STEM Books & Beyond: Become a Maker!

Belle Akers
1st Grade
San Francisco CA

NSTA Engage: Fall20
Elementary Science Showcase
NGSS: Next Generation Science Standards Science and Engineering Practices
- 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
Inspirations from Literature

- **Imagination / Creativity**
  - Students are actively engaged as they solve, create, iterate, and bring an idea to life.

STEM Challenges

- **Exploration** - Constructing with materials & discovering how can we use / change it
- **Collaboration** - Communicating, negotiating, and using each other’s ideas
Open-Ended Questions

Tell me about...?

What will you do...?

What would happen if...?

Is there another way you can...?

What else can you try?

Why do you think?

What does this remind you of?

How did you decide...?

Why did you...?
**STEM Pet Parade!**

- Design a float for our class Pet Parade.

**Materials:** scissors, tape or glue stick
Any craft materials, assorted paper, string or yarn, paper plates, straws, craft sticks, etc...

**NOTE:** This was completed via zoom teaching in September.
- Students posted Pet Parade on Seesaw.

Cheerios box, straws, ribbon
STEM

Pet Parade: Posted on Seesaw

Stuffies join in the fun!

Floating Aquarium w/Friends

Big Bird & Duck
**Click Clack Peep!**

- Solve a problem for Farmer Brown & Duck. The new chicks can’t fall asleep at night!
- **Materials:** 9x12” cardboard (base), chick* craft materials

**Bed:** a slide to fall in the bed
- plays lullabies
- rocks chick to sleep

* small chicks available @ Michaels (seasonal) or Oriental Trading
STEM Challenge: Chick Design

Ideas We CAN USE:
- comfort: feels safe
- activity: uses up energy
- physical space

3. DESIGN?

Hammock to rock the chick. & other comforts:
- milk
- ball
- radio
- back-up bed (in cup)

Bunk Bed: choose where to sleep
- roof reflects the moon/stars
- a safe place
- handle to carry design
**STEM Nuts to You!**

- Design a way to keep the squirrels from getting to the bird feeder.

- **Materials:** paper towel roll, cardboard base & craft materials

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**Teacher Prep**

Attach a paper roll.
- Cut a series of slits on one end.
- Fold back and use double-stick tape or glue to attach to base.
Right Design
- fork spikes
- pipe cleaner spikes

Left Design
- trap catches squirrel and shoots it away

Squirrel Design
- cameras on tree
- sticky tape on trunk
- spikes around tree
STEM  Not a Box  https://www.youtube.com/watch?v=Nif94VQ4Xsc

Take a small box to turn it into Not a Box!

Materials: small cardboard boxes (food boxes), paper - any type, pipe cleaners, craft sticks, felt, rubber bands, brads ...

camera  guitar  cat purse  dog purse
Fairy Tales

**Rapunzel**
Goal: Design an ESCAPE from the TOWER.

**Max Options:**
1. Design a TRAP for a fast ESCAPE
2. Design an EGG DELIVERY system

**Goldilocks Options:**
1. Design a BED
2. Design a CHAIR

**Three Billy Goats Options:**
1. Design a TRAP to Catch the TROLL
2. Design a BOAT to get to the other side.
Egg Delivery System
- egg tube slides down/goes up the yarn

Rapunzel’s Escape (top)
Left: slides down
Right: climb down cup ladder or slide down

Materials:
Craft materials

Teacher Prep
Attach a paper roll on base
<table>
<thead>
<tr>
<th>Title: Made by Maxine, Spiro, Ruth</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Materials:</strong> choose a small stuffy (in person or remote) small boxes, pipe cleaners, craft sticks, felt, brads, paper rolls, pom poms, etc.</td>
</tr>
<tr>
<td><strong>Goal:</strong> Design something for your stuffy to travel in for the class Pet Parade.</td>
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</tbody>
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<tr>
<th>Title: Going Places, Peter Reynolds</th>
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<tr>
<td><strong>Materials:</strong> Prep a “mystery bag” with same craft materials for each student</td>
</tr>
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<td><strong>Goal:</strong> Design something using the materials in the mystery bag.</td>
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</tbody>
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<th>Title: Boxitects, Kim Smith</th>
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<tr>
<td><strong>Materials:</strong> medium/large cardboard boxes, assorted paper, felt/fabric, paper rolls, craft sticks-wide, thin, straws, ...</td>
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<td><strong>Goal:</strong> Design something using box(es) as main element and add details</td>
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<th>Title: The Most Magnificent Thing, Ashley Spires</th>
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<tr>
<td><strong>Materials:</strong> small boxes, pipe cleaners, craft sticks, felt, brads, rubber bands, paper rolls, pom poms, ...</td>
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<td><strong>Goal:</strong> Design a contraption. What does it do? How does it work? Share. Option: Sketch and label.</td>
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<th>Title: Not a Box, Antoinette Portis</th>
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<td><strong>Materials:</strong> small cardboard boxes (food boxes), paper-any type, pipe cleaners, craft sticks, felt, rubber bands, ...</td>
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<td><strong>Goal:</strong> Design a purpose w/the small box as the main project: add craft materials to turn it into “Not a Box!”</td>
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<th>Fairy Tales - Solve problems for characters!</th>
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<td><strong>Ask:</strong> Identify a problem. Name the goal.</td>
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<td><strong>Imagine:</strong> Think of ideas. Sketch: What could it look like?</td>
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<td><strong>Plan:</strong> What materials will I need?</td>
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<tr>
<td><strong>Create:</strong> Build/construct a model (prototype).</td>
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<td><strong>Improve:</strong> Test. Fix things that don’t work. Change it. Try again!</td>
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<tr>
<td><strong>Share:</strong> How does your design work? Challenges? Solutions?</td>
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<tr>
<td>Engineering (*Hands-On)</td>
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<td>------------------------------------------------</td>
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<tr>
<td>*Look I'm an Engineer, DK Publishers</td>
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<tr>
<td>*How to Be An Engineer, Emily Hunt</td>
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<tr>
<td>Not a Box, Antoinette Portis</td>
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<tr>
<td>Not a Stick, Antoinette Portis</td>
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<tr>
<td>What if Rain Boots Were Made of Paper</td>
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<td>Kevin Beals &amp; P. David Pearson</td>
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<td>What to Do With a Box, Jane Yolen</td>
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<td>Little Red Fort, Brenda Maier</td>
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STEM Resources
There are many FREE products in the https://www.teacherspayteachers.com/ site. Type in STEM and free products (left column).

**STEM Sampler Pack with Sound STEM Challenge and Engineering Graphic Organizer**

**Freebies**, includes - STEM student recording sheet w/engineering process & activities

**Engineering Design Process Worksheets for all STEM Challenges- Distance Learning**
https://www.teacherspayteachers.com/Product/Engineering-Design-Process-Worksheets-for-all-STEM-Challenges-Distance-Learning-3659960?st=4bf61d6b4c0b065f7da685eee2c0fd29

Balloon Car Freebie - https://www.teacherspayteachers.com/Store/Vivify-Stem

Newsletters/Blogs with Teaching Resources

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<tr>
<td><strong>Vivify</strong> <a href="https://www.vivifystem.com/">https://www.vivifystem.com/</a></td>
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<td><a href="https://teachersareterrific.com/2020/10/5-free-stem-challenges.html">https://teachersareterrific.com/2020/10/5-free-stem-challenges.html</a></td>
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Books for STEM Inspiration

- Be a Maker
- Made by Maxine
- The Most Magnificent Thing
- If I Built a School
- Boxitects
- Two Problems for Sophia
- Going Places
- If I Built a House
- Click, Clack, Peep!
- Not a Box
- The Curious Garden
- In My Room