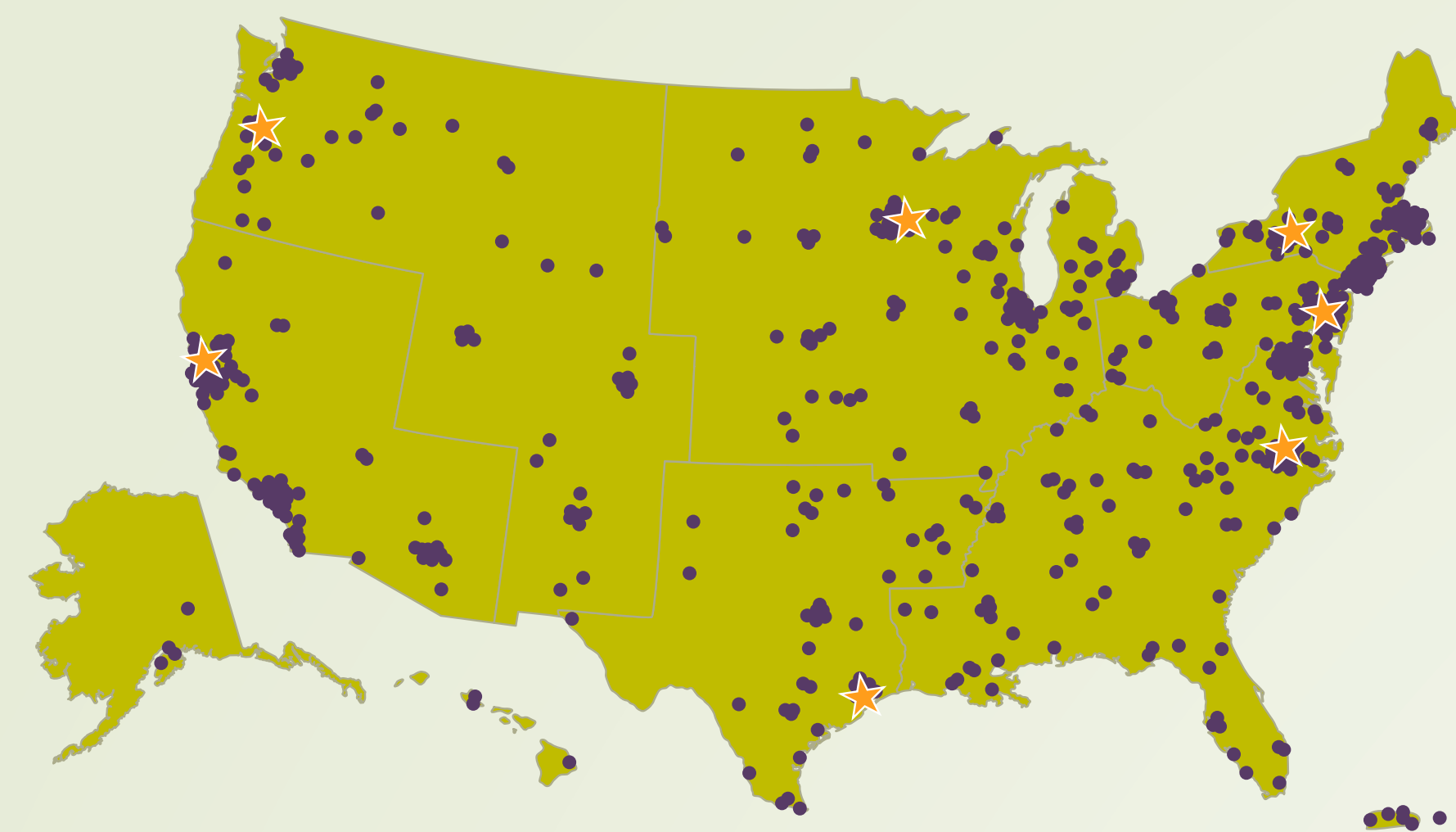## WHO'S INVOLVED?

The NISE Network includes over 555 partner organizations, representing all 50 states and Puerto Rico. Over 1,400 individuals are involved in the NISE Network.

NISE Network Partners
2005-2014

322	192	41
MUSEUMS	UNIVERSITIES	OTHER

555 partner organizations represent all 50 states and Puerto Rico.

The work of the Network is led by fourteen core partners:

- Museum of Science, Boston
- Science Museum of Minnesota
- Exploratorium
- Children's Museum of Houston
- The Franklin Institute
- Lawrence Hall of Science
- Museum of Life and Science
- Oregon Museum of Science and Industry
- Sciencenter
- Center for Nanotechnology in Society at Arizona State University (CNS-ASU)
- University of Wisconsin - Madison
- Association of Science-Technology Centers (ASTC)
- Materials Research Society (MRS)
- SRI International

NISE Network

The Nanoscale Informal Science Education Network is a national community of researchers and informal science educators dedicated to fostering public awareness, understanding, and engagement in nanoscale science, engineering, and technology.

GOALS

Build a network of sustainable relationships among informal science education (ISE) organizations and nanoscale science and engineering (nano) research organizations.

Engage the public in nano through exhibits, programs, and other learning opportunities.

Increase capacity among partner organizations by providing professional development, resources, and knowledge.

CHALLENGES

When the Network began in 2005, it faced the following challenges:

1. The content and pedagogy of nano education was only just emerging.

2. Little was known about how to engage the public in nano in ISE contexts.

3. ISE organizations had little expertise, experience, or incentive to engage the public in nano.

4. The ISE field had limited experience in developing and working within a national supportive network.

(Overview of NISE Network Evaluation Year 4 Summative Evaluation, 2009)

Central to our success in meeting these challenges have been:

• The scope of the project, including the breadth of involvement from funded staff and partners across the country and the 10-year span of the project, and

• The continued cycle of formative evaluation, partner feedback, reflection, and re-design at every level of our work.

Professional website: **www.nisenet.org** • Public website: **www.whatisnano.org**

WHO'S THE AUDIENCE?

Professional Audiences

NISE Net is made up of informal educators and research scientists at museums, colleges and universities, and other educational institutions.

We organize our partners around three levels of involvement with the following goals:

CORE PARTNERS
Increase the capacity of core partners to lead the field in raising public awareness, understanding, and engagement with nano.

NANO-INFUSED PARTNERS
Increase the capacity of these organizations to deliver nano education experiences as an ongoing, sustainable part of their programming.

BROAD REACH PARTNERS
Introduce nano informal education to these organizations, such as through participation in NanoDays.

Public Audiences

NISE Net reaches public audiences through the efforts of our partner organizations. Our primary audiences include families, school groups, and other visitors to science centers and children's museums. We also serve a range of other audiences, including teachers and students from primary grades through college.

USING NANODAYS TO BUILD COLLABORATIONS

NanoDays is an annual festival engaging people of all ages in nano. NanoDays events are organized locally by NISE Network partners and take place at over 250 museums and universities across the country.

NanoDays offers a tangible opportunity for partners to participate in the national Network and collaborate locally. The events draw on universities' content knowledge and museums' audience engagement knowledge.

"The NanoDays event and kit continues to bolster our institution's connection to current science and technology. Because of our association with the NISE Network and the resources it has provided, we have been able to find and leverage new partners, especially among our state universities."

— **Joe Schwanebeck,** Science Center of Iowa

ALL 50 STATES
received NanoDays kits

100%
OF KITS
are used throughout the year

Of those who reported partnering around nano:

86% of museum partners report that NanoDays has been "helpful" or "very helpful" in forming and sustaining their partnership with a university or college.

89% of university / college partners report that NanoDays has been "helpful" or "very helpful" in forming and sustaining their partnership with a museum or science center.

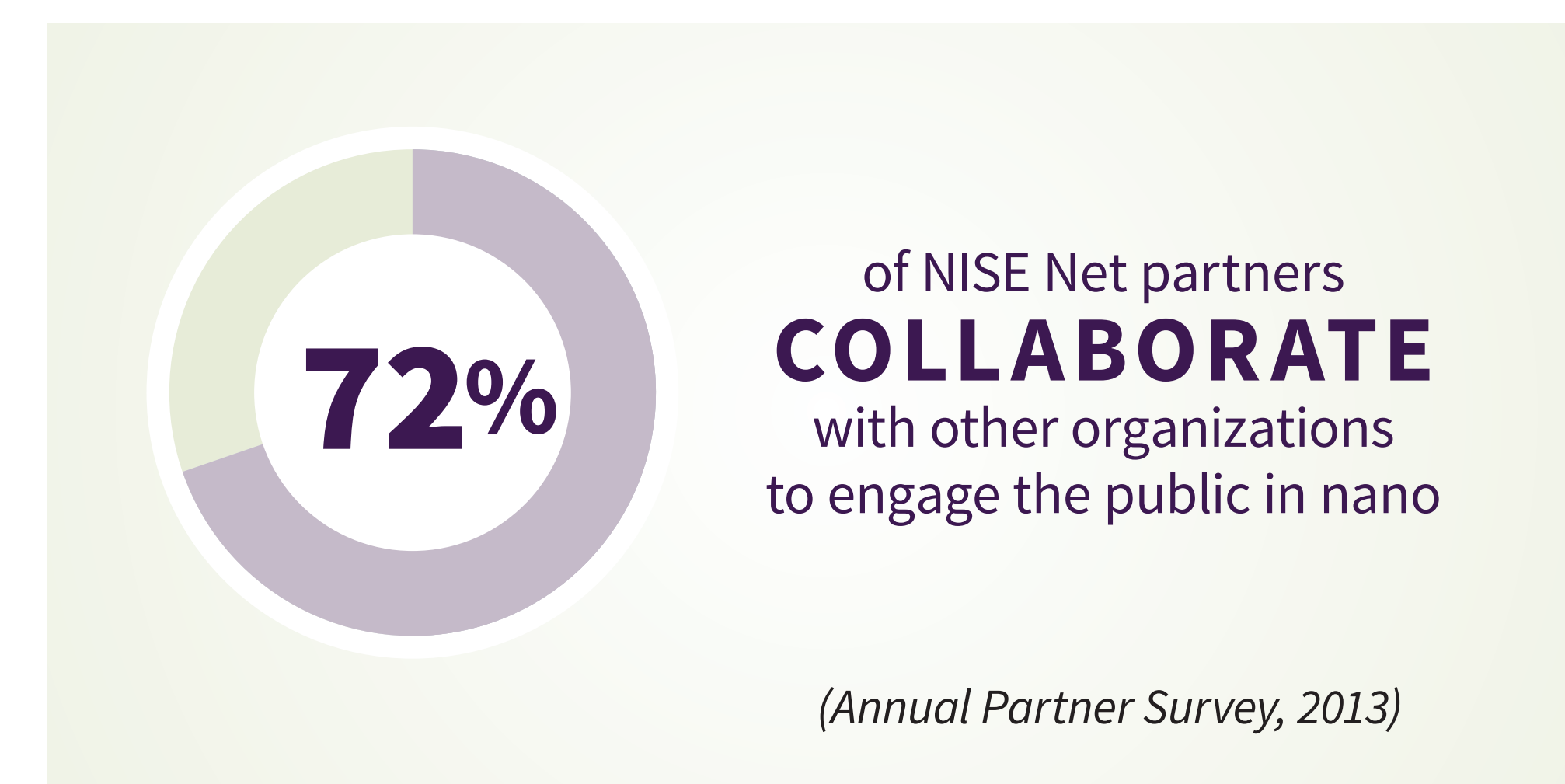*(Annual Partner Survey, 2013)*

Building a Network

The NISE Network includes hundreds of invested organizations that continue to build on and expand national, regional, and local collaborations.

HOW?

We encourage partnerships when awarding resources such as NanoDays kits, mini-grants, and *Nano* mini-exhibitions.

We provide networking opportunities, professional development, and guides to partnering.

We encourage partners to participate in ways that work for their organizations.

72%
of NISE Net partners
COLLABORATE
with other organizations to engage the public in nano

(Annual Partner Survey, 2013)

Top left: Industry partners volunteering at NanoDays at the Museum of Science, Boston. Top right: Face-to-face meetings help build community and foster communication across the Network. Bottom: Cornell University and the Sciencenter, Ithaca partnering to host NanoDays.

SUSTAINABILITY:

Local and Regional Collaborations

By promoting meaningful, mutually beneficial collaborations, NISE Net has created opportunities for partners to develop long-term relationships that extend beyond their work in nano.
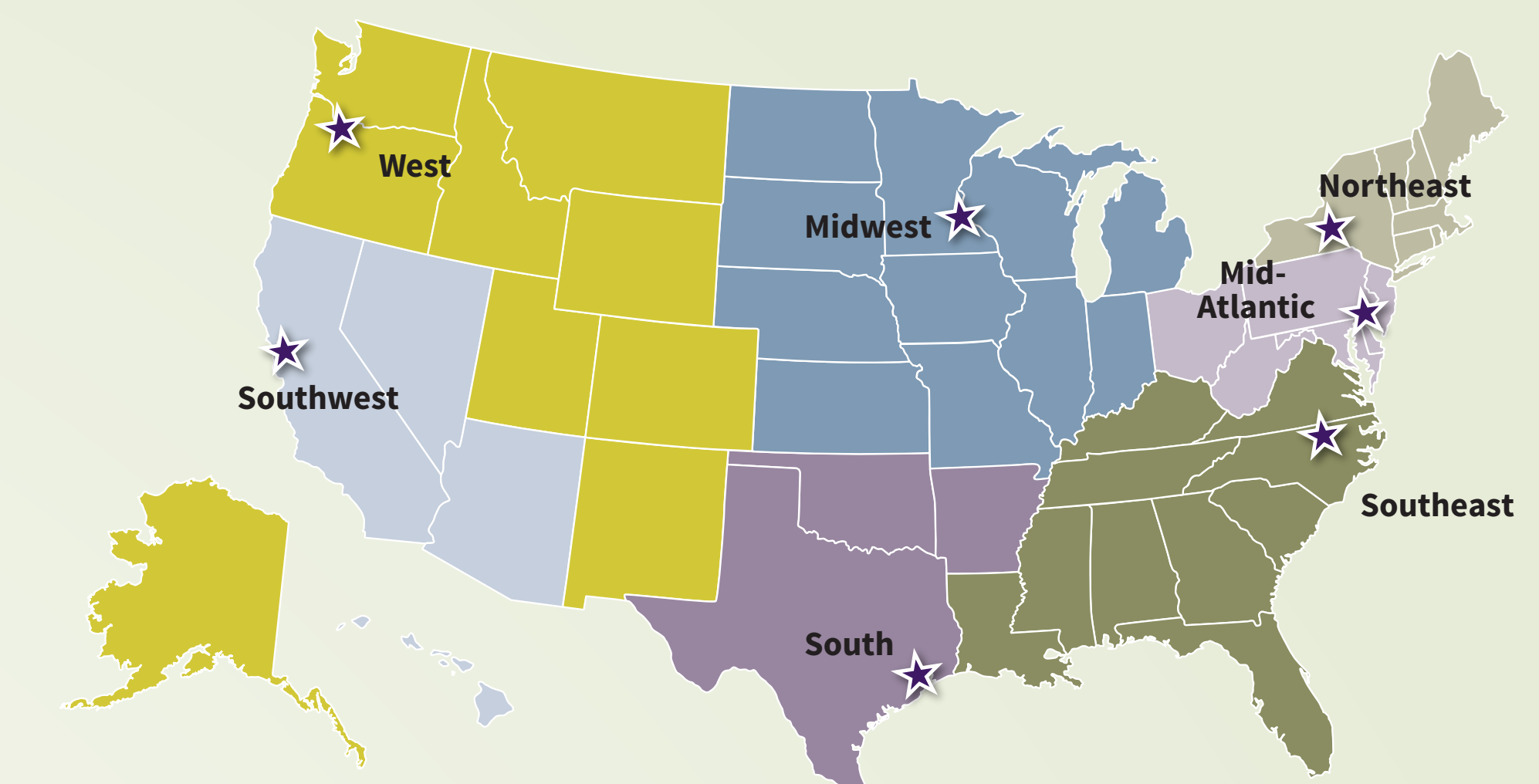
"Collaborations with other partners that began for NanoDays have blossomed into deeper relationships. For instance, one partner is currently working with us on a grant for a collaboration that would permanently change the science center, allowing us to reach all new audiences in entirely new ways!"

— **Jennifer Crispin,** Impression 5 Science Center

Local and national collaborations have led to many new projects focused on nano and other STEM topics.

REGIONAL HUBS

The NISE Network's seven regional hubs facilitate communication among partners, participation in Network activities, and local collaborations.

West
Midwest
Northeast
Mid-Atlantic
Southwest
Southeast
South

"It's an amazing thing to bring together high education people, community centers, science centers, and people like me who come from formal education. Everybody seems to have a place and a way to get something very meaningful out of this partnership."

— **Gail Jones,** North Carolina State University

The regional hub structure provides a personal, go-to resource for professionals. It serves as a central resource to disseminate Network updates, respond to partners' needs, and foster community at the regional level.

(Network Communication Study, 2012)

NANO MINI-EXHIBITION

Nano will be hosted by over 100 sites across the United States, reaching tens of millions of people each year. The 500 square foot exhibition presents the basics of nanoscale science and engineering, introduces some real world applications, and explores the societal and ethical implications of this new technology.
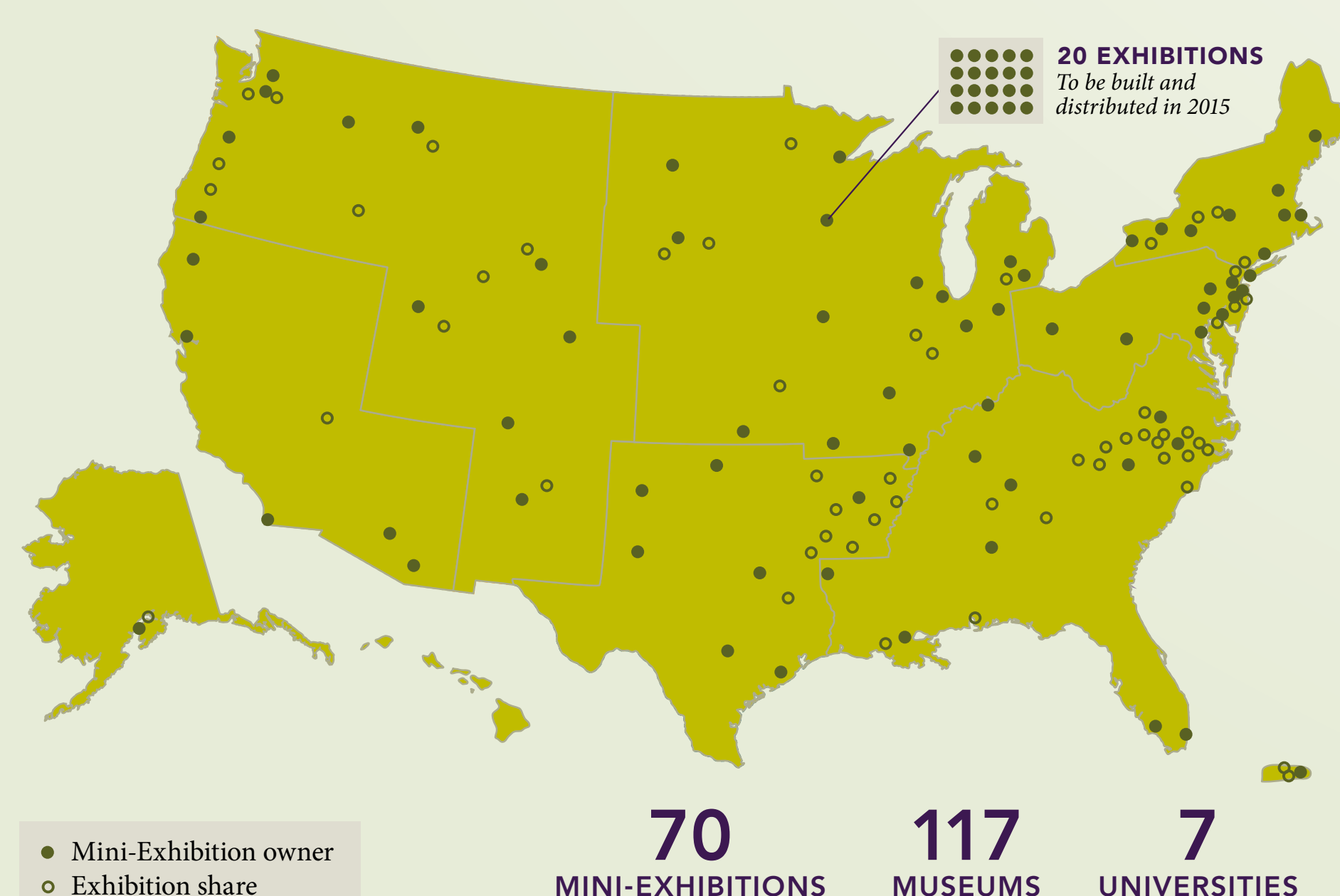
EVALUATION FINDING

Evaluation results show that this mini-exhibition has a big impact. Visitors describe Nano as interactive, informative, and family-friendly. 95% of visitors say Nano is enjoyable and 95% say it's interesting. The family-friendly design promotes social interaction, with 87% of groups playing, talking, and learning together. After their experience, 59% of visitors can describe the relevance of nanotechnology to their lives.

Nano also catalyzes other Network activities: 87% of partners implement new or enhanced programming; 62% develop or strengthen partnerships.

(Nano Mini-Exhibition Summative Evaluation, 2013)

Mini-Exhibition Locations
2012–2014

20 EXHIBITIONS
To be built and distributed in 2015

- ● Mini-Exhibition owner
- ○ Exhibition share

70 MINI-EXHIBITIONS   **117** MUSEUMS   **7** UNIVERSITIES

Engaging the Public

The NISE Net's educational materials engage a wide range of audiences in learning about complex scientific content—in ways that are fun and easy to understand.

In 2014 alone
NISE Net partners will reach over
8 MILLION PEOPLE
across all
50 states and US territories

1.2 MILLION
are reached through the
NanoDays kit

7 MILLION
will visit the
Nano mini-exhibition

NISE Net's online library includes *hundreds of*
FREE EDUCATIONAL RESOURCES

200
programs, activities, exhibits, and media

50
professional development and training resources

+250 ADDITIONAL PRODUCTS
shared from other sources

HOW?

NISE Net achieves broad public reach through the efforts of hundreds of partner organizations across the country.

Our materials are designed to align with partners' missions and existing activities, and to work well for a wide range of organizations.

Network partners use our educational materials in a variety of settings, including museums, universities, schools, and out-of-school time programs.

ONLINE LIBRARY

Our website offers over 300 open-source educational resources that suit different educational contexts, engage diverse target audiences, and convey a range of content.
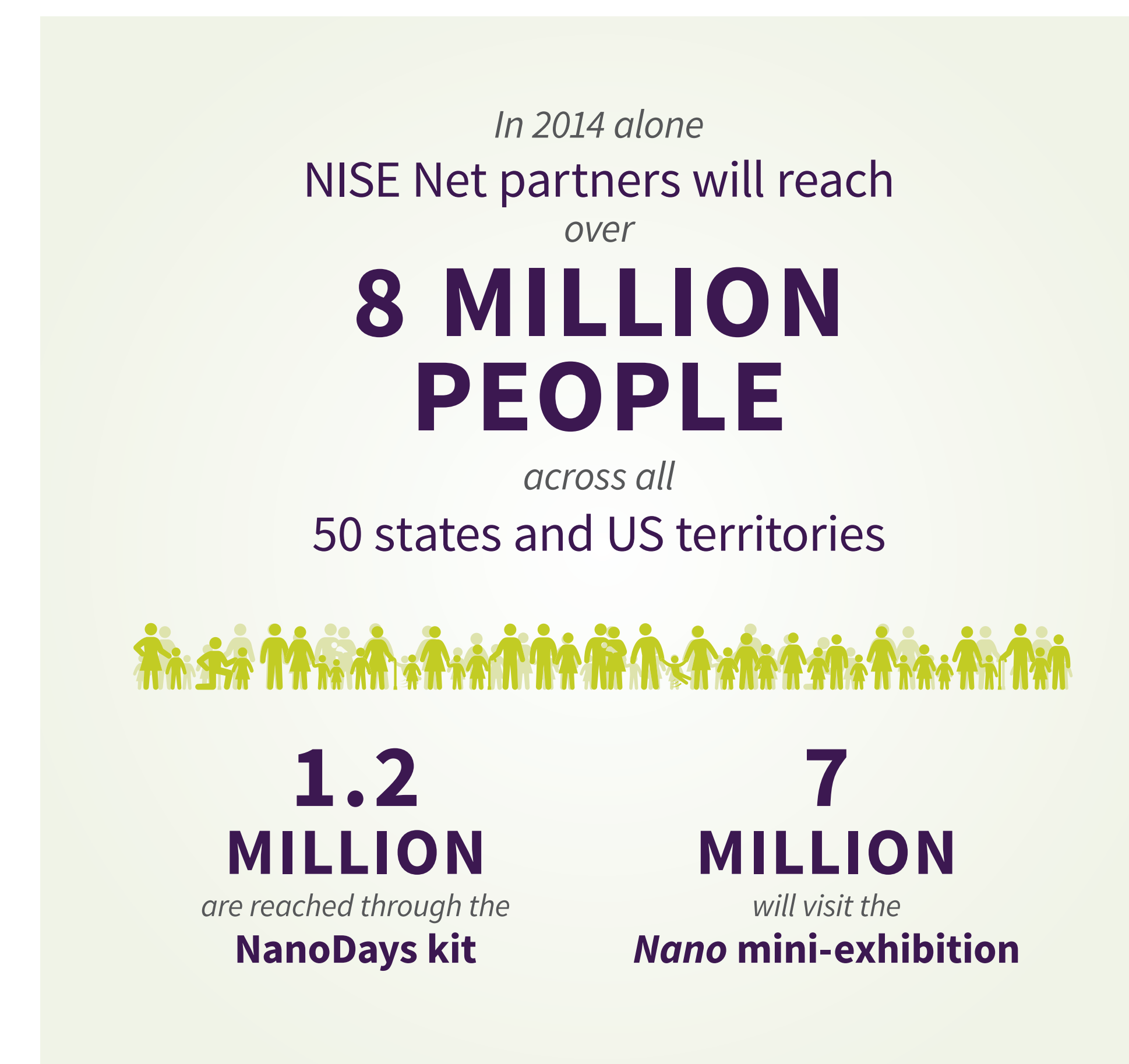
SUSTAINABILITY:
Integrating Nano into Ongoing Activities

By integrating nano into their ongoing activities, partners can continue to engage audiences in nano content long after NSF funding ends.

"Because the activities are of such high quality, we now have a suite of resources that address nanotechnology that we can use for workshops and additional experiences in our facility and out in the community."

— **Sloan Mann,** Imagination Station

Professional website: **www.nisenet.org** • Public website: **www.whatisnano.org**

DEVELOPING HIGH-QUALITY EDUCATIONAL PRODUCTS

The NISE Net uses a rigorous development process to ensure our educational products are scientifically accurate, represent best practices, and are effective experiences for visitors.

Scientist Review

Scientists are involved throughout, helping us find interesting ideas and present them accurately and effectively.

Peer Review

NISE Net teams include educators with a wide range of experience, who work at different kinds of organizations and with diverse audiences.

Visitor Evaluation

All educational products are prototyped and evaluated with their target audience. This integral part of the development process helps ensure our products are accessible, engaging, and educationally effective.

Inclusive Approaches Approach

Network development teams use and model inclusive approaches to engaging public audiences, including Universal Design and Spanish language translations.

Designed for Sharing

All NISE Network resources are shared through a Creative Commons Attribution Non-Commercial Share Alike license. This license allows partners to adapt, integrate, build on, and improve NISE Net materials to fit their needs.

USING MINI-GRANTS TO BUILD CAPACITY

Network mini-grants provide partners with financial support for new projects to engage diverse audiences. Mini-grants support sustainable efforts to infuse nano into ongoing activities.

Mini-grants support sustainable efforts to:

• Integrate nano into existing, ongoing programming.

• Reach new or traditionally underserved audiences with nano programming.

• Develop or build partnerships between museums and nano researchers.

Projects have included out-of-school time learning, K-12 enrichment, and staff and volunteer training.

Mini-Grant Awards
2011-2014

27 awards in 2011   **42** awards in 2012   **42** awards in 2013   **41** awards in 2014
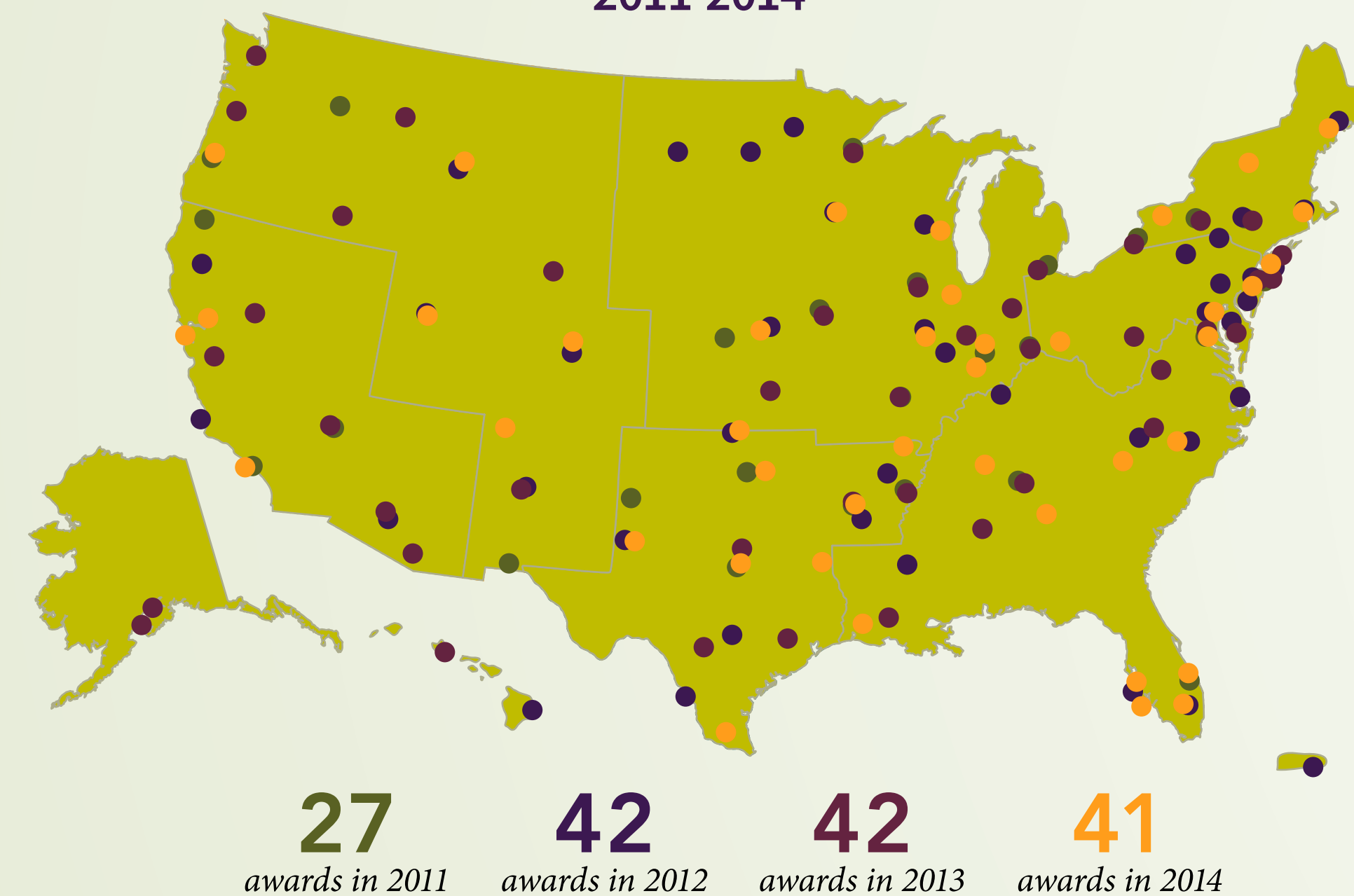
Completed mini-grant projects include: (clockwise from top left) Completing the installation of the University of Wisconsin Carbon Playground at the Discovery Center Museum in Rockford, IL; developing activity carts and providing volunteer training at Port Discovery Children's Museum in Baltimore, MD; exhibits in an existing "Animal Lab" at the Imaginarium Science Center in Fort Myers, FL.

Increasing Professional Capacity

NISE Net has built capacity by engaging our partners in doing work together at an unprecedented scale. We have provided the rationale, resources, and support to transform informal STEM learning in museums.

HOW?

NISE Net integrates our public engagement and professional development resources and opportunities, building capacity through practice. We provide resources to help educators and scientists develop the necessary skills, knowledge, confidence, and comfort to engage public audiences in nano content.

Evaluation Finding:

Partners benefit from NISE Net professional development experiences in various ways, including expanding their nano-related content knowledge and increasing their comfort conveying that knowledge to visitors; gaining new programming ideas and increasing their ability to integrate nano into their education offerings; and building and strengthening relationships with each other and in some cases forming new partnerships.

(A Review of NISE Net Evaluation Findings, Years 1 – 5 Summative Evaluation, 2011)

SUSTAINABILITY:

Applying New Skills to Future Work

NISE Net has provided the rationale, resources, and support for our partners to engage their audiences in nano long after NSF funding ends.

"Combined with ongoing professional development, NISE Net resources, and capped with the Nano exhibition, COSI Team Members across the institution have seized the opportunity to mainstream nanotechnology into their programs."

— **Joshua Sarver,** COSI

Partners are already applying concepts, skills, and practices learned in the NISE Net to other topics.

Professional website: **www.nisenet.org** • Public website: **www.whatisnano.org**

PROFESSIONAL DEVELOPMENT TRAININGS AND RESOURCES

NISE Network provides a variety of resources to help educators and scientists developed the necessary skills, knowledge, and confidence to engage public audiences in nano content. We also develop training tools, guides, workshops, and educational activities around a range of practices that can be applied more broadly than nano, including:

• **Science communication** for researchers, graduate students, and undergraduate students.

• **Nano and Society** – engaging audiences in conversations about the relationship between nanotechnology and society.

• **Team-Based Inquiry** – empowering educators to get the data they need, when they need it, to improve their products and practices.

• Practices to reach diverse audiences such as **Universal Design** and **bilingual translation** and programming.

NEW KNOWLEDGE FOR THE FIELD

Content Map

In consultation with experts in many fields, NISE Net created a content map identifying the content knowledge we determined was most important for engaging the public in learning about nano. The content map and associated resources provide key concepts and examples around four main concepts:

• Nano is small and different
• Nano is studying and making tiny things
• Nano is new technologies
• Nano is part of our society and our future

Research Studies

The NISE Net is funding four research studies to help us better understand museum-scientist partnerships; organizational change; real-world impact through traditional and social media; and public learning and decision-making.

Evaluation Studies

Over the nine years of the NISE Net, over 250 front-end, formative, and summative evaluation studies have been conducted about NISE Net products and practices. Many of these studies focus on understanding the impacts of the Network on public and professional audiences.