EDVENTURES IN S.T.E.A.M.

SPARKING CURIOUS MINDS

SLIDES CAN BE FOUND:
WWW.STEMEDVENTURES.COM

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ALRIGHT PEOPLE
LET'S DO THIS!
memegenerator.net

MY MOTIVATION

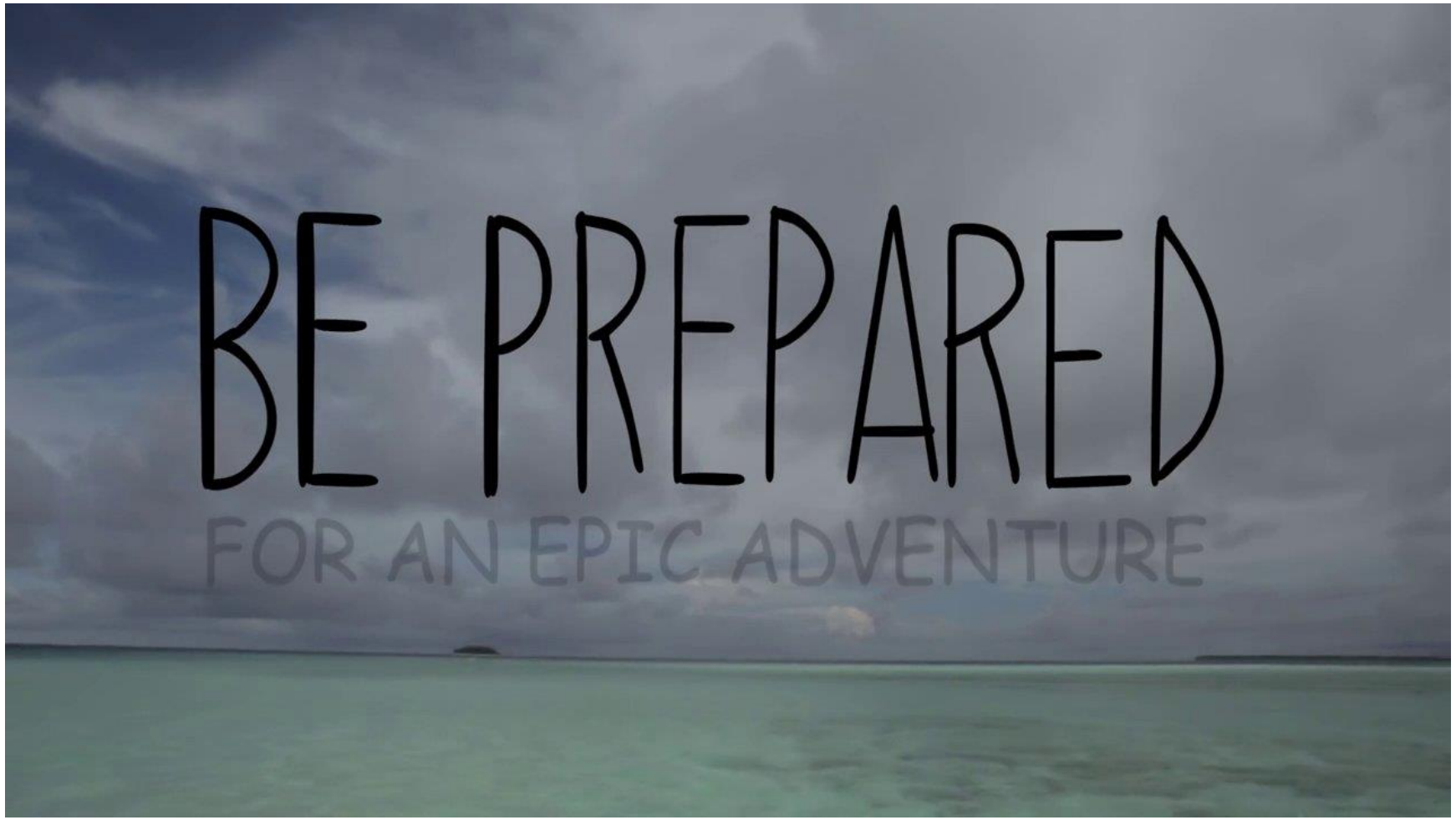
QUESTIONS ARE MORE IMPORTANT THAN ANSWERS

"A CULTURE OF INNOVATION, RISK-TAKING, AND CONTINUOUS LEARNING TOGETHER WITH CAPACITY BUILDING, GUIDED BY KNOWLEDGE OF THE APPROACHES AND PRACTICES MOST LIKELY TO PROVE EFFECTIVE ARE KEY”-

21ST CENTURY COMPETENCIES DOCUMENT (PG 45)

3 REASONS FOR OUR STUDENTS TO PURSUE STEAM CAREERS

- It makes good sense to steer students towards high-demand careers.
- There's a great opportunity for girls to make their mark in STEAM subjects.
- A career in a STEAM subject doesn't mean a role in a lab coat. Getting kids interested in STEAM subjects early will help open their eyes to the types of jobs and opportunities out there.


BE PREPARED
FOR AN EPIC ADVENTURE

WHERE ARE YOU GOING?

"STEAM education is an interdisciplinary approach to learning that removes traditional barriers separating the disciplines of science, technology, engineering, arts and mathematics and integrates them into real-world, rigorous, and relevant learning experiences for students." (adapted from Grade 3-8 STEM Lesson Essentials)

EXPLAINING YOUR EDVENTURE TO OTHERS

You let the students drive the bus?

How does this fit into the itinerary?

How much is this going to cost?

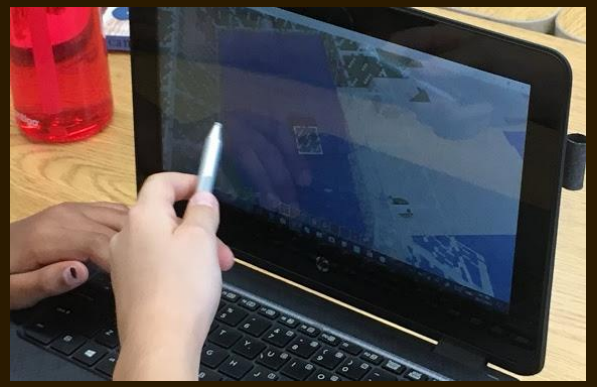
How do you have the time?

Where are you going to get the materials?

How are you going to rate that?

What if it doesn't work?

I could never do that !



GETTING PHYSICALLY PREPARED

GETTING MENTALLY PREPARED

We are a team of learners.

I am the leader of my own learning.

I act responsibly and take charge of my own success.

I collaborate because I know we achieve more when we work together.

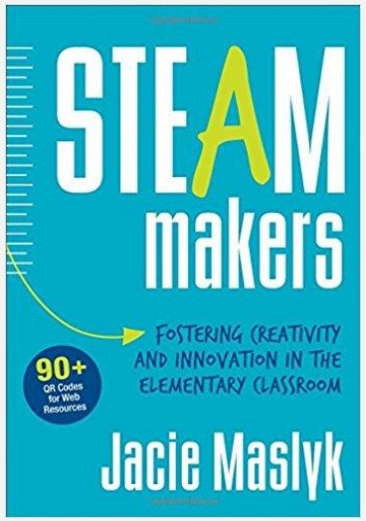
I show integrity and do the right thing even when no one is looking.

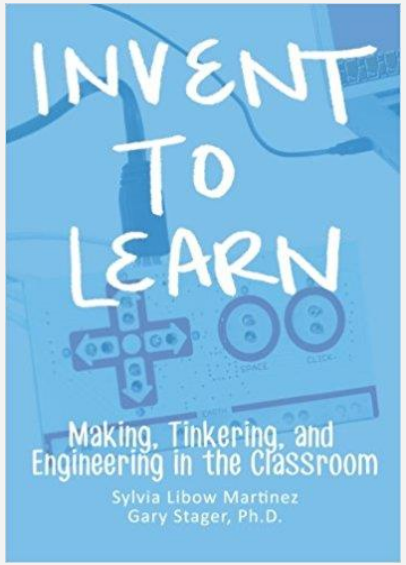
I innovate and use new ideas to solve problems and improve our world.

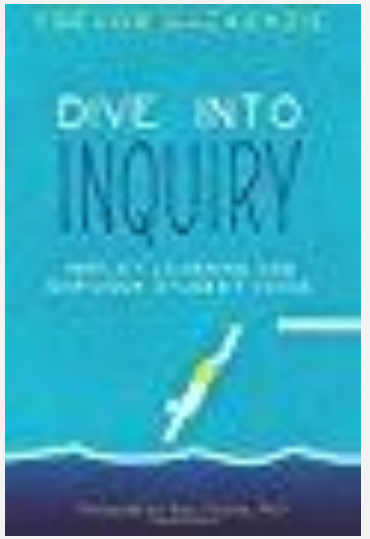
I strive for quality and work toward excellence.

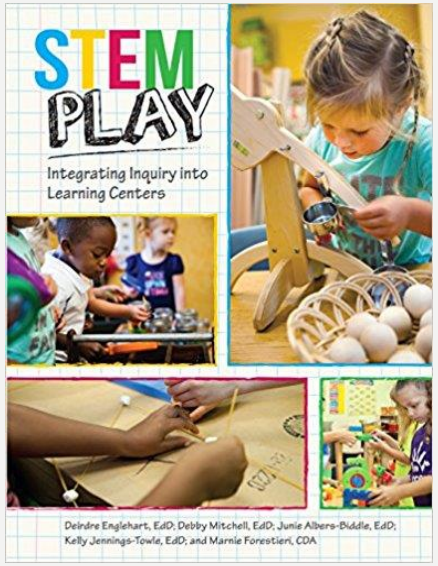
I support knowledge and global citizenship for all.

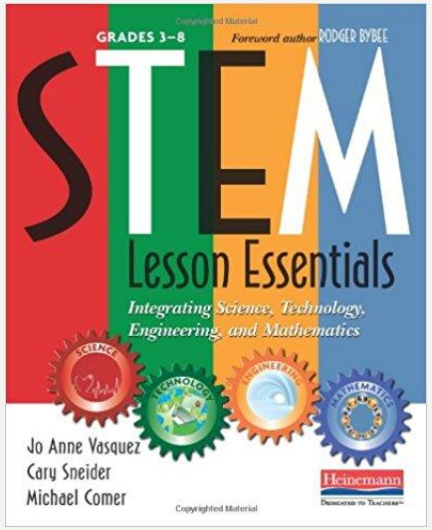
GUIDEBOOKS ARE GOOD TO HAVE

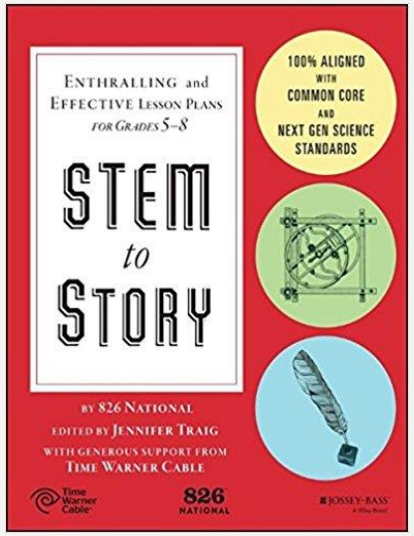




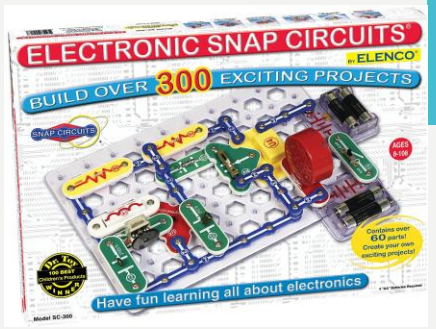


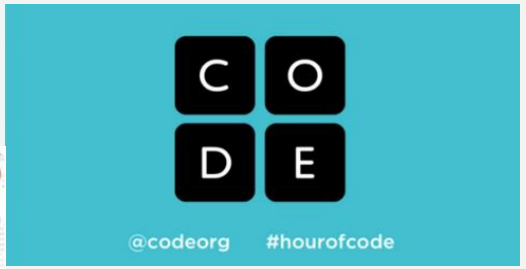


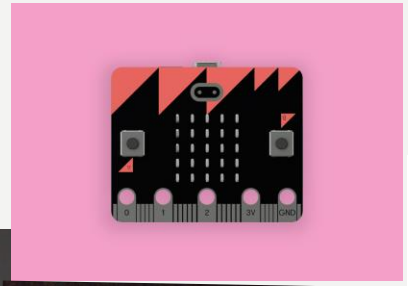


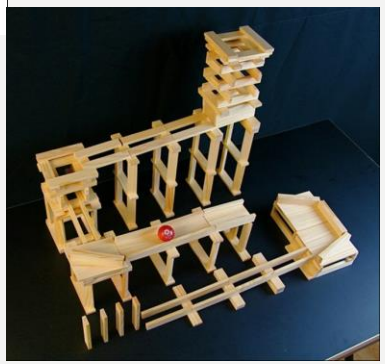


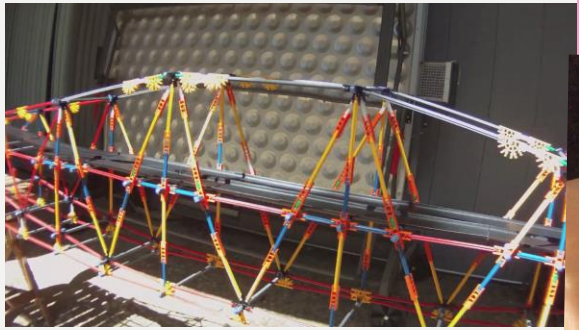
PACKING YOUR BAGS

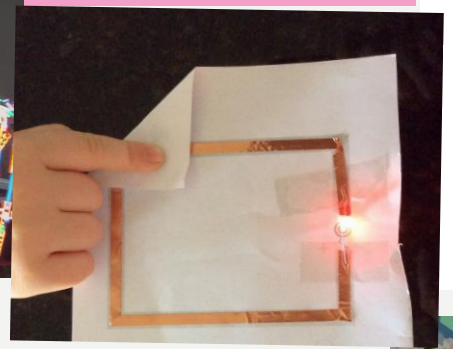












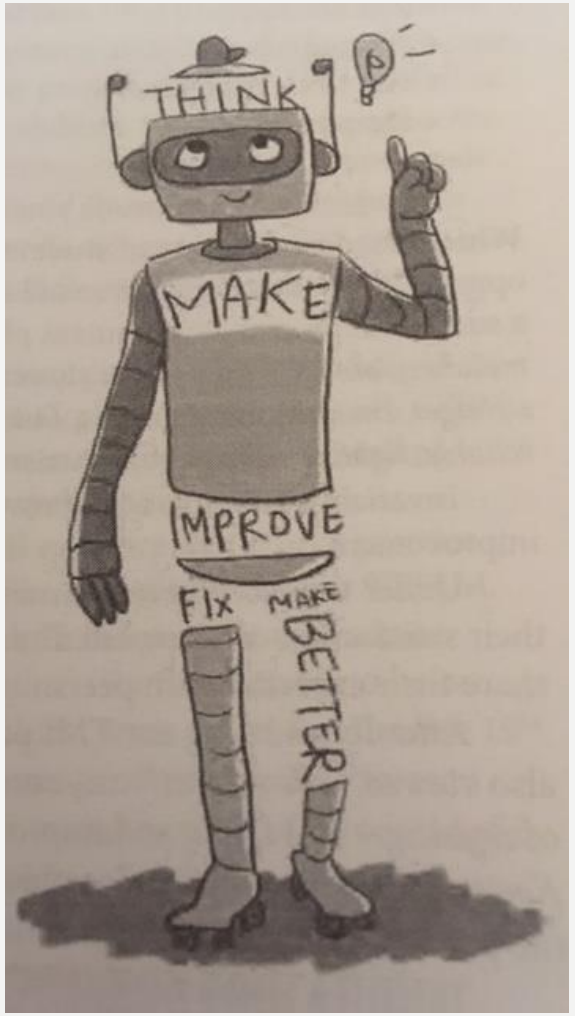
WHAT ABOUT THE CURRICULUM?

If you look at the BIG IDEAS in the Ontario Science Curriculum (Pg 11) you can see some easy connections to STEM projects.

1. to relate science and technology to society and the environment
2. to develop the skills, strategies, and habits of mind required for scientific inquiry and technological problem solving
3. to understand the basic concepts of science and technology

WHAT ABOUT THE CURRICULUM?

I



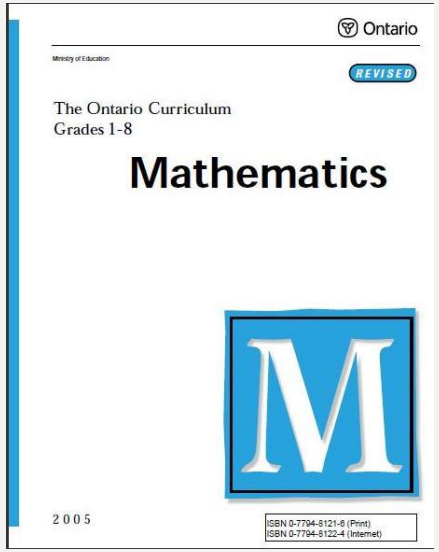
scientific problem solving skills (Pg 12):

- initiating and planning (e.g., asking questions, clarifying problems, planning procedures)
- performing and recording (e.g., following procedures, accessing information, recording observations and findings)
- analysing and interpreting (e.g., organizing data, reflecting on the effectiveness of actions performed, drawing conclusions)
- communicating (e.g., using appropriate vocabulary, communicating findings in a variety of ways)

WHAT ABOUT THE CURRICULUM?

Seven mathematical processes are identified in the curriculum document:

- problem solving
- reasoning and proving
- reflecting
- selecting tools and computational strategies
- connecting
- representing
- communicating. (Pg 4)



Number Sense- Experience suggests that students do not grasp these relationships automatically. A broad range of activities and investigations, along with guidance by the teacher, will help students construct an understanding of number that allows them to make sense of mathematics. (Pg 8)

Measurement- Measurement concepts and skills are directly applicable to the world in which students live. Concrete experience in solving measurement problems gives students the foundation necessary for using measurement tools and applying their understanding of measurement relationships. (Pg 8)

Geometry- Students learn to recognize basic shapes and figures, to distinguish between the attributes of an object that are geometric properties and those that are not. Mathematical concepts and skills related to location and movement are also addressed in this strand. (Pg 9)

Patterning- Requires students to recognize, describe, and generalize patterns and to build mathematical models to simulate the behaviour of real-world phenomena that exhibit observable patterns. (pg 9)

Data Management and Probability- Data management and probability are highly relevant to everyday life. Graphs and statistics bombard the public in advertising, opinion polls, population trends, reliability estimates, descriptions of discoveries by scientists, and estimates of health risks, to name just a few. (pg 10)

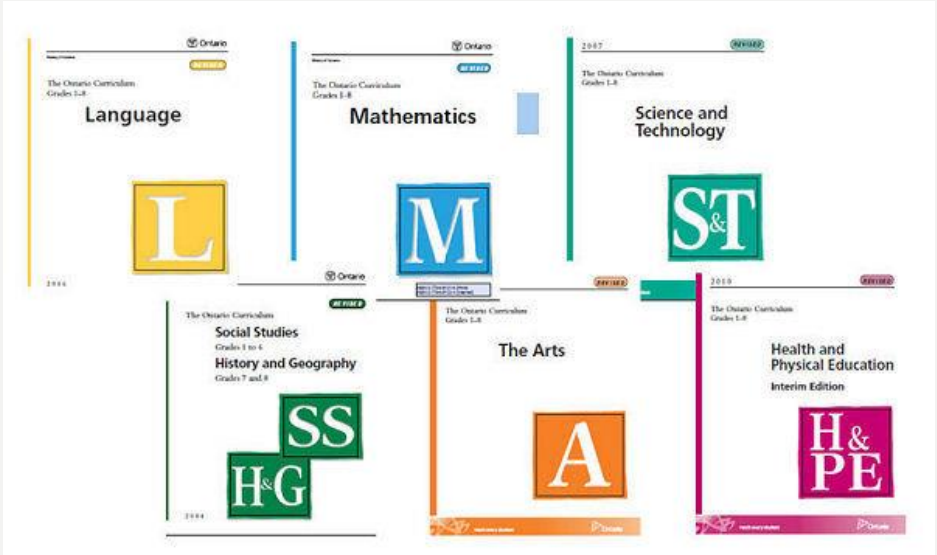
WHAT ABOUT THE CURRICULUM?

language expectations as students read the procedures or research a problem, write a procedure and share their findings with the class (oral and media).

There are lots of great links to projects that also incorporate visual arts and music.

You also have an opportunity to learn lots about a students learning skills when they are working on a project. Do they have collaboration skills? Can they work independently on a project? Do they work in an organized method and make a plan before building or are they more hap hazard in how they build a project? Do they have the initiative to ask for help when they get stuck or the perseverance skills to work through a road block.

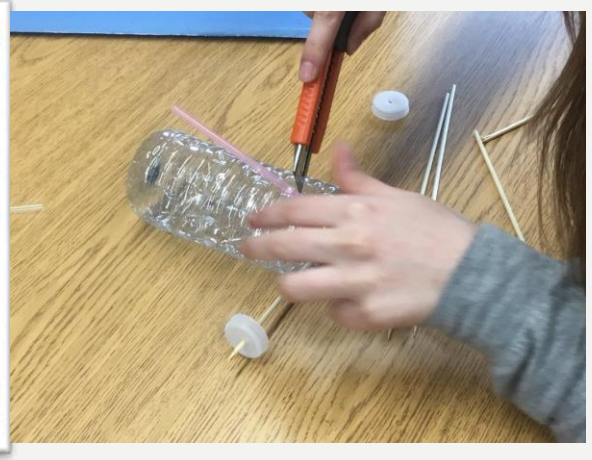
There are amble curriculum connections to STEM projects if you are selecting rigorous projects that allow students to solve real world applications that are relevant to the curriculum you need to cover and still allows students to have fun with their learning.



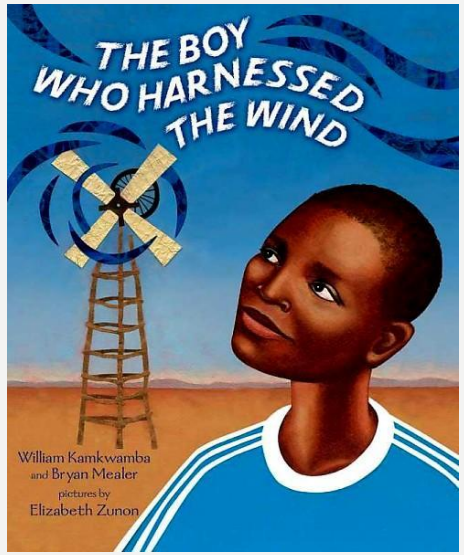

BON
VOYAGE
PACIFIC
OCEAN

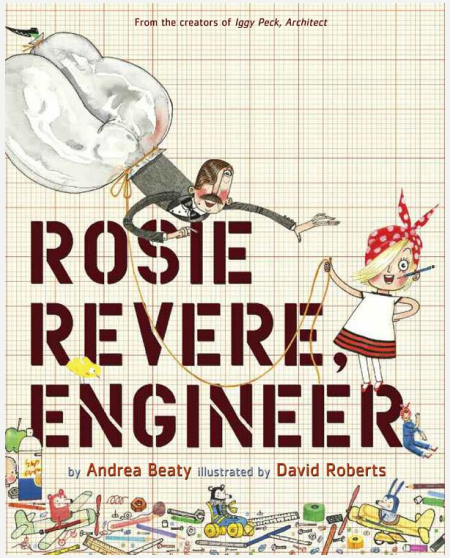
LESSON IDEAS

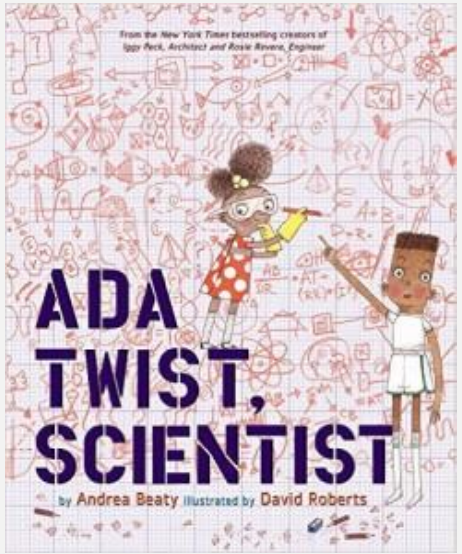
- PENCIL TOWERS
- PUMPKIN CATAPULTS
- MARBLE RUNS
- CIRCUIT GINGERBREAD HOUSES
- BUILD A HABITAT
- ZIPLINE DELIVERY
- WIND POWERED CARS
- PLANT MAZES
- PAPER AIRPLANE CHALLENGE
- BUILD A ROLLER COASTER

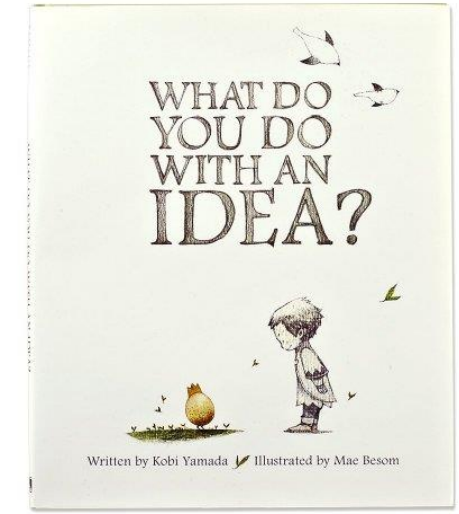


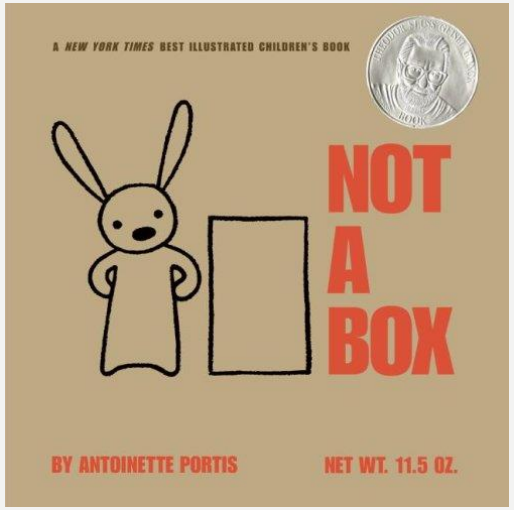
PICTURE BOOK LESSONS

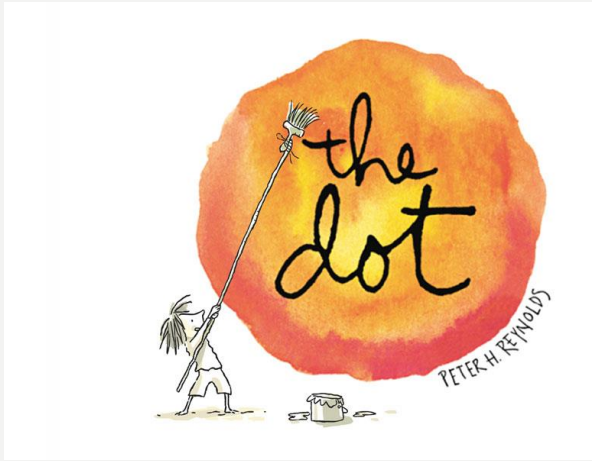


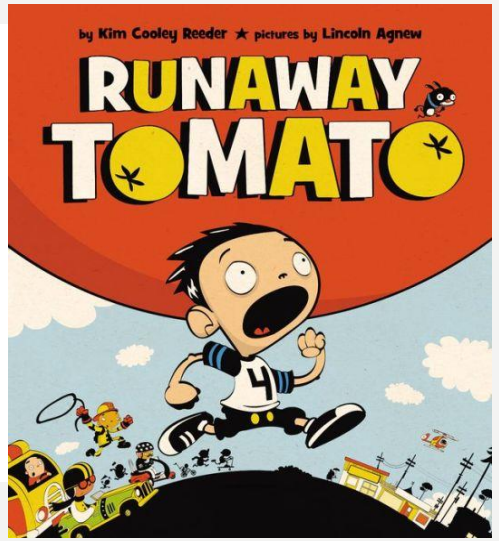












EXPLORER WEBSITES

Grades K-2 Sites

The Stem Laboratory
Playdough to Plato
Little Bins for Little Hands
Left Brain Craft Brain
Science Schoolyard
Funology

Grades 3-5 Sites

STEM Playground
STEM Works
STEM by Design
Brain Pop STEM
How to Smile
Grade 5: It Does Matter? (Pi Institute

Grades 6-8 Sites

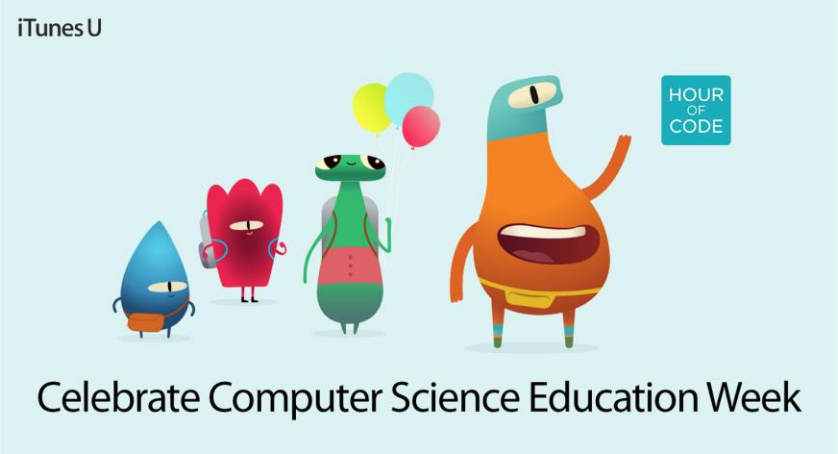
NASA STEM Activities
Pi Institute Resources (links to Ontario Curriculum)

General STEM Sites

NEA STEM Resources
James Dyson Foundation
Microsoft STEM Lessons
Derek Tangredi's Hacked Education
Instructables
Tomatoshpere Project
Let's Talk Science
Science Buddies
STEM Works
Code.org
Partners in Research
Exploratorium
How Stuff Works
Tynker
Scratch
PBS Learning Exchange
TED STEM Talks and Lessons
Carly and Adam Blog

GLOBAL CHALLENGES

- Canada-Wide Science Fair
- FIRST Robotics Canada
- Hydro-Québec Science Fair
- STEAM Horizon Awards
- Canadian Mathematical Society competitions
- Sanofi Biogenius Canada
- Little Inventors



ROAD BLOCKS

- Overcoming anxieties of being the expert
- Students jump into projects without planning
- Overcoming resistance to change - creating a new culture
- Some events or tasks are instructor intensive at first until you train students
- Time for set-up and clean up
- Storage
- Invest in a lot of clear containers
- Create storage labels
- Create laminated cards to itemize the contents of kits or games
- When Lego gets dirty - wash it in a mesh bag in the dishwasher (but will need a LONG time to dry)
- Have students use TAPE not glue when building so you can take things apart and rebuild again later

ASSESSMENT IN STEM

Student Reflection Questions

Tell us about your creation.

How does it work?

Why did your group pick this design?

What are the strengths of this prototype?

What would your team do differently next time?

How did you contribute to your group?

LETS EXPLORE TOGETHER

Click here for some instant fun you can take back to the classroom.


thanks!