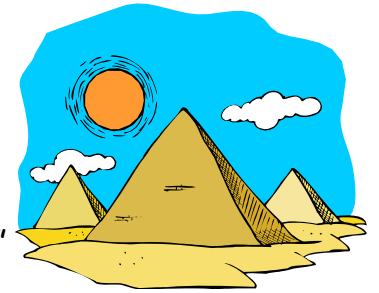


# Ancient Construction



**Background:** We have been learning about the ancient Egyptians and their magnificent pyramids. You will use the information you have learned and the pictures you have seen to construct your own "step pyramid."

**Design Challenge:** Work with a group of two or three classmates. Design and build a model of a step pyramid, using the materials provided. Your pyramid must have four sides and be eight levels high with each level smaller than the one below it.

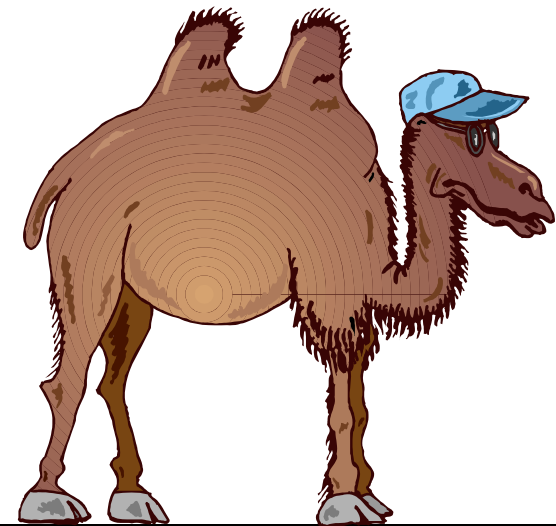
## Criteria:

Your pyramid must

- fit on a cardboard base no larger than 18" by 18"
- be constructed of cubes or rectangular solids
- have four sides
- include steps on all four sides
- be eight levels high with each level smaller than the one below it.

**Materials:** You may select from the items below.

- sugar cubes
- glue (for sugar cubes)
- small blocks or dominoes
- cardboard base
- ruler



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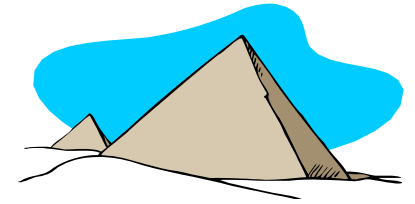
Targeted Standards of Learning: Mathematics 2.20  
History and Social Science 2.1

Supporting Standards of Learning: Mathematics 2.12, 2.22  
English 2.3, 2.8, 2.9, 2.11  
Science 2.1

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Targeted Standard for Technological Literacy: 7  
Supporting Standard for Technological Literacy: 8

# Ancient Construction



**Targeted Standards of Learning:**

- **Mathematics 2.20**  
The student will identify, describe, and sort three-dimensional (solid) concrete figures, including a cube, rectangular solid (prism), sphere, cylinder, and cone according to the number and shape of the solid's faces, edges, and corners.
- **History and Social Science 2.1**  
The student will explain how the contributions of ancient China and Egypt have influenced the present world in terms of architecture, inventions, the calendar, and written language.

**Targeted Standard for Technological Literacy: Standard 7**

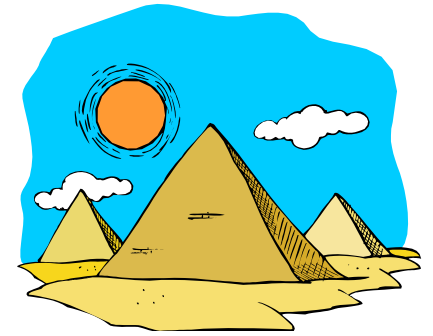
- Students will develop an understanding of the influence of technology on history.

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Time Management
<ul style="list-style-type: none"> <li>• Exposure to target Mathematics Standard of Learning 2.20 and History and Social Science Standard of Learning 2.1</li> </ul>	<ul style="list-style-type: none"> <li>• See Design Brief for recommended materials.</li> <li>• Teacher may substitute materials.</li> </ul>	<ul style="list-style-type: none"> <li>• Caution students not to eat sugar cubes.</li> </ul>	<ul style="list-style-type: none"> <li>• Two to three students per group</li> <li>• Students may need to build pyramid in two sessions in order for the glue to dry.</li> </ul>	<ul style="list-style-type: none"> <li>• Design Brief</li> <li>• Guided Portfolio</li> <li>• Rubric Assessments</li> <li>• KWL</li> </ul>	<ul style="list-style-type: none"> <li>• Session 1: Introducing Design Brief &amp; Portfolio. Examining and discussing building materials. (40 min.)</li> <li>• Session 2: Building (40 min.)</li> <li>• Session 3: Sharing and evaluating (30 min.)</li> </ul>

Guided Portfolio—1

Name \_\_\_\_\_

# Ancient Construction



Group Members:

\_\_\_\_\_

**1. What is the problem?** State the problem in *your own words*.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

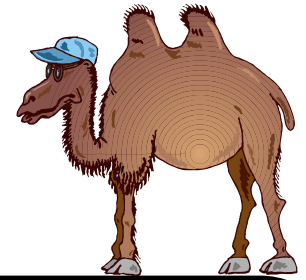
\_\_\_\_\_

Targeted Standard of Learning: Mathematics 2.20  
History and Social Science 2.1

Supporting Standards of Learning: Mathematics 2.12, 2.22  
English 2.3, 2.8, 2.9, 2.11  
Science 2.1

Targeted Standard for Technological Literacy: 7  
Supporting Standard for Technological Literacy: 8

Name \_\_\_\_\_



## 2. Brainstorm solutions.

Draw or describe some possible solutions.

A large graphic organizer consisting of four rounded rectangular boxes arranged in a 2x2 grid. The boxes are connected by a central illustration of a glowing lightbulb with radiating lines, symbolizing an idea or solution. The lightbulb is positioned in the center, with lines extending from its base to the corners of the four boxes.



Name \_\_\_\_\_

#### 4. Test your solution.

- Does your pyramid fit on the 18" by 18" base?
- Is it constructed of cubes or rectangular solids?
- Does your pyramid have four sides?
- Does it have steps on each side?
- Is your pyramid eight levels high with each level smaller than the one below it?

YES

NO

YES

NO

YES

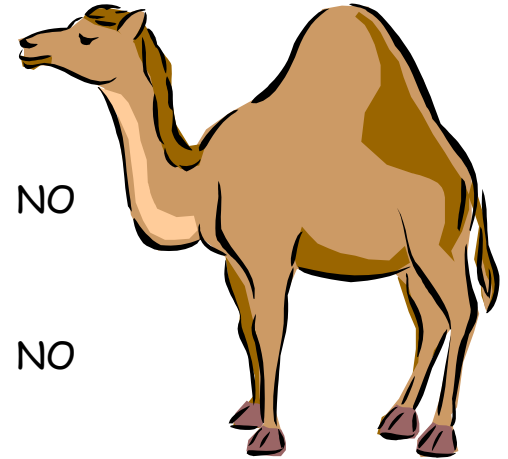
NO

YES

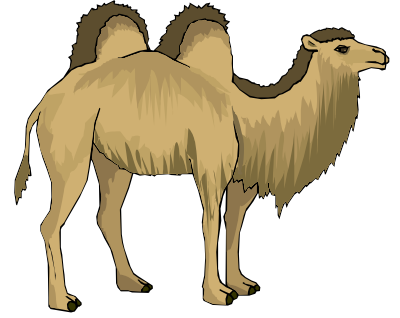
NO

YES

NO



Name \_\_\_\_\_



**5. Evaluate your solution.**

Was it the best solution? Would one of your other ideas have been better? Why or why not?

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What would you have done differently?

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Could you add to it to make it better? What would you add to it?

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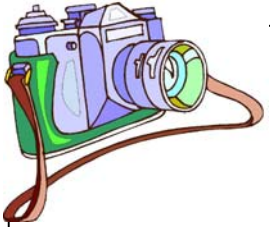
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Guided Portfolio—6

Name \_\_\_\_\_

Attach a photograph of your final project here. If you do not have a photograph, draw a picture of your final project.

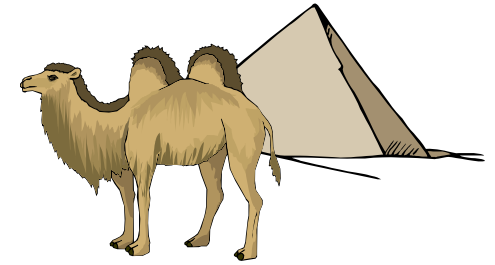


How would you make your project better? Draw a picture showing how it would look after you have made changes to it.





Name \_\_\_\_\_



## KWL: Ancient Pyramids

What we <u>K</u> now.	What we <u>W</u> ant to know.	What we <u>L</u> earned.
	<p style="text-align: center;"><b>Sample Questions</b></p> <p><b>What materials were used to build the pyramids?</b></p> <p><b>How tall were pyramids?</b></p> <p><b>How much did the stones weigh?</b></p> <ul style="list-style-type: none"><li>• <b>How did they move the stones?</b></li></ul> <p><small>Note: The teacher should make sure that all required information is listed in question form on the "W" (what we want to learn) section of the KWL. Use the <i>Virginia SOL Teacher Research Guide</i> to check what knowledge, skills, and processes are considered essential for the targeted Standards of Learning.</small></p>	

Targeted Standard of Learning: Mathematics 2.20  
History and Social Science 2.1

Supporting Standards of Learning: Mathematics 2.12, 2.22  
English 2.3, 2.8, 2.9, 2.11  
Science 2.1

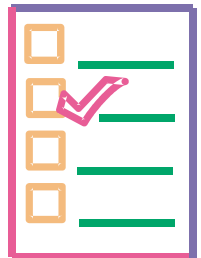
Targeted Standard for Technological Literacy: 7  
Supporting Standard for Technological Literacy: 8

# Rubric for *Ancient Construction*

Name \_\_\_\_\_

Date \_\_\_\_\_

<p style="text-align: center;"><b>Design Brief Rubric</b></p>	<p style="text-align: center;">no evidence  0</p>	<p style="text-align: center;">limited understanding  1</p>	<p style="text-align: center;">some understanding with room for improvement  2</p>	<p style="text-align: center;">good understanding with room for improvement  3</p>	<p style="text-align: center;">substantial understanding  4</p>
The student restated the problem in his/her own words.					
The student brainstormed more than one idea.					
The student created and labeled a sketch to use as a "blueprint."					
The student included notes about problems that occurred and their solutions.					
<p>The student tested the pyramid to make sure</p> <ul style="list-style-type: none"> <li>• it fit on a base no larger than 18" by 18"</li> <li>• it was constructed of cubes or rectangular solids</li> <li>• it had four sides</li> <li>• it had eight levels</li> <li>• each level was smaller than the one below it.</li> </ul>					
The student evaluated how he/she could make it better next time.					



# Rubric for *Ancient Construction*



Name \_\_\_\_\_

Date \_\_\_\_\_

Oral Communication Rubric	no evidence	limited understanding	some understanding with room for improvement	good understanding with room for improvement	substantial understanding
	0	1	2	3	4
<b>2.1 The student will demonstrate an understanding of oral language structure.</b> a) Create oral stories to share with others. b) Create and participate in oral dramatic activities. c) Use correct verb tenses in oral communication. d) Use increasingly complex sentence structures in oral communication.					
<b>2.2 The student will continue to expand listening and speaking vocabularies.</b> a) Use words that reflect a growing range of interests and knowledge. b) Clarify and explain words and ideas orally. c) Follow oral directions with three or four steps. d) Give three- and four-step directions. e) Identify and use synonyms and antonyms in oral communication.					
<b>2.3 The student will use oral communication skills.</b> a) Use oral language for different purposes: to inform, to persuade, and to entertain. b) Share stories or information orally with an audience. c) Participates as a contributor and leader in a group. d) Summarize information shared orally by others.					

## Standards of Learning

### English (2002)

#### *Oral Language*

- 2.3 The student will use oral communication skills.
- a) Use oral language for different purposes: to inform, to persuade, and to entertain.
  - b) Share stories or information orally with an audience.
  - c) Participate as a contributor and leader in a group.
  - d) Summarize information shared orally by others.

#### *Reading*

- 2.8 The student will read and demonstrate comprehension of fiction and nonfiction.
- a) Make predictions about content.
  - b) Read to confirm predictions.
  - c) Relate previous experiences to the topic.
  - d) Ask and answer questions about what is read.
  - e) Locate information to answer questions.
  - f) Describe characters, setting, and important events in fiction and poetry.
  - g) Identify the problem, solution, and main idea.
- 2.9 The student will demonstrate comprehension of information in reference materials.
- a) Use a table of contents.
  - b) Use pictures and charts.
  - c) Use dictionaries and indices.

#### *Writing*

- 2.11 The student will write stories, letters, and simple explanations.
- a) Generate ideas before writing.
  - b) Organize writing to include a beginning, middle, and end.
  - c) Revise writing for clarity.
  - d) Use available technology.

## **Science (2003)**

### ***Scientific Investigation, Reasoning, and Logic***

- 2.1 The student will conduct investigations in which
- observation is differentiated from personal interpretation, and conclusions are drawn based on observations;
  - observations are repeated to ensure accuracy;
  - two or more attributes are used to classify items;
  - conditions that influence a change are defined;
  - length, volume, mass, and temperature measurements are made in metric (centimeters, meters, liters, degrees Celsius, grams, kilograms) and standard English units (inches, feet, yards, cups, pints, quarts, gallons, degrees Fahrenheit, ounces, pounds);
  - pictures and bar graphs are constructed using numbered axes;
  - unexpected or unusual quantitative data are recognized.
  - simple physical models are constructed;

## **Mathematics (2001)**

### ***Measurement***

- 2.12 The student will estimate and then use a ruler to make linear measurements to the nearest centimeter and inch, including measuring the distance around a polygon in order to determine perimeter.

### ***Geometry***

- 2.20 The student will identify, describe, and sort three-dimensional (solid) concrete figures, including a cube, rectangular solid (prism), sphere, cylinder, and cone according to the number and shape of the solid's faces, edges, and corners.
- 2.22 The student will compare and contrast plane and solid geometric shapes (circle/sphere, square/cube, and rectangle/rectangular solid).

## **History and Social Science (2001)**

### ***History***

- 2.1 The student will explain how the contributions of ancient China and Egypt have influenced the present world in terms of architecture, inventions, the calendar, and written language.

## **Standards for Technological Literacy**

Standard 7: Students will develop an understanding of the influence of technology on history.

Standard 8: Students will develop an understanding of the attributes of design.