



Partnering for Equitable STEM Pathways for Youth Underrepresented in STEM (YeSTEM)

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August 10, 2018



AMERICAN
PSYCHOLOGICAL
ASSOCIATION

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Partnerships

London

UCL

Brent Lodge

STEMettes

Bristol

UCL

@Bristol

KWMC

Lansing

MSU

Impression 5

Boys & Girls
Club

Portland

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OMSI

Girls, Inc.

Responding to three shared challenges:

1. Lack of shared understanding of how youth from historically underrepresented backgrounds perceive and experience ISL opportunities across national contexts, and the practices and tools needed to support empowered movement through ISL
2. Limited shared understanding and evidence of core high-leverage practices that support such youth in progressing within and across ISL
3. Limited understanding of how ISL might be *equitable* and *transformative* for such youth seeking to develop their own pathways into and through STEM

Core strands

- **Strand 1: Youth Pathway Portfolios (Years 1 and 2)**
 - Local and x-site pathway representations
- **Strand 2: Practitioner High Leverage Practices Portfolios**
 - Local and x-site HLPs
 - Linking Youth Portfolios with HLPs
 - Creating an initial model of Equity-oriented HLPs/Pathways
- **Strand 3: Designing and testing new ideas for equity-oriented high leverage practices within and across sites**
 - Developing tools to support practices
 - Local and x-site testing of tools/practices
 - Refining tools and practices
 - Refining model
- **Strand 4: Dissemination**

Theoretical frameworks

- **Interest Development** – Interest is the product of the interaction of a person with their environment, always with the possibility to develop. (Renninger & Hidi, 2016; Hidi & Renninger, 2006)
- **Science Capital** – STEM-related cultural and social resources (e.g. knowledge, attitudes, experiences, networks) that youth possess, but may or may not be valued or recognized in a given context. Building on Bourdieu's work. (Archer, Dawson, DeWitt, Seakins, & Wong, 2015)
- **Learning Ecosystem & Mobilities of Learning** – Frameworks that highlight 1) the set of contexts that support learning across settings and 2) how youth navigate pathways towards STEM. (NRC, 2009; Traphagan & Traill, 2014; Falk & Dierking et al., 2016; Calabrese Barton & Tan, in press)

Our commitments

- **Equity** – we will produce new knowledge and practices to close the gaps in STEM.
- **Participatory and collaborative approaches** – the *voices of youth* and *practitioners* are central to re-imagining ISL knowledge and practices in new ways.
- **Contribute to learning and development theory and empirical understandings of how STEM pathways work** for minoritized youth



ISL and equity pathways

- How youth move through ISL and its cumulative impact
 - How equity pathways matter in very real ways to youth & why we need to see them from different perspectives
- “No one-off event is going to cut it in terms of making real impact on social inequalities and widen science engagement. The appeal of the pathways model is that it means no one person or organisation has to try to do it all.” (UK practitioner, phase 1 workshop)*

Research Questions (Strand 1)



- How do youth from communities under-represented in STEM experience and describe ISL activities? What factors seem to shape those experiences in ways that make them equitable (or not)?
- In what ways, and under what conditions are under-served youth supported in connecting ISL experiences to build their equitable and transformative STEM pathways? What makes pathway development successful (or not) and with what outcomes (e.g. content, practices, agency, identity)?
- What tools, resources and strategies can practitioners (and youth themselves) use to aid successful youth path-making in and through STEM?

Youth Portfolio Data Portland, OR

APA2018

Youth Researchers



Youth Researchers

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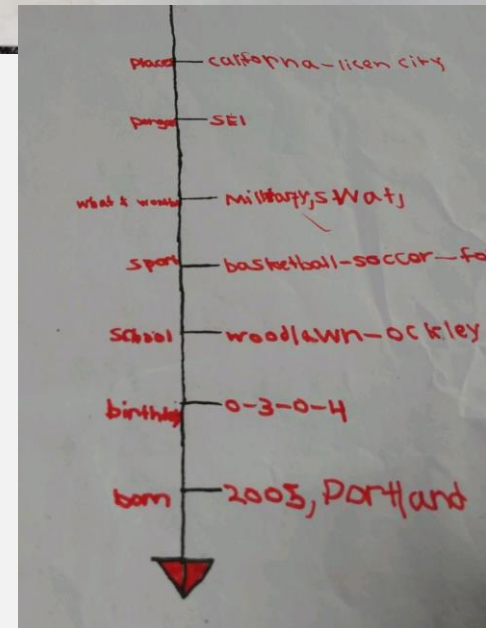
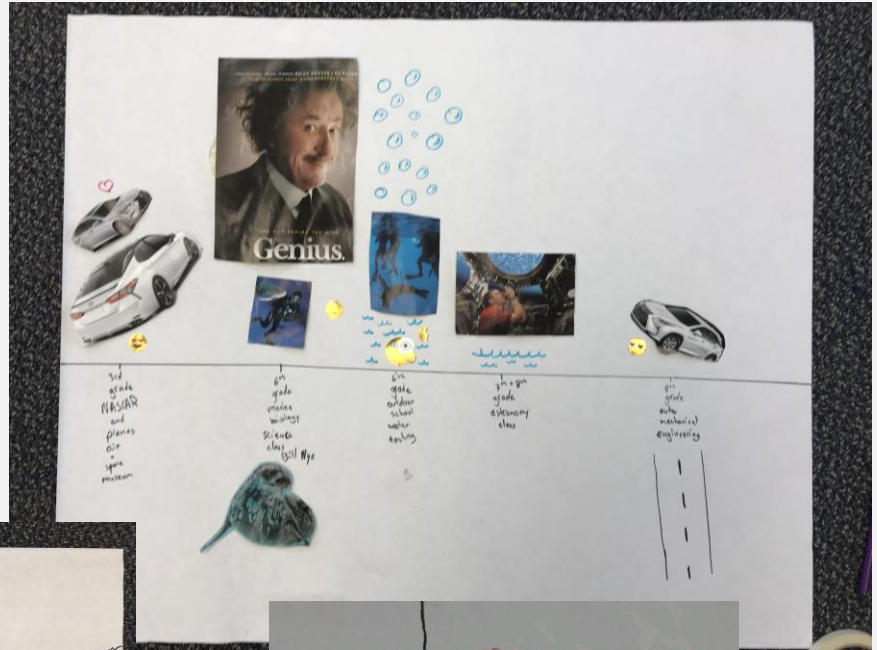
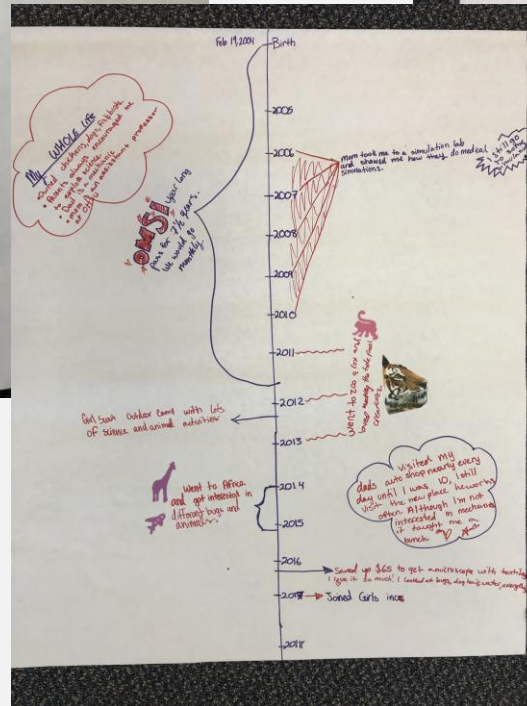
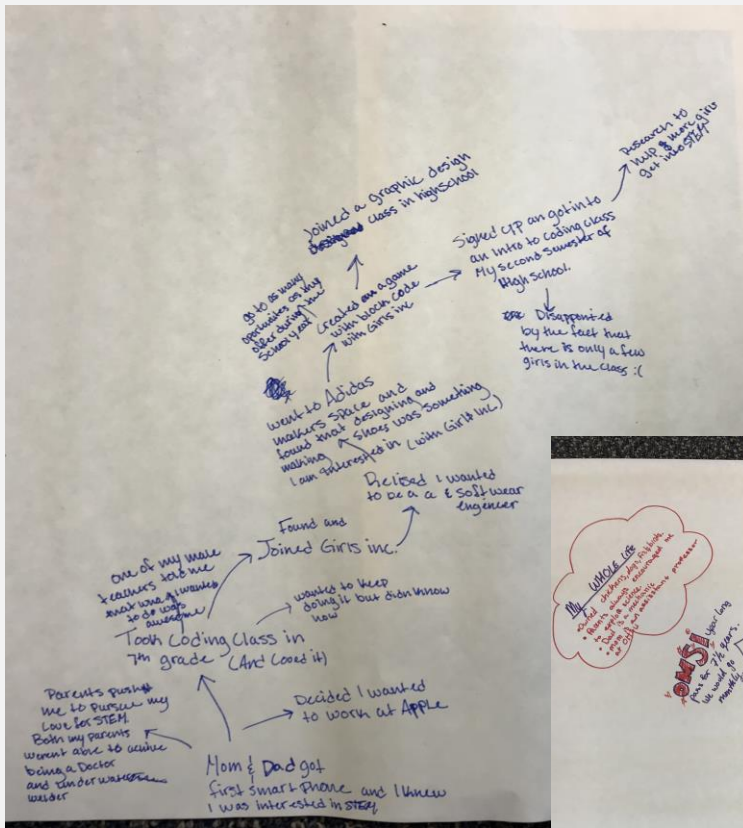
- Interest timelines
- STEM identity reflection: five years ago, now, ten years from now
- “Final” project to share ideas about STEM pathways (with other youth who may want to forge such a pathway and for practitioners supporting youth): what do they need to know, try, look out for

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- Interest timelines
- Personal Meaning Mapping (“ME” “STEM”)
- “Final” project to share ideas about STE(A)M, pathways, or interests: Why STEAM, how did they become interested, why did they choose such a topic for a school science project, what was it like to attend a STEAM school?

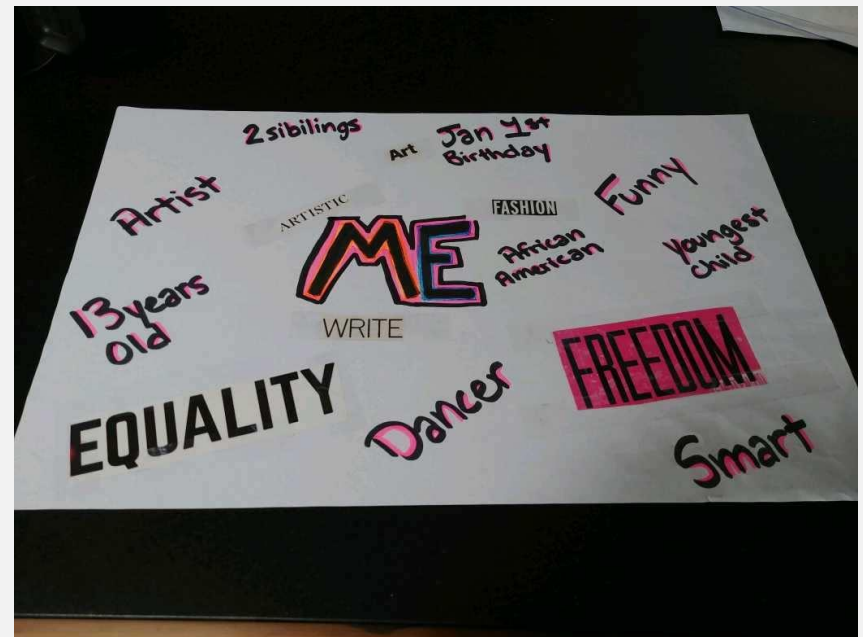
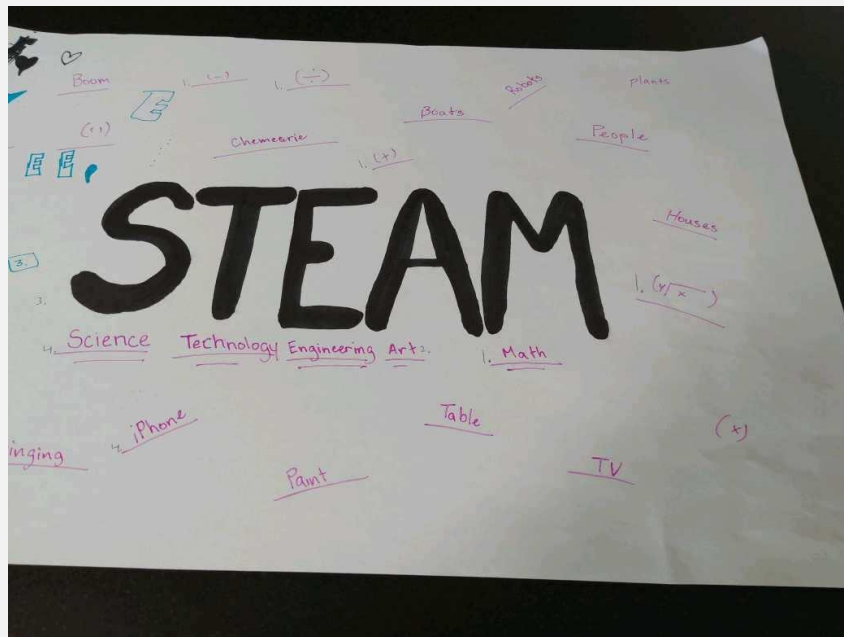
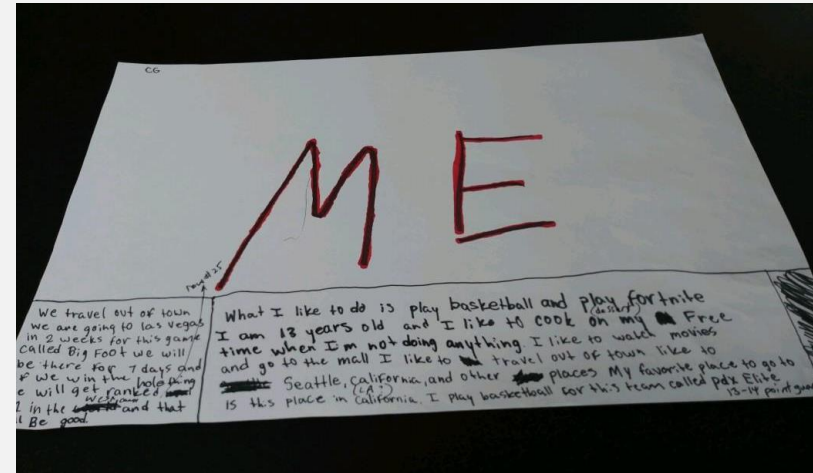
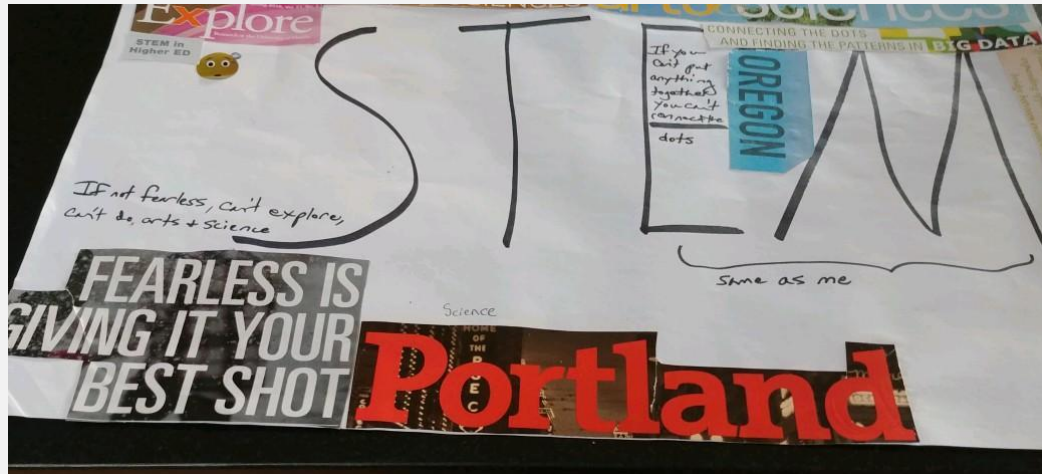
APA 2018

Timelines



APA 2018

Personal Meaning Mapping



APA 2018

My relationship with STEM has changed over the years. In middle school, I loved my science class. I worked hard and was invested in what I was doing. My class-mates were not very supportive causing me to feel like I too did not enjoy science. I now go to St. Marys, an all girls school. I feel like most of my teachers are supportive of me and want me to feel comfortable with my love of STEM. One of the many reasons why I wanted to attend St. Marys was because I thought that it would be a place where I could freely express what I enjoy doing. I have found that the girls who are interested in STEM are claimed to be the "nerdy" girls. I'm not sure what it is that causes people to group others because of what they like. Girls Inc. has provided me a place to love science and do so without being ashamed. I think that for the most part I have had negative experiences but it has come out as a positive thing. It has pushed me to want to do better and surprise others and myself about what I am able to do. I have always been a hands on learner and I love when I have those moments when things click. I am trying to put myself out there and do things that are out of my comfort zone. I think that seeing women doing science that is relatable will get more girls involved or interested in STEM. When I hear about women who have done something new, I think oh thats awesome!

got to do alot of fun things.

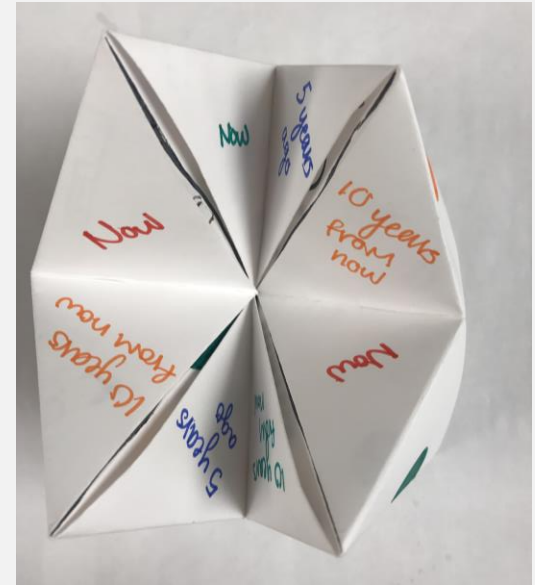
One time a fish Hatchery place that works with salmon came to my school when I was in 4th grade and we dissected salmon.



In 6th grade we had a guest artist come and we made beats to our poems.



Poem → Bo-Boom Bum-Bum Doom



5 years ago
 How is STEM or my interest in STEM present?
 • I made a magnetic liquid and showed how the magnetic force is apparent
 • I am looking into careers as an AG teacher or a computer scientist
 • I have learned college level concepts of my organism and its life
 What would be helpful to achieve my goal?
 • My goal was to make a volcano with baking soda and vinegar
 • More exposure to what a computer designer does
 • More hands on experience in the lab to better find a career in STEM
 Who could help me achieve my goal?
 • My mom
 • My teachers, girls inc. family
 • My significant other, my friends
 Who am I in this timeframe?
 • I was little and confused about life but I was happy
 • I am now in a timeframe to try to become what I want to do with my life
 • I am educated, I am successful and happy in life
 What do I value?
 • Family
 • Connections with a wide variety of people. The opportunity to do many things and go many places
 • My future, the beginning of a new start. My memories from my past experiences
 What advice would I give to other youth wanting to pursue STEM?
 • There are many areas and it doesn't have to be DIRECTLY under STEM. There are many side topics one can study.
 • Keep going! The world will always continue to advance and to do so, they need more people in STEM
 • Anything to overcome if you stick with it and believe in yourself
 What advice would I give adults to help me in this step?
 • Let me look into many different things that could possibly interest me
 • Help me learn and more ways to improve my skills. Or help find colleges around the world or online
 • Support me and push me to keep going when I loose faith

BASKETBALL



Basketball relates to STEAM because of the Physics that goes into shooting the ball and dribbling. Also the kinetic energy of the ball hitting the ground.



Next Steps

- Project researchers and practitioners discuss youth portfolio data and emerging themes highlighted by youth about their experiences.
- Based on these discussions, identify High-Leverage Practices (HLPs) for each context. Conduct design-based research by using HLPs in each context in the US and UK, and iterate. (Year 3)
- Engage in cross-site comparisons (within the US and UK, and between the US and UK).



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Micaela Balzer (Impression 5)

Marcie Bennie (Oregon Mus of Sci & Industry)

Carolyn Manke (Girls Inc., Pacific Northwest)

Sample Title

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