Bridge Design Challenge

Introduction
In the real world bridges are constructed to get us safely across waterways, canyons other roads. Much planning is involved, as well as heavy construction materials like concrete and steel, and skilled workers. The entire process can take years, and the results can dramatically change a community as people on one side are allowed access to resources on the other side.

Building bridges can be a great metaphor for tackling challenges in our lives. In this activity, students will work together to quickly construct a bridge using toothpicks and candy, and then test their designs in a friendly competition.

Materials
- Pen/pencil
- Paper
- Toothpicks (approximately 100 per team)
- Mini marshmallows (plan on half a bag per team, these will be strongest if the bag is left open overnight) or an equivalent number of gum drops or jelly beans
- Box of paper clips (to be used as weights for testing)
- Lightweight containers for holding the weights on each bridge (paper bowls are a good option, as long as there are enough for each team of the same object to make testing fair)
- Test spans for each group (this may be two stacks of books, two empty upside-down Kleenex boxes, or similar objects that are separated by 8-10 inches)

Instructions
- Divide the group into small teams (4 students per team is recommended). Try to assemble groups of students who don't normally work together.
- Give each team their materials (pen/pencil and paper, toothpicks, marshmallows and a lightweight container) and assign them a test span area. They'll have 10-20 minutes to make a plan on paper and then successfully build a bridge across the span.
- After the time is up, all successful bridges will get a load-bearing test. Begin by placing the lightweight container on the top of each bridge in the middle of its span.
- Then add one paperclip at a time to the container on each bridge until one by one, the bridges fail, and only one is left intact. This is the winner.
ESSENTIAL SKILLS™ PERSEVERANCE

Rules
• Teams can only use the materials provided.
• Teams have a set amount of time to complete the challenge.

Discussion
• Did your final design look like your initial sketches/plan? If not, what changes did you make and why?
• How did the design process go for your team? Did you have any set backs that you had to overcome?
• Was your design a success or a failure?
• What is the purpose of a bridge? What sort of a metaphor might a bridge represent in your life?
• What kind of challenges or obstacles have you had to overcome in life?
• Talk about a time you wanted to give up.
• How do you push forward (persevere) when it would be easier to quit?
• What other Essential Skills did you use today?

Reflecting & Connecting
• Although this activity can be used to discuss almost any Essential Skill (there are elements of teamwork, leadership, goal setting, and agility at play), students are likely to fail in their early bridge attempts and require perseverance to accomplish the task.
• Make the connection that the strongest bridges are built through a series of failures. Just as we learn the most about building from repeated bridge failures, we learn the most about ourselves through our own failures. Remind students that they can use challenging experiences in their lives to build their best selves.
• Failure is only failure if you give up. If you persevere, your failures are just one step on the road to succeeding.