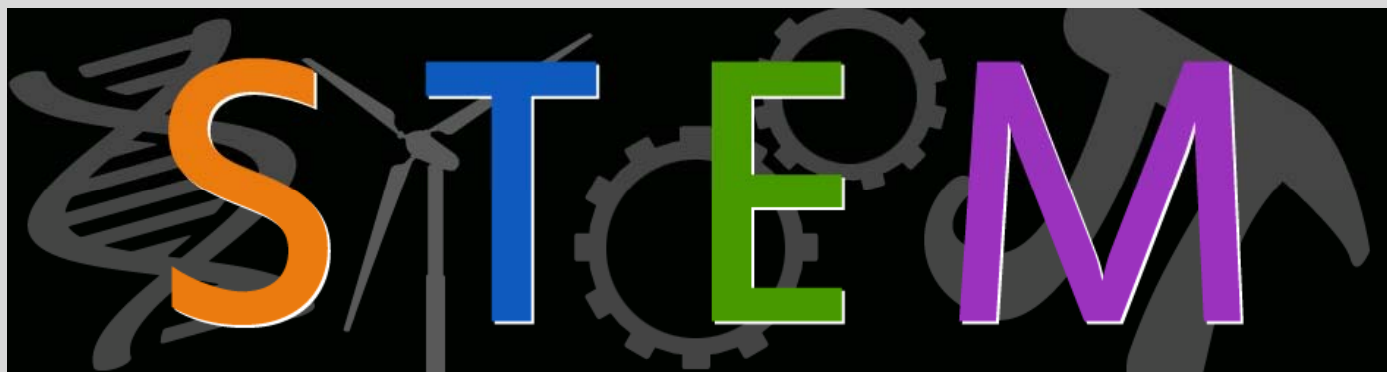




STEM Education and After-School Programs

*"Presenting evidence-based, unbiased research to
examine the family impact of policies and programs"*

Fourth Family Impact Seminar, 2013



Jeffrey Weld, Ph.D.

Executive Director, Governor's STEM Advisory Council
Associate Professor, Department of Biology, University of Northern Iowa



S T E M



IDEA

Intuition Design, Emotion, Art

STEM

Science, Technology, Engineering, Math

From <http://www.futurewecreate.com/>



STEM

V

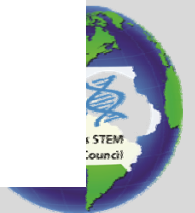
California's statewide STEM initiative *uses afterschool and summer programs...*

- Student-centered, inquiry-based, project-based, and complementary to the academic curriculum
- Ideal places to deliver STEM activities in innovative ways that have relevance to students
- Reach a diverse group of students at a time when they often lose interest
- Provide an excellent training ground for future STEM educators

[From

CSLNet = California Afterschool Network + museums, aquaria, zoos science centers

<http://cslnet.org/>



STEM

Seminar Goal: “ ... to better connect research and policy, and to promote a family perspective in policymaking”

- I. How connected (or disconnected) are research and policy currently, in after-school STEM in Iowa?
- II. How best can we promote family perspective in policymaking around after-school STEM?



STEM

I. How connected (or disconnected) are research and policy currently, in after-school STEM in Iowa?

Library Garden YM/WCA Scouts School Museum Science center, daycare
Kitchen table 4-H Zoo camping hikes Nature center Beach Running errands
Big Brothers/Sisters College business Clubs Extension Farm Community center



+



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I. *How connected (or disconnected) are research and policy currently, in after-school STEM in Iowa?* **Continued**

✓ “Do people learn science in nonschool settings? This is a critical question for policy makers, practitioners, and researchers alike—and the answer is yes.”

✓ Good out-of-school STEM programming...

- is designed with specific learning goals in mind;
- is interactive;
- provides multiple ways for learners to engage with concepts, practices, and phenomena within a particular setting;
- facilitates learning across multiple settings;
- prompts and supports participants to interpret their learning experiences in light of relevant prior knowledge, experiences, and interests;
- supports and encourages learners to extend their learning over time;
- is developed through community-educator partnerships and rooted in local contexts.

•AND evaluates specific to afterschool settings, clients, pedagogy, and expected outcomes.

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II. How best can we promote family perspective in policymaking around after-school STEM?

State STEM Models

- ✓ PD and materials = Alabama, South Carolina, Washington State, Iowa
- ✓ STEM special schools = Ohio, Texas, North Carolina (Iowa?)
- ✓ Networks and public-private partnerships = New York, Tennessee, Wisconsin, Iowa
- ✓ Scale-up STEM programming = Massachusetts*, California**, Iowa***

* Modest – handful of schools, \$500,000

** Medium scale (n= 250) completely via out-of-school as mentioned

*** Massive (n= 900) blended in school and out



STEM

Governor's STEM Advisory Council, July 2011

To date...

1. Built a management and governance model
2. Established a Regional STEM Network for Iowa.
3. Created statewide Scale-Up initiative to grow 12 exemplary programs to 900 LEAs, 38,000 youth.
4. Compiled a nineteen-recommendation strategic plan for Iowa from seven working group reports.
5. Built a comprehensive evaluation plan of 18 indicators and surveys.





IOWA GOVERNOR'S STEM ADVISORY COUNCIL



STEM Ho-hum



State of diversity



Fields of dreams

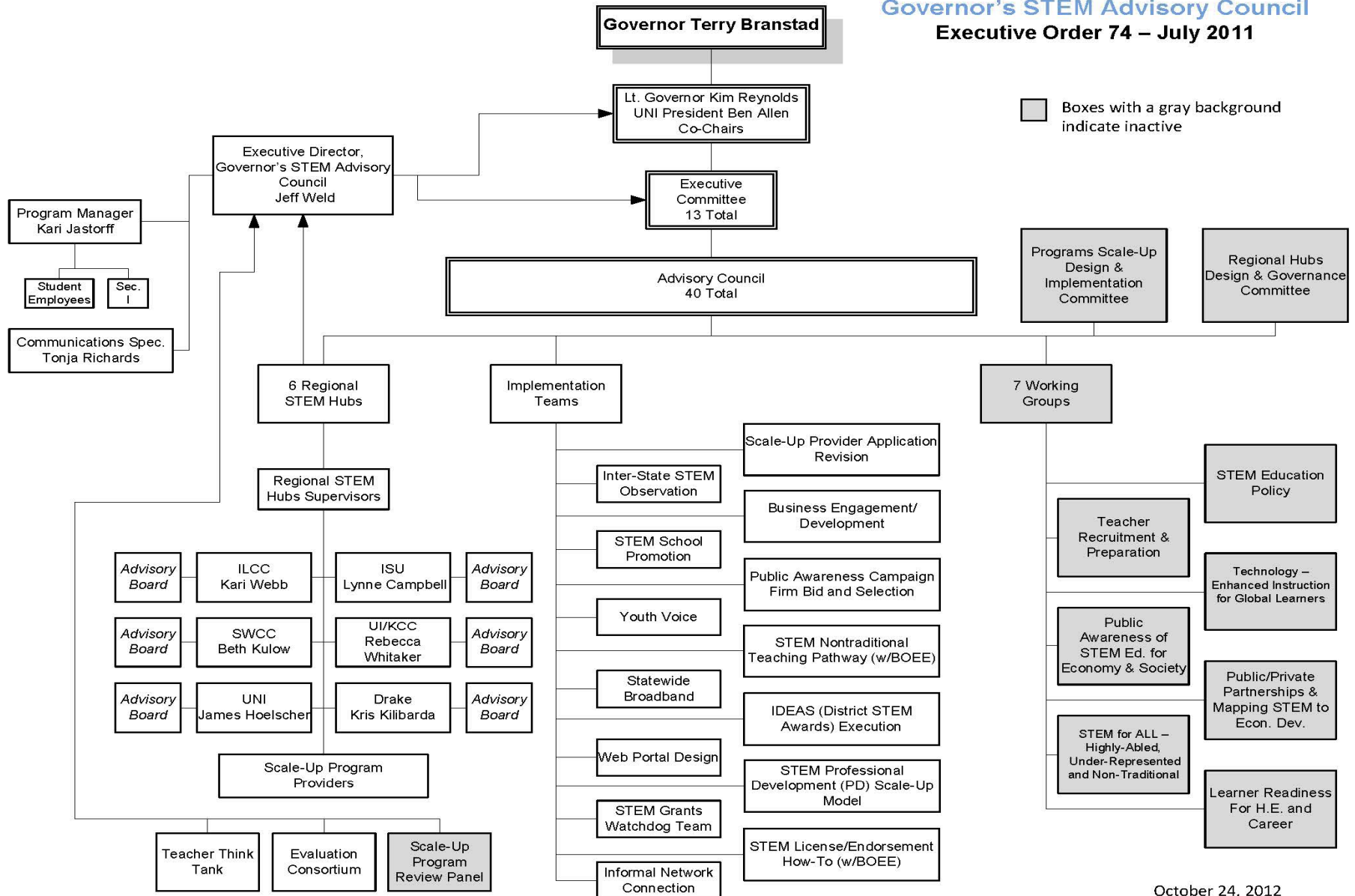




WHO'S STEM COUNCIL?

Governor's STEM Advisory Council Executive Order 74 – July 2011

Boxes with a gray background indicate inactive

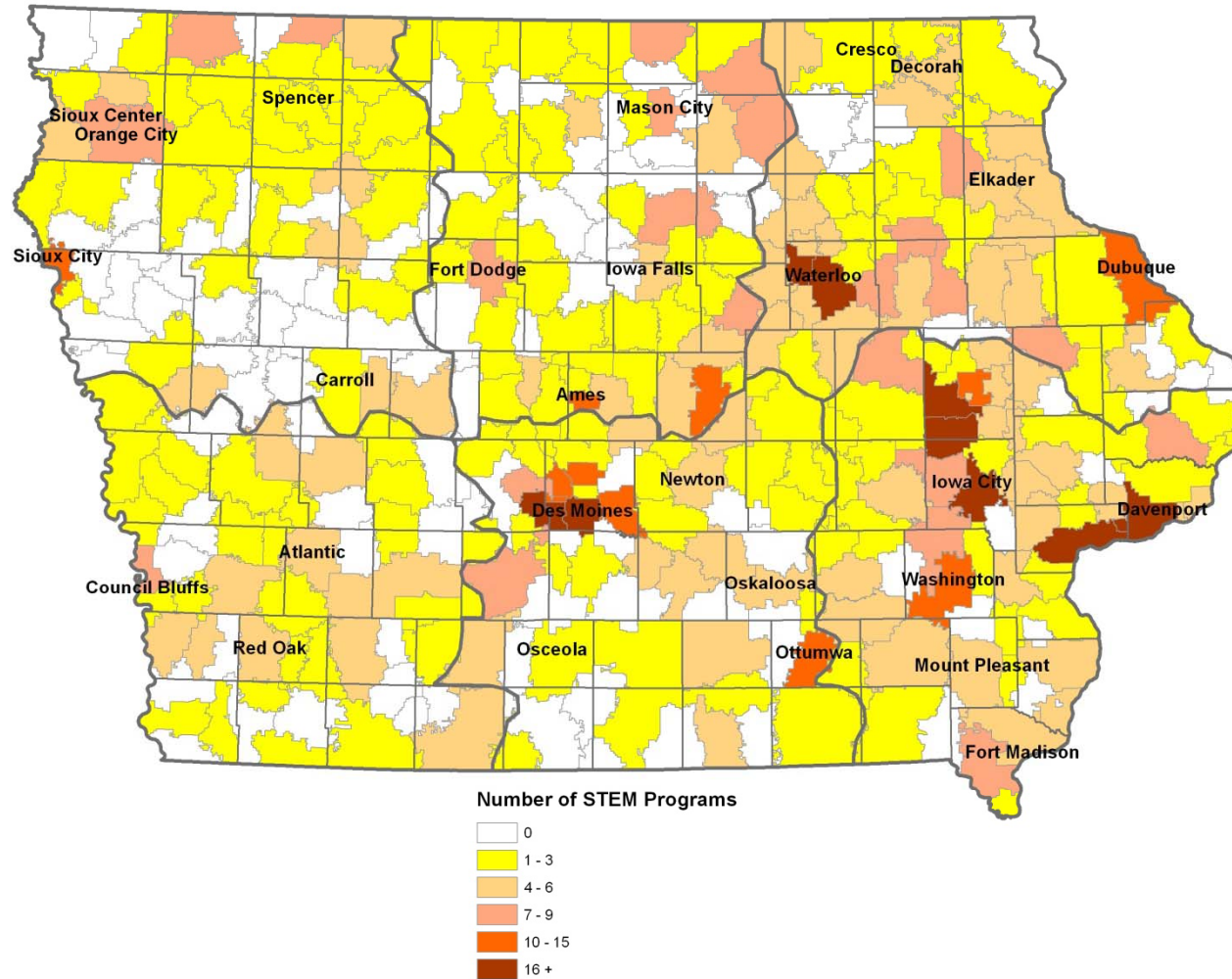


October 24, 2012



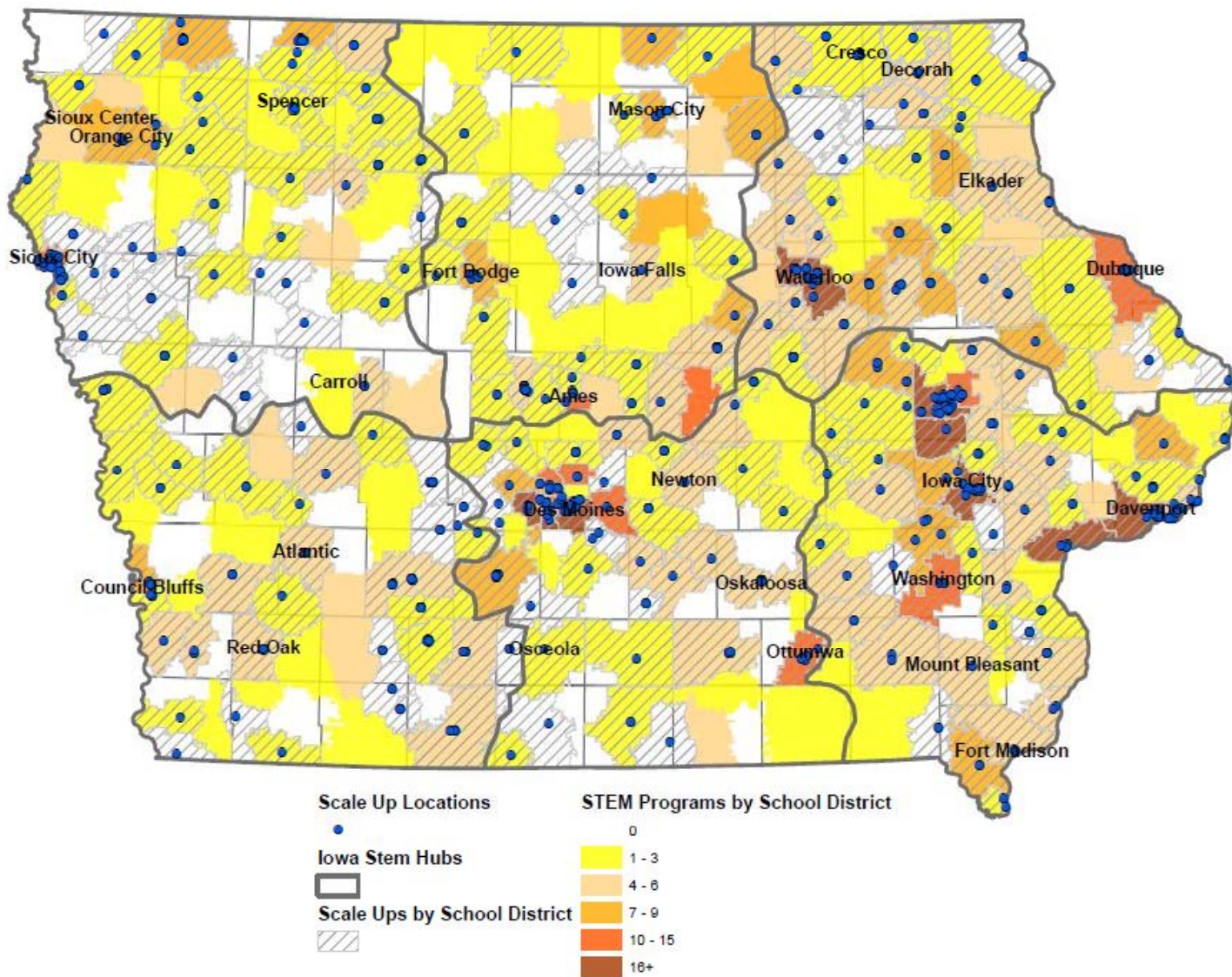
WHERE'S STEM?

STEM Education Heat Map, September 2012



STEM

Number of STEM Programs and Scale-ups by School District, November 12, 2012





HOW TO BRING STEM?





WHAT STEM TO BRING?

2012-13

1. A World in Motion
2. Fabulous Resources in Energy Education (FREE)
3. Partnership for Engineering and Educational Resources for Schools (PEERS)
4. FIRST Lego League
5. FIRST Tech Challenge
6. HyperStream
7. KidWind
8. Project HOPE
9. The CASE for Agriculture Education in Iowa
10. State Science + Technology Fair of Iowa
11. iExploreSTEM
12. Corridor STEM Initiative (CSI)





* PLTW - \$249,141 for FY 2013





WHAT'S IN THE HOPPER?

Governor's STEM Council 2013

TARGETED PRIORITIES <i>established in 2011</i>	Student interest/achievement	Technology-enhanced instruction	STEM Teacher Recruitment/Preparation	Post-secondary readiness	Policy	Public Awareness	Public-Private Partnership	STEM For All	
RECOMMENDATIONS of working groups 2012 	Professional development in STEM	Recognitions, incentives	STEM license/endorsement	Business skills map	Coordinate P.D.	PR campaign	Incentive public-private partnerships	STEM-focused schools	
	Virtual community	High speed internet	Pathway for STEM professionals to teach	Evidence-based practice	Competency-based	Career awareness	Model regional clusters	Parental engagement	
PROGRAMS/TEAMS 2013 	Scale-Up Round II Blended statewide P.D. model Web Portal	Broadband statewide I.D.E.A.S.	STEM License & endorsement model Nontraditional license pathway	NCRC @ Hubs Scale-up	Inter-state STEM	Awareness Campaign STEM Summits Youth voice	Business engagement plan Externships STEM Network	STEM Schools start-up Informal Network	
REACH	Regional Networks = Managers, Hubs, Advisory Boards								
EVALUATION	LEA Scale-Up Reports	Statewide Survey of Public Attitudes Toward STEM		Statewide Student Interest Inventory		Iowa STEM Indicators System (ISIS)			
SUPPORT	Grants Coordinator		Community Foundation			Summits, forums, conferences			





Iowa STEM Monitoring Project

Objective: Systematically observe a series of defined metrics and sources to examine changes regarding STEM education and economic development in Iowa.

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

RISE
RESEARCH INSTITUTE

THE UNIVERSITY
OF IOWA



Center for Social and
Behavioral Research



Iowa STEM Indicators System (ISIS)

System to track publicly available data at the national, state, and regional levels

18 indicators in 4 areas:

1. K-12 student preparation
2. Achievement/interest
3. College completions
4. Employment

Data sources:

- Department of Education
- Iowa colleges and universities
- Census Bureau
- Iowa Workforce Development
- Scale-up programs
- Iowa Testing
- NAEP/ACT



Statewide Survey of Public Attitudes Toward STEM

Annual survey of Iowans regarding attitudes toward and awareness of STEM education and economic development

Special sections for parents of K-12 children (ages 4-11 and ages 12-19)

Year 1 data collection with 2,010 Iowans

Created to allow for comparisons with other state/regional/national studies



Statewide Student Interest Inventory

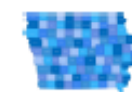
Annual assessment of Iowa K-12 student interest in STEM topics

Administered with regular Iowa Assessments in schools across the state

8 STEM interest items in 2 versions for older and younger students

Interest will be compared across demographic and geographic lines

Student interest and achievement will be compared



Scale-Up/Regional

Regional perspective on STEM programming and student involvement

Over 800 local education agencies (LEA) participating in 12 Scale-Up programs

Each LEA reports about local Scale-Up implementation process;

Assessment of STEM interest among student participants in Scale-Up programs

Assessment of STEM achievement among student participants in Scale-Up programs



Iowa STEM: What's known so far?



- ✓ 26% of Iowans have heard of the acronym STEM
- ✓ 48% say their child is being very well prepared in STEM subjects by the school he/she attends
- ✓ 59% of parents say their child is likely to pursue a STEM career
- ✓ 87% of LEA respondents reported they thought the Scale-Up program had increased STEM interest among students *quite a bit or a great deal*.
- ✓ 71% of LEA respondents reported they thought the Scale-Up program had increased STEM achievement among students *quite a bit or a great deal*.
- ✓ 76% of LEA respondents reported they thought the Scale-Up program had increased STEM career interest among students *quite a bit or a great deal*.
- ✓ 62% of LEA respondents reported they thought the Scale-Up program had broadened STEM Participation among diverse students *quite a bit or a great deal*.



✓ = Survey of 2,000 Iowans by the CSBR at UNI, 2012

✓ = Mid-year Survey of Scale-Up implementers by the CSBR at UNI, 2013



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Circling back...

-  How connected (or disconnected) are research and policy currently, in after-school STEM in Iowa?
-  How best can we promote family perspective in policymaking around after-school STEM?



Tell Congress you support Afterschool!

<http://www.good.is/posts/tell-congress-that-you-support-afterschool-programs-in-your-community>



THANK YOU



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