Today's Presenters

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KITSAP REGIONAL Library

Make, Do, Share:

Getting Started with STEM in a Box

INSTITUTE of Museum and Library SERVICES

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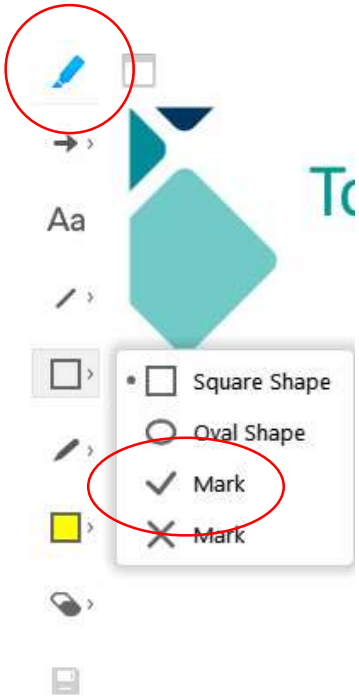
Annotation Tools

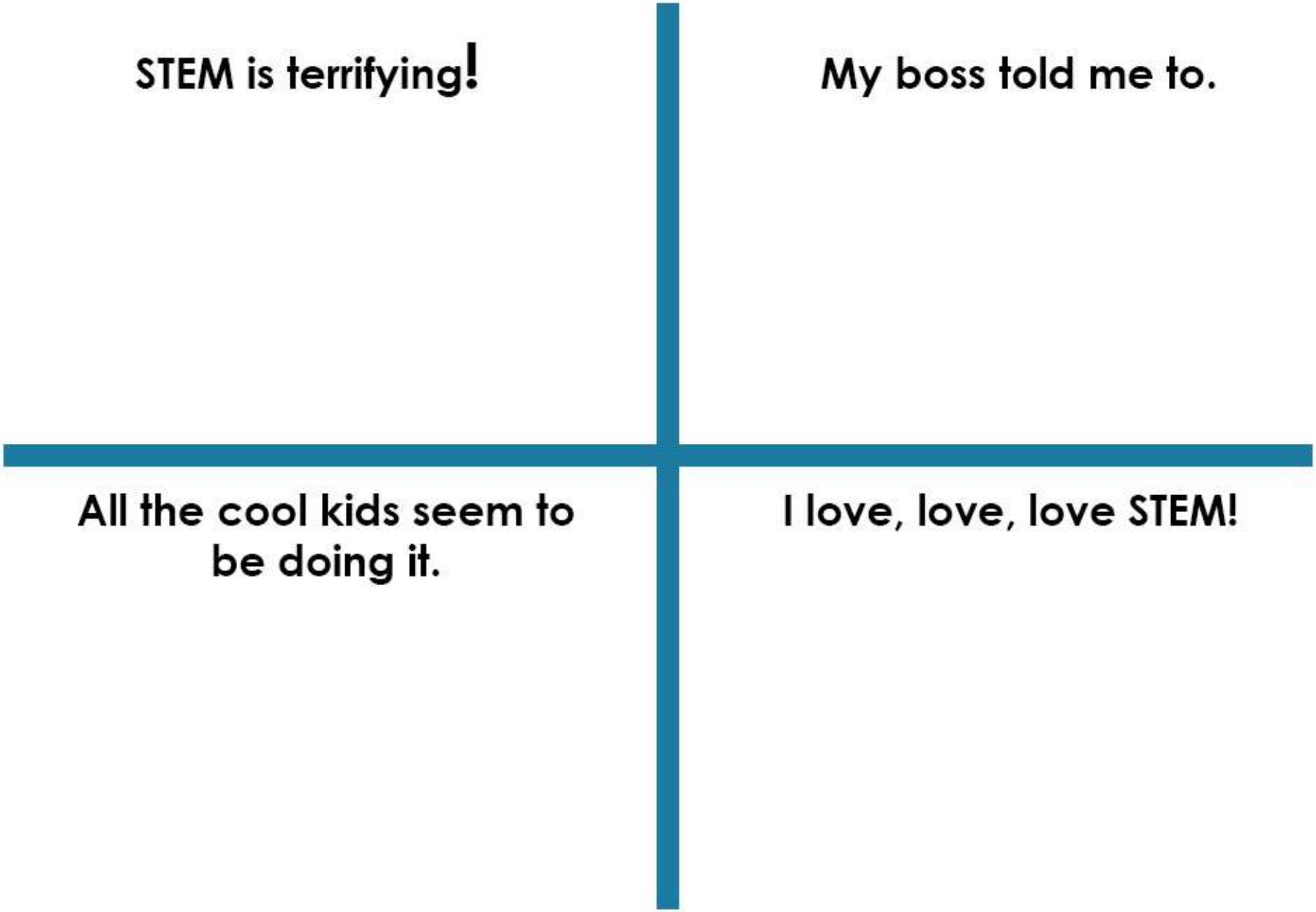
Click on the marker at the top left corner of the screen and the tool buttons will open.

Check mark

- Half-way down menu, click on square.
- Use the drop-down menu and choose the check mark.
- Click on slide to indicate choice.

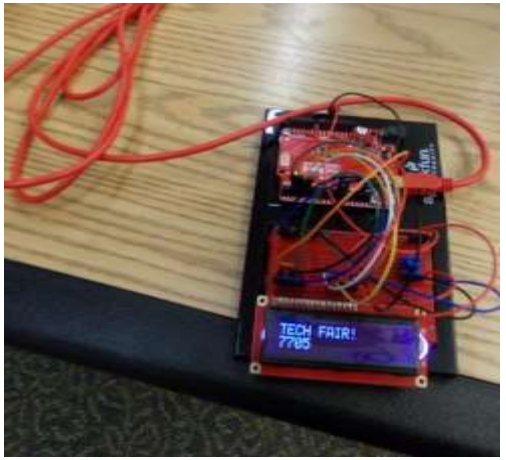


I'm here because...



Agenda

- ✓Make Do Share Project Overview
- ✓Road Map: Planning and Learning Guide
- ✓Play Book: Program Outlines and Ideas
- ✓Q & A



BiblioTEC

Make Do Share

Why STEM?

Job Growth

STEM careers growing 3x faster than non-STEM

STEM: Good Jobs Now and for the Future, U.S. Dept. of Commerce, Economics and StatisticsAdministration, 2011.

New Economy

30 of the fastest growing jobs (2008-2018) will require a STEM related skill

Preparing for jobs that don't yet exist

The 30 fastest growing occupation 2008-18, U.S. Bureau of Labor Statistics, 2010.

Student Performance and Readiness Gaps

35th out of 64 in math and 27th in science on 2012 PISA

45% of high school graduates ready for college work in math, 30% in science (2011)

The Condition of College & Career Readiness. Iowa City, IA: ACT, Inc., 2011

Fleishman, H.L., Hopstock, P.J., Pelczar, M.P. and Shelley, B.E. (2010) Highlights from PISA 2009: Performance of U.S. 15-Year-Old Students in Reading, Mathematics, and Science Literacy in aninternational Context (NCES 2011-004). Washington, DC: National Center for Education Statistics, U.S.

Why STEM in libraries?

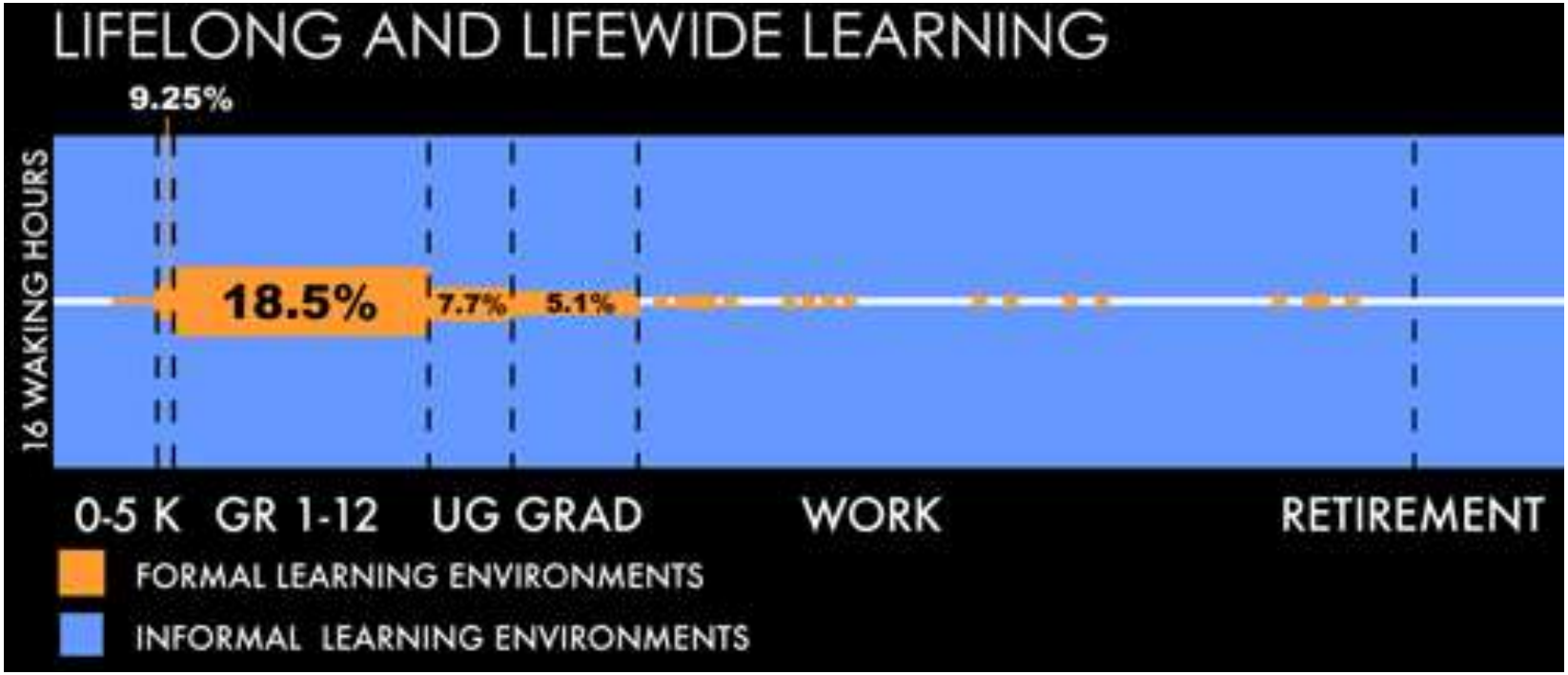
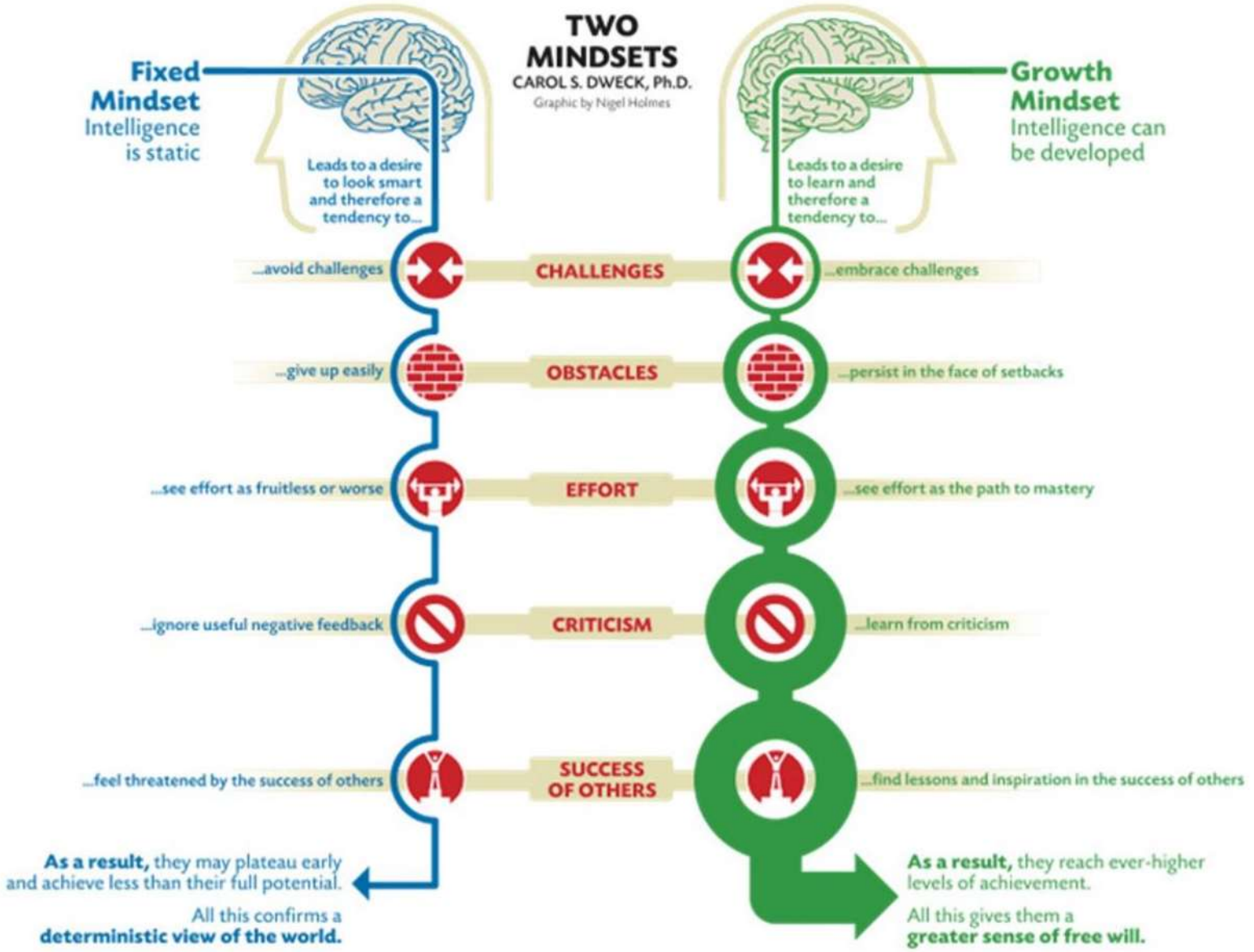


Figure 1: The LIFE Center Lifelong and Lifewide Learning Diagram

- ✓ Built-in capacity to support informal learning
- ✓ Diverse audiences and underserved populations
- ✓ Low-stakes, hands-on environment

Start with Growth Mindset



http://nigelholmes.com/graphic/two-mindsets-stanford-magazine/

Road Map
Planning and Learning

Study, Listen, Look!

- ✓Demographic data
- ✓Community mapping

Discover Your Community

Resources for further learning:

Annie E. Casey Foundation. *Kids Count Data Center.* http://datacenter.kidscount.org/

Ready by 21. *Program Landscape Mapping Packet.* http://www.readyby21.org/resources/program-landscape-mapping-packet

U.S. Department of Education. *Data and Research.* http://www2.ed.gov/rschstat/landing.jhtml?src=image

Work Group for Community Health and Development. "Assessing Community Needs and Resources Toolbox" *Community Toolbox.* University of Kansas. http://ctb.ku.edu/en/assessing-community-needs-and-resources >.

Focus on Facilitation

Build Relationships with Youth and Families through

- Knowledge of ages and stages
- Community building
- Youth voice

Resources for further learning:

David P. Weikart Center for Youth Program Quality. *Youth Works Methods Series (Fee based print materials and online training).* http://www.cypq.org/products_and_services/training/YWM

MIT Media Lab. *Family Creative Learning Facilitation Guide.* http://family.media.mit.edu/

SEARCH Institute. *Parent Further.* http://www.parentfurther.com/

Develop Community **Connections**

- ✓Increase Capacity
- ✓Achieve stronger outcomes

Resources for further learning:

Ready by 21. *Building Blocks for Effective Change: Broader Partnerships, Bigger Goals, Better Data, and Bolder Actions.* http://www.readyby21.org/toolkits

Remake Learning. "The Learning Network." *Remake Learning Playbook.* http://remakelearning.org/playbook

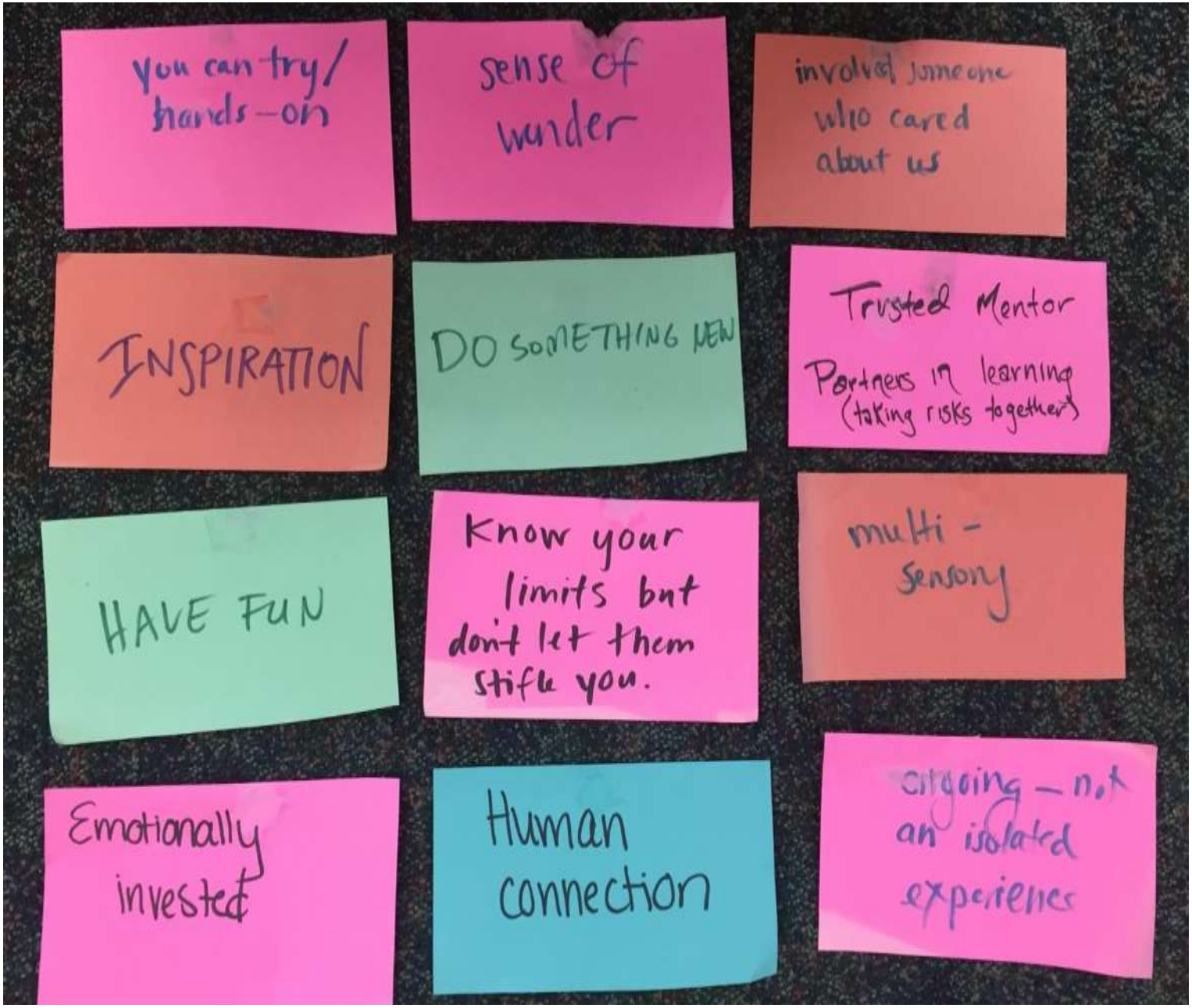
STEM Ecosystems. *Key Resources.* http://stemecosystems.org/key-resources/

Plan for Impact

DML Research Hub
@DMLResearchHub

Follow

"It isn't really about the tech, it is not about #coding. It's about a philosophy of #learning." bit.ly/1xiXeUO


you can try/ hands-on
sense of wonder
involved someone who cared about us
INSPIRATION
DO SOMETHING NEW
Trusted Mentor
Partners in learning (taking risks together)
HAVE FUN
Know your limits but don't let them stifle you.
multi-sensory
Emotionally invested
Human connection
ongoing – not an isolated experience

Program Examples

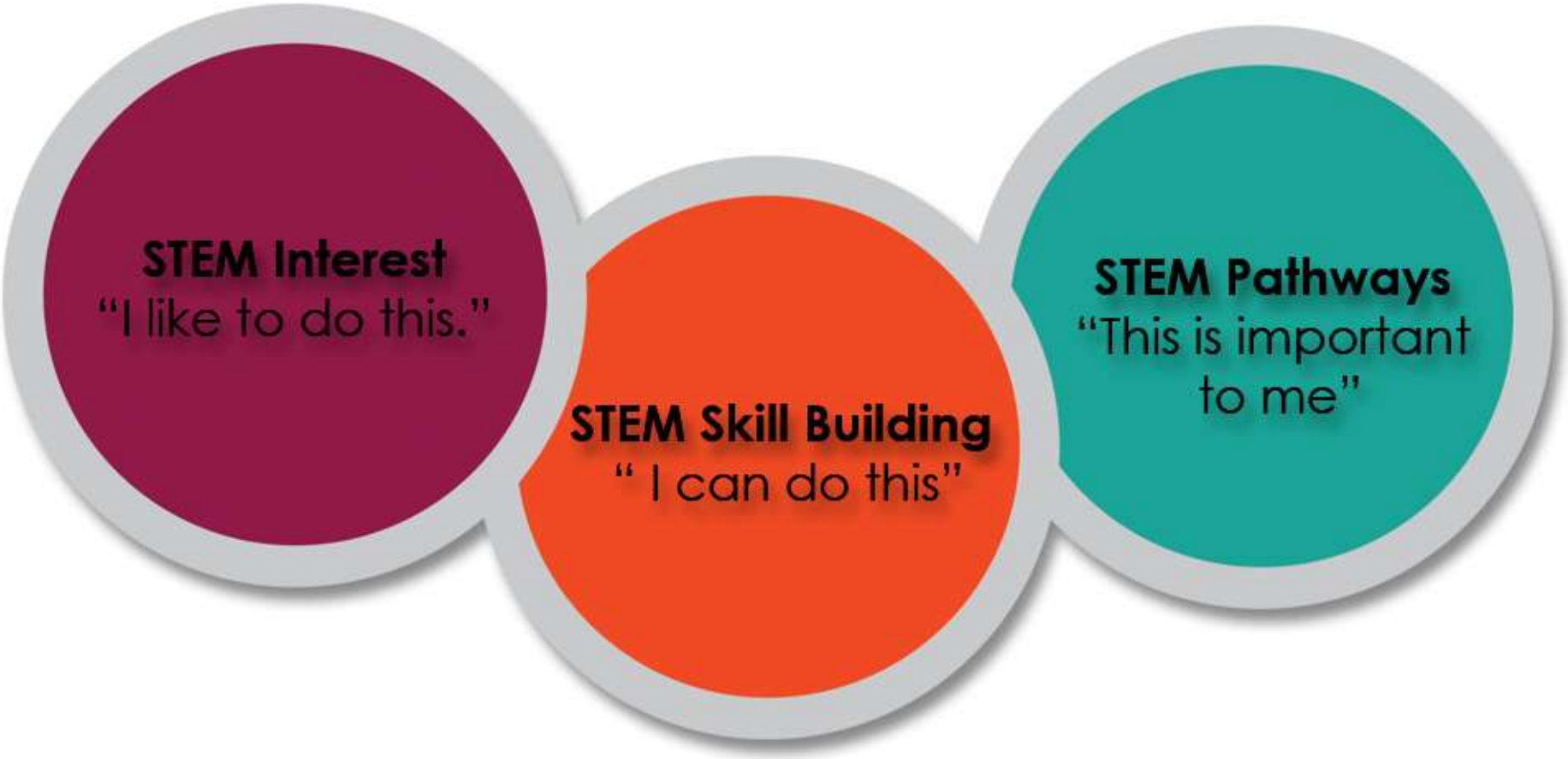
Library A hosts a robotics program. Staff layout equipment and step-by-step instructions and help youth to build a robot.

Library B hosts a multi-session STEM program. Staff ask youth to design a robot to address a particular problem or issue that exists in their life. After presenting on their ideas and getting feedback from the group, youth research the basics of the library's existing robotics equipment and as a group, decide how it might be used to address one of the afore-mentioned problems. Participants discuss the actions required to build the robot, identify who is in charge of each aspect, and work together on their creation. Once the robot is built, they test its ability to solve the intended problem and iterate the activity as necessary.

Outcomes

The change in skill, behavior, attitude, or belief that a recipient will have as a result of attending your program.

Outcomes for Informal STEM Programs

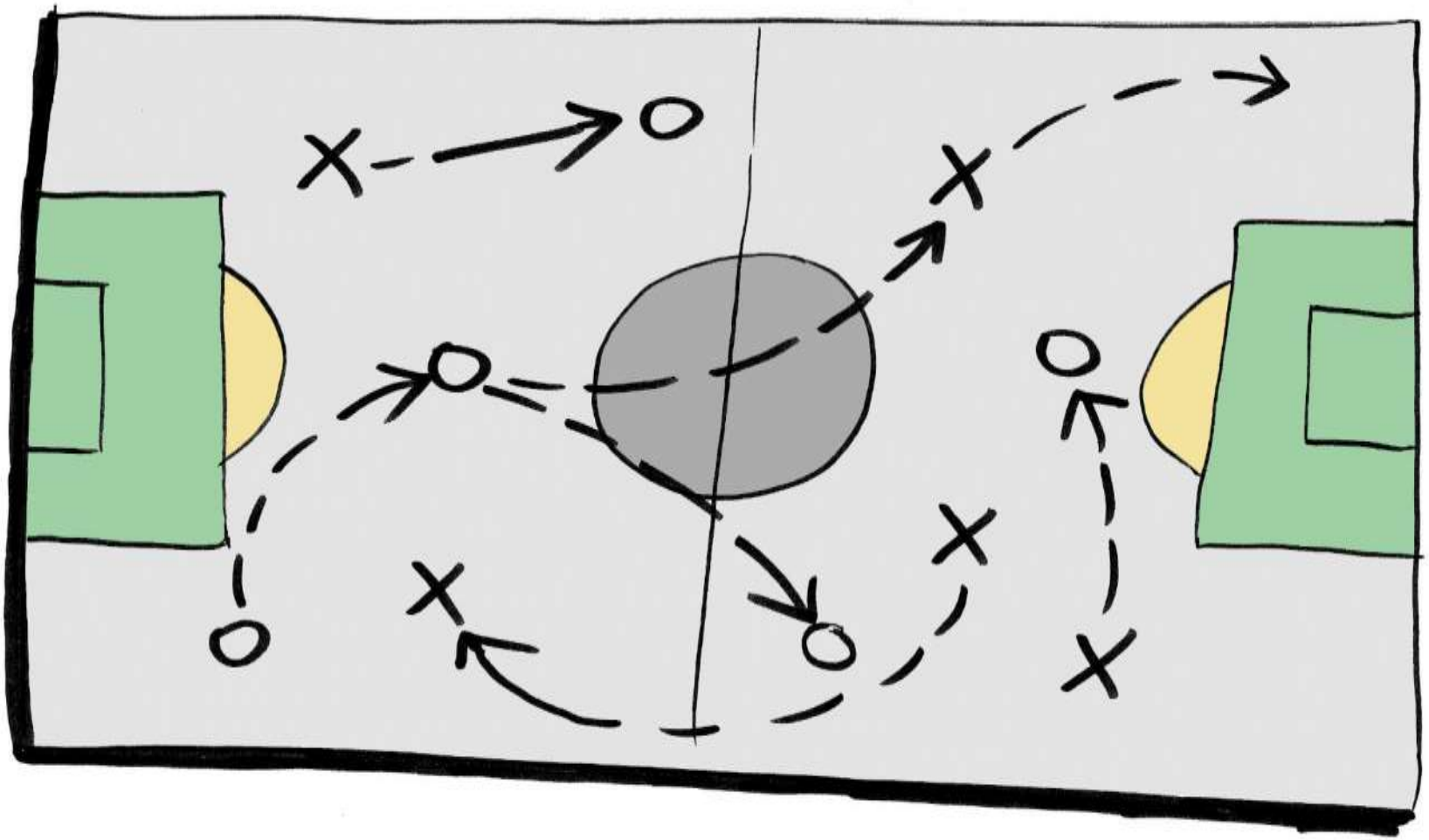


Afterschool Alliance. Defining Youth Outcomes for STEM Learning in Afterschool. Web. 20 Jan 2016. < http://www.afterschoolalliance.org/STEM_Outcomes_2013.pdf>

In order to achieve those outcomes…

- ✓ Integrate youth voice and encourage youth ownership
- ✓ Focus on relationships
- ✓ Make time for planning and reflection
- ✓ Build a network
- ✓ Embrace continuous learning

Playbook



Creative Commons Image thanks to Cucchiaio


PRACTICE
Youth gain skills through supporting STEM learning
Interns, volunteers, participating youth
Youth interest
Youth Voice
BITS
"I like to do this"
Develop an interest in STEM and STEM learning activities
Active participation in STEM learning opportunities
Curiosity about STEM topics and concepts
Program
Framework
ENGAGE
"This is important to me"
Value the goals of STEM and STEM learning activities
Understand values of STEM in society
Awareness of STEM professions
EXPLORE
"I can do this"
Develop a capacity to productively engage in STEM learning activities
Ability to engage in STEM process of investigation
Exercise STEM-relevant life and career skills

Developing a Plan

Pre-plan

Who is your audience?
What are their interests?
Is anyone in your community doing this type of STEM programming?

Planning

Identify program outcomes
Incorporate youth interest
Understand STEM programming content

Reflection

Did the plays work?
What would you change?
Next step programming

BITS Play Package: Community Building

Play #1
Welcome

Example Play: Hi everyone, in today's program we are going to be working with Snap Circuits. You'll learn to build all sorts of electronic devices like a radio, solar powered lights and a lie detector. The whole idea of this program is to give you time to try things out, see what you can do, and get some ideas about how electronic circuits work. So, don't worry about getting it right all the time. Have fun and see what happens.

Also, feel free to work in groups on something and ask each other for ideas, help, etc. At different times during the program I'll give you all a chance to show-off to the group what you've been working on and ask questions or give suggestions.

Before you get started I want to give everyone a chance to get to know each other. I'm going to get us started with a short group introduction activity.

Play #2
Community Builder

For Bits programming it's a good idea to start with a short and easy to complete group activity. While developing this play remember that it's likely that yourth will not know each other and that staff could be seeing a different audience week to week. These simple community building activities are a good way for youth to start to feel comfortable with each other.

Example Play: IF.....

Before the session starts write out a series of "if" questions on index cards. For example, if you could go anywhere in the world where would it be? Or, if you were able to have any kind of animal as a pet what would it be? Have youth sit in a circle with the index cards in the middle. Have each youth select a card and answer the question.

Play #3
Intro to Materials

Start the hands-on activity with an overview of the materials available and what youth can accomplish with them. Show youth some examples of what they might create and give them a chance to ask some getting started questions.

Play Package Part 2: Challenge

Play #4
Challenge

Challenges are a great way to give program participants a focus while also giving youth the chance to put their own spin on using the tools and technologies. Some youth and families may not feel comfortable simply "playing" with materials. Challenges help guarantee that everyone is involved and learning.

Play #5
Check-in with Groups

As the youth work on the challenge(s), adults and teen interns or volunteers should walk around, help out, and cheer youth on whenever possible. As they move around the room adults and teen interns or volunteers can ask youth to:

Explain what they are doing and why
Talk about what they are having trouble with/what's most challenging
Talk about what they are finding easy to do
Discuss what was surprising and why

Play #6
Challenge 2

As youth finish the initial challenge give them the chance to:

Expand on the challenge by adding to what they started
Try a new challenge that library staff or teen interns provide
Teach someone else in the group how to complete the challenge

BITS Play Package: Reflection

Play #7

Showcase

Throughout the STEM program youth will be showing what they created. As a final showcase you can ask youth to show the work they ended up with,and have them talk about what they liked, didn't like, what they would change, etc.

Play #8

Reflection

Make sure that you have at least 10 minutes at the end of the program for youth to think about and articulate what they learned during the session. Each reflection Play can help you to assess learning outcomes. As you take part in the reflection activities with youth think about the following outcomes:

STEM Ideas
Comfort
Interest in STEM

Program Assessment

Program Assessment

Did you achieve outcomes?
Reflect on community?
Did the plays work?
What would you change?
Get feedback from teen interns and volunteers?
Develop next step programming?

Q&A