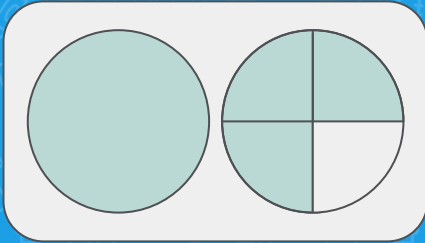


Before We Start

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

MASS
STEM HUB | one8
FOUNDATION

STEM WEEK CHALLENGE

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

Challenge Designer

High School



Project based learning support services

Industry Partners



Middle School



INNOVATIVE
LEARNING
PARTNERS

in
partnership
with



PLTW

K-12 applied learning curriculum



Elementary School



ST Math

Elementary conceptual math program



New England
Aquarium





ST Math®

stmath.com

MA Education Success Team



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New England
Aquarium

Protecting the blue planet

MASS
STEM HUB



one8
FOUNDATION



ST Math®



Mass STEM Week

mindresearch.org



MIND
RESEARCH INSTITUTE

Contact Us

STMathMA@mindresearch.org

stmath.com/massachusetts

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

Click “View Options” then
“Annotate”, select arrow stamp

Stuck → type in to chat.

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.

Mass STEM Week 2020 (K-5th)

Boost human connection
and STEM outreach
amidst social distancing.





Chapter 2: Lemur Ages

In Madagascar, Fanorona is very popular.

Old and young like to play it together.





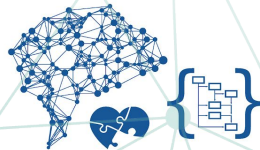
PLAY, CREATE, SHARE, REFLECT



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



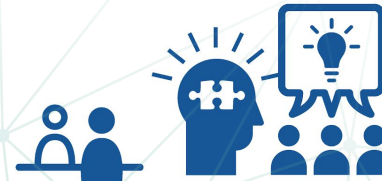
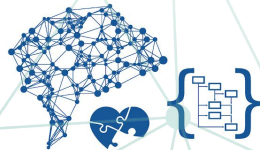
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10. Creativity



Creativity is as important
in education as literacy.



Sir Ken Robinson, Ted Talk, 2006



novelty

relevance

**Creative
Problem
Solving**





REACTIVITY ROADMAP





REACTIVITY ROADMAP





**Creative
Climate**

REACTIVITY ROADMAP





creativity ~ photosynthesis



Kinder

4th

6th

9th



Kinder

4th

6th

9th



environment

Creative Climate

experiences

emotions



40% physical
60% social, emotional

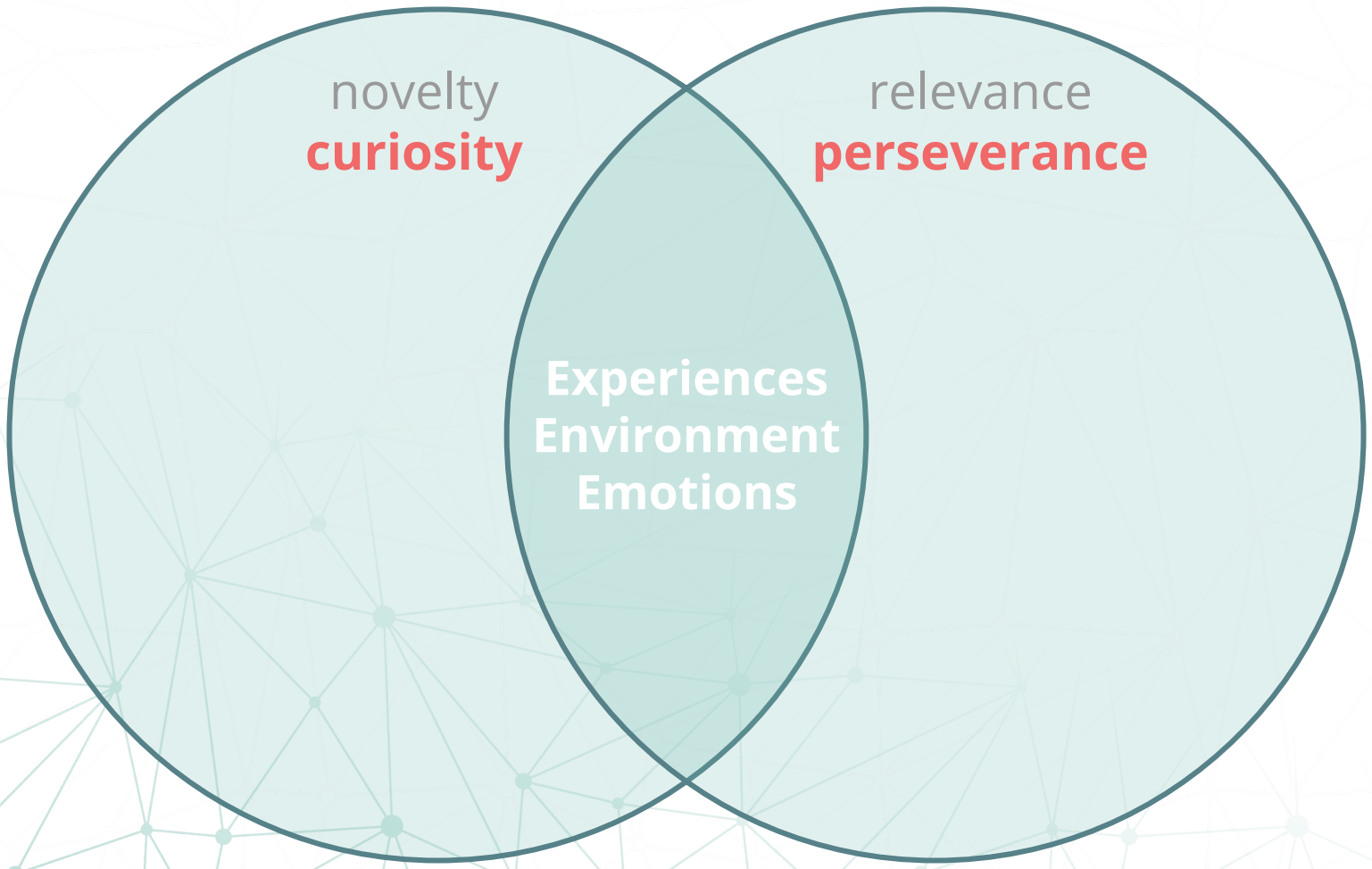


novelty

relevance

Experiences
Environment
Emotions





novelty
curiosity

The diagram consists of two overlapping circles. The left circle is labeled 'novelty' and 'curiosity'. The right circle is labeled 'relevance' and 'perseverance'. The intersection of the two circles contains the text 'Experiences', 'Environment', and 'Emotions'. The background features a network of light blue lines and dots.

relevance
perseverance

Experiences
Environment
Emotions



Yay

Nay

novelty ~ curiosity

relevance ~ persistence





Yay



Nay

novelty ~ curiosity

relevance ~ persistence



Yay



Nay



Yay

Nay

novelty ~ curiosity

relevance ~ persistence



Yay

Nay



Yay

Nay



novelty ~ curiosity

relevance ~ persistence



Yay



Nay





Yay

Nay

novelty ~ curiosity

relevance ~ persistence



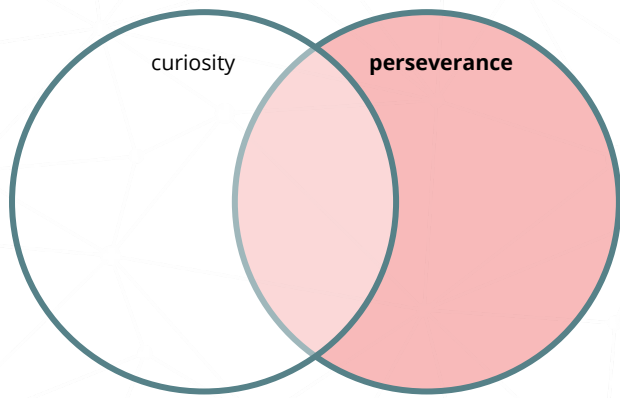
Yay



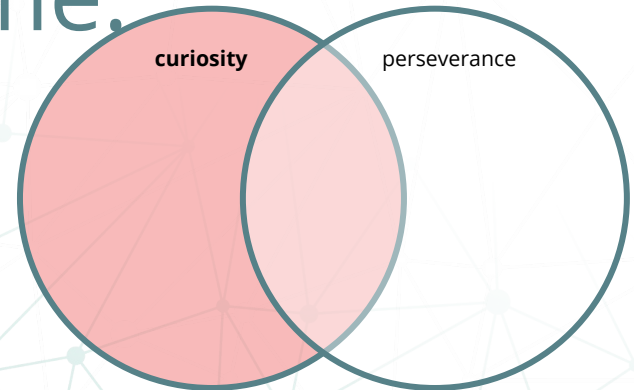
Nay








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



A conceptual image featuring a lightbulb with a globe of the Earth inside it. The background is black, adorned with white splatters and several virus-like particles. The text "high expectations without high pressure" is overlaid on the image.

high expectations **without**
high pressure



Medical & Science

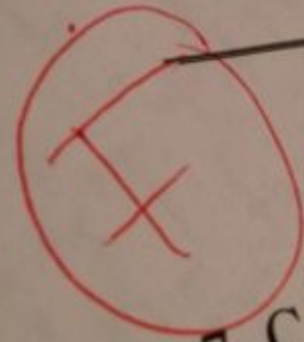
PEMDAS

means

Turn a task into a challenge.

by [acronymsandslang.com](https://www.acronymsandslang.com)

6. What is the definition of PEMDAS?



7. Calculate this expression

$(2) \times (4) \times (5) + (6)$

When teachers are told to be responsible for students achieving at a high level, their

| | |
|-------------------|--------------------------------|
| Talking x2 | Controlling statements x3 |
| Criticism x2.5 | Offered less student choice |





Emotions:

Yay

Nay

relaxed



Yay

Nay

relaxed



Yay

Nay

relaxed

angry



Yay

angry

Nay

relaxed



Yay

angry

Nay

relaxed

self-conscious



The background of the slide features a light gray network pattern of interconnected lines and dots. A vertical gray line divides the slide into two equal halves.

Yay

angry

Nay

relaxed

self-conscious



Yay

angry

Nay

relaxed

self-conscious

stress



The background of the slide features a light gray network pattern of interconnected lines and dots. A vertical gray line runs down the center of the slide, separating the 'Yay' side from the 'Nay' side.

Yay

angry

urgency

Nay

relaxed

self-conscious

high-stress

A small orange geometric logo consisting of interconnected lines forming a cube-like structure is located in the bottom left corner.A small orange geometric logo consisting of interconnected lines forming a cube-like structure is located in the bottom right corner.

Yay

urgency without anxiety

gift-giving

love

others-focused purpose

social approval

malicious delight

physically ecstatic

sense of purpose

openness to experience

self-belief



A black and white illustration of a lightbulb. Inside the bulb is a detailed map of the Earth (globe). The bulb is surrounded by various splatters and small, spiky virus-like particles. The text "evoke 'go for it' response early on in the task" is overlaid on the image. The words "go for it" and "early on" are in red, while the rest of the text is in white.

evoke "go for it" response
early on in the task

environment

Creative Climate

experiences

emotions



environment

strong social component

Creative Climate

experiences

emotions





Mass STEM Week Challenge 2020

Engage your students in playing, creating and sharing their own math-based games!

ST MATH IN MASSACHUSETTS



Play. Create. Share.

Hours:

1

2

3

4

5

6

7

8

9

10

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



maturing ~ pruning

Creativity is something we do,
not someone we are.



**Productively
Manage
Missteps**

Three E's

REATIVITY ROADMAP

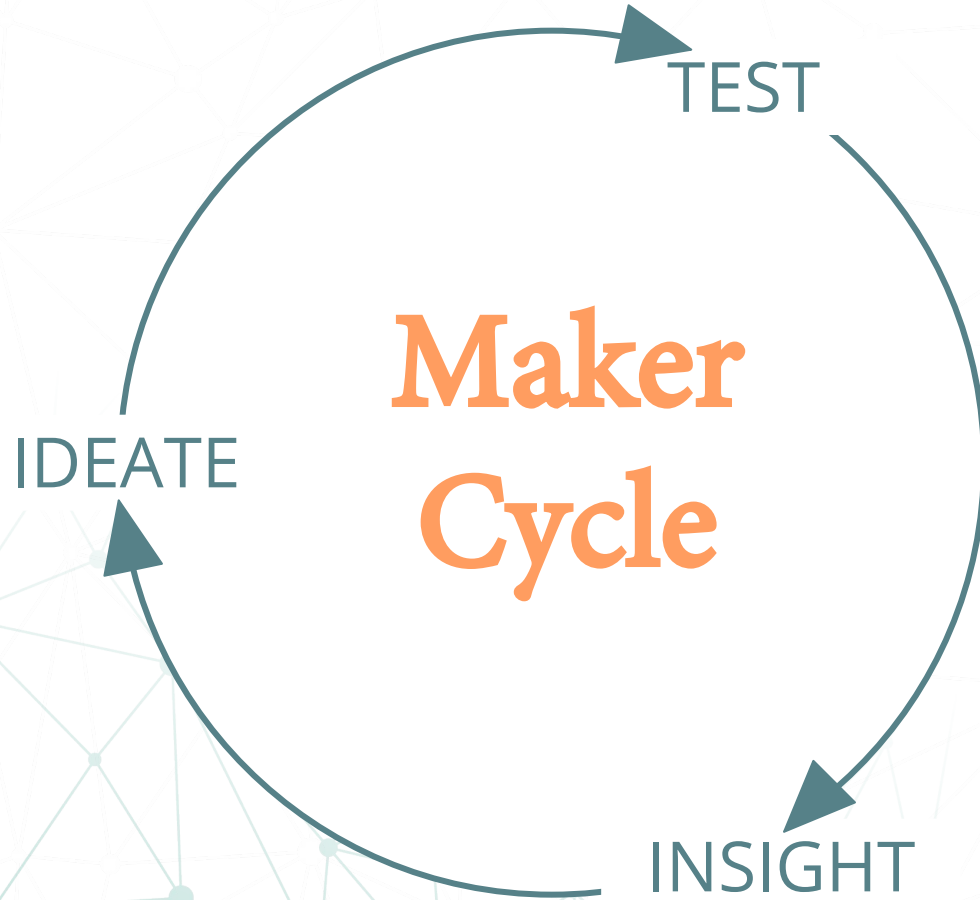




IDEATE

TEST

INSIGHT

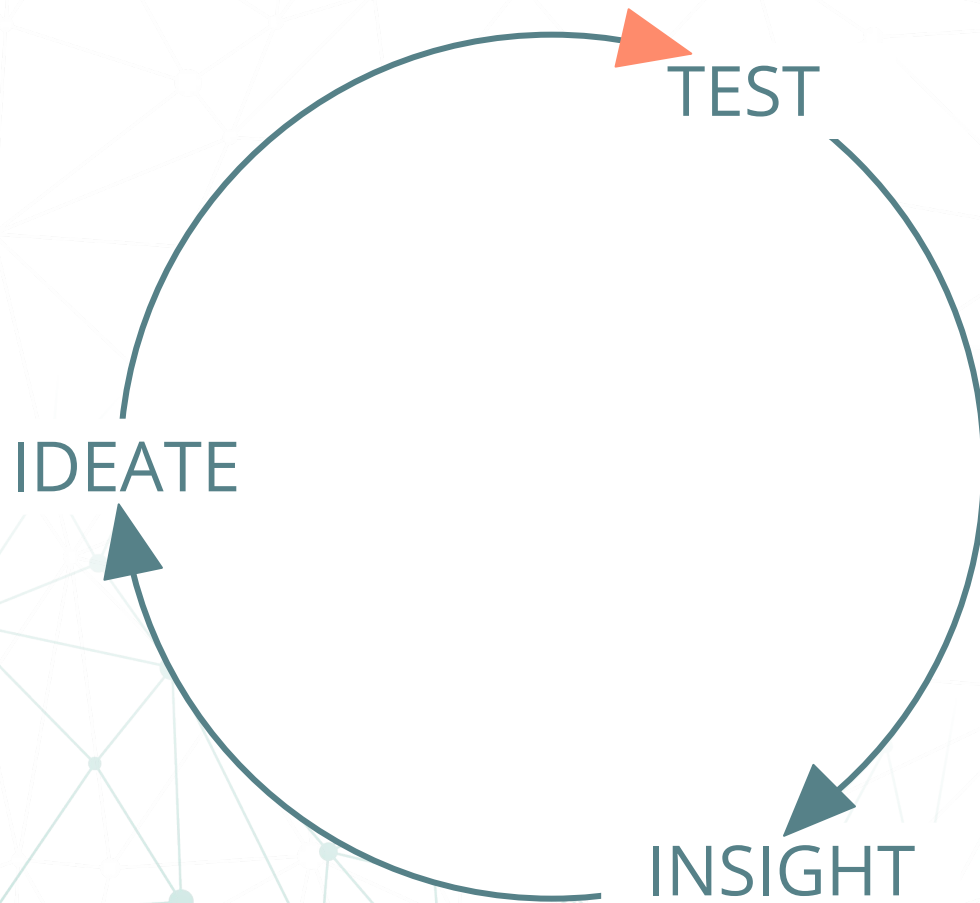




IDEATE

TEST

INSIGHT





IDEATE

TEST

Testing an idea requires
trying it out for real.

INSIGHT

2 in 1 tool







Test early, simply, and often.





Medical & Science

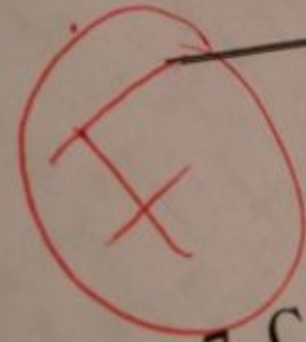
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IDEATE

TEST

+ desire & way to test for real

- **guarantee of success**

INSIGHT



IDEATE

TEST

INSIGHT





IDEATE

TEST

Insight is an intuitive
understanding that feels
like an ah-ha.

INSIGHT

A conceptual image featuring a lightbulb against a black background. Inside the lightbulb is a map of the African continent. The background is filled with numerous small, white, spiky particles resembling viruses or bacteria. The text is overlaid on the image in a bold, sans-serif font.

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.







unintentional
untargeted
without insight



iterate intentionally
insight
creative





IDEATE

TEST

- + meaningful feedback
 - real-time
 - first-person
 - informative
 - encouragement

- testing that's
 - too late
 - too much
 - too formal
 - to merely gather data

INSIGHT



IDEATE

TEST

INSIGHT



IDEATE

TEST

Re-ideation happens when
insight picks up enough
knowledge to work with.

INSIGHT

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



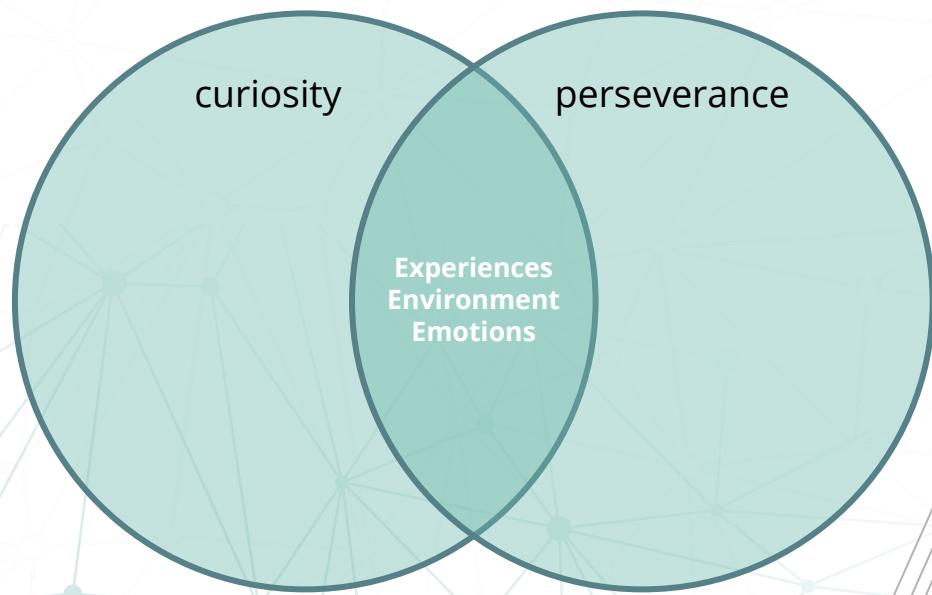


IDEATE

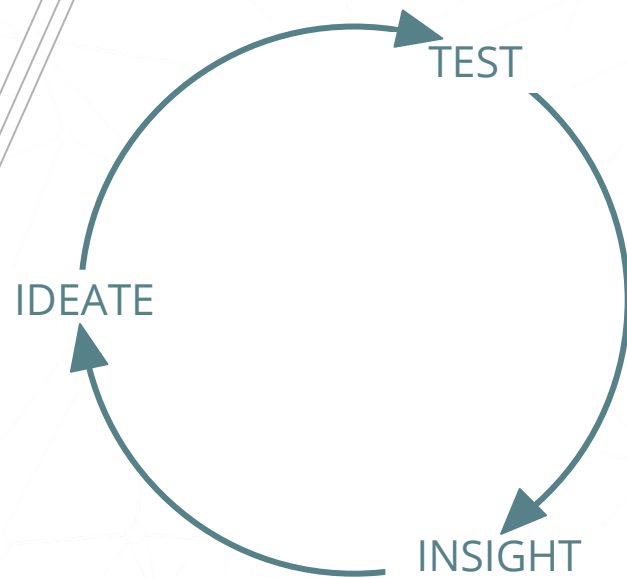
TEST

- + “just-in-time” knowledge
- **pigeonholing assumptions**

INSIGHT



Three E's



Maker Cycle

Q&A



Before We Go

[Link in Chat](#)