CEO FORUM

September 29–October 2

ASTC 2018

Annual Conference

Agenda

- **Speed Networking**—Three Rounds
- **Opening Remarks** —Talia Milgrom-Elcott, Co-Founder and Executive Director, 100Kin10
- Panel Discussion—**Deep Dive on Science Centers and STEM Education Ecosystems**
  - Ron Ottinger, Executive Director, STEM Next *(moderator)*
  - Chevy Humphrey, The Hazel A. Hare President and CEO, Arizona Science Center
  - Alfred Mays, Program Officer, Burroughs Wellcome Fund
  - Steve Snyder**,** President and CEO, Fleet Science Center
- Breakout Discussion #1—**Identifying Common Community Challenges and Unlikely Partners**
- Breakout Discussion #2—**Root-Cause Mapping and Science-Center Roles**
- **Try This at Home**
- **What to Expect at the 2018 ASTC Annual Conference**

SPEED NETWORKING

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What superpower do you wish you had?

How would you use it?

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What is something inspiring you saw in science engagement recently outside of your center?

What made it particularly impressive and memorable?

What you would write on a postcard to a loved one about why you're here today?

What wish would you share on that postcard for what a lifelong engagement with science and technology could mean for them?

OPENING REMARKS

TALIA MILGROM-ELCOTT
Co-Founder and Executive Director
100Kin10

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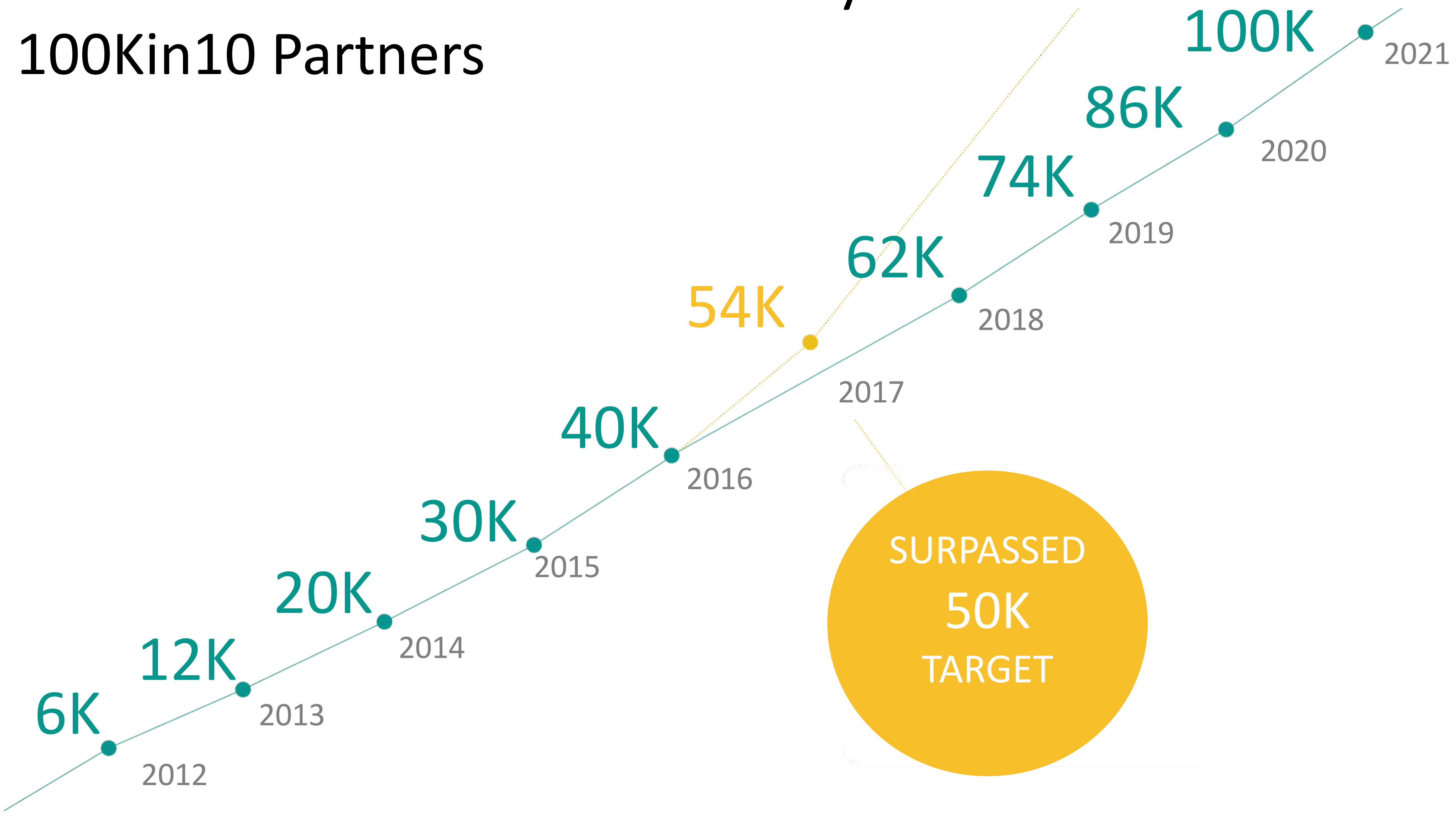
Keystone Species

New STEM Teachers Produced by 100Kin10 Partners



Why is it so hard to get and keep great teachers, especially in STEM?

the number of teacher preparation programs that have high admissions standards	the number of high-quality professional development and learning opportunities for PK-12 STEM mentor teachers
the pool of qualified PK-12 STEM teachers that are available for school leaders to hire	the number of PK-12 STEM teachers who perceive that school leaders prioritize time for teacher collaboration
the number of states with strong PK-12 science standards	the number of PK-12 STEM teachers who are prepared to use culturally-relevant teaching strategies
the number of opportunities that preparation programs provide to PK-12 student-teachers to observe high-quality teaching	the ability of districts to identify high-quality engineering curriculum
the number of professional development offerings with up-to-date STEM content	the training opportunities for elementary teachers that focus on how to teach higher-order thinking skills
the number of PK-12 STEM teachers who are prepared to meet the unique challenges experienced by students in rural schools	the number of schools using integrated STEM instructional models
the number of families that are aware of how to support their children's science, technology, and engineering learning	the number of school leaders effectively using student assessment data to inform professional development for PK-12 STEM teachers
the number of states that have certification tests requiring demonstration of STEM content knowledge	the number of school leaders that provide opportunities for PK-12 STEM teacher leadership
the number of STEM teachers who are trained to provide active learning experiences	the number of hours that preparation programs require for PK-12 student-teachers to practice high-quality teaching
the number of states that require preparation programs to include substantial instructional experiences for PK-12 student-teachers	the number of universities with education and STEM departments that collaborate around PK-12 STEM teacher preparation
the number of schools with systems to identify and support model PK-12 STEM teachers to serve as peer coaches	the alignment between teacher evaluation criteria and the different stages of a teacher's career
the time for PK-12 STEM teachers to participate in professional development during the school day	the diversity of PK-12 STEM teachers
the number of alternate certification routes for PK-12 STEM teachers offered by states	the accuracy of pre-service tests in predicting teacher effectiveness
the number of people who perceive PK-12 STEM teaching as an intellectually rigorous career	the number of women working in STEM fields
agreement among educators on the purpose for professional development at the different stages of PK-12 STEM teachers' careers	the number of universities that are willing to reduce revenue because they reform their education departments
the number of elementary teachers who had positive STEM experiences in PK-16 school	the number of testing and accountability systems that promote PK-12 STEM teacher creativity in the classroom
the number of professional development opportunities for PK-12 teachers that focus on how to engage students in active STEM learning experiences	the number of school leaders who understand the professional development needs of PK-12 STEM teachers
the number of people who perceive that elementary teachers are interested in teaching STEM	the ability of districts to identify high-quality computer science curriculum
the number of families that are aware of the importance of science, technology, and engineering skills in the current and future job market	agreement on reliable methods for measuring the quality of PK-12 STEM teacher professional development
the availability of resources for PK-12 STEM teachers to integrate engineering concepts into instruction	the number and range of STEM courses that high schools are required to offer
the number of school leaders who are trained in fostering collaborative work environments	the number of states that consider the job performance of graduates when approving preparation programs
the alignment between STEM professional development opportunities and individual teacher's needs	the alignment between teacher evaluation criteria and teachers' professional growth needs
the number of PK-12 STEM teachers who have access to culturally-relevant curricula and resources	the number of states with PK-12 standards that include engineering design practices
the number of STEM professors who encourage STEM majors to pursue PK-12 STEM teaching careers	the number of teacher preparation faculty with expertise in elementary STEM education
the presence and visibility of a variety of STEM jobs in rural communities	the number of professional development providers that collaborate with districts to ensure coherence in training across PK-12 STEM teachers' career stages
the availability of resources for PK-12 STEM teachers to integrate science standards into instruction	the amount of STEM-specific instructional resources available to elementary teachers
the number of school leaders with PK-12 STEM training and experience	the ability of districts to identify high-quality technology curriculum
the number of school leaders allocating resources for elementary teacher professional development in science, technology, and engineering	the number of preparation programs that have clear accountability measures for producing effective PK-12 STEM teachers
the number of states with accountability measures for science, technology, and engineering teaching and learning	the number of states that track PK-12 STEM teacher supply and demand
the number of preparation programs with accountability measures for elementary teachers to have STEM content knowledge	the number of professors who model strategies that PK-12 STEM teachers will need to use in their instruction
the number of PK-12 teachers who encourage their students to pursue PK-12 STEM teaching careers	the number of districts that ensure school leaders are prepared to evaluate PK-12 STEM teaching
the number of PK-12 STEM mentor teachers	the number of school leaders who understand how to integrate technology, engineering, and computer science into the curriculum
the number of states that require STEM content area training for pre-service elementary teachers	PK-12 STEM teacher involvement in the selection of professional development
the number of teacher preparation programs that collaborate with local districts around preparation for PK-12 STEM teachers	the number of high-quality professional development opportunities for PK-12 STEM teachers
the number of PK-12 STEM teachers who are able to identify high-quality STEM instructional resources	the number of opportunities for PK-12 STEM teachers to collaborate with STEM experts
the number of districts providing high-quality, STEM-focused induction and mentoring supports for new PK-12 STEM teachers	accountability for student learning in science, technology, and engineering
the time for PK-12 STEM teachers to collaborate during the school day	the number of universities that classify PK-12 STEM teaching as a STEM profession among their alumni
the number of districts implementing schedules to foster PK-12 STEM teacher collaboration	the number of preparation programs that require rigorous STEM coursework for pre-service elementary teachers
autonomy for PK-12 teachers to experiment with new STEM teaching strategies	the number of states and districts requiring competency-based professional development for re-licensure
the time for PK-12 teachers to experiment with new STEM teaching strategies	the number of families that encourage PK-12 STEM teaching careers
the number of people who perceive PK-12 STEM teaching as a career for people of any gender	the number people who perceive that PK-12 STEM teachers have intellectually dynamic work environments
the number of PK-12 STEM teachers who are prepared to meet the diverse learning needs of students	the number of opportunities for elementary teachers to specialize in STEM
the number of universities that publicly recognize the importance of STEM teachers	the availability of resources for PK-12 STEM teachers to integrate computer science concepts into instruction
the number of districts that hold school leaders accountable for creating positive work environments	the availability of resources for PK-12 STEM teachers to integrate technology concepts into instruction
bonuses for PK-12 STEM teachers	salaries for PK-12 STEM teachers
the number of people who perceive PK-12 STEM teaching as a STEM job	funding for schools to purchase PK-12 STEM materials
the number of states with PK-12 computer science standards	the amount of STEM-specific professional development available to elementary teachers
the number of people who perceive that girls, minority, and low-income students can excel in science, technology, and engineering	the number of school leaders with an appreciation for science, technology, and engineering
scholarships or loan forgiveness for STEM college majors entering PK-12 STEM teaching jobs	the number of states and districts with career ladders for PK-12 STEM teachers
the number of states that have rigorous STEM coursework requirements for PK-12 preservice teachers	the number of PK-12 STEM teachers with access to STEM labs
the number of districts that designate funds for STEM instructional resources	the number of states with PK-12 standards that include technology proficiencies and measures
exposure to high-quality PK-12 STEM coursework, especially for historically underrepresented groups of students	the number of male PK-12 STEM teachers

Prestige

HOW MIGHT WE RAISE THE PRESTIGE OF THE STEM TEACHING PROFESSION?

- Teaching lacks financial incentives.
- Teaching is devalued by cultural norms.
- Teachers lack collaborative work environments.
- STEM professors often devalue PK-12 teaching and do not encourage STEM students to pursue the profession.

Preparation

HOW MIGHT WE ENSURE TEACHERS ENTER THE CLASSROOM WELL-PREPARED TO TEACH STEM?

- Prep programs often have low admissions standards.
- STEM content and pedagogy are not integrated.
- Pre-service teachers often lack effective coaching.
- Teachers often lack preparation for diverse learning needs.
- Many teacher preparation programs do not account for local or regional needs.
- Many teacher preparation programs are reluctant to change their approach.
- Few teacher preparation programs track the quality of their graduates.

Elementary STEM

HOW MIGHT WE EFFECTIVELY PREPARE AND SUPPORT ELEMENTARY TEACHERS TO TEACH STEM?

- Few elementary teacher preparation programs have a STEM focus.
- Elementary teachers often lack access to STEM professional development.
- Many elementary teachers have anxiety about teaching STEM subjects.

Professional Growth

HOW MIGHT WE ENSURE VALUABLE PROFESSIONAL DEVELOPMENT AND GROWTH FOR STEM TEACHERS?

- There is no commonly-agreed upon trajectory for teacher professional growth.
- Teachers often lack access to quality STEM professional development.
- Professional development is often treated as a compliance issue.
- Schools often lack a collaborative environment to foster teacher growth.
- Teachers' voices are regularly absent from conversations about their professional growth.

Teacher Leadership

HOW MIGHT WE EMPOWER STEM TEACHERS WITH LEADERSHIP AND AUTONOMY?

- Teachers' voices are regularly absent from conversations about their professional growth.
- Many schools lack opportunities for teacher leadership.
- The traditional school model discourages experimentation.

Value of Science, Technology, + Engineeri

HOW MIGHT WE ENSURE SCIENCE, TECHNOLOGY, AND ENGINEERING ARE VALUED IN SCHOOLS?

- Principals often do not advocate for science, technology, and engineering.
- Communities often do not advocate for science, technology, or engineering.
- Schools and principals often are not accountable for science, technology, and engineering learning.
- Few teachers have opportunities to engage with current STEM content and industry.

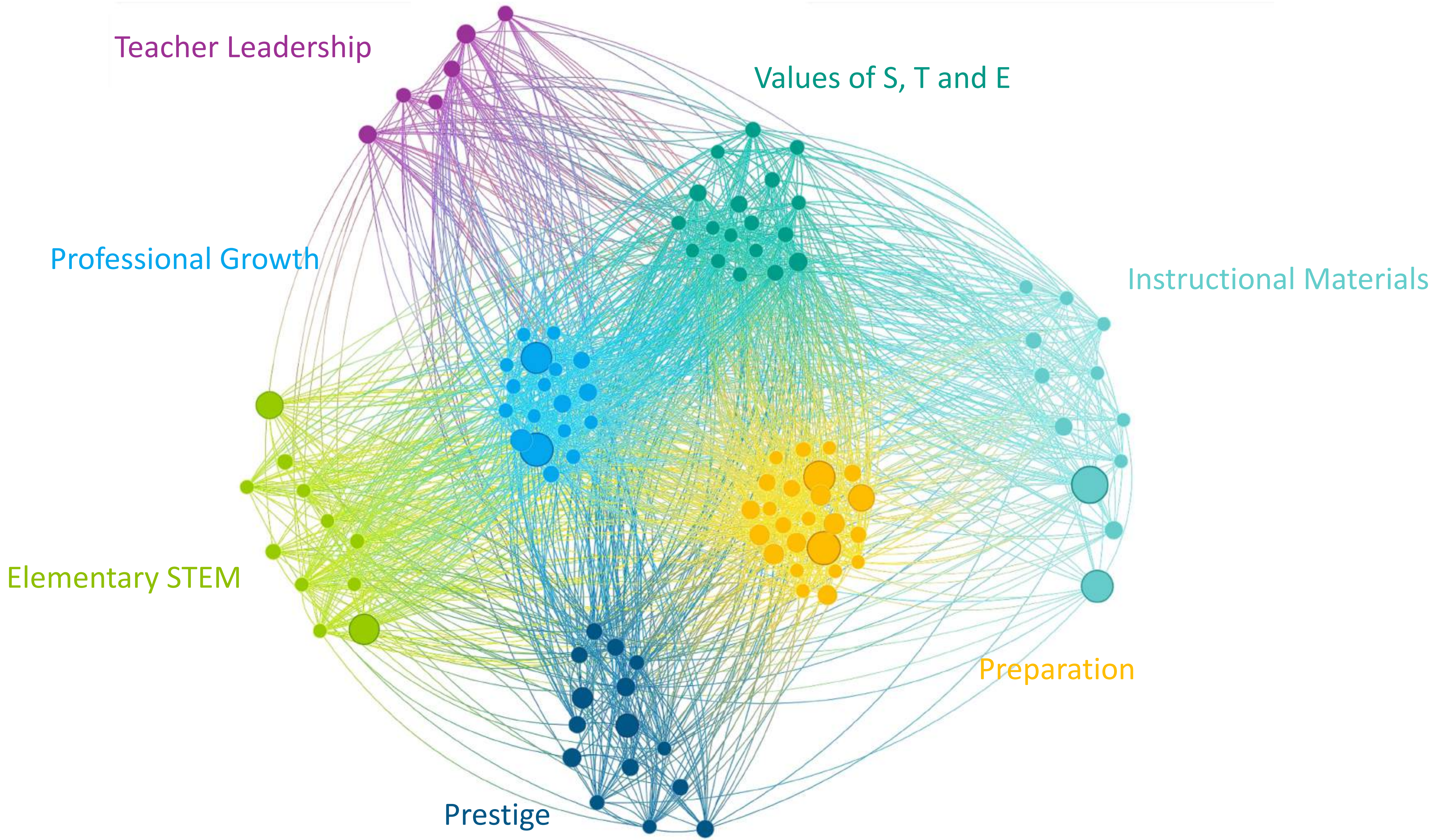
Instructional Materials

HOW MIGHT WE ENSURE TEACHERS HAVE ACCESS TO QUALITY STEM INSTRUCTIONAL MATERIALS?

- Many teachers lack access to quality STEM curriculum.
- Teachers lack funding to provide quality STEM instructional experiences.
- Few teachers have opportunities to engage with current STEM content and industry experiences.

If problem “A” improved,
would it make some other problem “B”
better, worse, or leave it the same?

750+ experts
35,000+ votes


Teacher Leadership
Values of S, T and E
Professional Growth
Instructional Materials
Elementary STEM
Preparation
Prestige

EVERYTHING IS CONNECTED

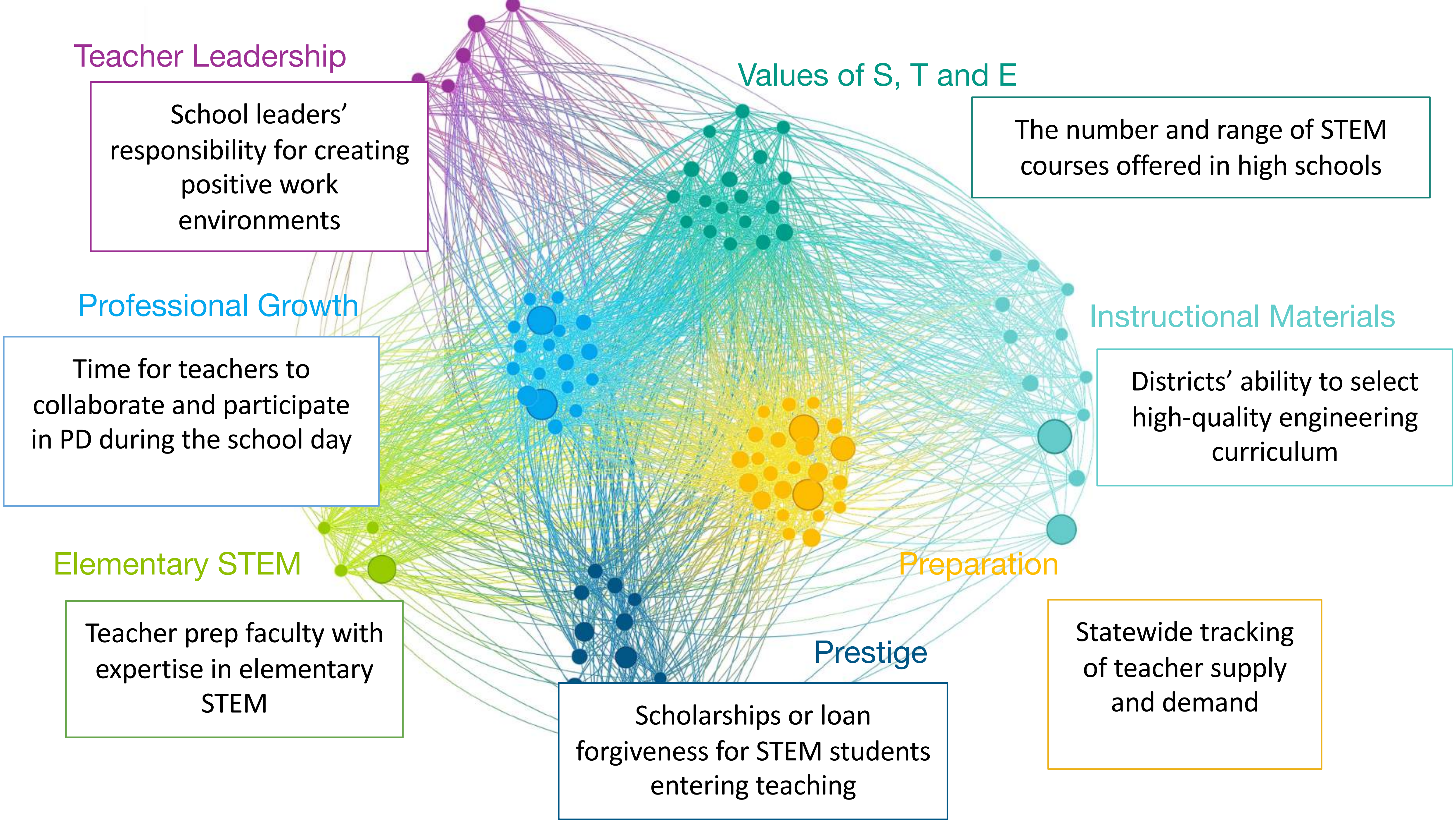
NOT EQUALLY

EVERYTHING IS ^ CONNECTED

NOT RANDOMLY

EVERYTHING IS ^ CONNECTED

NON-RANDOMNESS HELPS US SIMPLIFY, SO WE CAN FIND OUR STARFISH


Teacher Leadership
School leaders' responsibility for creating positive work environments
Values of S, T and E
The number and range of STEM courses offered in high schools
Professional Growth
Time for teachers to collaborate and participate in PD during the school day
Instructional Materials
Districts' ability to select high-quality engineering curriculum
Elementary STEM
Teacher prep faculty with expertise in elementary STEM
Preparation
Prestige
Scholarships or loan forgiveness for STEM students entering teaching
Statewide tracking of teacher supply and demand

THANK YOU.

@ 100Kin10

SCIENCE CENTERS + STEM EDUCATION ECOSYSTEMS

RON OTTINGER
Executive Director, STEM Next

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stem next
OPPORTUNITY FUND

The Role of Science Centers in Changing and Shaping local STEM education ecosystems

September 28, 2018

New Research: Afterschool STEM Works

INSPIRE

78% of students said they had a more positive attitude about STEM because of their afterschool experience.

EDUCATE

73% of students said they had a more positive STEM identity because of their afterschool experience.

EXPLORE

80% of students said their STEM career knowledge increased because of their afterschool experience.

PREPARE

72% of students said their perseverance and critical thinking skills increased because of their afterschool experience.

STEM Next Major Investments

50 STATE AFTERSCHOOL NETWORK

CHARLES STEWART MOTT FOUNDATION

every hour counts
expanding learning so every student can thrive

STEM ecosystems

AFTERSCHOOL STEM HUB

imagine science

BOYS & GIRLS CLUBS OF AMERICA

NATIONAL 4-H COUNCIL

girls inc.

the Y

pear

STEM Funders Network

girl scouts

CLICK 2 SCIENCE pd

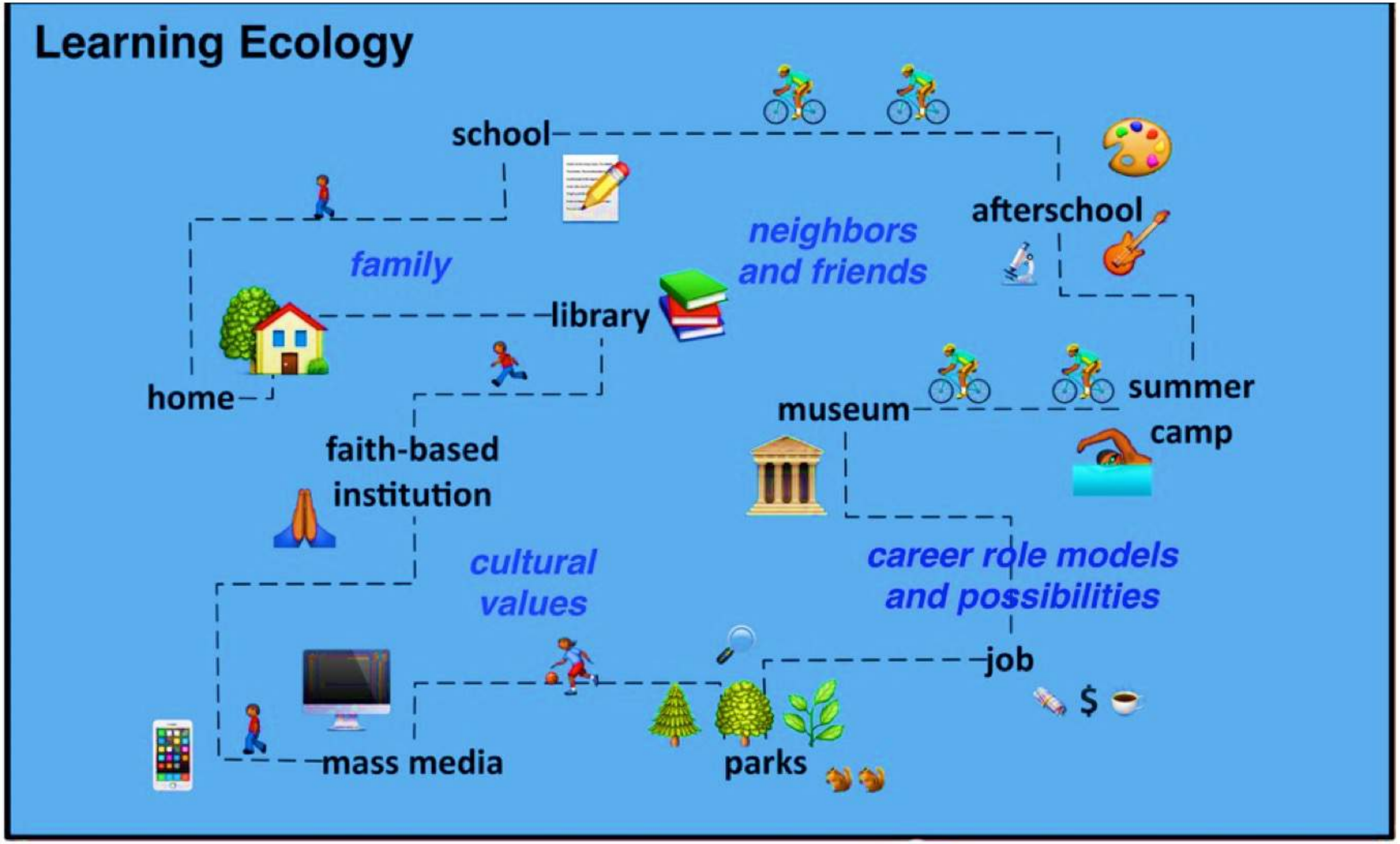
FAMILY ENGAGEMENT in STEM

ACRES
Afterschool Coaching for Reflective Educators in STEM
a project of
MMSA Maine Mathematics and Science Alliance

STEM Funders Network

We Believe:
STEM Learning Opportunities Happen at Charging Stations

Youth who plug into STEM organizations like science centers get engaged, inspired, and knowledgeable about science, technology, engineering, and mathematics.



Research+Practice Collaboratory. 2015.

STEM Ecosystems + Science Centers

San Diego STEM Ecosystem
San Diego, CA

Arizona SciTech Ecosystem
Arizona (Statewide)

Bay Area STEM Ecosystem
South San Francisco, CA

Region 5 STEAM
San Benito, Santa Clara, Santa Cruz, and Monterey, CA

Symbiosis
British Columbia, Canada

North Louisiana STEM Alliance
Shreveport, LA

STEM-NM
Albuquerque, NM

NYSCI Neighbors
Queens, NY

Statewide & Citywide Networks + Science Centers

every hour counts
expanding learning so every student can thrive

Frontiers in Urban Science Exploration

- New York, NY
- Nashville, TN
- Providence, RI
- Boston, MA
- Chicago, IL

THE 50 STATE AFTERSCHOOL NETWORK

- 32 STEM States
  - Explora, New Mexico
  - New York Hall of Science, New York

Panel Discussion:
Science Centers + STEM Education Ecosystems

Moderator

Ron Ottinger, Executive Director, STEM Next

Panelists

- **Chevy Humphrey**, The Hazel A. Hare President and CEO, Arizona Science Center
- **Alfred Mays**, Program Officer, Burroughs Wellcome Fund
- **Steve Snyder,** President and CEO, Fleet Science Center

BREAKOUT DISCUSSION

Identifying Common Community Challenges and Unlikely Partners

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- **Pick a common and seemingly intractable challenge that you aim to address.**
    - What impact are you aiming to have in your community?
    - How will your community be different (better) if you are successful?

- **Who else needs to be at the table to help you understand and map the challenge?**

BREAKOUT DISCUSSION

Root-Cause Mapping and Science-Center Roles

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- Why it is so hard to solve the challenge you identified in the last session? What are a few **root causes and obstacles** in the way?

- Which "**keystone**" root causes, if addressed, would allow the most progress?

- For these "keystone" root causes, which **new, novel, or unlikely partners** would you bring to your planning table first?

- What is **highest impact role for science centers** and where might they start (or expand) their work towards the identified challenge?

THREE THINGS TO TRY AT HOME

Put Network Mapping to Work in Your Own Community

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TRY THIS AT HOME

1. What is the big goal that will inspire and mobilize likely and unlikely allies?

2. Who is one unlikely partner you will reach out to before the sun sets next Friday?

3. What is one thing you will stop doing to make room for this work?


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