

## STEM: Building a Bridge Challenge

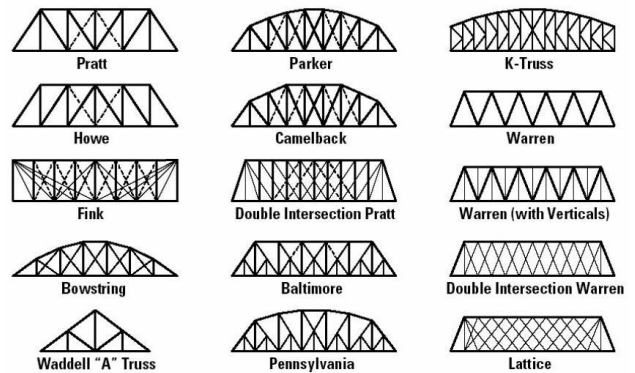


# BRAIN BUSTER 3D

**Objective:** To design a bridge that incorporates structural elements of bridges such as trusses, beams, bracing and supports using a 3D pen and PLA filament and no other materials.

### STEP 1 –Research

Do an internet search and look at various types of bridge trusses. Note: It is important to research bridge construction and design before undertaking this project. Below is a link to a website with great information <http://pghbridges.com/basics.htm>



### STEP 2

Goal is to construct a bridge with a 3D pen and PLA filament.

### STEP 3

#### Bridge Challenge

The bridge must incorporate structural elements of bridges, e.g., trusses, beams, bracing, triangular supports, etc.

The bridge may be a new design or a recreation of an existing design.

### STEP 4

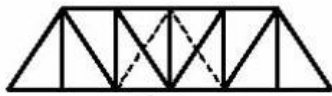
Determine which bridge design and create a stencil for the bridge using graph paper and a ruler.

### STEP 5

Cover the plan with a sheet protector and use the 3D pen and filament to draw the parts for the bridge.

#### Extend:

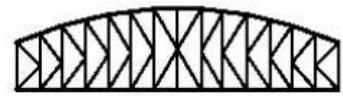
Just for fun, explore how much weight the bridge can hold. Use small weights, pennies, or stones, adding one at a time to test strength. Record the number of weights as you add them so you know how many weights each bridge was able to hold before each reached their breaking point.



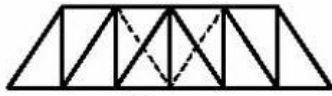
Pratt



Parker



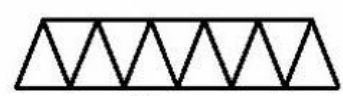
K-Truss



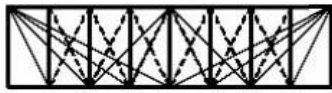
Howe



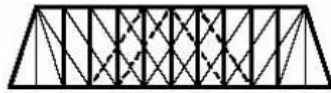
Camelback



Warren



Fink



Double Intersection Pratt



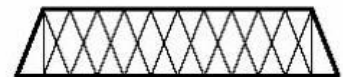
Warren (with Verticals)



Bowstring



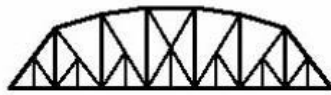
Baltimore



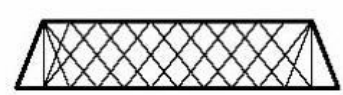
Double Intersection Warren



Waddell "A" Truss



Pennsylvania



Lattice

