediment ___ Architrave ___ Stylobate
Template	9-10 points	8 points	7 points	6 points
____/10	___ Student used a ruler to measure and draw a straight line independently ___ Created templates reflective of blueprint design ___ Proportions should be to a scale no larger than 6 X 4 X 6 inches	___ Student used a ruler to measure and draw a straight line with little assistance. ___ Created templates similar to that of the blueprint design. ___ Proportions should be to a scale no larger than 6 X 4 X 6 inches	___ Student used a ruler to measure and draw a straight line with much needed assistance. ___ Created templates that strayed from original blueprint design. ___ Proportions are not within the range requirements.	___ Student did not use a ruler to measure and draw a straight line. ___ Created templates that without using original blueprint design. ___ Proportions are not within the range requirements.
Final project	45- 50 points	40-44 points	35-39 points	34- below
____/50	Student: ___ used templates to cut clay pieces ___ used all Score Slip and Smoothing techniques ___ project is well crafted and supports the roof ___ created the project independently. ___ glazed project ___ project did not fall apart	Student: ___ used templates, but did not cut out all the pieces accurately ___ used Score Slip and Smoothing techniques most of the time ___ project is well crafted and supports the roof ___ created the project independently. ___ glazed project. ___ project did not fall apart	Student: ___ used templates, but most pieces were not cut out accurately ___ Scored, Slipped and Smoothed only some of the parts ___ project has some structural problems, such as bowed columns or sagging roof ___ created the project with much assistance ___ glazed project ___ project had some structural breaking	Student: ___ used templates, but most pieces were not cut out accurately ___ Scored, Slipped and Smoothed only some of the parts. ___ project has some structural problems, such as bowed columns or sagging roof ___ created the project with much assistance ___ did not glaze project. ___ project fell apart