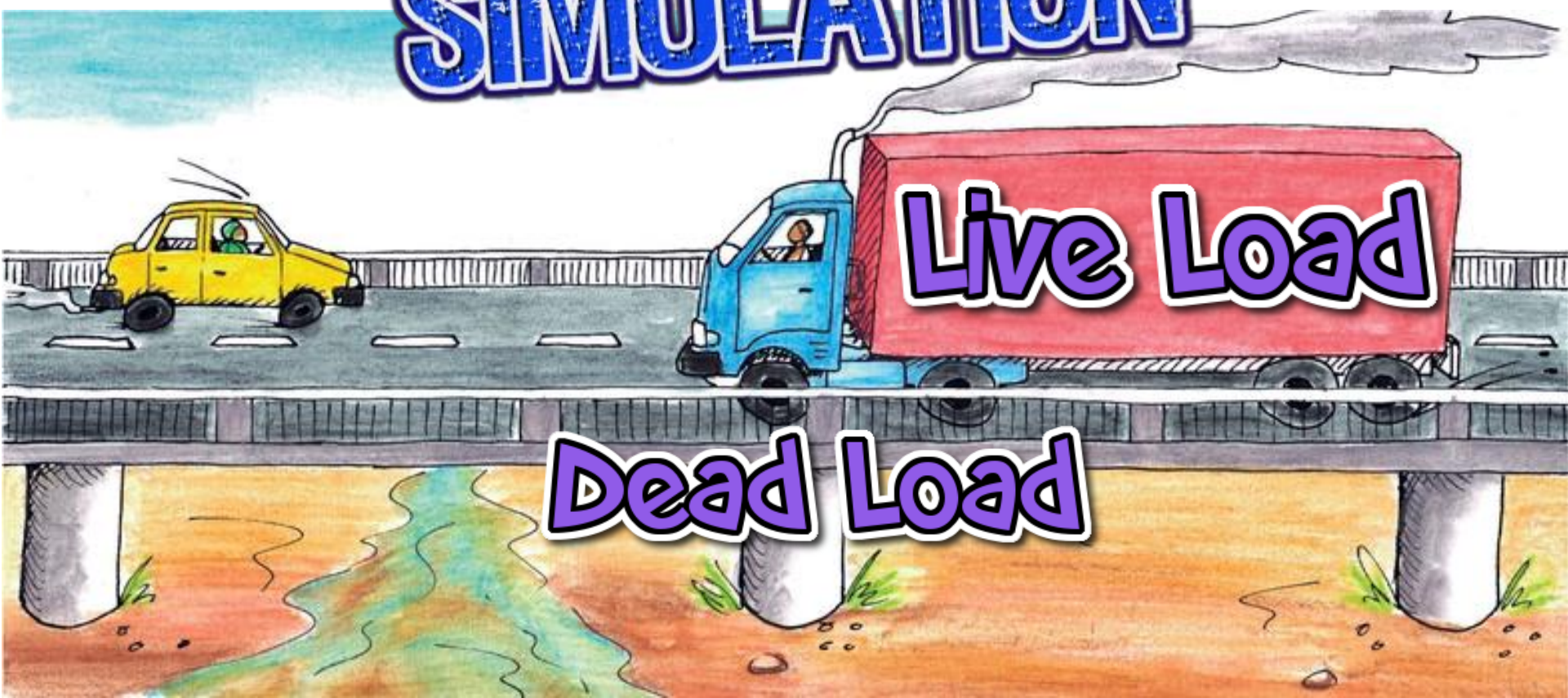
BRIDGE BUILDING SIMULATION

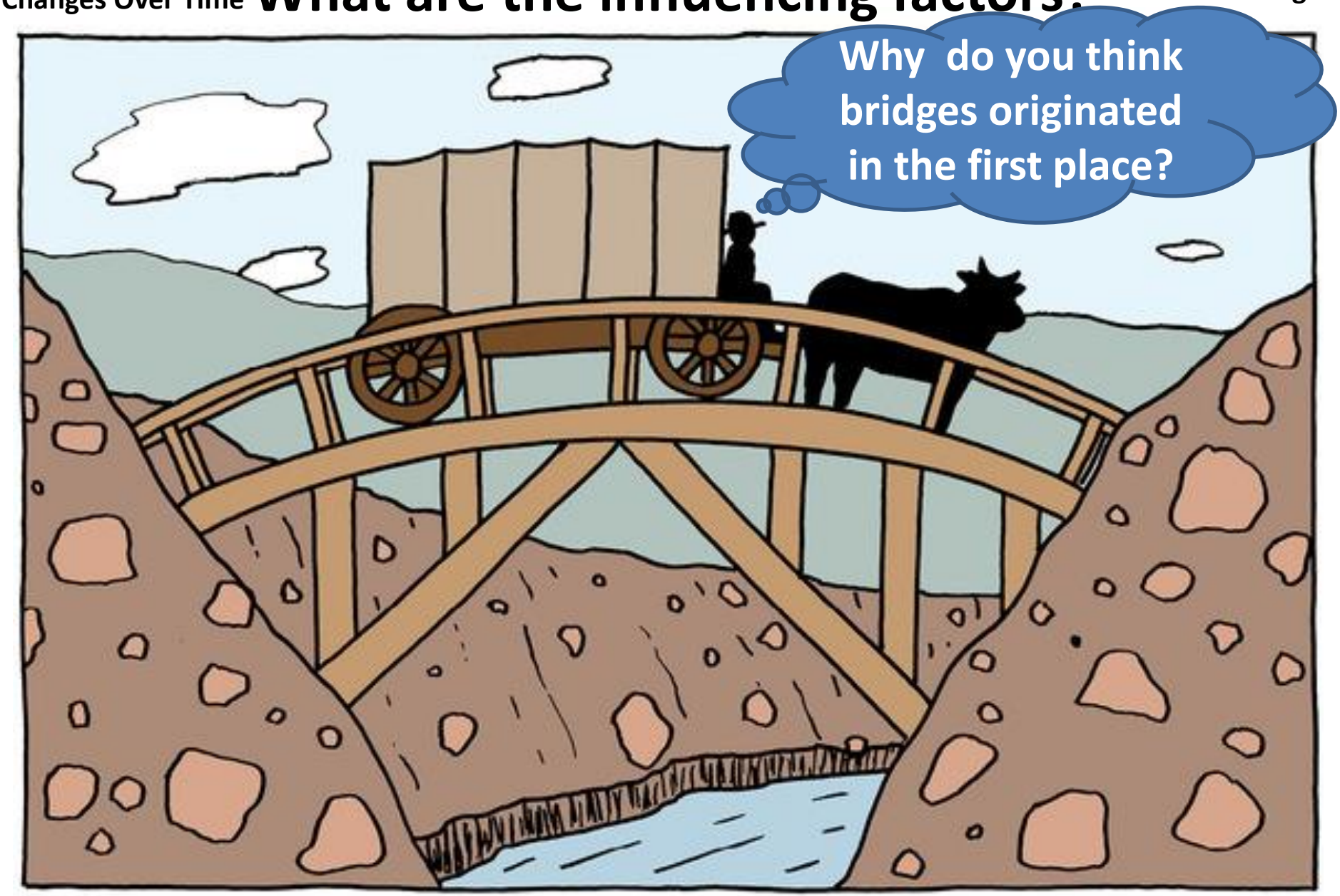


“You may not think about the bridges you cross on your way to work, but they're far more than pretty structures that make your commute manageable. Bridges are crucial transportation links that carry road and rail traffic across rivers, gorges or other roads. When a bridge collapses or closes for repairs, it can cause massive traffic problems or strand people altogether, if they live on an island.” -Ed Grabianowski

Changes Over Time

Bridges continue to change over time. What are the influencing factors?

Origin




DEAD LOAD + LIVE LOAD = ENGINEERING FAILURE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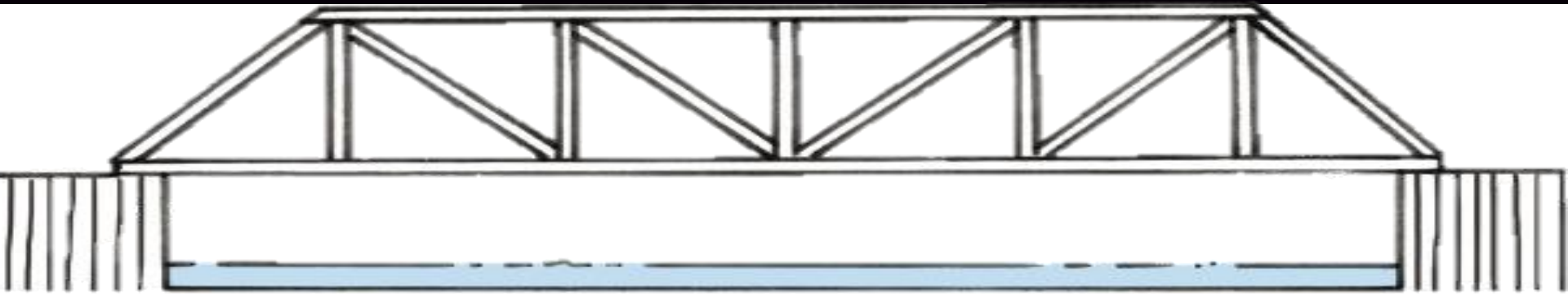


DESIGN A TRUSS BRIDGE

Bridge Building Simulation
Part I
Design Specifications, Regulations, and Materials

The Challenge: Design and engineer the strongest model truss bridge possible. The model will be destructively tested to determine the design efficiency.

The Constraints:  Time and  Money

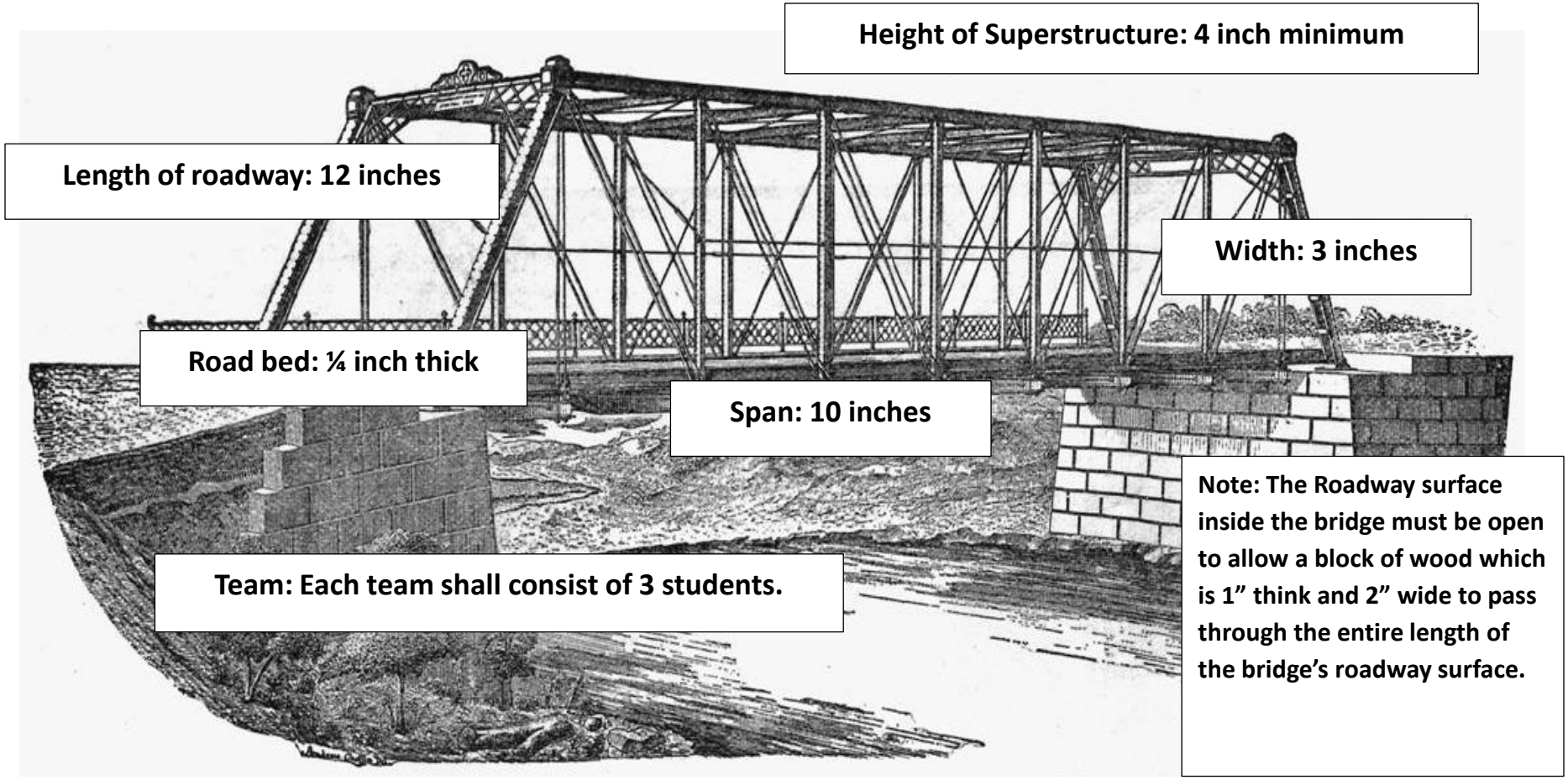
Bridge efficiency shall be determined by the following formula:

$$\text{Efficiency} = \frac{\text{Load (lbs)} \times 454 \text{ (g/lb)}}{\text{Mass of bridge (g)}}$$

Load is the weight in pounds at which the bridge failed. (Multiplying the load by 454 converts the pounds to grams.) Dividing by the mass of the bridge in grams will yield the efficiency, or the weight, each gram of the structure was able to support. **The bridge with the highest number is the winner; in the event of a tie, the bridge with the lower cost will be the winner.**

Specifications & Regulations:

NOTE: All measurements are in inches, from outside edge to outside edge. All lumber used in the bridge construction is 1/8 by 1/8 inch balsa wood timbers. We will use special fast-drying glue from Pitsco.



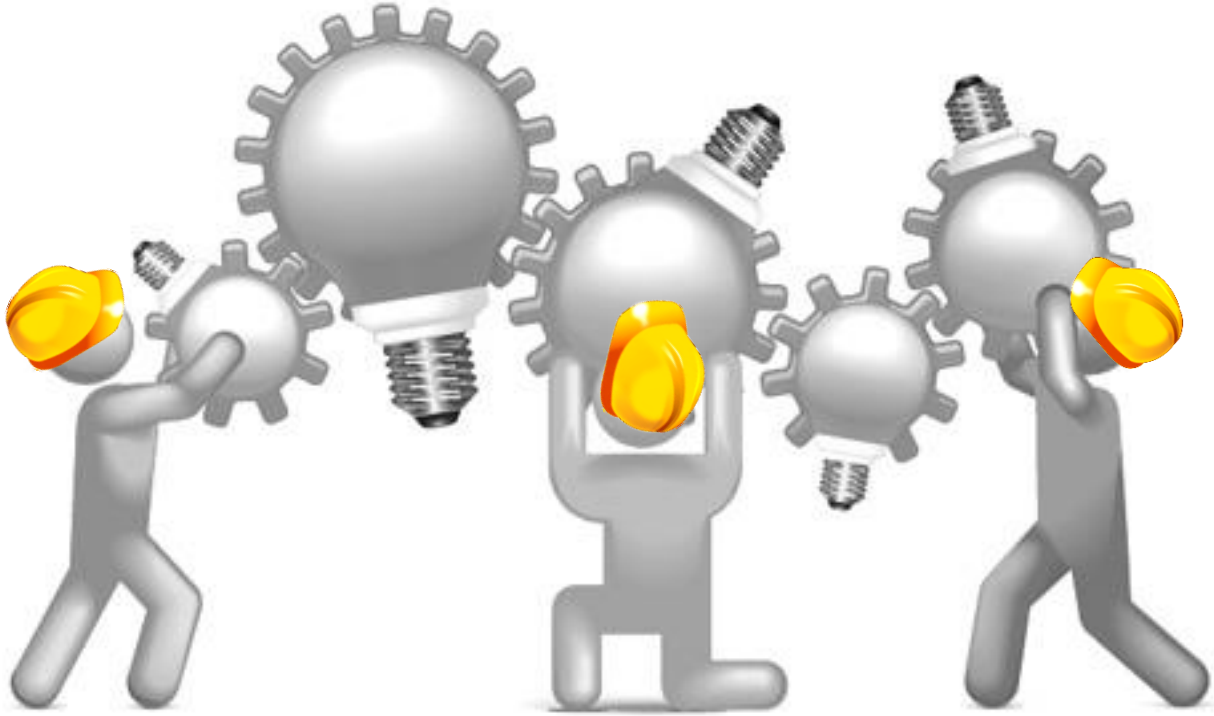
Bridge Building Simulation
Part II
Budget & Accounting

Financial Goal: Build the strongest bridge without going over budget. The team must also maintain accurate records of all expenditures and deposits.

Total **budget** for building a truss bridge: **$500,000**

Materials: All materials shall be purchased or leased from **The Real World ALPHA Company**, which is owned by your teacher, Mr. /Mrs. _____.

Alone we can do so little; together we can do so much.



DESIGN. BUILD. TEST.