Sarah Greer Wake Forest University

TOPIC: Algebra I and Swedish History

NCTM STANDARDS: Number and Operations, Measurement

GOALS:

Students will learn about the Vasa, a 17th Century Swedish warship, and practice algebra concepts of scale and proportion. They will use measurement skills to construct a model and relate their results to well-known objects.

INTRODUCTION:

In the early 1600s, the Vasa was built according to the order of King Gustavus Adolphus. This Swedish warship was intended to be the greatest warship in the world, but on August 10, 1628 when the ship set sail for the first time, it was an immediate disappointment. The ship sank in the harbor because it did not have enough ballast weight to balance the weight of the guns, upper hull, masts, and sails of the ship. Inquiries were conducted in an attempt to locate the people responsible for the disaster. The final conclusion was that the ship was well built but poorly proportioned.

ACTIVITIES:

- Part 1. Introduction. Students read about the Vasa on the Internet. As a class, they create a list of facts to tell the story of this historical ship. The teacher should supplement this information to complete the story if necessary.
- Part 2. Dimensions and Comparisons. Given the dimensions and scale of the model, students calculate the approximate dimensions of the ship. They will check their values with the exact dimensions available on the Internet and convert the exact dimensions into yards. These dimensions will be compared to a football field to give students a more concrete idea of the size of the ship.
- Part 3. Construction. Students select a scale different from the scale of the model discussed in class. Using this scale they determine the dimensions and create a new model. This model may be 2-dimensional or 3-dimensional and they will decorate their model to relate to what they have learned about Sweden and the Vasa.

ASSESSMENT: When the models are submitted, they will be graded using the attached rubric to assess correct calculations, construction, and design.

Part 1. Introduction.

The Vasa is a famous 17th Century Swedish warship. Explore the following website to learn about the Vasa.

http://www.vasamuseet.se/Vasamuseet/Om.aspx?lang=en

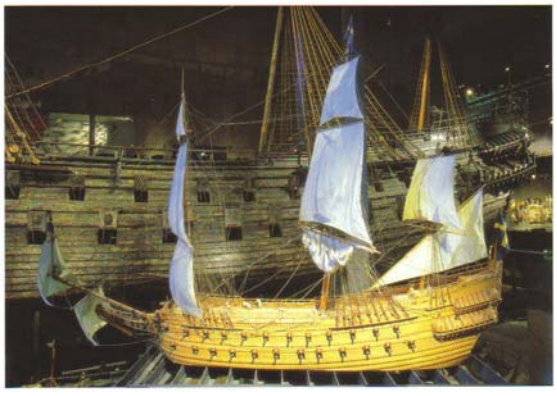
Be prepared to discuss the story of the Vasa. You should be able to answer each of the following questions as part of our discussion.

1. King Gustavus Adolphus was hoping the Vasa would be the mightiest warship in the world. What features were included to make this ship unique?

2. What is the ship most famous for?

3. What caused the disaster?

Part 2. Dimensions and Comparisons.



This model of the Vasa is displayed in the Vasamuseet to show visitors what the ship looked like on the day it sailed. The model is 6.93 meters long and 4.75 meters tall. The scale of the model is 1:10.

1. Use this information to estimate the dimensions of the Vasa.

length:

width:

2. Use the website to find the actual dimensions of the Vasa and convert each measurement from meters into yards (1.093613298 yards = 1 meter).

	in meters	in yards
length		
width		
height		

3. How do the length, width, and height of the ship compare to the length of a football field?

Part 3. Construction.

1. Choose a scale different from the model discussed in Part 2. Using the actual dimensions (length, width, and height) of the Vasa found on the website, calculate the dimensions for a model with your scale.
2. Create your own model of the Vasa. Your model can be 2-dimensional or 3 dimensional and you may choose your materials.
3. Decorate your display using what you have learned about the Vasa. For example, since the Vasa is a Swedish ship your model could be flying a Swedish flag.
4. Attach a 3 by 5 index card to your display. On the card, list your scale and the length, width, and height of your model. You must also turn in a sheet of notebook paper showing your work for calculating the dimensions of your model.

Your model is due on: _____

Be creative!

TEACHER NOTES/SOLUTIONS

Part 1. After students have researched the Vasa on the museum website, lead a class discussion on the history of the Vasa. Create a class list of important information about the ship and its sinking. Supplement the student information if necessary to complete the story.

Part 2.

1. length: 69.30 meters; width: 47.50 meters
2.

	in meters	in yards
length	69.00	75.46
width	11.70	12.80
height	52.50	57.41

3. The length is approximately three-fourths of a football field, the width is slightly more than one-tenth of a football field, and the height is a little more than half of a football field. (Students may have general answers like the sample answer given or specific proportions. The goal is for students to have an idea of how large the ship is by comparing it to something they are familiar with, so general answers are sufficient.)

Part 3.

Provide students with a copy of this rubric with the construction directions.

30	Calculations: Length, width, and height are each worth 10 points. The student must use the selected scale on all three dimensions, show a proportion equation, and correctly complete calculations for each dimension.
30	Model: Length and height are each worth 15 points for a 2-dimensional model. Length, width, and height are each worth 10 points for a 3-dimensional model. The dimensions of the model must match the calculations appropriate for the scale to receive full credit.
20	Display Card: Scale, length, width, and height are each worth 5 points. The card must be displayed on the front of the poster or 3-dimensional display with complete information (including units) to receive full credit.
20	Creativity: Creative use of materials and design related to Sweden and the Vasa are two examples of ways to earn creativity points. It is not necessary to create a scale copy of the Vasa. The model could be a very different looking ship with decoration that gives historical information.
extra credit (5 pts.)	Scale Difficulty: Extra points will be given if your scale cannot be reduced to 1 to some number. For example, a scale of 499:500 would not be a good choice for the project, but it would earn the extra credit points.