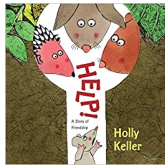
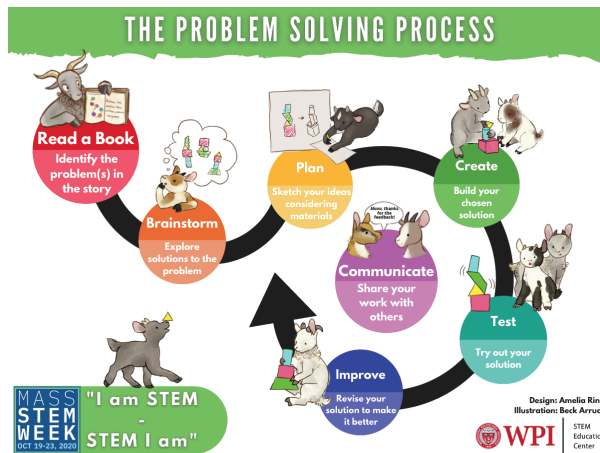


I am STEM: STEM Week Lesson

Written by: Amy Donahoe

<p>Selected Book</p>	<p>Title: Help! A Story of Friendship Written by: Holly Keller Illustrated by: Holly Keller</p> 		
<p>Grade</p>	<p>2</p>	<p>Read-Aloud Link</p>	<p>Help! A Story of Friendship - Google Slides.webm</p>
<p>Challenge Overview:</p>	<p>A mouse is friends with other animals. One friend tells Mouse to be careful of Snake, because snakes eat mice. Mouse becomes afraid of his friend, Snake. He becomes so upset when he is out walking he doesn't notice a large hole in the ground and falls in. How can his friends get him out of the hole? In this challenge the students will design and build a different way to get Mouse out of the hole.</p>		



	Monday	Tuesday	Wednesday	Thursday	Friday
<p>STEM/ Problem Solving</p>	<p>Read the book. Identify the problem(s) in the story. Define criteria and constraints. Brainstorm possible solutions.</p>	<p>Plan your solution: Sketch your ideas. Gather and explore materials. Share your work.</p>	<p>Create your chosen solution. Share your work.</p>	<p>Test your solution. Share and obtain feedback. Improve your solution.</p>	<p>Communicate your revised solution to an audience.</p>



STE, Math, and ELA Practices

STE	Math	ELA
<ul style="list-style-type: none"> ✓ Asking questions and defining problems ✓ Developing and using models ✓ Planning and carrying out investigations ✓ Analyzing and interpreting data ✓ Using mathematics and computational thinking ✓ Constructing explanations and designing solutions ✓ Engaging in argument from evidence ✓ Obtaining, evaluating, and communicating information 	<ul style="list-style-type: none"> ✓ Make sense of problems and persevere in solving them ✓ Reason abstractly and quantitatively ✓ Construct viable arguments and critique the reasoning of others ✓ Model with mathematics ✓ Use appropriate tools strategically ✓ Attend to precision ✓ Look for and make use of structure ✓ Look for and express regularity in repeated reasoning 	<ul style="list-style-type: none"> ✓ Demonstrate independence ✓ Build strong content knowledge ✓ Respond to the varying demands of the audience, task, purpose and discipline ✓ Comprehend as well as critique ✓ Value evidence ✓ Use technology and digital media strategically and capably ✓ Come to understanding other perspective and cultures

Culturally & Linguistically Sustaining Practices (CLSP)

- ❑ Connect the content of the book to your students' cultural and linguistic backgrounds.
- ❑ Ask relevant and inclusive questions that connect to all students from various backgrounds (i.e. Asking what kind of instruments and music they like or hear in their homes, rather than what instruments they play).
- ❑ Ask students to make connections to the problems in the stories by relating them to their home and community experiences.
- ❑ Encourage students to express and communicate their knowledge and ideas using multiple modes and modalities (i.e. writing, drawing, speaking, etc...), including students' home language.
- ❑ Select materials and tools that are developmentally appropriate, culturally accepted and easily available for all students.
- ❑ Give students plenty of opportunities to discuss and share various stages and possibilities of the design.
- ❑ When possible, assist students in group work by providing them clear and fluid roles.
- ❑ Scaffold students' learning using their family and home funds of knowledge (i.e. connect the students' family/community expertise to inform the problem solving process).



MA STE, Math or DLCS Standards

Engineering Design:

2.K.2.ETS1.3. Analyze data from tests of two objects designed to solve the same design problem to compare the strengths and weaknesses of how each object performs.*

Learning
Targets:

Students will be able to:

- Analyze data from tests of two designs (solutions to the problem)
- Compare the strengths and weaknesses of each design

MA ELA Standards

Comprehension and Collaboration

CCSS.ELA-LITERACY.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.

CCSS.ELA-LITERACY.SL.2.1.A. Follow agreed-upon rules for discussions.

CCSS.ELA-LITERACY.SL.2.1.B. Build on others' talk in conversations by linking their comments to the remarks of others.

CCSS.ELA-LITERACY.SL.2.1.C. Ask for clarification and further explanation as needed about the topics and texts under discussion

ELA
Learning
Targets:

Students will be able to:

- Participate in collaborative conversations, giving feedback to their peers about the design they created
- Follow agreed upon rules: Share strengths and weaknesses of their peers' designs, as well as ways to improve the design

Key Vocabulary Words

<u>Tier 1</u>	<u>Tier 2</u>	<u>Tier 3</u>
<ul style="list-style-type: none"> - One - With - What - You - Our - From - Hole 	<ul style="list-style-type: none"> - Strength - Weakness - Solution - Improve - Morning - Mouse - Hedgehog - Snake - Friend - Whispered - Fox - Skunk - Dangerous - Together - Perfectly - Calm - Idea - Knot 	<ul style="list-style-type: none"> - Data - Design - Feedback - Gossip - Hesitated - Insist - Attention - Nervously - Peered - Straight - Prickles - Rescue - Scaring - Hobble - Bandaged - Bouquet - Pleased

CLSP Strategies:

- Connect the content of the book to your students' cultural and linguistic backgrounds.
- Encourage students to express and communicate their knowledge and ideas using multiple modes and modalities (i.e. writing, drawing, speaking, etc...), including students' home language.

Materials


- The story, Help! A Story of Friendship
- Variety of materials for building including but not limited to...
 - Craft materials like rubber bands, popsicle sticks, string, felt, clay, etc...
 - Household materials like spoons, cups, paper plates or bowls, foil, etc...
 - Recycled materials like boxes, plastic containers, paper towel rolls, plastic bottles, bags, etc...
- Glue or Tape
- Scissors
- Shoebox or deep container (paper towel tube?) with lid that can be cut
- A toy Mouse or cotton balls/pom poms to represent a mouse



CLSP Strategies:


- Select materials and tools developmentally and culturally appropriate/available for all students.



<h1>Monday</h1>	
Teacher Preparation:	<ul style="list-style-type: none"> • Listen to the read aloud • Identify key vocabulary • Display the Engineering and Design Process (EDP) visual • Bring Help! A Story of Friendship Design Process packet (optional)
Student Preparation:	<ul style="list-style-type: none"> • Listen to the story
Problem Solving:	<ul style="list-style-type: none"> • Read the book. • Identify the problem(s) in the story. • Define criteria and constraints. • Brainstorm possible solutions
CLSP Strategies	<ul style="list-style-type: none"> • Connect the content of the book to your students' cultural and linguistic backgrounds. • Ask relevant and inclusive questions that connect to all students from various backgrounds (e.g. Asking what kind of instruments and music they like or hear in their homes, rather than what instruments they play). • Connect the problems in the stories to all students' home and community experiences. • Scaffold students' learning using their family and home funds of knowledge (e.g. connect the problem to the students' family/community expertise).



Duration	Activity	Instructions	Product
10 minutes	Read Aloud	Listen to the story <u>Help! The Story of Friendship</u> . While listening to the story, the students discuss the text. (<i>Consider adding SEL component*</i>)	Active discussion with the students about the text as it is being read
10 minutes	Review the EDP	Begin the lesson by talking to the students about STEM. Show the Engineering Design Process poster and talk about the steps an engineer uses to create and solve problems.	Active discussion
15 minutes	Identify the problem Define criteria and constraints	Present the Challenge: Design another way to get Mouse out of the hole. Review Criteria and Constraints: The hole is 11 inches deep and only 1.5 inches wide (paper towel tube) Time & materials	Small group discussion, whole group sharing out
10 minutes	Brainstorm	Talk about the solution Snake came up with. Was it a good solution? Why or why not? Discuss other ways the friends could have rescued Mouse. Brainstorm and share solution ideas Determine if the solutions are testable or non-testable.	A sorted list of solutions <i>Optional: Record answers in student design packet</i>

<h1>Tuesday</h1>	
Teacher Preparation	<ul style="list-style-type: none"> ● Bring Help! A Story of Friendship Design Process Booklet (<i>optional</i>) ● Display the EDP visual
Student Preparation:	<ul style="list-style-type: none"> ● Prepare pencils, colored pencils, markers, or crayons
Problem Solving:	<ul style="list-style-type: none"> ● Plan your solution: <ul style="list-style-type: none"> ○ Sketch your ideas ○ Gather and explore materials. ○ Share your work
CLSP Strategies	<ul style="list-style-type: none"> ● Encourage students to express and communicate their knowledge and ideas using multiple modes and modalities, including students' home language. ● Give students plenty of opportunities to discuss and share various stages and possibilities of the design. ● Assist students in group work by providing them clear and fluid roles, whenever possible.

Duration	Activity	Instructions	Product
10 minutes	Review the challenge	Review the challenge and the steps on the EDP poster to identify where they are in the process	
20 minutes	Plan your solution	Remind the students about the problem the friends had getting Mouse out of the hole. Show them the available materials. Have students look at their ideas and circle one idea they would like to try and build. Sketch their idea (label parts)	Sketch with parts labeled <i>Optional:</i> Sketch in Design Process Booklet
15 minutes	Discuss/ Share	Give the students a few moments to share their ideas with their classmates, after they have finished sketching them.	Student discussion Students take notes about feedback from classmates










<p>Wednesday</p>	
<p>Teacher Preparation:</p>	<ul style="list-style-type: none"> • Display the EDP visual • Gather craft, household and/or recycled materials • Prepare a model “hole” ... Could be a paper towel tube or you could cut the top off of a ½ gallon milk or orange juice container; place the container in a plastic container or a shoe box or a container that has a lid; cut a hole in the lid and place the container inside...this will give a land-like surface and a hole for the Mouse to be in. • Prepare a ‘mouse’ <ul style="list-style-type: none"> ○ This could be as simple as a cotton ball or pom poms placed in the container, or a stuffed animal that is small
<p>Student Preparation:</p>	<ul style="list-style-type: none"> • Design a hole for the presentation of their model (see above), if the activity is done remotely
<p>Problem Solving:</p>	<ul style="list-style-type: none"> • Create your chosen solution. • Share your work.
<p>CLSP Strategies</p>	<ul style="list-style-type: none"> • Encourage students to express and communicate their knowledge and ideas using multiple modes and modalities, including students’ home language. • Give students plenty of opportunities to discuss and share various stages and possibilities of the design. • Assist students in group work by providing them clear and fluid roles, whenever possible.










Duration	Activity	Instructions	Product
5 minutes	Review the challenge	Review the challenge, where they are in the EDP, the criteria and constraints and the expectations of how they should work together	
30 minutes	Create your chosen solution	Show the students the “hole” they will be getting Mouse out of. Show them the materials they will be able to use.	A completed 3-D design of their model
10 minutes	Share your work	Give the students a few minutes to do a carousel walk around the room to look at their classmate’s designs. Compare their solution to another group’s solution Follow agreed upon rules for discussion and share strengths and weaknesses of their peers’ designs, as well as ways to improve both designs	Student discussion Students take notes about feedback from classmates



<div style="background-color: #4a7ebb; color: white; padding: 10px; text-align: center;"> <h1>Thursday</h1> </div>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Read a Book Identify the problem(s) in the story</p> </div> <div style="text-align: center;">  <p>Brainstorm Explore solutions to the problem</p> </div> <div style="text-align: center;">  <p>Plan Sketch your ideas considering materials</p> </div> <div style="text-align: center;">  <p>Create Build your chosen solution</p> </div> <div style="text-align: center;">  <p>Test Try out your solution</p> </div> <div style="text-align: center;">  <p>Improve Revise your solution to make it better</p> </div> <div style="text-align: center;">  <p>Communicate Share your work with others</p> </div> </div>
<p>Teacher Preparation:</p>	<ul style="list-style-type: none"> ● Display the EDP visual ● Gather craft, household and/or recycled materials ● Prepare a model “hole” ... Could be a paper towel tube or you could cut the top off of a ½ gallon milk or orange juice container; place the container in a plastic container or a shoe box or a container that has a lid; cut a hole in the lid and place the container inside...this will give a land-like surface and a hole for the Mouse to be in. ● Prepare a ‘mouse’ <ul style="list-style-type: none"> ○ This could be as simple as a cotton ball or pom poms placed in the container, or a stuffed animal that is small
<p>Student Preparation:</p>	<ul style="list-style-type: none"> ● Design a hole for the presentation of their model (see above), if the activity is done remotely
<p>Problem Solving:</p>	<ul style="list-style-type: none"> ● Test your solution. ● Share and obtain feedback. ● Improve your solution.
<p>CLSP Strategies</p>	<ul style="list-style-type: none"> ● Encourage students to express and communicate their knowledge and ideas using multiple modes and modalities, including students’ home language. ● Give students plenty of opportunities to discuss and share various stages and possibilities of the design. ● Assist students in group work by providing them clear and fluid roles, whenever possible.

Duration	Activity	Instructions	Product
15 minutes	Test your solution	Present the EDP visual and review steps. Test solutions in small groups or as a whole class. Each group should test 3 or more times and record results each time.	Test results
10 minutes	Share and obtain feedback	Break students up into small groups. Follow agreed upon rules for discussion and share strengths and weaknesses of their peers' designs, as well as ways to improve both designs	Student discussion
20 minutes	Improve your solution and retest	Improve their design and retest 3 or more times and record results each time.	Students' improved solutions & test results



Friday	      
Teacher Preparation:	<ul style="list-style-type: none"> • Display the EDP visual • Invite a special guest to join the class
Student Preparation:	<ul style="list-style-type: none"> • Draw a picture or write “I am STEM because...”
Problem Solving:	<ul style="list-style-type: none"> • Communicate your revised solution to an audience.
CLSP Strategies	<ul style="list-style-type: none"> • Ask relevant and inclusive questions that connect to all students from various backgrounds. • Encourage students to express and communicate their knowledge and ideas using multiple modes and modalities, including students’ home language. • Give students plenty of opportunities to discuss and share various stages and possibilities of the design.

Duration	Activity	Instructions	Product
45 minutes	Share their solutions with a special guest	<p>Introduce a special guest to the class</p> <p>Have each student show their solution to a special guest, being sure to explain the strengths and weaknesses of their design, as well as the improvement that they made.</p> <p>Have the students draw or write about themselves in STEM. “I am STEM because...” (if completed ahead of time, students can share with special guest)</p> <p>Celebrate how they solved a problem like engineers!</p>	<p>Students revised solutions to the problem (real solutions or photos)</p> <p>Students’ work on “I am STEM because...”</p>
	Family connection	<p><u>Optional:</u></p> <p>Put together a digital class book or slideshow and share it with all students and families after the lesson</p>	<p><u>Optional:</u></p> <p>Book or Slideshow</p>



Final STEM Week Activity:

Ask your students to complete the statement, “**I am STEM because...**”
Students can create a video, poster, essay, skit, etc...

Note: *You will be asked to share some student answers on our survey, so be sure to have a few examples available.*

**Optional SEL discussion:* Talk with your students about why Mouse is afraid of Snake. Discuss what it means to gossip and what it means to be a good friend.

