Future Ready Project - BUILDING BRIDGES

Teacher Name:		Duration (in minutes): This was done in 3 40 minute library sessions.
Grade Level(s): 1	Subject/Course: Library/ELA/STEM	Unit: BUILDING BRIDGES
Resources needed: (On-site people, facilities, tools, technology, materials, community connections)	Books about bridges; recyclable materials such as cups, straws, boxes, etc. Optional - strawbees or Keva Planks or magna tiles Books used as read alouds: This Bridge Will Not Be Gray by Dave Eggers; Secret Engineer by Rachel Dougherty;	
Learning Standards: (content + CS & DF)	K-1.CT.10 Collaboratively create a plan that outlines the steps needed to complete a task. 2-3.CT.4 Identify multiple ways that the same problem could be decomposed into smaller steps 2-3.DL.4 Use a variety of digital tools and resources to create digital artifacts.	
Big Idea:	Can you design a bridge that can hold 3 billy goats?	
Authentic Purpose: (Why does this matter to your students?)	Scholastic Unit 2's focus is Folklore. We read different versions of the Three Billy Goats Gruff. In the different versions the illustrators imagine a different bridge. We look at the similarities of each bridge and talk about how we would make a bridge. Students love to build and create. A natural extension is designing a bridge for the goats to cross to get to the other side. Can we design our own bridge for the goats?	
Future-Ready Competencies: _x__Collaboration __x_Communication __x_Critical Thinking & Problem Solving __x_Creativity & Innovation ___Other:	Objectives: Students will be able to use design concepts to build a beam bridge. • Understanding the purpose of a bridge • Identify a beam bridge • Begin to identify parts of bridge and idea of weight/load • Applying design concepts such as stability, balance, and symmetry in bridge construction • Collaborating effectively in a group project	
Project Statement: (Include: issue, problem or challenge; student role, purpose, beneficiary, and desired outcomes)	With a partner and choosing the materials provided, design a bridge that can support three goats. Once the bridge is created can you make it longer or taller, what if you change the materials? What if you needed it to hold more than 3 goats?	
Empathy Anchor: (How will students develop empathy and care about this problem)	A bridge is a wonderful metaphor - how do we make connections? How do we support each other from one place to another? How do we create things to solve problems?	
Public Audience & Reveal: (Experts, audiences, or product users students will engage with during and at the end of project)	Future Ready Showcase	
Knowledge Construction: (How are students going to construct content knowledge and practice it)		Student Assessment: The bridge

Opening:

- Show students images of different types of bridges from the Billy Goats Gruff stories and ask them what they notice about them. Look at images of other bridges and bridges in our community.
- Engage students in a discussion about bridges and their functions.
- Ask students: "What do you think makes a bridge strong and able to support weight?"

Introduction to New Material:

- Introduce the concept of a beam bridge and explain its basic components (supports and beams).
- Discuss different types of loads that affect a bridge (e.g., people, vehicles, weather conditions).
- Present examples of real-life beam bridges and explain their design features.

Guided Practice:

- Divide students into small groups and provide each group with materials (blocks, popsicle sticks, tape, etc.) for bridge construction.
- Guide students through the process of brainstorming and designing their own beam bridges.
- Scaffold questioning from easy to hard by asking students questions like: "What shapes could you use for the bridge supports?" and "How can you ensure that your bridge is balanced and stable?"
- Monitor student performance by circulating throughout the groups, providing guidance, and assessing their understanding of design concepts.

Independent Practice:

- In their small groups, students will construct their beam bridges using the provided materials.
- Emphasize the importance of collaboration, communication, and problem-solving within the groups.
- Encourage students to test and improve their bridge designs as they build.
- Repeat with the magnatiles and keva planks

Closing:

- Have each group present their completed beam bridge to the class.
- Lead a discussion to reflect on the design process and the effectiveness of different bridge solutions.
- Summarize the key points learned about beam bridges and their design concepts.

Students can explain how they designed the bridge and what worked and what didn't and how they adapted their bridge.

Design Process:	Describe what (& how) students are going to do in each step:
1. Discover 2. Research & Empathize 3. Brainstorm	1. Students will learn about bridges, specifically beam bridges. We will read a book about different types of bridges and see what they look like. 2. Students will learn how to communicate and work with a partner and share

4. Choose 5. Build 6. Test 7. Communicate 8. Redesign	ideas. What happens when there is a disagreement with the partner - how to solve problems. 3. Students will select from everyday materials and use supplies to build a beam bridge that has to support 3 goats. 4. Explain what worked and what didn't work when designing the bridge. Which supplies did they prefer? What did they notice about the different materials? How did they work together and share ideas?