Name: ____ Date: ____________________

Total Bridge Cost Worksheet

To estimate the cost of the bridge, read each question and complete the table information.

1. Girders (Beams)

Material cost can be calculated easily for a rectangular beam. First, calculate the volume of the material needed by multiplying the cross-sectional area by the length of the beam. Next, the cost of the material depends on the material chosen. We will use steel, so we need to convert our volume to tons, using: 4.08 cubic feet = 1 ton of steel. Then, calculate the total cost per beam by multiplying the volume of the material by the cost of the material. What is the total cost for the beams, if there is a total number of six beams for this bridge?

Beam Cross-Sectional Area (ft^2)	Beam Length (ft)	Beam Volume (ft^3)	Beam Volume (tons)	Cost of Material – Steel or Concrete	Total Cost per Beam	Total Number of Beams	Total Cost for All Beams
5	**100**			**$2,000 / ton**		**6**	

2. Piers (Columns)

Material cost can also be calculated for the piers (columns). Each of our columns will have a length of 25 feet. Calculate the volume of the material needed by multiplying the cross-sectional area by the column length. Next, the cost of the material depends on the material chosen. We will use concrete, so we need to convert our volume using: 1 cubic yard = 27 cubic feet. Then, calculate the total cost per column by multiplying the volume of the material by the cost of the material. What is the total cost for the piers, if there is a total number of 12 piers for this bridge?

Column Cross-Sectional Area (ft2)	Column Length (ft)	Column Volume (ft3)	Column Volume (cu. yd.)	Cost of Material – Steel or Concrete	Total Cost per Column	Total Number of Columns	Total Cost for All Columns
12.56	**25**			**$65.10 / cu. yd.**		**12**	

3. Foundation and Soil Investigation

The cost of the material for the foundation and soil investigation is next. Calculate the volume of the material needed for the foundation by multiplying the cross-sectional area by the length of the foundation. We will use concrete, so we need to convert our volume using: 1 cubic yard = 27 cubic feet. Then, calculate the total cost per foundation by multiplying the volume of the material by the cost of the material. What is the total cost per foundation?

Site investigations must be used to determine the size of the foundation. For each foundation, two site investigations, or drill holes, are needed. The cost per investigation is $526.50. To calculate the cost of investigation per foundation, multiply the number of site investigations per foundation by the cost per investigation. To calculate the total cost per foundation, add the cost per foundation for material with the cost of investigation per foundation. What is the total cost for all the foundations, if there is a total number of 12 foundations for this bridge?

Cross-Sectional Area of Foundation (ft²)	Foundation Length (ft)	Foundation Volume (ft³)	Foundation Volume (cu.yd.)	Cost of Concrete	Cost per Foundation for Material
12.56	**50**			**$65.10 / cu. yd.**	
Number of Site Investigations per Foundation	Cost per Investigation	Cost of Investigation per Foundation	Total Cost per Foundation	Total Number of Foundations	Total Cost for All Foundations
2	**$526.50**			**12**	

4. Engineering Services

A bridge often takes weeks or months to design. For this project, the design engineer hourly fee is $150. Often, a field engineer is needed on the job site to monitor construction. For this project, the field engineer hourly fee is $100. Assume that the design of our bridge takes three months, and its construction takes nine months; thus, the entire project takes 12 months to complete. Figure out how many hours each engineer worked in the chart below. Then find the total pay for each engineer by multiplying the total hours worked by the hourly rate. What is the total expense for both engineers?

Engineer Type	Hourly Rate	Months of Work	Weeks Worked per Month	Days Worked per Week	Hours Worked per Day	Total Hours Worked	Total Pay
Design Engineer		**3**	**4**	**5**	**8**		
Field Engineer		**9**	**4**	**5**	**8**		
					Total Pay for Both Engineers		

5. Total Cost Estimation

To calculate the total cost estimation, fill in each empty box below with your calculations from above tables. Then, add them up. What is the total cost estimation for this project?

Cost for beams	
Cost for columns	
Cost for foundations	
Cost for engineering	
Total Cost Estimation →	