In Pursuit of STEM (Science, Technology, Engineering, Mathematics)

Isa Kaftal Zimmerman
IKZAdvisors, LLC
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The acronym

Science
Technology
Engineering
Mathematics

The schedule for this morning

- Presentation–questions of clarification encouraged
- Work in groups –delineate a plan for further action (use modified logic model)
- Report out and discuss

What we all want…

photo by Larisa Schelkin

Why study STEM?

A. Global challenges due to natural & man made progress/crises

B. Economic health of all nations; employment in the 21st century

C. Well educated global citizens

D. Adapting to a changing world

Related Issues

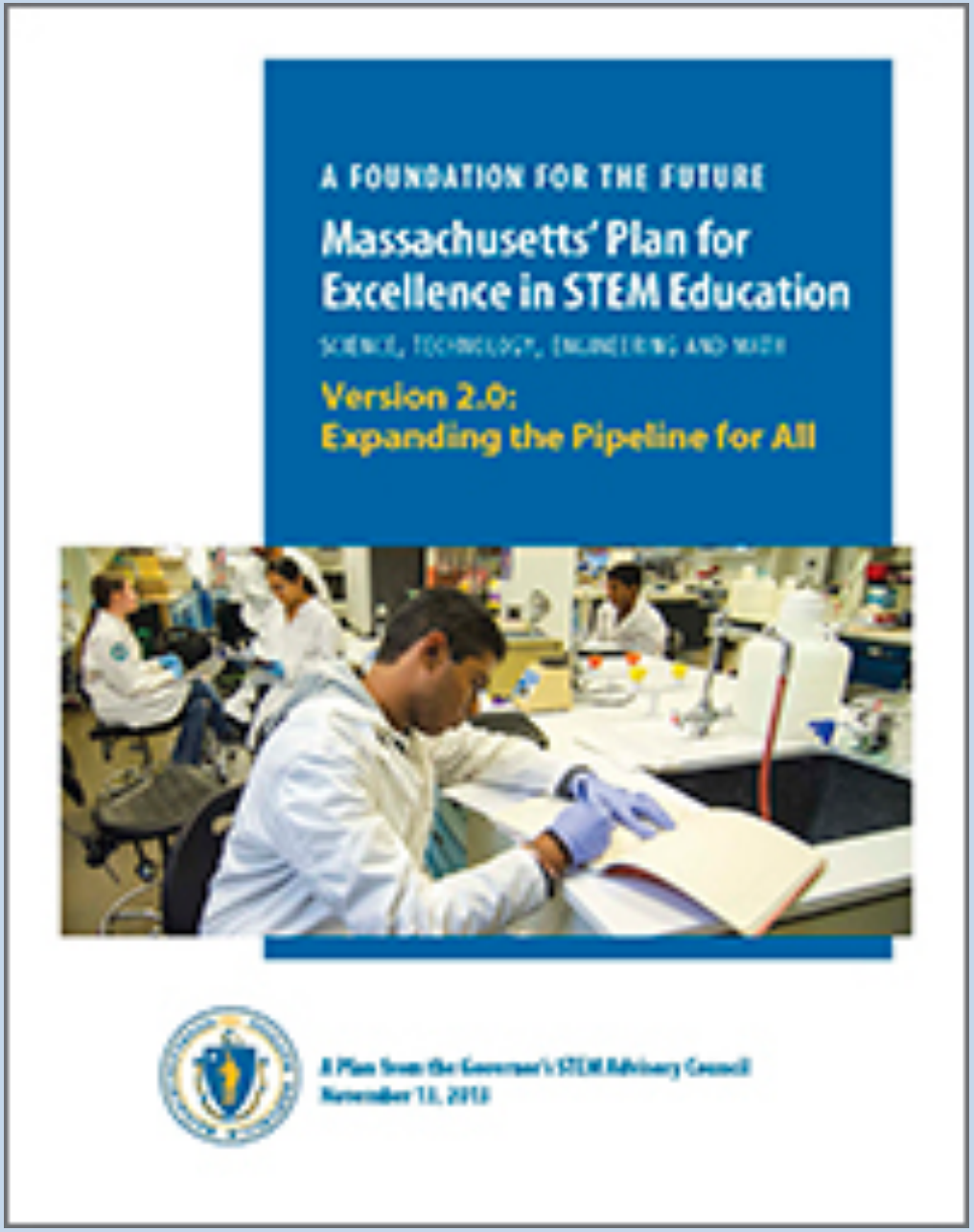
- College & Career Readiness
- Career & Technical Education
- Lifelong learning/skills
- Common Core/state standards
- Assessment
- Research

What constitutes STEM education?

- **Curriculum…*what to learn***
- **Instruction…*how to learn***
- **Preparation…*education & re-education***
- **The learning contexts…*building/ redesigning schools/spaces; using non-school resources***

How to create a STEM Culture in a School/District?

- **Professional learning for current educators**
- **Creating communities**
- **Creating a plan: *nation, district, school***


A FOUNDATION FOR THE FUTURE
Massachusetts' Plan for Excellence in STEM Education
Version 2.0:
Expanding the Pipeline for All

Iowa's plan: Roadmap

GREATNESS STEMS FROM IOWANS

GOVERNOR'S STEM ADVISORY COUNCIL

dedicated to building a strong STEM education foundation for all Iowans

MA Plan's FIVE Goals

1. Increase student interest in STEM areas

2. Increase student achievement in all Pre-K-12 students to prepare graduates to be civically & college &/or career ready

MA STEM Goals

3. Increase the % of skilled educators who teach Pre-K-16 STEM classes

4. Increase the % of students completing post-secondary degrees or certificates in STEM subjects

Goal FIVE

5. STEM degrees & certificate attainment will be aligned with corresponding opportunity in STEM-related fields to match the state's workforce needs for a STEM talent pipeline.

Engage the community

- Create (an) advisory council(s)
- Create networks/hubs (MA has 9; Iowa has 6)
- Hold meetings; schedule events, e.g The Summit, Fairs, After-school, Summer programs
- Create website(s), fact sheets, PR
- Consider legislation/mandates

When to start?
early and often…

- **Hands on in pre-K & forever after**
- **Developmentally appropriate materials; scope & sequence**
- **Built on prior knowledge & experience**

Teaching STEM in Iowa

How to infuse real-world problem solving into STEM?

- Spend time w. faculty developing/ locating/acquiring C & I
- Programs available for global STEM education
- Create the momentum

Broaden the scope.1

- The individual disciplines
- Interdisciplinary approaches in STEM and with art (STEAM), literature, history…

Broaden the scope.2

Think global STEM Education

Essential are:

- **Collaboration**
- **Team Work**
- **Technological skills**
- **Understanding diversity**
- **Diplomacy**

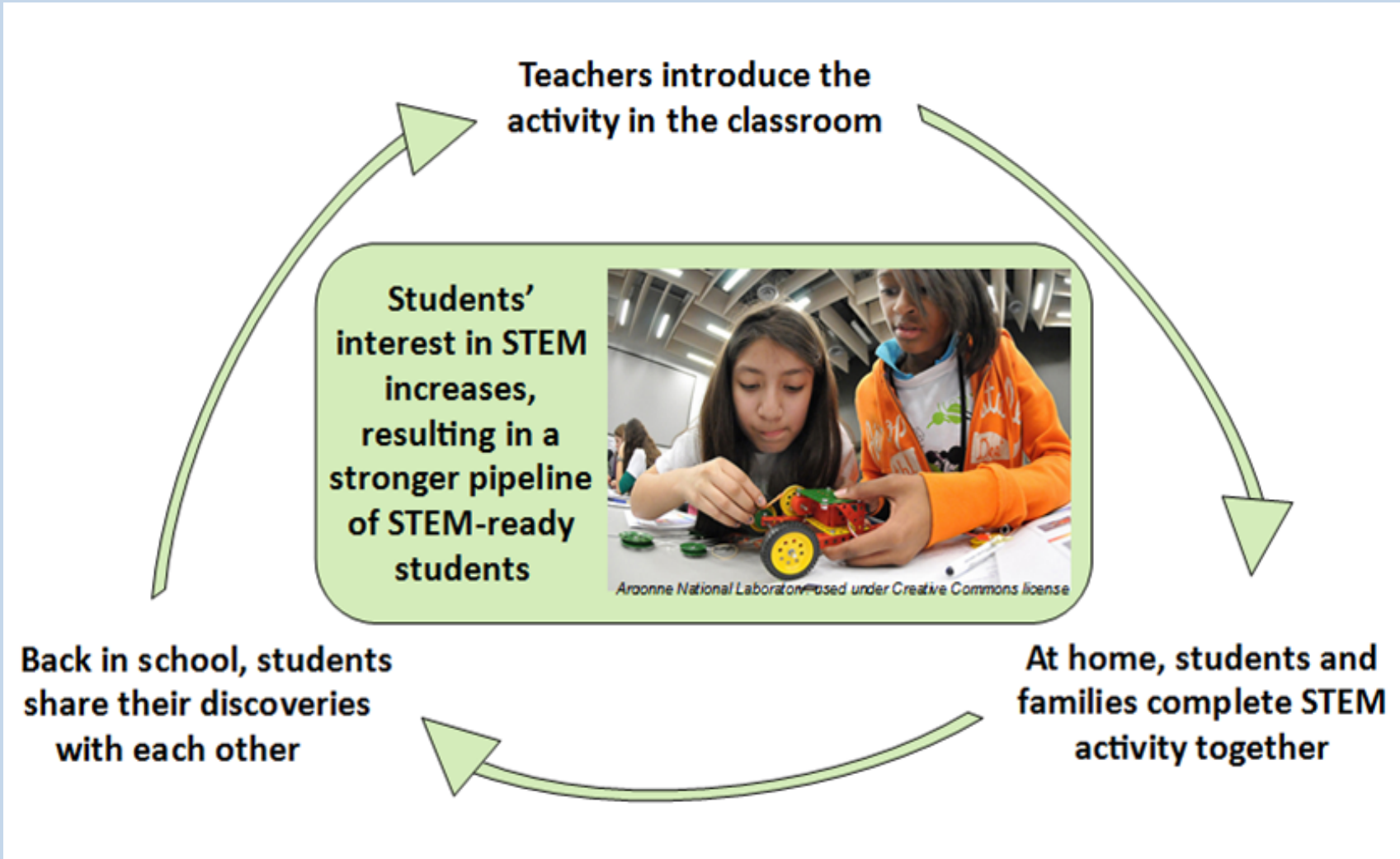
See www.globalSTEMcenter.org


Photo Courtesy of Larisa Schelkin

Broaden the scope.3

- Online teaching & learning
- Digital resources
  -Games, apps, websites, OER
- Hybrid teaching & learning
- MOOCS

From Wheelock College



Broaden the scope.4

- Museums: The Children's Museum, The Museum of Science
- Professional organizations

About standards in the US

- Common Core…national orientation
- State Standards...in the US education is the domain of each state

A few good resources to think about issues:

https://www2.ed.gov/about/overview/budget/budget15/crosscuttingissues/stem.pdf

https://www.educateiowa.gov/article/2015/08/25/state-board-education-adopts-new-science-standards

http://education.ufl.edu/stem-tips/files/2012/12/STEM-TIPS-Present12-5-12.pdf

IT IS USEFUL IF

The leaders of your nation lend their support, e.g.new effort exposes students to STEM careers President Obama…) About 50 national labs in 20 states will host 5,000 students as part of a new program launched recently by President Barack Obama. The program -- a take on "take your child to work day" -- is intended to expose students to potential careers in science, technology, engineering and math.

The Associated Press (2/28/16)

Photo Courtesy of Larisa Schelkin

IT IS USEFUL IF.1

Large and small companies help with such practices as:

- **Apprenticeships for students**
- **Externships for teachers**
- **Support for specific events or projects**
- **Assistance in convening people**

Useful & multiple resources

Simply Google

Then measure against the specifics of the context of the institution

A Tale of Two States

http://www.mass.edu/stem/home/council.asp

http://www.mass.edu/stem/home/stemplan.asp

http://www.iowastem.gov

http://www.iowastem.gov/sites/default/files/STEMEducationRoadmap2011.pdf

An article :

http://www.ikzadvisors.com/wp-content/uploads/Where-Do-Our-Students-Encounter-Materials1.pdf

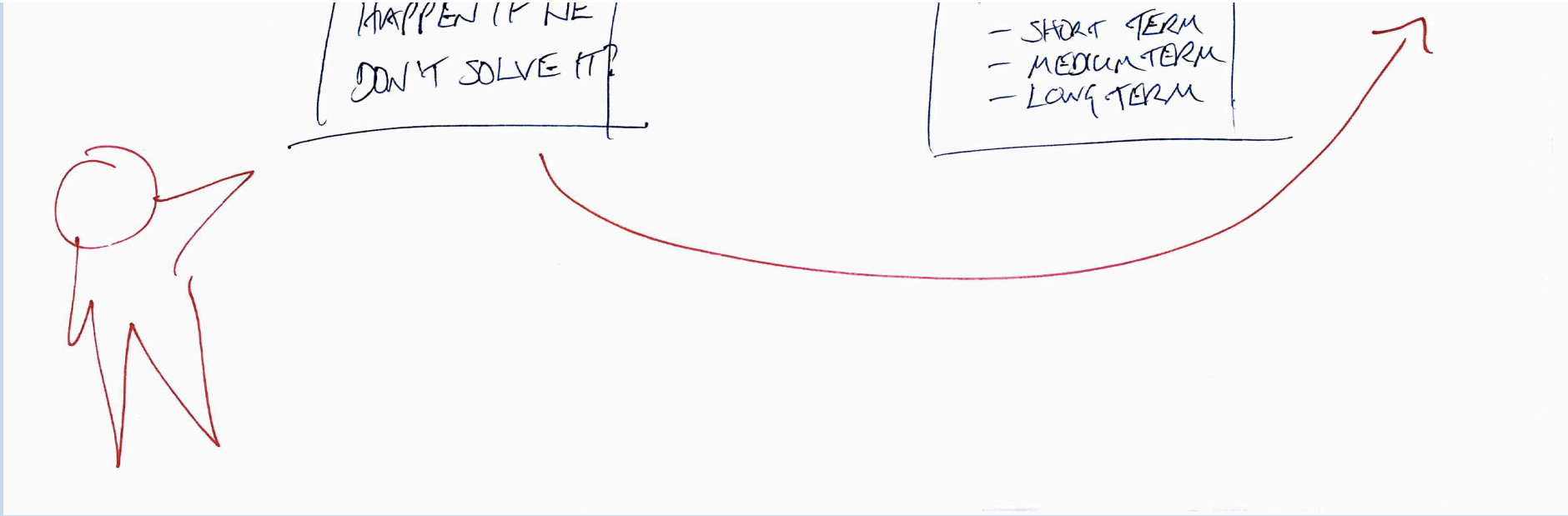
Contact information

Isa Kaftal Zimmerman

Mobile 617-642-4733

ikz1@verizon.net

http://www.ikzadvisors.com


HAPPEN IF WE
DON'T SOLVE IT?
– SHORT TERM
– MEDIUM TERM
– LONG TERM

The document you will work from

Modified Logic Model for Discussion/Planning

1. **What is the problem we are solving?**
2. **What will happen if we do not solve it?**
3. **What will success look like (impact)?**
4. **What activities we will engage in?**
5. **What are the anticipated outcomes?**

Short Term (by when?) Middle Term (by when?)
Long Term (by when?)