Skywalker Support

2nd Grade

Unit 3 – Building Bridges with Unlikely Friends

Text Connections: *Bridges: Amazing Structures to Design, Build, & Test* by Carol A. Johmann & *Pop's Bridge* by Eve Bunting

Design Challenge Summary
Challenge: What will the students be required to do?
You are one of the engineers building the Golden Gate Bridge. Recently, a group of skywalkers fell into the bay. It is your job to make sure this does not happen again. You are to design a bridge that is long enough to go over the San Francisco Bay that can support a group of 10 skywalkers. The length of the bridge should be at least 15 unifix/linking cubes.
Standards: What standards are addressed?
Science: NS.1.2.1 Communicate observations orally, in writing and in graphic organizers NS.1.2.2 Develop questions that guide scientific inquiry NS.1.2.3 Conduct scientific investigations as individually and in teams NS.1.2.4 Estimate and measure length… NS.1.2.5 Collect measurable empirical evidence in teams and as individuals NS.1.2.6 Make predictions in teams and as individuals based upon empirical evidence NS.1.2.7 Use age-appropriate equipment and tools in scientific investigations NS.1.2.8 Apply lab safety rules as they relate to specific science lab activities PS.6.2.1 Investigate the relationship between force and motion **Math:** Mathematical Practice Standards 2.MD.1 Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes. 2.NBT.1 a. 100 can be thought of as a bundle of ten tens — called a "hundred." 2.NBT.2 Count within 1000; skip-count by 5s, 10s, and 100s. **Other:** W.2.1 Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a concluding statement or section. W.2.2 Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points and provide a concluding statement or section SL.2.1 Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups SL.2.3 Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information or deepen understanding of a topic or issue SL.2.4 Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences SL.2.6 Produce complete sentences when appropriate to task and situation in order to provide requested detail or clarification

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Result: What will students know, value, and be able to do as a result of the lesson? What's the big idea?

Know and apply the engineering design loop process.
Demonstrate ability to modify designs based on observations and predictions.
Work collaboratively on solving a problem.
Build a bridge that successfully holds up to 100 pennies

Assessment: What evidence will be used to determine student learning?

Did they build a bridge that held up to 100 pennies?
Did they follow the design loop process?
Did they work collaboratively?
Did they modify and adjust their design?

Prior Knowledge/Experiences: What prior content knowledge and skills will the students need?

Experience with the Engineering Design Loop process
Connections to the Mathematical Practices
Investigations/inquiry in Science
Measure in non-standard units
Experiences with bridge structures (*Bridges: Amazing Structures to Design, Build, and Test*)
Pop's Bridge vocabulary (skywalkers)

Summary/Connections: How will this design challenge connect with new/future learning, other content areas, real world experiences, etc.?

This lesson will help students develop problem solving skills and collaboration skills that are essential in succeeding in the 21st century. It will allow student the opportunity to transfer and apply skills from various content areas within one task.

As a summary activity, you could engage students in:
W.2.1 Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a concluding statement or section.
W.2.2 Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points and provide a concluding statement or section

Extensions:
After looking at all of the bridge designs, redesign the structure of your bridge to support 20 skywalkers. Would your structure still support 10 skywalkers during an earthquake?

Materials/Equipment/Preparation: What materials and equipment will students need to successfully complete this design challenge?

20 straws
1 desk length of masking tape
1 desk length of yarn
10 paper clips
1 pair of scissors

Other supplies:
Cup
100 pennies
15+ Unifix/linking cubes

ADDITIONAL INFORMATION

- Review bridge designs in the *Bridges: Amazing Structures to Design, Build, and Test* book
- Student Pages are created for this STEM challenge
- You can use more than 15 Unifix cubes/linking cubes but no less than 15
- Bridge can span between two desks to represent the bay
- Cup is used for holding the pennies on the bridge
- 10 pennies represent one skywalker
- Desk length is used for nonstandard measurements for the masking tape and yarn
- Writing could be extended into a writer's workshop activity

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You are one of the engineers building the Golden Gate Bridge. Recently, a group of skywalkers fell into the bay. It is your job to make sure this does not happen again. You are to design a bridge that is wide enough to go over the San Francisco Bay that can support a group of 10 skywalkers.

(The length of the bridge should be at least 15 unifx/ linking cubes.)

Generate Ideas:

Skywalker Support Necessary Supply List

20 straws

1 desk length of masking tape

1 desk length of yarn

10 paper clips

1 pair of scissors

Other supplies:

Cup

100 pennies

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Build the Item - create and test your bridge:

Record observations from the building process, testing, evaluation, and redesign of your bridge

Test #	Number of Pennies	Skywalker	Successful?
Example	10	1	Yes
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Evaluate:

1. How did the number of skywalkers affect the stability of your bridge?

_____

_____

_____

_____

_____

_____

2. After observing all of the bridges: In your opinion, if you were a skywalker, which bridge would you like to work on and why?

_____

_____

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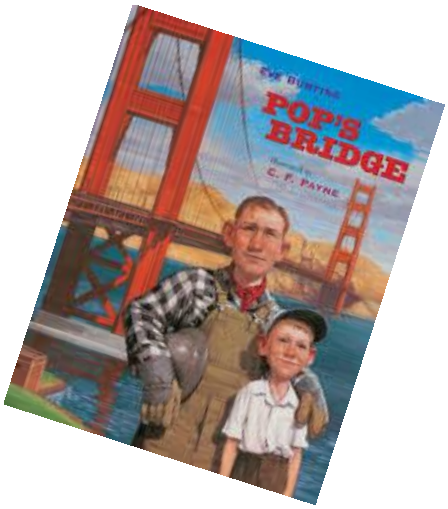
Group Supplies:

20 straws
1 desk length of masking tape
1 desk length of yarn
10 paper clips
1 pair of scissors

Other supplies:

Cup
100 pennies
15+ Unifix or linking cubes



10 pennies represents 1 Skywalker