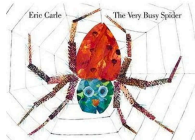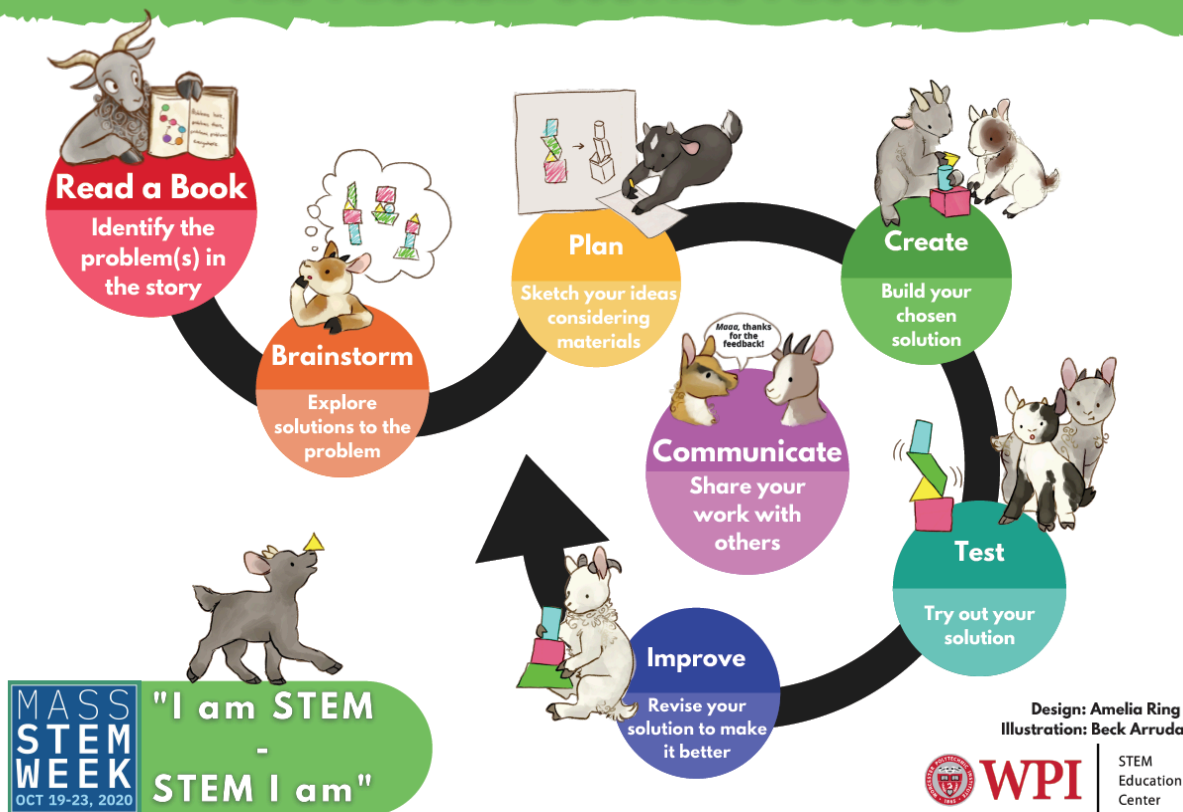# I am STEM: STEM Week Lesson
Written by: Melissa Dionne

Selected Book	**Title:** The Very Busy Spider **Written by:** Eric Carle **Illustrated by:** Eric Carle		
Grade	1	Read-Aloud Link	https://www.youtube.com/watch?v=hskDDqGg7Bw&t=4s
Challenge Overview:	A spider spends her entire day building her web and has no time to play with the other animals. By the end of the day the spider is so tired that she falls asleep, only catching one fly. Students will learn how different spiders make all kinds of webs and then design a spider web that can catch and hold at least 20 flies for 1 minute so that the spider has lots to eat after playing with its friends.		

THE PROBLEM SOLVING PROCESS

Read a Book — Identify the problem(s) in the story

Brainstorm — Explore solutions to the problem

Plan — Sketch your ideas considering materials

Create — Build your chosen solution

Communicate — Share your work with others

Test — Try out your solution

Improve — Revise your solution to make it better

"I am STEM - STEM I am"

MASS STEM WEEK OCT 19-23, 2020

Design: Amelia Ring
Illustration: Beck Arruda

WPI | STEM Education Center

	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

Inheritance and Variation of Traits:
1.LS3.1. Use information from observations (first-hand and from media) to identify similarities and differences among individual plants or animals of the same kind.
Engineering Design:
1.K.2.ETS1.2. Generate multiple solutions to a design problem and make a drawing (plan) to represent one or more of the solutions.

Learning Targets:	● Students will explain how spiders are similar ● Students will explain how spiders are different from each other. ● Students will make a list of solutions to their design problem. ● Students will make a drawing (plan) of one or more solutions.

MA ELA Standards

Comprehension and Collaboration:
CCSS.ELA-LITERACY.SL.1.1. Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.

CCSS.ELA-LITERACY.SL.1.1.A. Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).
CCSS.ELA-LITERACY.SL.1.1.B. Build on others' talk in conversations by responding to the comments of others through multiple exchanges.
CCSS.ELA-LITERACY.SL.1.1.C. Ask questions to clear up any confusion about the topics and texts under discussion.

ELA Learning Targets:	*Students will be able to:* ● Participate in collaborative conversations with diverse partners ● Respond to the comments of others through multiple exchanges ● Ask questions during discussions

Key Vocabulary Words

Tier 1 - Spider - Web	**Tier 2** - Fence post - Thread - Bleat - Meadow - Grunted - Crowed	**Tier 3** - Busy - Silky - Pesty

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

☐ G1 The Very Busy Spider Caregiver Letter
📄 G1 The Very Busy Spider Rubric

Lesson Handouts
N/A

Online Resources
▶ The Very Busy Spider - Eric Carle - READ ALOUD
https://www.youtube.com/watch?v=4J5kArP5gAE
https://baynature.org/wp-content/uploads/2015/10/spider_webs.pdf
https://bugguide.net/node/view/1954/bgimage?from=0

Hands-on Materials

Variety of materials for spider web design including but not limited to…
- Paper plates, cross-stitch hoops, Mason jar lids, craft sticks, real sticks, (any material with center cut out)
- Yarn, string, etc.
- Flies- could be paper, small plastic flies, paper clips, pasta, etc...
- Scissors, tape, hole punch, plastic sewing needles
- Writing Tools

CLSP Strategies	● Select materials and tools developmentally and culturally appropriate/available for all students.

Monday	Read a Book — Identify the problem(s) in the story	Brainstorm — Explore solutions to the problem	Plan — Sketch your ideas considering materials	Create — Build your chosen solution	Test — Try out your solution	Improve — Revise your solution to make it better	Communicate — Share your work with others

Teacher Preparation:	● Copy and distribute Caregiver Letter -
	 🟨 G1 The Very Busy Spider Caregiver Letter
	 ● Lesson Rubric - 📄 G1 The Very Busy Spider Rubric
	 ● Listen to the story read aloud
	 ● *https://www.youtube.com/watch?v=hskDDqGg7Bw&t=4s*
	 ● Prepare images/ videos of different spiders and their webs
	 ● Show the spider web video:https://www.youtube.com/watch?v=4J5kArP5gAE
	 ● Show spider web images:
	    ○ https://baynature.org/wp-content/uploads/2015/10/spider_webs.pdf
	    ○ https://bugguide.net/node/view/1954/bgimage?from=0
	 ● Prepare paper and pen or note-taking app
	 ● Display the Engineering Design Process (EDP) Visual

Student Preparation:	● Listen to the story read aloud *https://www.youtube.com/watch?v=hskDDqGg7Bw&t=4s*
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
Read: The Very Busy Spider (20 minutes)	Read: The Very Busy Spider Have students act out how a spider creates a web. Discuss: Have you ever seen a spider? What did it look like?	Students act like spiders designing webs. Class Discussion
Watch: Spider web video (15 minutes)	Watch the spider web video, look at spider and spider web images Discuss similarities and differences between the spider in the story and the spiders in the images & video. Create a graphic organizer or use jamboard	Graphic organizer showing how spiders are similar and different
Identify the problem (10 minutes)	Present the challenge: **Design a spider web to help the spider catch a lot of flies.** Review the criteria: The spider web needs to hold at least 20 flies for 1 minute. Present the EDP visual	

Tuesday	Read a Book — Identify the problem(s) in the story	Brainstorm — Explore solutions to the problem	Plan — Sketch your ideas considering materials	Create — Build your chosen solution	Test — Try out your solution	Improve — Revise your solution to make it better	Communicate — Share your work with others

Teacher Preparation:	● Display the EDP visual ● Prepare paper and pen or note-taking app ● Prepare a list of available materials
Student Preparation:	● Prepare paper and writing tools

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
Brainstorm possible solutions (15 minutes)	Review the steps on the EDP visual Have students brainstorm solutions, in small groups. Design a spider web that can catch and hold at least 20 flies for 1 minute.	List of students' ideas
Plan your solution (20 minutes)	Review students' ideas and sort them into testable and non-testable solutions Have students, in small groups, start planning their solutions by drawing or writing Encourage students to think about materials they will use to design their spider webs	A sorted list of ideas Students' plans for the solutions
Share your work (10 minutes)	Share their plans with the class	

Wednesday	Read a Book — Identify the problem(s) in the story	Brainstorm — Explore solutions to the problem	Plan — Sketch your ideas considering materials	Create — Build your chosen solution	Test — Try out your solution	Improve — Revise your solution to make it better	Communicate — Share your work with others

Teacher Preparation:	● Display the EDP visual ● Prepare paper and pen or note-taking app ● Prepare materials from list (if done in class)
Student Preparation:	● Gather materials needed according to their plans (if challenge done at home)
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
Create your chosen solution (30 minutes)	- Review the EDP visual and steps - Review the challenge and criteria "The design of the web should hold at least 20 flies for 1 minute. - Students begin to build their first model	Students' first model
Share your work (15 minutes)	- Students share their web design with the class - Other students in the class are encouraged to provide feedback on each groups web design	

Thursday	Read a Book — Identify the problem(s) in the story	Brainstorm — Explore solutions to the problem	Plan — Sketch your ideas considering materials	Create — Build your chosen solution	Test — Try out your solution	Improve — Revise your solution to make it better	Communicate — Share your work with others

Teacher Preparation:	- Display the EDP visual - Prepare paper and pen or note-taking app - Bring the created spider webs (if created in class) - Bring flies for testing spider webs
Student Preparation:	- Gather materials needed according to their plans - Bring the created spider webs (if created at home) - 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 EDP visual and review steps
	
	Test solutions 3 times in small groups/partners:
	
	    Have students pour flies over web
	
	    Have students count how many flies were caught in their web
	
	Ask each other questions and respond to comments
	
	Have students provide feedback to each other on what could be improved
		Students test spider webs and count how many flies were caught (record the number of flies during each test)
		
		Students write down feedback

Improve your solution (20 minutes)	Revise the solutions based on the feedback they received. _Option:_ Have the students test and revise it on their own after the lesson until they are happy with their solutions!	Students' improved solutions

Friday	Read a Book - Identify the problem(s) in the story	Brainstorm - Explore solutions to the problem	Plan - Sketch your ideas considering materials	Create - Build your chosen solution	Test - Try out your solution	Improve - Revise your solution to make it better	Communicate - Share your work with others

Teacher Preparation:	• Lesson Rubric - 📄 G1 The Very Busy Spider Rubric • Invite a special guest to join the class • Display the EDP visual • Prepare paper and pen or note-taking app • Prepare students solutions if challenge conducted in class
Student Preparation	• Draw a picture or write "I do STEM when…" • The finished spider webs if conducted at home
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
Share their solutions with a special guest (45 minutes)	Introduce the special guest to the class Have each student show their solution to the special guest, making sure to explain how spiders are similar and different. Students should include their drawings(plan) in their presentation as well. Have the students 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