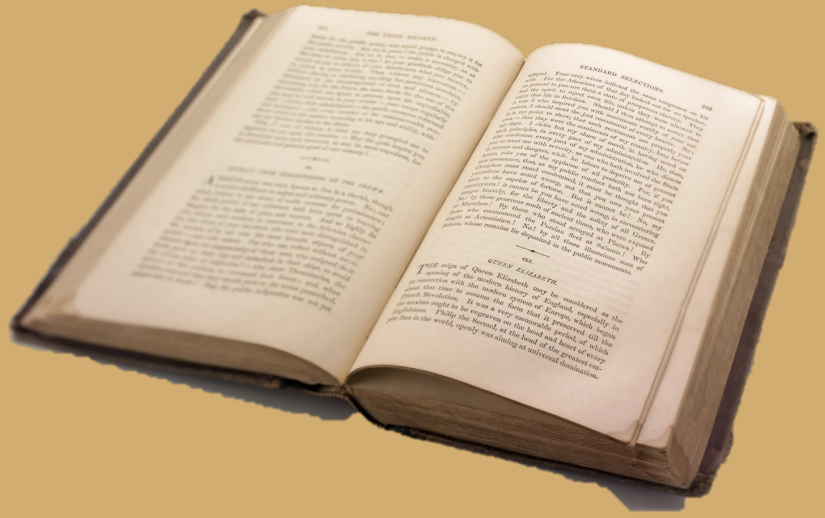


Happily Ever After:
Engineering Solutions to Classic Stories

Nathan Lutz,
Kent Place School

Agenda

Why?
Classic Stories
STEAM
Design Cycle
Practice
Work

Why?

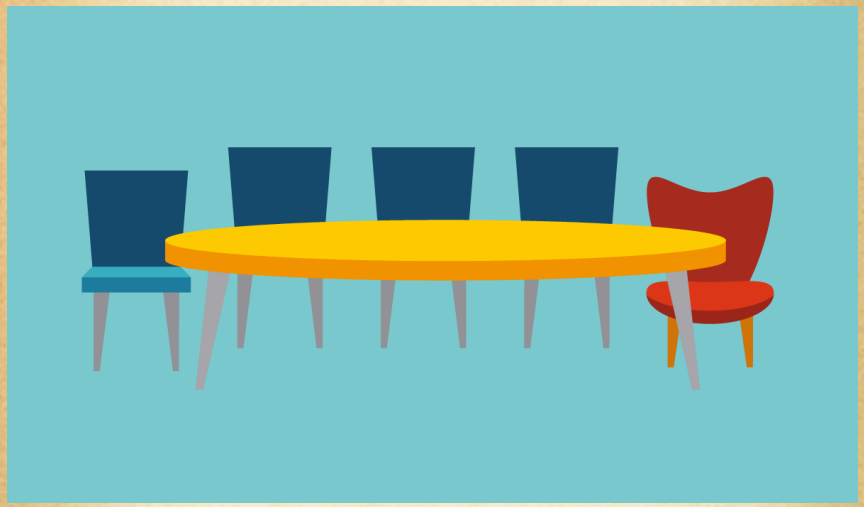
Kent Place School =
Girls' school

Girls typically underrepresented
in STEM fields

. . .despite interest and ability to
excel in these fields

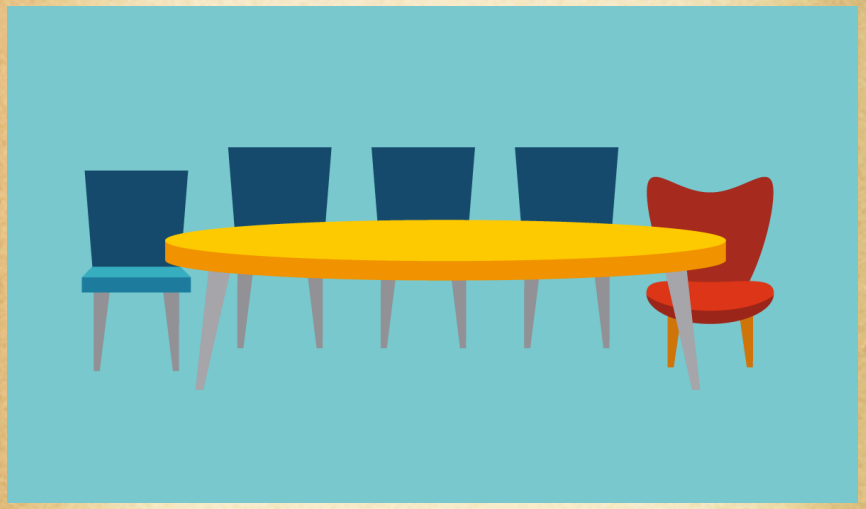
2014 *Psychological Science* study

Why?



A Seat at the Table

Why?

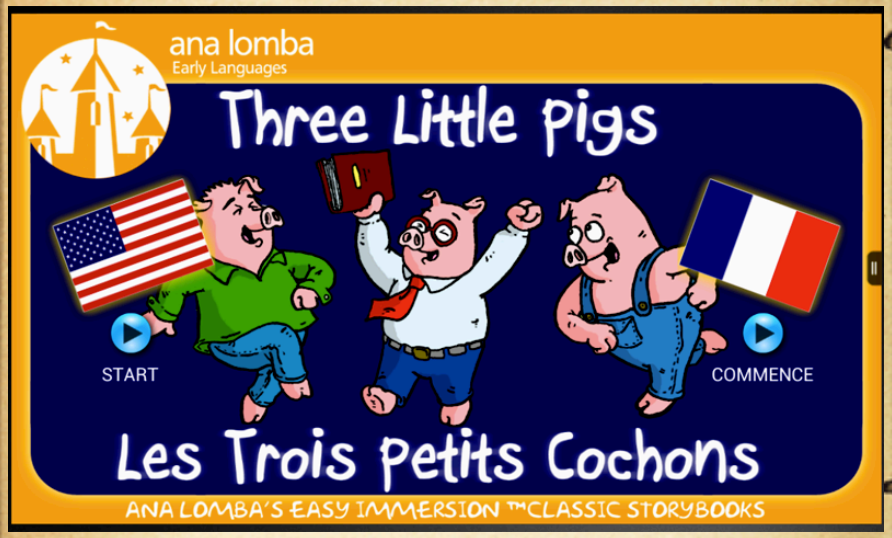


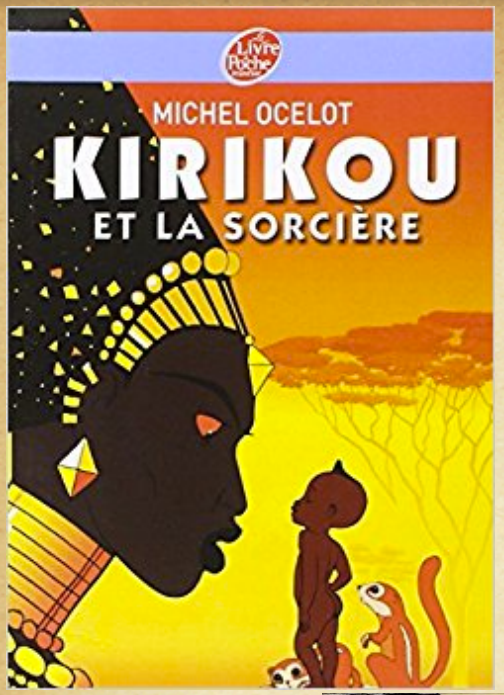
A Seat at the Table

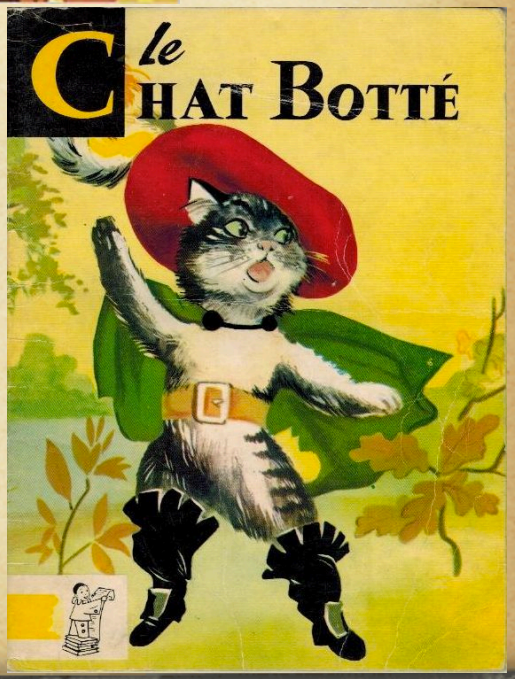
It is not enough for students to be well-versed in science, technology, engineering, and math in order to solve the world's problems.

They'll also need to be proficient in more than one language in order to communicate with others – whether here at home or abroad.

Classic Stories

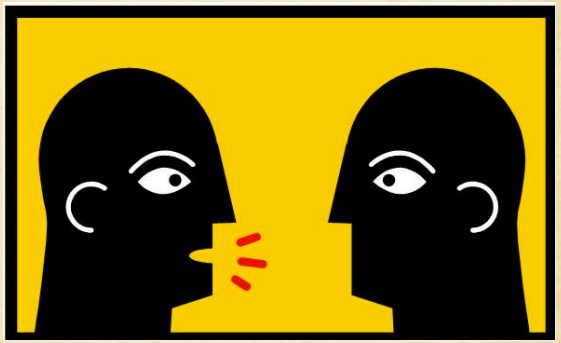






Think/Pair/Share

What are your favorite classic stories from your culture?



Why are Stories So Powerful?

Brains Crave Stories!

Cortex Activity

Facts are processed in two lobes; highly engaging stories stimulate motor cortex, sensory cortex, and frontal cortex

Neural Coupling

Stories activate part of brain that listeners relate to their ideas and experiences

Mirroring

Listeners relate to each other but also to the story teller

Dopamine

Brain releases powerful dopamine when experiencing emotionally charged events, thus helping memory

Power of Narrative

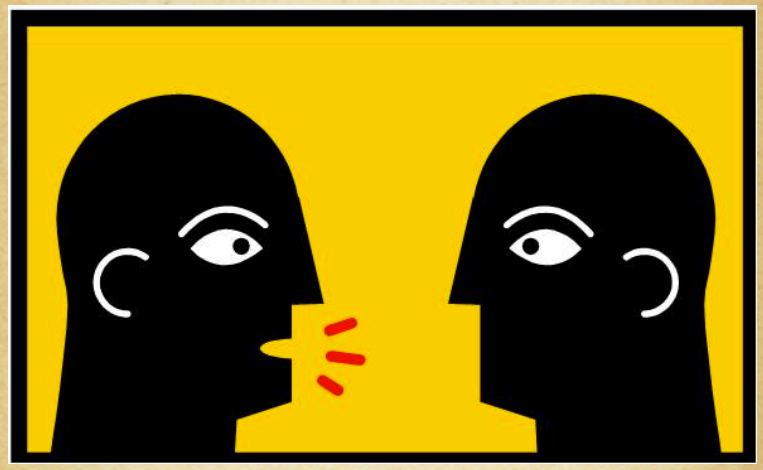
"I'm a narrative learner. I nail down concepts by aligning them to stories or make up stories about them." – Lev Fruchter

"Research shows that when STEM problems have a narrative, students working on those problems are more engaged" – Nathan Lutz

"In addition, combining reading with engineering provides boosts in literacy development." – Nathan Lutz

Telling a Story

What are the elements of a story?



Think/Pair/Share

Telling a Story

What are the elements of a story?

- Characters
- Plot
- Setting
- Details
- Themes
- Text
- Subtext

Telling a Story

Does substance matter?

Telling a Story

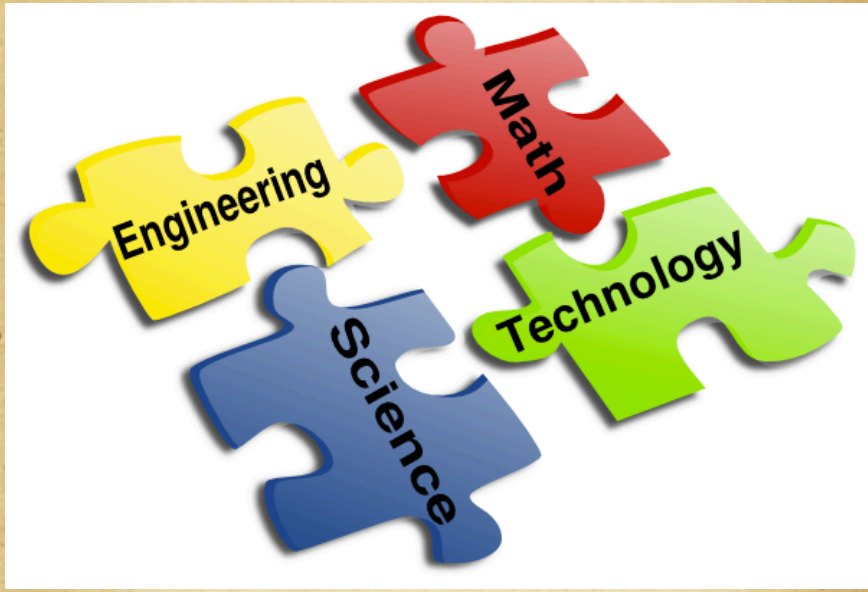
Does substance matter?

- Is it good storytelling?
- Is it compelling?
- Are the characters relatable?

STEM/STEM

Not just an acronym!

It's a philosophy – a way to approach problems, blending knowledge and creativity – to invent new solutions to old and new problems



STEM & Early Learners

Children are naturally curious

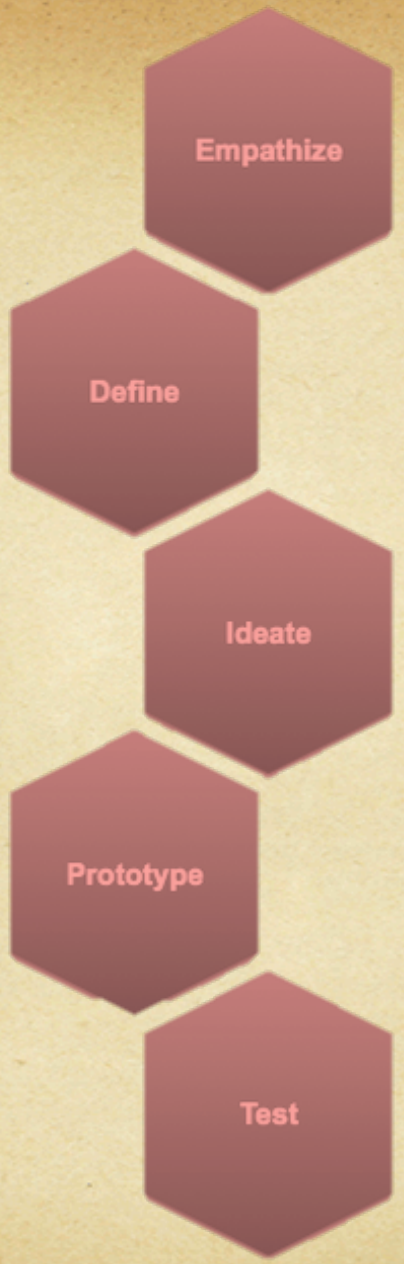
Children's hands need to be engaged

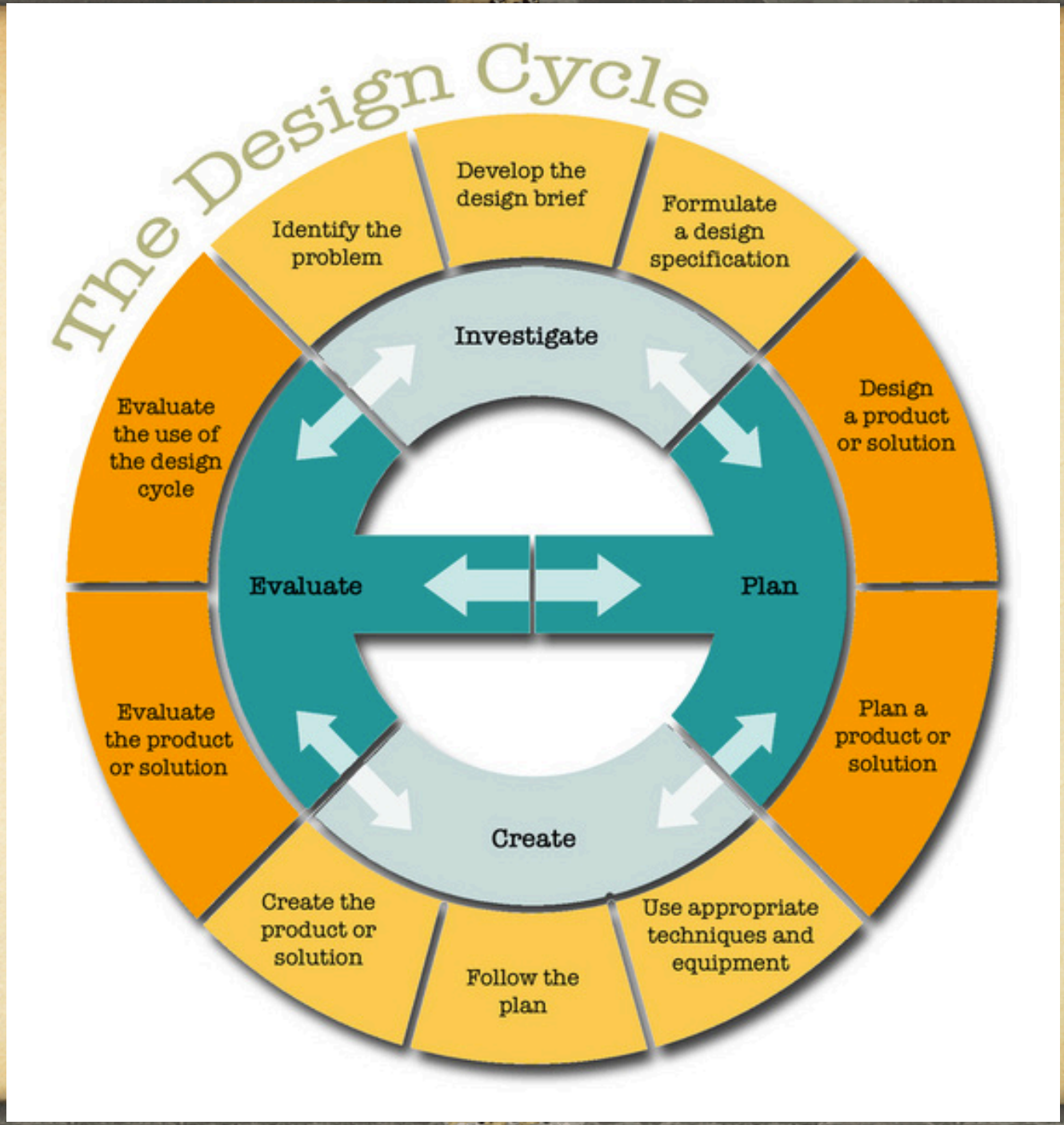
Children are concrete learners, working on becoming abstract learners

Workforce-Pipeline Issues

Design Thinking

Empathy with an audience
Definition of the problem
Ideate a solution
Build a prototype
Test the prototype



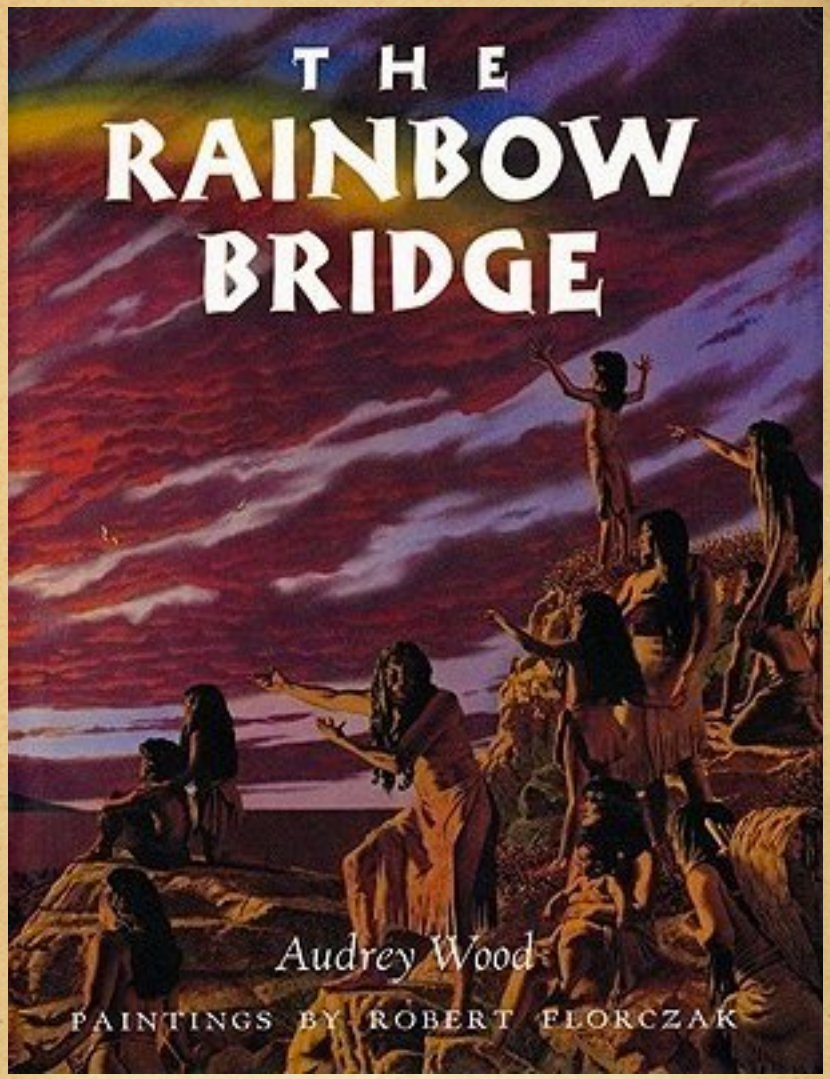

The Design Cycle
Identify the problem
Develop the design brief
Formulate a design specification
Investigate
Design a product or solution
Plan
Plan a product or solution
Use appropriate techniques and equipment
Follow the plan
Create
Create the product or solution
Evaluate the product or solution
Evaluate
Evaluate the use of the design cycle

Method

- Start with a compelling tale
- Define the problem
- Give learners the supplies/ constraints
- Allow students time to ideate, design, build, and test
- Return to the drawing board if needed

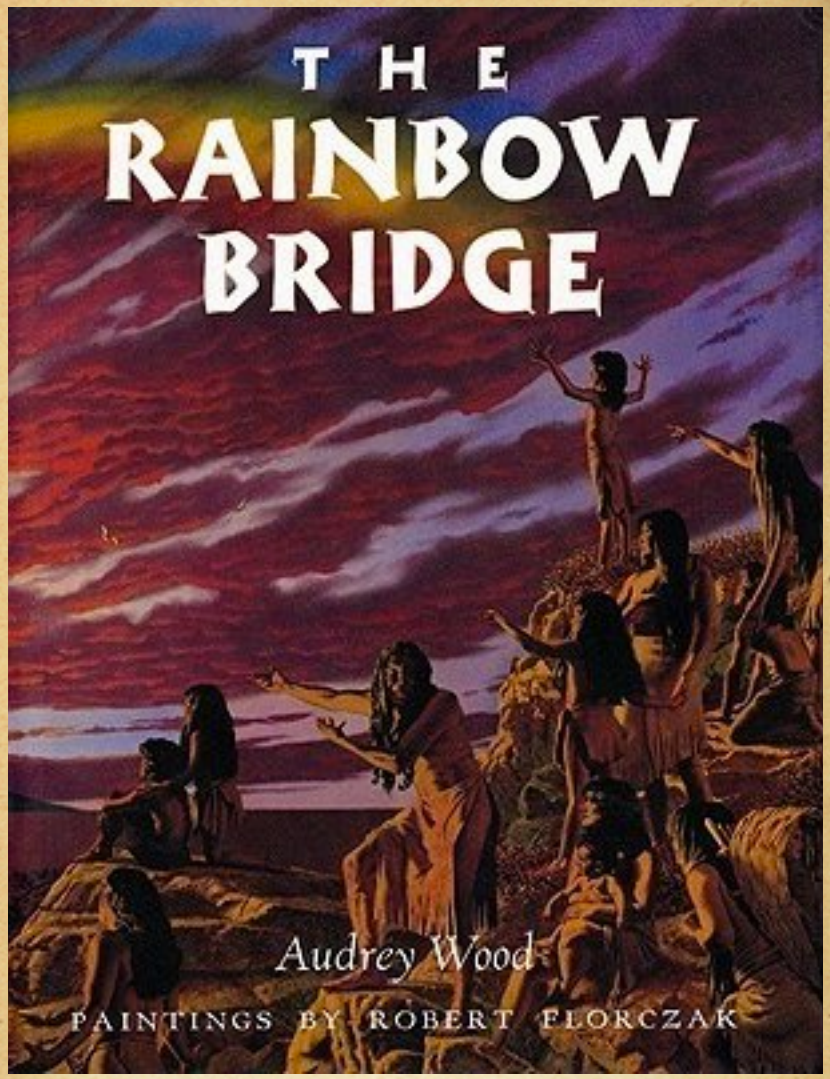
Example

- Start with a compelling tale
- Define the problem
- Give learners the supplies/ constraints
- Allow students time to ideate, design, build, and test



Setting
Characters
Plot
Problem
Solution

Andrew Bosley



Challenge:

Design a bridge that the people can safely cross

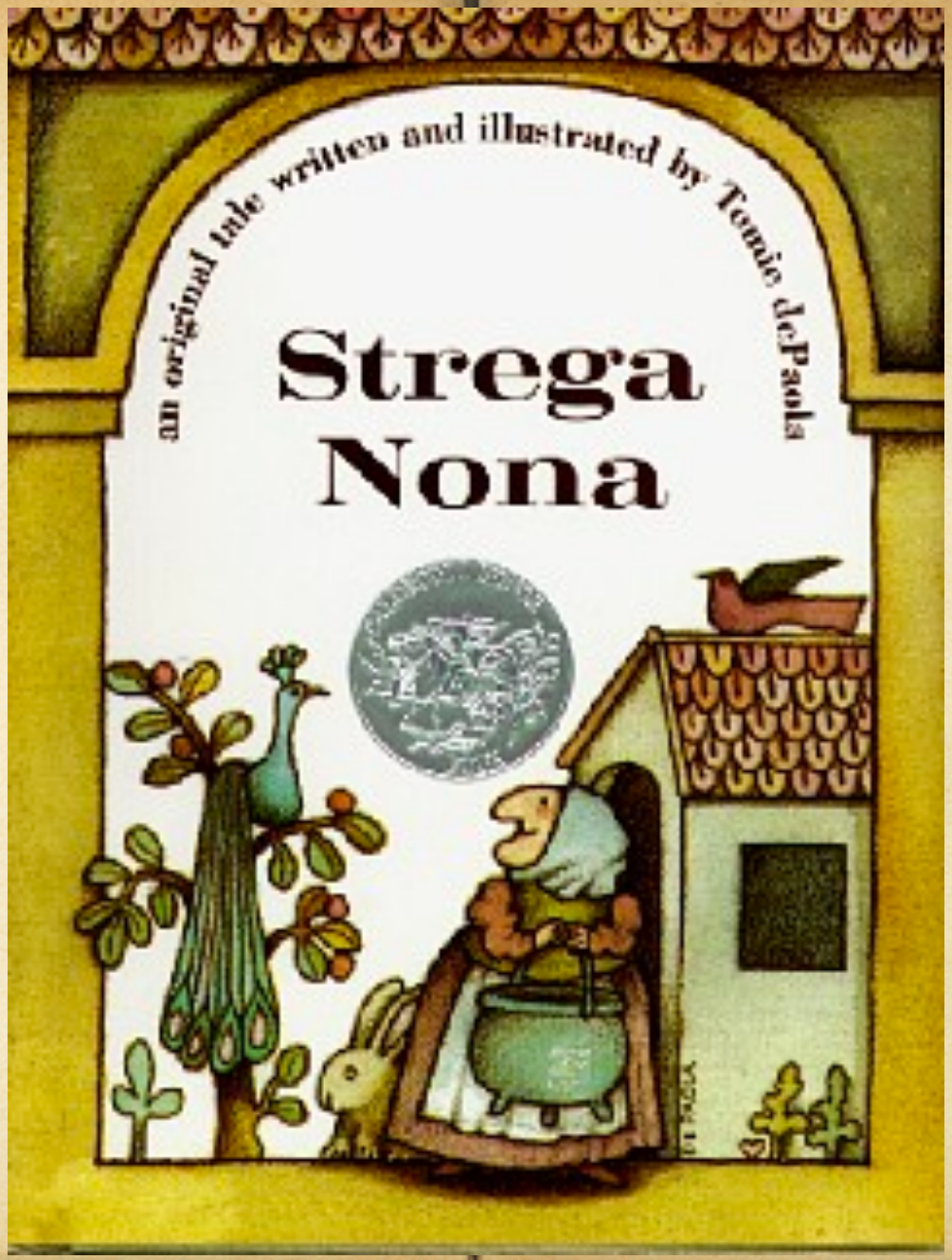
Constraints:

Popsicle sticks
Masking Tape
Paper

Must span 12 inches

“Sometimes it’s frustrating
because the thing you
want to make fails.

But that’s part of the process.”
– Claire


an original tale written and illustrated by Tomie dePaola
Strega Nona

Alain chiche
LES TROIS PETITS COCHONS
Seuil jeunesse

OUR DAY
Arrival
Meeting
Choice
P.E.
Snack
Clean-Up
Outside
Mix It Up Lunch
Birthday
Story Time
Dismissal
The month is
February
19
20
21
22
23
24
Happy Birthday, Xavier!
YES
NO

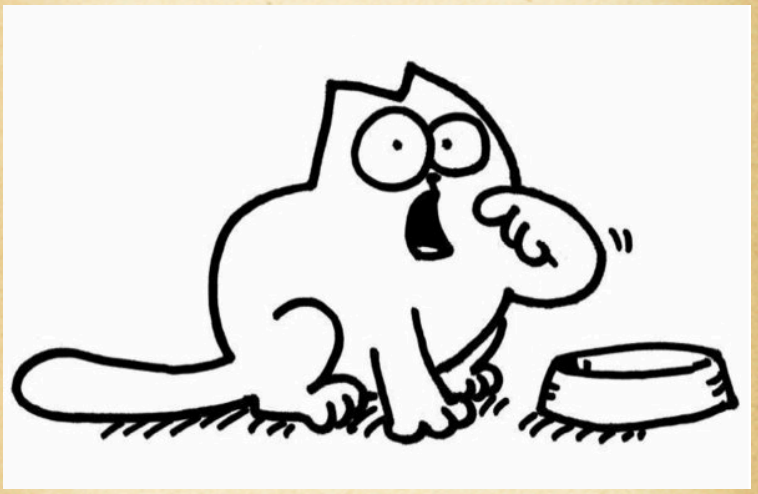
Jillian
KPS
Solar

LEGO
LEGO
LEGO
LEGO
LEGO
LEGO
LEGO
LEGO

Patrick
Trisha
Chelsea
03/03

03/03/2017

15
Thank you! Thank you! Sam-I
I do not like green eggs and h
Do you like green eggs and ham
I do not like them, Sam-I-am.
Would you like them with a mouse?
03/03/2017



“Sticky Tape”

Time for You!

- Arrange yourself by the language that you teach.
- Think of a story you teach/ might teach.
- What STEM projects can you identify
- What language structures can accompany this project?