Name_____ Date_____

Full STEAM Ahead Project Worksheet

HONORS PRECALCULUS

Directions: This worksheet provides background information and outlines tasks to be accomplished for the honors semester-long project. You will complete the project in separate documents, and you may use word processing files, slide show presentations, or a combination of both to complete the written tasks. Some tasks require drawing and making a model; you may choose your materials. You will need to take a photo or scan your artwork in order to submit it. As you create your art, think about how science, technology, engineering, and math are involved. Include STEM insights in your writing. Incorporate what you learn in each unit where possible.

Review the project rubric for the criteria by which your work will be evaluated.

Part 1: Inspiration

Throughout the semester, you will be studying various types of functions and graphs. Mathematical shapes like these serve as inspiration for artists. Perhaps they will inspire your work in their own way.

1. Summarize the works and style of two of the sculptors you explored in the introductory lesson.
2. What about their work did you find inspiring?
3. What STEM connections do you see in their work?

Part 2: Concept, Theme, and Type of Sculpture

Barton Rubenstein's portfolio includes several types of sculpture, most with very simple shapes used in expressive ways. For your project, consider his kinetic, suspension, water, and vertical works. Kinetic sculptures are designed to move in a controlled way with the wind. Sculptures in suspension give the illusion that the pieces are not connected to each other but are in a delicate balance. Water sculptures are designed with a specific water flow pattern. Vertical sculptures are stationary.

1. What practical physical considerations are needed for each type of sculpture?
2. Which of the four types of sculpture would you like to create?
3. What concept or theme would you like your sculpture to convey?
4. What title will you use?

You will submit the description of your planned project to your teacher on the second project progress lesson day after the introductory lesson.

Part 3: Line Drawing and Scale

Though the design process begins with a line drawing, some backwards design is needed to ensure that your final work will be a manageable, realistic size.

1. Render your design on paper, showing three dimensions as best you can.
2. Measure and label the key aspects of your design (such as lengths, widths, heights, and angles).
3. Determine the scale you will need to use to render your design in a 3D model. Explain your choice.
4. Determine the scale you will need to use to render your design in its final form. Explain your choice.
5. Make a table with your measurements. The four columns should represent the dimension being measured, the line drawing measurement, the 3D model measurement, and the final design measurement.

Part 4: 3D Model

Going from a two-dimensional drawing to a three-dimensional model brings new dynamics in the interaction of the pieces of your sculpture.

1. Build a three-dimensional scale model of your line drawing, using practical materials of your choice.
2. If you have access to a computer-aided design program, you can also render your model electronically.
3. How do the shapes of adjoining sides relate to each other? Are they necessarily the same shape or a mirror image? Why or why not?
4. What was most challenging about joining the pieces?
5. Now that you have studied several types of functions and graphs, could you find an equation to represent the curve or relationship of the sides of your sculpture?
6. Be sure to take a photo of your model.

At some point while working on part 3 or 4, you will summarize your progress and send your summary to your teacher.

Part 5: Planning Fabrication and Installation

Barton chooses to work mainly in stainless steel and bronze because of their durability and appearance. When he transports and installs his pieces, he is very careful and always puts safety first.

Select the link to access the Rubenstein Studios: Sculpture Details website to learn more about his fabrication process and sculpture details.

Rubenstein Studios Sculpture Details

1. What other factors should a sculptor consider when choosing materials and planning installation beside durability and appearance? Why?
2. Research the properties of two types of materials you could use for your final sculpture. What makes them appealing choices?
3. Describe the fabrication process in terms of STEAM. How do science, technology, engineering, art, and math work together?

You may not be able to build the final version of the sculpture you designed, but you can build a work of art that puts STEM to the test. Rock balancing has become very popular. Some structures seem to defy the laws of gravity.

1. Explore the principles behind rock balancing and summarize your findings.
2. Create a gravity-defying sculpture with stones or twigs or other small items.
3. Be sure to take a photo of your creation.
4. Describe your process, challenges, and successes.



Part 6: Submit Project and Summarize Experience

1. Gather the components of your project:
    a. answers to questions
    b. drawings
    c. table with measurements and comparative scale
    d. photos or scans of artwork

2. Submit your completed project to your teacher in the Drop Box provided in the unit before the semester exam.

Once you have submitted your project, reflect on the work you have done.

1. What discoveries did you gain?
2. What was the most enjoyable aspect of the project?
3. What was the most challenging aspect of the project?
4. What surprised you about the process?
5. Do you see science, technology, engineering, and math as inherent aspects of artistic design?