

Frosted Fort: Tabby Construction

Adapted from *Kingsley Crispies!* by Amber Grafft-Weiss and Sarah Miller, Florida Public Archaeology Network (July 2008).

Grade Levels

3rd – 8th

Estimated Time

2 ½ – 3 ½ hours

Goal

Students will have an opportunity to learn about the historical building technique of making tabby by constructing structures from a Frosted Flakes or Rice Krispies bar recipes.

Objectives

After completion of the activity and viewing of the *Fort Frederick Tabby* documentary, students will be able to:

1. *Observe* tabby being made and *reproduce* the process through activity.
2. *Listen* to the history of Fort Frederick and *remember* key events.
3. *Identify* the location of Fort Frederick in South Carolina.
4. *Compare* and *contrast* the physical state of Fort Frederick over time.
5. *Build* a *model* of Fort Frederick or another tabby structure in order to *simulate* tabby construction.
6. *Analyze* the *cause and effect* of natural erosion and human activity at Fort Frederick.
7. *Discuss* the importance of historic preservation and *propose* ideas for historic preservation.
8. *Assess* the condition of tabby *models* through *measurements* and *evaluation*.

Academic Standards

Social Studies

- 3-2.2 Summarize the motives, activities, and accomplishments of the exploration of South Carolina by the Spanish, French, and English.
- 3-2.4 Summarize the development of the Carolina colony under the Lords Proprietors and the royal colonial government, including settlement by and trade with the people of Barbados and the influence of other immigrant groups.
- 4-1.3 Explain the political, economic, and technological factors that led to the exploration of the new world by Spain, Portugal, France, the Netherlands, and England, including the competition

between nations, the expansion of international trade, and the technological advances in shipbuilding and navigation.

- 6-6.4 Compare the economic, political, and religious incentives of the various European countries to explore and settle new lands.
- 7-1.1 Compare the colonial claims and the expansion of European powers through 1770.
- 8-1.2 Compare the motives, activities, and accomplishments of the exploration of South Carolina and North America by the Spanish, French, and English.

Math

- 3-1 Students will demonstrate an understanding of the academic standards and accompanying indicators through problem solving, reasoning and proof, communication, connections and representations.
- 3-4 Through the process standards students will demonstrate an understanding of geometric attributes and the relationship to shape, congruency, symmetry, and movement within two-dimensional space.
- 3-5 Through the process standards students will demonstrate an understanding of measurable attributes of objects, apply tools to determine measurements, and demonstrate an ability to make change.
- 3-6 Through the process standards students will demonstrate an understanding of organizing, interpreting, analyzing and making predictions about data, the benefits of multiple representations of a data set, and the basic concepts of probability.
- 4-3 Through the process standards students will demonstrate an understanding of numeric and nonnumeric patterns, representing simple mathematical relationships, and applying procedures to find the value of an unknown.
- 4-4 Through the process standards students will demonstrate an understanding of the characteristics and properties of two-dimensional and three-dimensional geometric shapes and a developing understanding of the applications of transformations and the coordinate system.
- 4-5 Through the process standards students will demonstrate an understanding of measurable attributes of objects including perimeter, area, angles, and elapsed time and conversions within the U.S. Customary System.
- 4-6 Through the process standards students will demonstrate an understanding of the impact of data collection methods, interpreting and organizing data, the appropriate graph for categorical and numerical data, and analyze possible outcomes of a simple event.
- 5-1 Students will demonstrate an understanding of the academic standards and accompanying indicators through problem solving, reasoning and proof, communication, connections and representations.

- 5-3 Through the process standards students will demonstrate an understanding of the use of patterns, relations, functions, models, structures, and algebraic symbols to represent quantitative relationships and analyze change in various contexts.
- 5-4 Through the process standards students will demonstrate an understanding of the characteristics and properties of two-dimensional and three-dimensional geometric shapes and the application of transformations and symmetry.
- 5-5 Through the process standards students will demonstrate an understanding of measurable attributes of objects, the units and systems of measurement, and apply tools and formulas to determine measurements.
- 5-6 Through the process standards students will demonstrate an understanding of designing an investigation, the affect of data collection methods on a data set, interpretation and application of measures of center, and application of basic concepts of probability.
- 6-1 Students will demonstrate an understanding of the academic standards and accompanying indicators through problem solving, reasoning and proof, communication, connections and representations.
- 6-4 Through the process standards students will demonstrate an understanding of the properties and attributes of two-dimensional shapes through coordinate geometry and transformational geometry.
- 7-1 Students will demonstrate an understanding of the academic standards and accompanying indicators through problem solving, reasoning and proof, communication, connections and representations.
- 7-4 Through the process standards students will demonstrate an understanding of the properties and attributes of two-dimensional and three-dimensional shapes through coordinate, spatial, analytical, and transformational geometry.
- 7-5 Through the process standards students will demonstrate an understanding of scale factors and rates, calculating perimeter, area, surface area, and volume using appropriate units, techniques, and formulas and relationships between the U.S. Customary and Metric Systems.
- 8-1 Students will demonstrate an understanding of the academic standards and accompanying indicators through problem solving, reasoning and proof, communication, connections and representations.
- 8-5 Through the process standards students will demonstrate an understanding of proportionality of similar figures, pi, applying formulas to determine volume, levels of accuracy and precision, and relationships between the U.S. Customary and Metric Systems.

Activity: In-Class

This activity is to be done as an in-class activity. The teacher will make or purchase the Frosted Flakes or Rice Krispies bars and distribute them to the students for the construction of their tabby structures. Construction of tabby structures can be done individually or as a team.

Materials

Fort Frederick Tabby documentary (optional to view other documentaries in the Fort Frederick series)

Frosted Fort: Tabby Construction Worksheet

Frosted Flakes or Rice Krispies bars recipe

Frosted Flakes or Rice Krispies bars ingredients

One paper plate per student

Historical Background

- Fort Frederick was built by the British colonial government to protect approaches to Beaufort Towne from the Atlantic Ocean by way of Port Royal Sound and the Beaufort River.
- Estimates for the construction costs of the fort were presented on 20 January 1726 to the South Carolina Commons House of Assembly by Colonel William Rhett. Rhett had overseen construction of the defenses surrounding Charles Towne in 1707.
- An estimated 50,000 bushels of oyster shells were used to construct Fort Frederick.
- Barracks were probably completed before January 1733 because James Oglethorpe lodged a large group of Georgia's first settlers in the building while he looked for lands to settle around Savannah.
- Construction of the fort was complete, except for platforms, in 1734.
- The architect/engineer of the fort is not known, and the original plans for the fort have been lost.
- The best historical information we now have about the original construction of the fort is in the verbal description given by Robert Brewton who examined the nearly completed fort on behalf of the South Carolina Commons House of Assembly in 1734. Brewton stated that he saw four lines and two bastions, observing that the tabby walls were five feet high and five feet thick at the top. The fort contained a magazine, and this was described as leaky in 1739/1740. Brewton also mentioned barracks but does not give any location or dimensions leaving open the question as to whether or not such accommodations were constructed within the fort's enclosing walls. That is one of the research questions archaeologists working at the fort in 2014/2015 determined with their excavations.
- Fort Frederick was built by "Messrs. Bond and Delabere." A partial payment for construction was made on 24 January 1734 in the amount of £1,600.
- The fort was garrisoned from 1734/1735 until it was abandoned in the 1740s.

- Within six years of the fort's completion, the tabby walls had partially disassociated along the western wall, the barracks had deteriorated, and the magazine was unfit for service. Other than a few minor patches to the fort, no major repairs or alterations were authorized.
- Openings along the fort walls may have been original or alterations during the Civil War to provide access for a landing stage.
- In the late 1750s, permission was sought to remove material from Fort Frederick in order to construct Fort Lyttelton. It cannot be determined if this actually took place.
- Fort Lyttelton took the place of Fort Frederick in 1757.
- The fort varied in its number of occupants anywhere from two provincials to 100 British regulars.
- In 1785, the fort and its surrounding land were sold to Captain John Joyner on whose death in 1796 the property passed to his grandson John Joyner Smith (1790-1872). This tract of land was comprised of 700 acres by 1861 and was known during the late antebellum period as *Old Fort*, the *Smith Place*, or *Smith's Plantation*. By 1860, the history of the fort is assumed to have been forgotten as people called the fort *Old Spanish Fort* or *Smith's Fort*.
- The fort was occupied by Union forces following the Battle of Port Royal in November 1861. It became the headquarters for the 1st South Carolina Regiment of Volunteers, a regiment of African-American soldiers. The site was renamed Camp Saxton after General Rufus Saxton (self-styled Governor of the Sea Islands and leading advocate of the Port Royal Experiment).
- In 1863, the fort and its surrounding plantation land, as well as many other plantations on Port Royal Island were sold by the American government (Union authorities) for the non-payment of taxes. The amount owed on *Old Fort* plantation was \$93.40. The U.S. government purchased the property for \$1,000.
- In 1949, part of the site was developed as a U.S. Naval Hospital and associated housing.
- In 1974, Fort Frederick was nominated to the National Register of Historic Places.
- The preserve was acquired in 1997 by the South Carolina Department of Natural Resources with funds from the Heritage Land Trust Fund and by a donation from the National Park Service's Federal Land to Parks program.
- Fort Frederick is the oldest known tabby structure in South Carolina, and the oldest known tabby fort in the Southeastern United States.

Lesson

1. Give a brief history of Fort Frederick Heritage Preserve.
2. Show the *Fort Frederick Tabby* documentary film.
3. Talk with the students about the process of making tabby.
4. Distribute the plates, Frosted Flakes or Rice Krispies bars.

5. Brainstorm with the students about how they would construct a structure if all they had available to them were local materials (i.e., clay, sand, water, stones, shells, trees). What could they make - bricks, stone walls, tabby, or wooden palisades?
6. Using an item familiar to the students, Frosted Flakes or Rice Krispies, talk with the students about how these are similar and different to the oyster shells used to construct Fort Frederick. Is the frosting on the flakes similar to the sand in the tabby mixture of the fort?
7. What else is needed for the flakes or krispies to stick together? Marshmallows and butter take the place of sand, lime and water as bonding materials in this activity.
8. Talk with the students about different bonding materials they might use.
9. Talk with the students about the long-term effects of weather on the bars. If we put this bar in the sun or the rain or next to a river what will happen to it?
10. Talk with the students about the short-term and long-term effects of weather and human activity to historical structures like Fort Frederick.
11. Students can now make the bars in the outline of Fort Frederick or another historical tabby structure. Experiment with adding a second layer of tabby. What are the challenges to get the layers to stay in place? What are possible solutions? Would the same challenges exist if making real tabby? Not only do layers of tabby have to hold together individually, each layer has to bond with the layer below and above it to create a solid structure.
12. Have students place their tabby structures on the spaces provided on the *Frosted Fort: Tabby Construction Worksheet* and draw the footprint of their structures. Repeat this process following deconstruction (see optional step 13 below). Mathematically compare and contrast the two footprints. Students can measure their structures using the U.S. Customary System, Metric System, or both.
13. If time permits, allow students to deconstruct their tabby structures by eating away at the structure in the way natural erosion or human activity does. Half of Fort Frederick has washed away due to the meandering of the Beaufort River. Rain and other natural factors have also deteriorated the fort, while human activity such as looting also damages the fort's historical and structural integrity.
14. Discuss with the students why the preservation of historical structures like Fort Frederick is important, and what they can do to help with the preservation of cultural resources (i.e., historical structures, archaeological sites) in their own communities.

Frosted Flakes Bars and Rice Krispies Bars Recipes

Frosted Flakes Snack Recipe

Time: 30 minutes

Servings: 12

http://www.cdktichen.com/recipes/recs/27/Frosted_Flakes_Snack59070.shtml

Ingredients

4 cups mini marshmallows

¼ cup margarine

1/3 cup peanut butter

7 ½ cups Frosted Flakes cereal

Directions

Use a 4-quart microwave bowl to melt miniature marshmallows. Add margarine. Set microwave on high for 3 minute; then stir halfway. Stir in peanut butter until mix is smooth. Add Frosted Flakes. Stir until well-coated. Use a buttered spatula and press mixture into a lightly greased 9x13 pan. Let mixture set for about 5 minutes. Cut into bars. Please note that cooking times may vary.

Rice Krispies Treats

Time: 30 minutes

Servings: 12

<http://www.ricekrispies.com/recipes/the-original-treats>

Ingredients

3 tablespoons butter

4 cups miniature marshmallows

6 cups Rice Krispies

Stovetop Directions

In a large saucepan melt butter or margarine over low heat. Add marshmallows and stir until completely melted. Remove from heat. Add Rice Krispies cereal. Stir until well coated. Using buttered spatula or wax paper evenly press mixture into 13x9x2-inch pan coated with cooking spray. Cool. Cut into bars.

Microwave Directions

In microwave-safe bowl, heat butter and marshmallows on high for 3 minutes, stirring after 2 minutes. Stir until smooth. Add Rice Krispies cereal. Stir until well coated. Using buttered spatula or wax paper

evenly press mixture into 13x9x2-inch pan coated with cooking spray. Cool. Cut into bars. Please note that cooking times may vary.

Note

For best results, use fresh marshmallows. One jar (7 oz.) marshmallow creme can be substituted for marshmallows. Diet, reduced calorie or tub margarine is not recommended. Store no more than two days at room temperature in airtight container. To freeze, place in layers separated by wax paper in airtight container. Freeze for up to six weeks. Let stand at room temperature for 15 minutes before serving.

Frosted Fort: Tabby Construction Worksheet

Name: _____ Date: _____

Instructions

Fill out the table as you make your Frosted Fort. Compare and contrast building materials used to make your Frosted Fort with the building materials used to make and restore Fort Frederick. The first one is done for you.

Ingredients	
<i>Frosted Flakes or Rice Krispies</i>	<i>Fort Frederick Tabby</i>
1. Frosted Flakes or Rice Krispies	1. Oyster Shells
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.

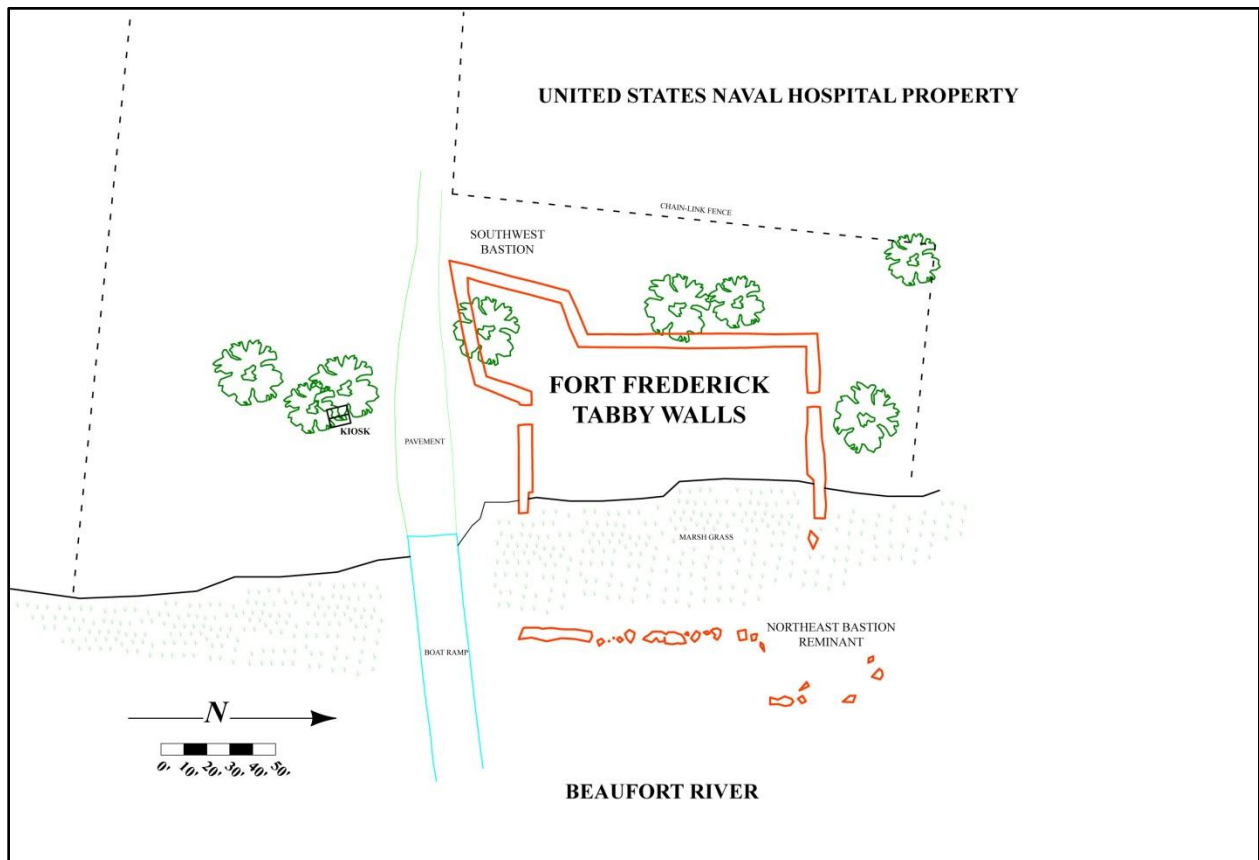
What happens to what you are making if you do **not** follow the recipe?

What could have happened to Fort Frederick if the builder in the 1700s did **not** follow the tabby recipe?

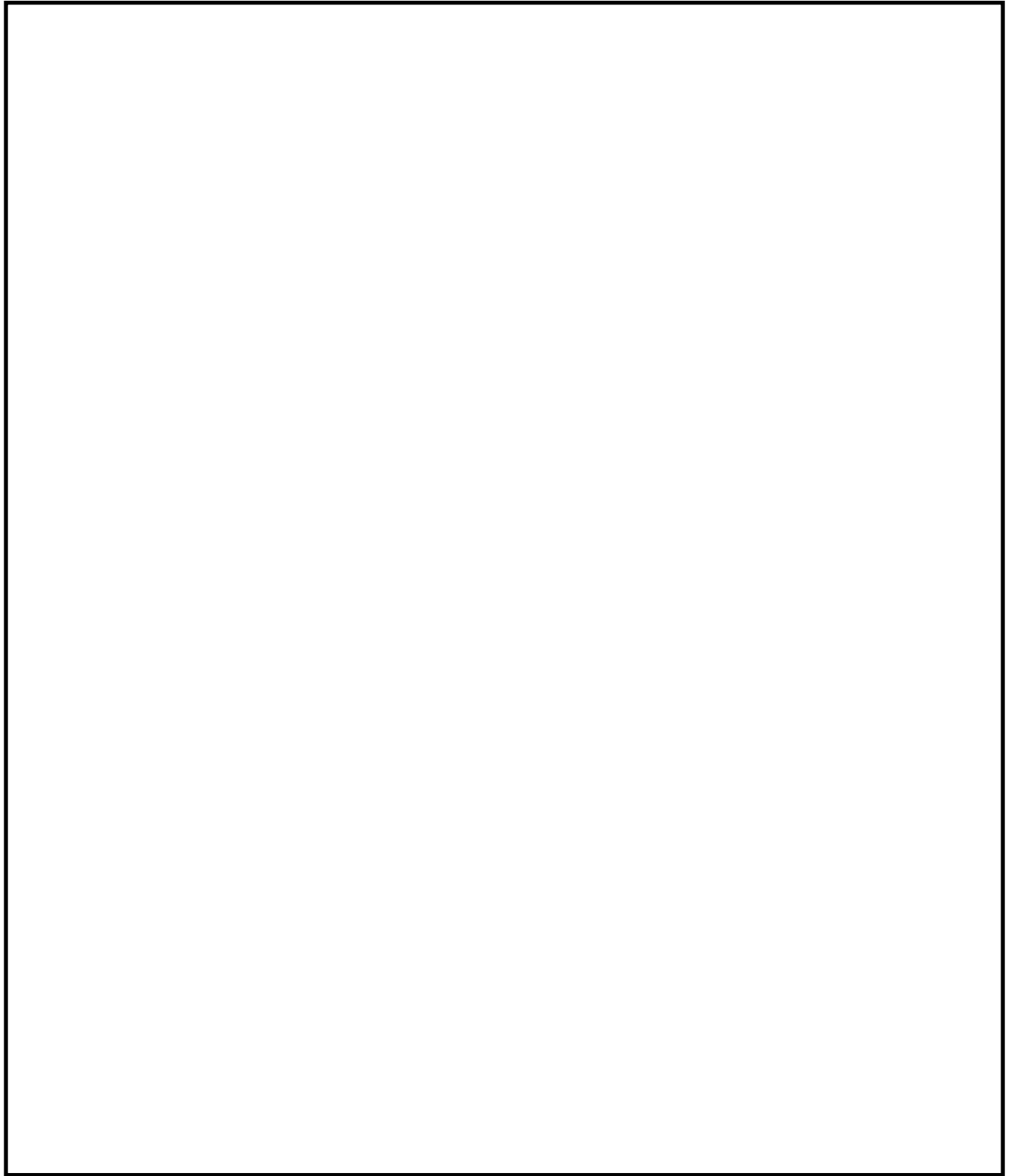
Math in Archaeology

Archaeologists use math every day. The archaeologists who worked at Fort Frederick Heritage Preserve used metric measurements during their excavations and to map the size of Fort Frederick.

Use the space on the next two pages to draw the footprint of your tabby structure. First, draw the footprint of your tabby structure right after construction. Then, draw the footprint of your tabby structure after it has been deconstructed by “natural erosion” and/or “human activity.” What are the measurements of your tabby structure? What is the perimeter of your structure? What are the square centimeters or inches of your structure? What is the difference between the measurements of your two drawings?



The Existing Plan of Fort Frederick drawn in 2000 uses U.S. standard measurements (feet) rather than metric (SCDNR).



Draw the footprint of your tabby structure after construction. Don't forget to write out the measurements for each side.



Draw the footprint of your tabby structure after deconstruction. Don't forget to write out the measurements for each side.