Before We Start

bit.ly/stemWkTeacher
Schedule

- Introduction to STEM Week
- Meet the MA STMath team
- Few administrative items
- (All Group) Creativity Step 1
- (Breakouts) Project and Website
- (All Group) Creativity Step 2
- Q&A
The STEM Week Challenge is a high-quality, meaningful K-12 applied learning experience for Mass STEM Week – this year with added emphasis on flexibility to meet educators and students where they are. Students tackle real-world problems informed by relevant industry experts – in this case: exhibit designers, animal trainers and educators at the New England Aquarium.

The 2020 STEM Week Challenge is brought to you by the One8 Foundation and its program Mass STEM Hub.

Learn more at STEMWeekChallenge.org!
Our MISSION is to provide schools with access to and support for applied learning and STEM education that builds knowledge and skills students need to succeed in a rapidly-changing, high-tech world.
Fantastic partners have created meaningful and relevant student experiences across grades K-12

High School

**Challenge Designer**

*Project based learning support services*

**Industry Partners**

*Partners In Health*  *IBM*

Middle School

*INNOVATIVE LEARNING PARTNERS*

*in partnership with*

*K-12 applied learning curriculum*

Elementary School

*ST Math.*

*Elementary conceptual math program*
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bi-weekly office hours (email)

mass-stemhub.org/stem-week-2020/

expert forum, final challenge submission
Key Dates

- Ongoing: asynchronous training + office hour (tell your fellow educators!)
- Mid-Late September: missing videos live on our website
- Early October: Ask an Expert online forum opens (we will email when it’s live!)
- 10/19-10/23: STEM Week!
- Friday, 10/23: by midnight: virtual submissions due
- Mid-November: feedback on student-submissions, celebration video
Training Feedback

Link at the end of the session
Saying “Cape Cod” is fine.

It’s called “the Cape”!

If you say “Cape Cod”, you probably also like the Yankees.

I don’t know who the Yankees are.

Stuck → type in to chat.
Mass STEM Week 2020 (K-5th)

Boost human connection and STEM outreach amidst social distancing.
Chapter 2: Lemur Ages

Did the young Math play it safe too?
PLAY, CREATE, SHARE, REFLECT
Top 10 skills

in 2020

1. Complex Problem Solving
2. Critical Thinking
3. Creativity
4. People Management
5. Coordinating with Others
6. Emotional Intelligence
7. Judgment and Decision Making
8. Service Orientation
9. Negotiation
10. Cognitive Flexibility

in 2015

1. Complex Problem Solving
2. Coordinating with Others
3. People Management
4. Critical Thinking
5. Negotiation
6. Quality Control
7. Service Orientation
8. Judgment and Decision Making
9. Active Listening
10. Creativity

Source: Future of Jobs Report, World Economic Forum
Top 10 skills

<table>
<thead>
<tr>
<th>in 2020</th>
<th>in 2015</th>
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<tbody>
<tr>
<td>1. Complex Problem Solving</td>
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<td>2. Critical Thinking</td>
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<tr>
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Source: Future of Jobs Report, World Economic Forum
Creativity is as important in education as literacy.

Sir Ken Robinson, Ted Talk, 2006
novelty

relevance

Creative Problem Solving
REATIVITY ROADMAP
REATIVITY ROADMAP
Creative Climate

REATIVITY ROADMAP
creativity ~ photosynthesis
Creative Climate

- environment
  - experiences
  - emotions
40% physical
60% social, emotional
Experiences
Environment
Emotions
novelty  
curiosity

relevance  
perseverance

Experiences  
Environment  
Emotions
Yay

n novelty ~ curiosity
relevance ~ persistence

Nay
Yay

Nay

novelty ~ curiosity
relevance ~ persistence
Yay

Nay

novelty ~ curiosity

relevance ~ persistence
Yay

Nay
Yay

Nay
Yay

Nay

novelty ~ curiosity

relevance ~ persistence
The sweet spot isn’t automatically transferable between activities nor over time.
curiosity and perseverance within a single math task/challenge
Yay

- specific, strategic, non-routine goal
- addictively tricky puzzles
- diverse experiential types
- value autonomy and failure
- minimize distractions and consequences

Nay

- drill’n’kill worksheets
- all kinds of cool supplies
- every assignment graded
- passport/raffles family night
- giving all the steps right away
high expectations without high pressure
Turn a task into a challenge.
When teachers are told to be responsible for students achieving at a high level, their

<table>
<thead>
<tr>
<th>Talking</th>
<th>Controlling statements</th>
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<tr>
<td>x2</td>
<td>x3</td>
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<tr>
<td>Criticism</td>
<td>Offered less student choice</td>
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<td>x2.5</td>
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</table>
Emotions:
Yay

Nay

relaxed
Yay

Nay

relaxed

angry
Yay

angry

Nay

relaxed
Yay

angry

Nay

relaxed

self-conscious
Yay

angry

Nay

relaxed

self-conscious
Yay

angry

urgency

Nay

relaxed

self-conscious

high-stress
urgency without anxiety

love

social approval

physically ecstatic

openness to experience

gift-giving

others-focused purpose

malicious delight

sense of purpose

self-belief
evoke “go for it” response early on in the task
Creative Climate

- experiences
- emotions

environment
Creative Climate

- environment
- strong social component
- experiences
- emotions
Mass STEM Week Challenge 2020
Engage your students in playing, creating and sharing their own math-based games!

ST MATH IN MASSACHUSETTS

Some Ways to Get It

- Offer lots of opportunities for curiosity.
- Offer novel, tantalizingly tricky challenges.
- Remove barriers for risk-taking and exploration.
  - Teachers aren’t the gatekeepers of “success.” Be careful with grades.
- Remove distractions on attention.
  - Offer little to no initial supplies. These distract kids away from the task.
- Make it easy and low-stress to mess up and learn from it.
- Don’t tell kids all the steps. Kids should learn to act before they have the answers.
  - If you don’t know, have a go. \(^{(12)}\)
- Offer strong social interactions.
- High expectations without high pressure
  - Too often we feel both together and many of us shy away.
**Maker Challenges**

**Kinder / 1st**  -  Make your own math memory cards. See if this time it'll be harder for the adults. If you want, change the rules a little bit too.

**2nd / 3rd**  -  Make the coolest math twist on Achi where the kids, on average, beat the adults.

**4th / 5th**  -  Make the most addictively tricky math golf ball puzzle or turtle puzzle experience.
tantalizing, clear goal

- unclear path
- no one right answer

DIY Challenge

- evoke “go for it”
- focus on others
Breakouts
Questions?
creativity ~ photosynthesis
Creativity is something we do,
not someone we are.

Brandon Smith
Testing an idea requires trying it out for real.
2 in 1 tool
Test early, simply, and often.
Turn a task into a challenge.
+ desire & way to test for real
- guarantee of success
Insight is an intuitive understanding that feels like an ah-ha.
What just happened.
Why I think it happened that way.
What might I be able to do about it.
We're hiding from you, Kate!

We're right here!
Next to your short term memory.
+ meaningful feedback
  - real-time
  - first-person
  - informative
  - encouragement

- testing that’s
  - too late
  - too much
  - too formal
  - to merely gather data
Re-ideation happens when insight picks up enough knowledge to work with.
Knowledge is not always helpful to creativity, however. People with an expert level of knowledge can display tunnel vision, a narrowed field of thinking.

James C. Kaufman, Robert J. Sternberg
The Cambridge Handbook of Creativity (Cambridge Handbooks in Psychology)

#kindlequotes
IDEATE

+ “just-in-time” knowledge

- pigeonholing assumptions

TEST

INSIGHT
Three E’s

- curiosity
- perseverance
- Experiences
  - Environment
  - Emotions

Maker Cycle

1. IDEATE
2. INSIGHT
3. TEST
Q&A
Before We Go

Link in Chat