I am STEM: STEM Week Lesson

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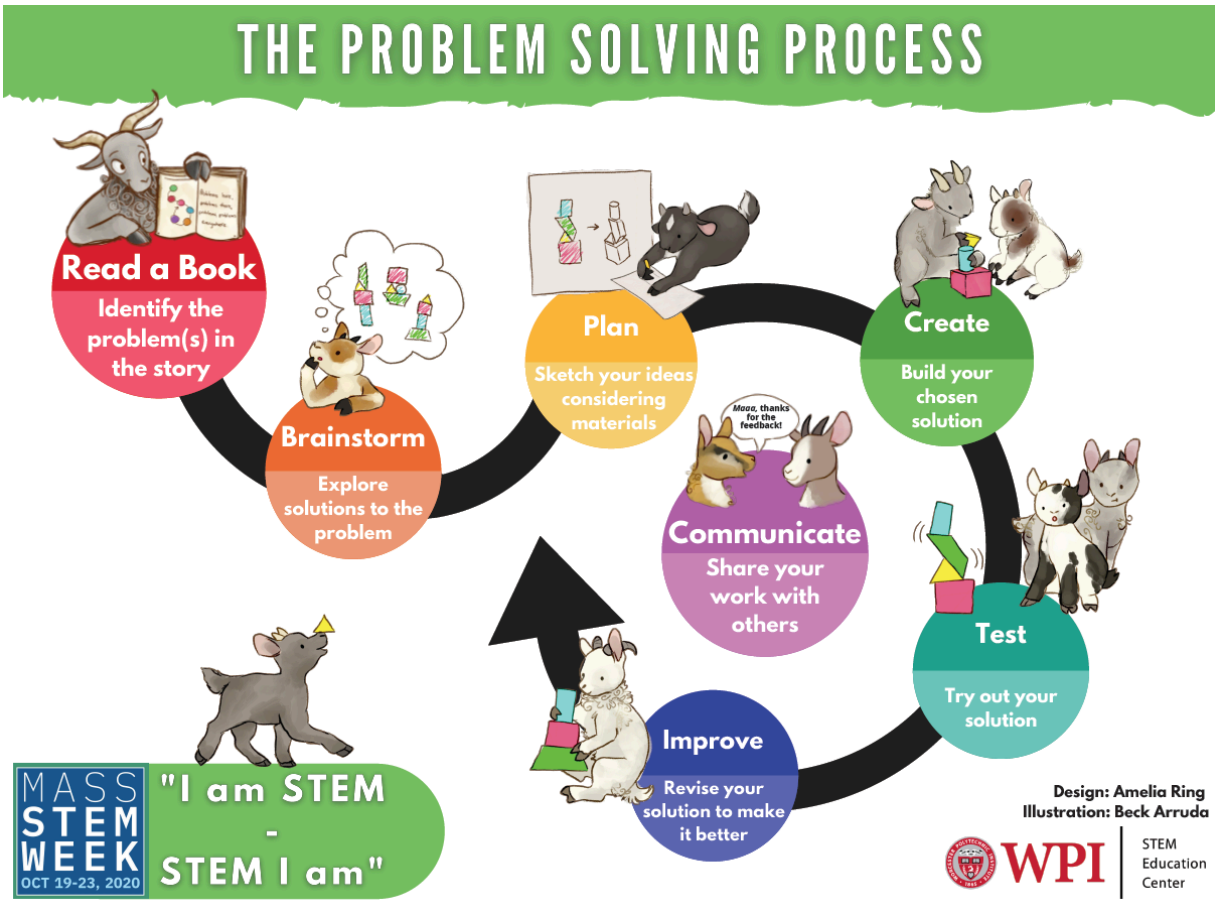
Selected Book	**Title:** Stellaluna **Written by:** Janelle Cannon **Illustrated by:** Janelle Cannon 		
Grade	3	Read-Aloud Link	https://www.youtube.com/watch?v=VLRIvyWUzxs
Challenge Overview:	Stellaluna, the bat, gets separated from her mother, and is befriended by a family of birds who teach her how to behave like a bird. She later learns that birds and bats are quite different and can't always do the same things (even if they want to). Design and build a device that will help the birds or Stellaluna do something that their inherited characteristics don't normally allow them to do (i.e. help the birds to fly at night).		



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

STE, Math, DLCS, and ELA Practices

STE	Math
✓ 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	✓ 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
ELA	**Computer Science (DLCS)**
✓ 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	✓ Creating computational artifacts ✓ Connecting computing concepts ✓ Abstracting to develop models and manage information ✓ Analyzing computational artifacts created by themselves and others ✓ Communicating clearly, accurately, and responsibly ✓ Collaborating with others ✓ Researching

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

Heredity: Inheritance and Variation of Traits:
3-LS3-2. Distinguish between inherited characteristics and those characteristics that result from a direct interaction with the environment. Give examples of characteristics of living organisms that are influenced by both inheritance and the environment.

Learning Targets:	*Students will be able to:* ● Explain the difference between inherited characteristics and those characteristics that result from a direct interaction with the environment. ● Give examples of characteristics of living organisms that are influenced by inheritance. ● Give examples of characteristics of living organisms that are influenced by the environment.

MA ELA Standards

Presentation of Knowledge and Ideas:
SL3.4 - Report on a topic, text, or solution to a mathematical problem, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace and using appropriate vocabulary.

ELA Learning Targets:	*Students will be able to:* ● Share appropriate facts and relevant descriptive details from the story when explaining the chosen solution. ● Speak clearly and at an understandable pace. ● Use appropriate vocabulary.

Key Vocabulary Words

Tier 1	**Tier 2**	**Tier 3**
- Living - Twig - Curious - Babbling - Crawly - Clamored	- Characteristics - Environment - Bugs - Obey - Exercising - Shriek	- Inherit/inheritance - Organisms - Nocturnal - Diurnal - Fruit bat - Stellaluna (name meaning)

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

G3 Stellaluna Caregiver Letter
G3 Stellaluna Rubric

Lesson Handouts
Stellaluna One Pager

Online Resources
'Stellaluna' read by Pamela Reed

Hands-on Materials
Variety of materials for building including but not limited to…
- Craft materials
  - Rubber bands, popsicle sticks, string, paint, construction paper, pipe cleaners, etc…
  - Glue and/or Tape
  - Scissors
- Household materials
  - Spoons, paper towels, tissues, paper, foil, etc…

○ Recycled materials ■ Boxes/cardboard, empty soup cans, plastic containers, paper towel rolls, plastic bottles, bags, etc… ● Tablets or books to research bats and birds ● G-suite to access Jamboard or another tool for students to collaborate	
CLSP Strategies:	● Select materials and tools developmentally and culturally appropriate/available for all students.

Monday	
Teacher Preparation:	• Copy and distribute Caregiver Letter - G3 Stellaluna Caregiver Letter • Lesson Rubric - G3 Stellaluna Rubric • Display the Engineering Design Process (EDP) visual • Show the Youtube video or have the book ready: https://www.youtube.com/watch?v=VLRIvyWUzxs • List the vocabulary words • Prepare chart paper
Student Preparation:	• Prepare paper, or something to brainstorm on
Problem Solving:	• Read the book. • **Identify the problem(s)** in the story. • Define criteria and constraints. • **Brainstorm** possible solutions
CLSP Strategies	• 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).

Activity (Duration)	Instructions	Product
Review the EDP (5 minutes)	Show and explain the different steps of the Engineering Design Process (EDP). Explain that the students are going to work through EDP to solve a problem.	
Read the book (15 minutes)	Read the book, stopping to notice vocabulary words.	
Identify the problem Define criteria and constraints (15 minutes)	Present the Challenge: **Design and build a device that will help the birds or Stellaluna do something that their inherited characteristics don't normally allow them to do** (i.e. help the birds to fly at night). Review the Criteria and Constraints: Criteria: the device must allow a bird or a bat to do something they wouldn't normally be able to do (due to their inherited traits) Constraints: Time and materials	Group Discussion
Brainstorm (10 minutes)	Have the students, in small groups, brainstorm possible solutions given the materials they have available. Determine if the solutions are testable or non-testable.	A sorted list of solutions

Tuesday	
Teacher Preparation:	• Display the EDP visual
Student Preparation:	• Bring paper • Bring a tablet or computer for research

Problem Solving:	• **Plan** your solution:
	  ○ Sketch your ideas
	  ○ Gather and explore materials.
	  ○ Share your work

CLSP Strategies	• 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.

Activity (Duration)	Instructions	Product
Review the EDP (10 minutes)	Review the challenge and the steps on the EDP poster to identify where they are in the process	
Research and choose a solution (15 minutes)	Research inherited characteristics of bats and birds and add to brainstormed list Choose a testable solution	Create a Venn Diagram comparing bats and birds
Plan your solution (20 minutes)	Show students available materials Have students design a device that will help the birds or Stellaluna do something that their inherited characteristics don't normally allow them to do (i.e. help the birds to fly at night). Have student use information from their research to inform their design Have students label their sketches	Sketch with parts and materials labeled
Share your work	Share their plans if time allows	

Wednesday	

Teacher Preparation:	• Gather a variety of materials for building including but not limited to…
	  ○ Craft materials (ie. rubber bands, popsicle sticks, string/twine/yarn, felt)
	  ○ Household materials (ie. paper towels, paper clips, paper, foil, index cards, etc…)
	  ○ Recycled materials (ie. cardboard boxes, plastic containers, paper towel rolls, plastic bottles, bags, etc…)
	• Bring glue or tape and scissors

Student Preparation:	• Bring the sketch of design • Gather building materials if not supplied by the teacher
Problem Solving:	• **Create** your chosen solution. • **Share** your work.
CLSP Strategies	• 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.

Activity (Duration)	Instructions	Product
Review the EDP (5 minutes)	Review the challenge, where they are in the EDP, the criteria and constraints and the expectations of how they should work together	
Create your chosen solution (30 minutes)	Students work in small groups to build their solution	Student's first model
Share your work (10 minutes)	Students share their solution with classmates Other students in the class are encouraged to provide feedback about their design	Students take notes about feedback from classmates

Thursday	

Teacher Preparation:	• Gather a variety of materials for building including but not limited to…
	  ○ Craft materials (ie. rubber bands, popsicle sticks, string/twine/yarn, felt)
	  ○ Household materials (ie. paper towels, paper clips, paper, foil, index cards, etc…)
	  ○ Recycled materials (ie. cardboard boxes, plastic containers, paper towel rolls, plastic bottles, bags, etc…)
	• Bring glue or tape and scissors

Student Preparation:	• Bring prototype/Model • Prepare paper and writing tools
Problem Solving:	• **Test** your solution. • **Share** and obtain feedback. • **Improve** your solution.
CLSP Strategies	• 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.

Activity (Duration)	Instructions	Product
Test your solution **Share** and obtain feedback (25 minutes)	Present the EDP visual and review steps Test solutions in small groups or as a whole class. Shares their results, have students provide feedback to each other on what could be improved	Test results List of suggestions from peers
Improve your solution and retest (20 minutes)	Improve their design and retest	Students' improved solutions

Friday	
Teacher Preparation:	• Lesson Rubric - G3 Stellaluna Rubric • Invite a special guest to join the class • Display the EDP visual • Prepare paper and pen or note-taking app • Bring students solutions (if challenge conducted in class)
Student Preparation:	• Bring the finished solutions (if conducted at home) • Write and draw “I do STEM when…”
Problem Solving:	• **Communicate** your revised solution to an audience.
CLSP Strategies	• 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.

Activity (Duration)	Instructions	Product
Communicate and **share** the solution (45 minutes)	Introduce the special guest to the class Have each student show their solution to a special guest Explain the inherited traits (characteristics) of the bat or bird and how their device helps the animal do something they couldn't normally do. Draw or write about themselves in STEM. "I do STEM when…" (if completed ahead of time, students can share with special guest) Celebrate how they solved a problem like engineers!	Students revised solutions to the problem (real solutions or photos) Students' work on "I do STEM when…"
Family connection	*Optional:* Put together a digital class book or slideshow and share it with all students and families after the lesson	*Optional:* Book or Slideshow