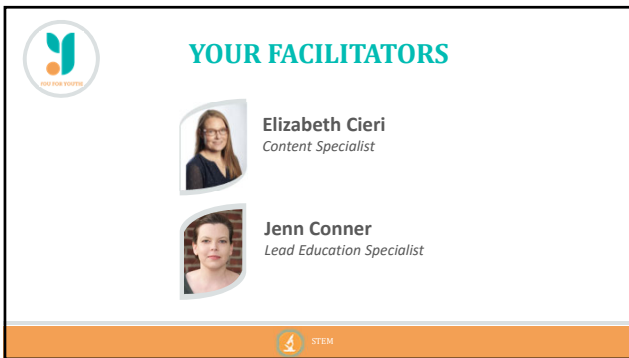




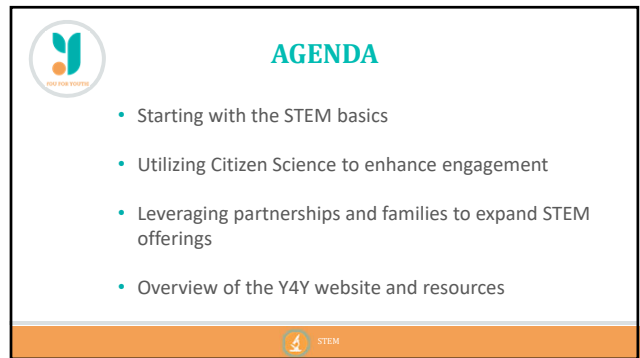
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# STEM




Tennessee State Y4Y Training

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## SESSION OBJECTIVES

- Identify Y4Y resources that assist with science, technology, engineering, and math (STEM)
- Review the components of successful STEM programming
- Develop strategies to implement STEM in your program







STEM


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## UNDERSTANDING STEM


- Science
- Technology
- Engineering
- Mathematics



STEM

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## CLOSING THE STEM GAP


Good News...

- 60% of new jobs this century will be in STEM fields
- 25% of high school students indicated interest in pursuing a degree in STEM

...Not So Good News


- Only 20% of U.S. workforce will be equipped with skills and education for these new STEM positions
- Only 16% of graduating seniors are both proficient in math and interested in a STEM career






STEM

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## MAKING THE TIME




**Dedicating Time**

When will you schedule STEM? Keeping simple basic materials available should be the everyday norm. In addition, many STEM elements can be worked into program times such as snack and homework. During snack time, committees can present weather and news reports (including vocabulary, measurement, presenting data, giving reasons), conduct surveys, and manage distributions and menus. During homework time, students can do hands-on projects to supplement classroom learning, or homework time can begin with mental math contents, puzzles, or gaming games. Homework is also a good time for vocabulary expansion and questioning. Physical education can include sports stats, outdoor explorations, counting, and measurement, and enrichment time is wide open for a range of exciting options.

Tools/ STEM/Plan and Implement




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## PLANNING STEM ACTIVITIES









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## STEM PROCESS






Teach/ STEM/ STEM Everyday Training to Go





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## WAYS TO ALIGN

- Understand what students are learning in school
- Collaborate with school-day staff
- Build background knowledge

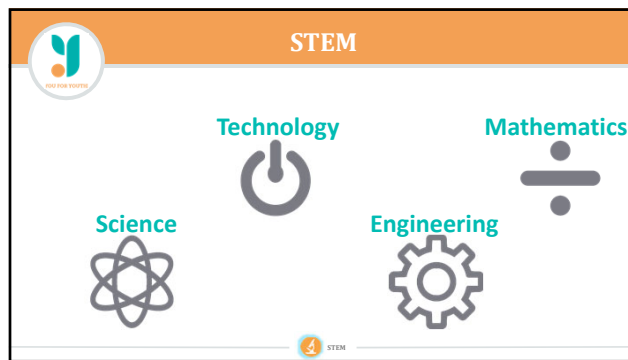



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ALIGNING TO STANDARDS		
Activity	Grade level(s)	Skills, Concepts, and Standards
Learning about Tadpoles	K-2	LS1.B (NGSS) Animal life cycles, how animals adapt to survive
Three Billy Goats Gruff	3-5	3-5-ETS1-1 (NGSS) Basic principles of engineering
Balls and Tracks	6-8	MS-ETS1-4 (NGSS) Understanding the design process
Heavy Weight Lesson	9-12	HS-LS3-1; HS-LS3-2 (NGSS) Cause and effect, collecting and analyzing data

Tools/ STEM/ Plan and Implement

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### S IS FOR SCIENCE




**Scientific literacy**

- Ability to use knowledge in the sciences to understand the world

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### SALT & PEPPER

How can you separate a salt a pepper mixture?



Teach/ STEM/ Trainings to Go/Inquiry Based Learning

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## DEBRIEF

*Why were you able to separate the salt and pepper?*

### Static electricity created:

1. A current ran that through the spoon and repelled the salt.
2. Negative electrons on the spoon that attracted the positive charges within the pepper.
3. Positive charges on the spoon that repelled the negative charges in the salt.

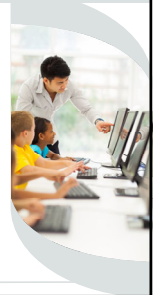


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## T IS FOR TECHNOLOGY

- Technological literacy
- Computer science literacy
- Computational thinking



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## COMPUTATIONAL FAIRY TALES

**Computer science concepts through fairy tales.**

Explaining algorithms:

- The Ant and the Grasshopper: A Fable of Algorithms
- Hunting Dragons with Binary Search
- Binary Searching for Cinderella



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## ONLINE INTERACTIVES


- NASA Kids Club
- Brain Games
- PBS Learning Media
- Code.org




Tools/ Learn More Library/ Web-based Resources




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## E IS FOR ENGINEERING



**Engineering literacy** is the ability to put scientific and mathematical principles to practical use.



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## HOUSE OF CARDS

**Building Rules:**


- Test the strength and stability of a square, arch, and triangle.
- Select the one shape you will use to build your house.
- Your building must be at least four stories high.
- You cannot lay a shape on its edge, but you can tape shapes together.
- A paper plate will go on top to hold the marbles

**Materials:**


- 50 Index Cards
- One roll of tape
- Marbles



Teach/ STEM/ STEM Everyday Training to Go





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## M IS FOR MATHEMATICS

**Mathematical literacy** is the ability to analyze and communicate ideas effectively by posing, formulating, solving and interpreting solutions to mathematical problems.





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## MATH IN RESTAURANTS




Tools/ Learn More Library/ External Videos




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# CITIZEN SCIENCE





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## CITIZEN SCIENCE

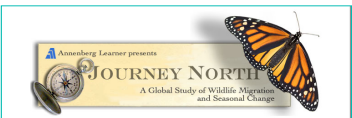
- Meaningful connections
- No single “right” answer
- Inquiry-based learning
- Data used by scientists

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## JOURNEY NORTH




**Welcome to Journey North!**

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- [News](#)
- [This Season](#)
- [Report a Sighting](#)
- [Maps](#)


[Research butterflies](#)




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## REFLECTION



What techniques and strategies for STEM do you want to integrate?




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YOU FOR YOUTH

# STRATEGIES AND TECHNIQUES




**You for Youth | STEM**


## Strategies and Techniques

1

Choose overall strategies and specific techniques that fit your students, resources, time, and staff. Recognize that you can use multiple strategies at the same time, or use different strategies at different times. Over the course of the year, for example, you may move from less to more intensive to more intensive programming for STEM.



YOU FOR YOUTH



STEM

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[Team Activities](#)



Online Professional Learning and Technical Assistance for 21st Century Community Learning Centers

Y4Y > Courses > STEM

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## Introduction to STEM <sup>+</sup>

- Learn about the potential of science, technology, engineering and mathematics (STEM) topics for enhancing 21st Century programs. Learn how to find local technology resources for 21st Century programming and how to coordinate.

### Implementation Strategies <sup>+</sup>

- Expand STEM in your program with practical steps to increase 21st Century learning experiences. Connect with other local educators, the state, and more.

### Creating My Staff <sup>+</sup>

- Find resources for staff development on STEM, including links to trainings, the Web, and guidelines to use on-line.

### Tools <sup>+</sup>

- Find links to on-line, customizable tools that can help build 21st Century program planning and implementation.

### My Notebook

Science Technology Engineering Mathematics

The Notebook is a good place to get resources in all four subjects. It also has links to the Web for each subject. If you'd like to use the Notebook, please log in if you already have an account or register for a new one from the Y4Y homepage!

### Glossary

SCIENCE TECHNOLOGY ENGINEERING MATHEMATICS



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