



Growing the STEL Maker requires the learner to apply effective practices. This session presents ideas on how to use Making and Doing Practices to implement STEL Core/Contexts and integrate STEM learning.

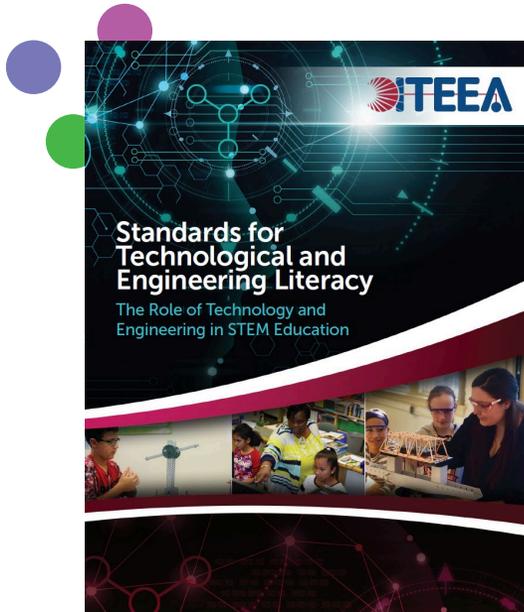
The STEL Maker

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MARCH 26, 2021 ... 2:00PM – 2:50PM ET

Three session goals

Review STEL Organizers



Provide/Create STEL Examples for Classroom Use

STEM CHALLENGE (Teacher Guide)

Title: Skippyjon Jones's Fashion show

Grade Level: Kindergarten - 1st grade

Literacy Connection: *Skippyjon Jones* by Judy Schachner

Unit: Measuring, Problem-Solving, Modeling

STEM Standards:
Math.1. Describe several measurable attributes of a single object, including but not limited to length, weight, height, and temperature

Science: Engineering, Technology, and Applications of Science

1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Standards for Technology and Engineering: Core Concepts of Technology and Engineering

- A. Illustrate how systems have parts or components that work together to accomplish a goal.
- B. Safely use tools to complete tasks.
- C. Explain that materials are selected for use because they possess desirable properties and characteristics.
- D. Develop a plan in order to complete a task.
- E. Collaborate effectively as a member of a team.

Big Ideas:

- We can use materials to problem-solve
- After reading a book, we can identify the traits of the characters
- When we work in groups, we can sometime come up with even better ideas together
- The engineering design process can help people solve common problems

Scenario: Skippyjon Jones is a siamese cat that thinks he is a chihuahua because his ears and his head are way too big for his body. He gets into all kinds of trouble because he thinks he is a dog.



Making & Doing Practices



Engineering ... Verb

Act of engineering

- ▶ Envisioning
- ▶ Comparing
- ▶ Designing (under constraints)
- ▶ Making
- ▶ Evaluating
- ▶ Re-designing
- ▶ Presenting/marketing

Career of engineering

- ▶ The use of scientific and technological principles to design and plan the building of machines, structures, and other items, including bridges, tunnels, roads, vehicles, and buildings



Effective Making & Doing Practices



“Real World”

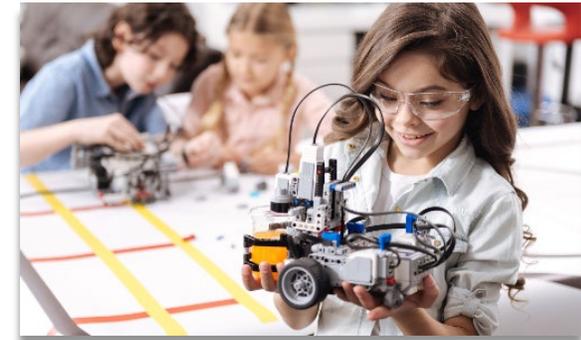
Challenges

Solving challenges that address standards in a real-world scenario



Engineering Design

Breaking ill-structured problems down in to smaller parts to identify strategies, techniques, and possibilities for solving them creatively



Teamwork

Utilizing 21st Century Skills to communicate, collaborate, cooperate and think critically

Creating Making and Doing STEL lessons

Lessons

- Literacy-based lesson prompts
- Construction blocks
- Coding
- Paper engineering
- Scale models
- Real-world applications
- Application of concepts
- Opportunities for teamwork

Creating Lessons

- Start with standards
- Determine intended outcomes first
- Remember, applied learning leads to long-term learning gains
- Use engineering design methodology
- Ill-structured problems are best
- End with a presentation or defense

Lesson Writing Tool

- STEL Lesson Plan Tool
- On the ITEEA website
- Efficient - standards aligned
- End result - complete lesson plan emailed to you



Strategically integrating STEM context

Resources

STEL Appendix A (pg. 118) ... interactive STEL website that provides resources and examples to assist educators in the development of integrated STEM curriculum and lessons.

(https://www.iteea.org/Activities/2142/STEL/stel_resources/175086.aspx)

Features:

- ▶ A compendium that lists the benchmarks at the grade band level.
https://www.iteea.org/Activities/2142/STEL/stel_resources/175101.aspx
- ▶ A crosswalk matrix that links STEL standards and benchmarks to *Next Generation Science Standards (NGSS)*, Common Core Mathematics (CCSS-Math) benchmarks, and Common Core English Language Arts (CCSS-ELA) benchmarks.
<https://www.iteea.org/File.aspx?id=175089&v=cf8fd955>
- ▶ A verb matrix that aligns benchmarks to the cognitive, affective, and psychomotor domains (p. 120).
<https://www.iteea.org/File.aspx?id=175128&v=1ace7ee6>

STEL Lesson Plan Tool

ITEEA Webpage

Publications > Standards > (tab) STEL Lesson Plans

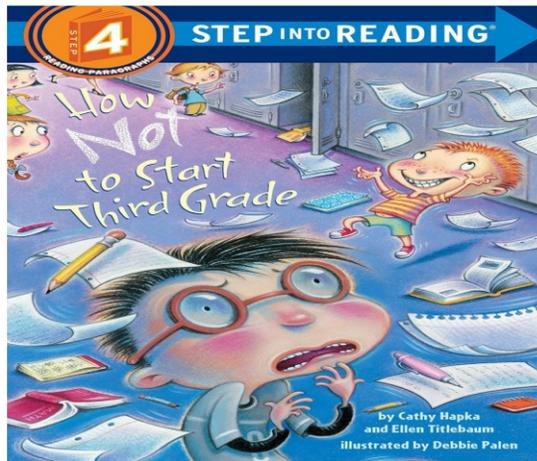
<https://www.iteea.org/Activities/2142/STEL/STELLessonPlans.aspx#tabs>

Features:

- ▶ Demonstrates how to use the Lesson Plan Tool
- ▶ Provides Copy/Paste fields
- ▶ Check boxes for STEL Standards/Benchmarks
- ▶ Allows you to incorporate your state standards
- ▶ Includes link to integration of other subject content learning
- ▶ Has ITEEA Lesson Plans

Lesson

How Not To Start Third Grade- Literature-based Curriculum Design Challenge



Teachers Guide

Grade Level: 3rd to 4th Grade

Literacy Connection: How Not To Start Third Grade by Cathy Hapka and Ellen Titlebaum

Stem Content Standards

STEM CHALLENGE

Title: VibroBOT Challenge (Teacher Edition)

Grade Level: 4th – 8th

Literacy Connection: Zap! *Wile E. Coyote Experiments with Energy* by Suzanne Slade

Unit: Materials, Friction, Circuits, Balance, Weight, Resistance, Troubleshooting

STEM Content Standards:

Science:

Physical Science

4-PS3-1 - Use evidence to construct an explanation relating the speed of an object to the energy of that object.

4-PS3-2 - Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and **electric currents**.

Technology and Engineering:

Engineering, Technology, and Applications of Science

4-ETS1-1 - Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

4-ETS1-2 - Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

4-ETS1-3 - Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

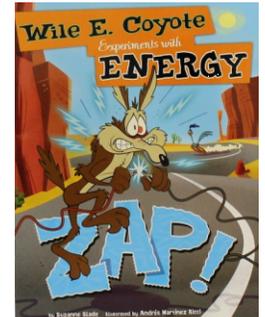
Standards for Technological and Engineering Literacy

Standard 2: Core Concepts of Technology and Engineering Education

F. Describe how a subsystem is a system that operates as part of another, larger system.

G. Illustrate how, when parts of a system are missing, it may not work as planned.

I. Describe requirements of designing or making a product or system.



Create a Making & Doing Lesson

Making & Doing Practices: “Real World” Challenges - Engineering Design - Teamwork

- Start with standards
 - Determine intended outcomes first
 - Remember, applied learning leads to long-term learning gains
 - Use engineering design methodology
 - Ill-structured problems are best
 - End with a presentation or defense
- Resources
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 - Publications > Standards > (tab) STEL Lesson Plans
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- Literacy-based lesson prompts
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