Bringing chemists and chemistry experiments into your museum and out into your community

Science Museum of Minnesota
Agenda

- Catherine McCarthy, cmcarthy@smm.org
  Science Museum of Minnesota, Saint Paul, MN

- Patti Galvan, P_Galvan@acs.org
  American Chemical Society, Washington, DC

- Emily Belle, ebelle@sciencenter.org
  Sciencenter, Ithaca, NY

- Soma Chatterji, ChatterjiS@carnegiesciencecenter.org
  Carnegie Science Center, Pittsburgh, PA

- Darrell Porcello, porcello@gmail.com
  Children’s Creativity Museum, San Francisco, CA

- Discussion and Questions
Catherine McCarthy
Science Museum of Minnesota
Saint Paul, MN
Project Overview

Explore Science: Let’s Do Chemistry

Catherine McCarthy
Science Museum of Minnesota
cmccarthy@smm.org
ASTC 2019
Project Goals
Putting research into practice

Hands-on activities that increase:

1. Interest,
2. Relevance
3. Self-efficacy
Explore Science: Let’s Do Chemistry kit contents
Explore Science: Let’s Do Chemistry kit contents
Training Guides

Let's Do Chemistry

Event Overview and Training

Gum and Chocolate Training Guide

Planning and Partnership Guide

What's in the Box? Improv Game

Safety Guide
Event Planning and Partnership Guide

This guide contains everything you will need to begin planning and promoting your Let's Do Chemistry event.

Guide covers

• Planning timeline
• National Chemistry Week
• Collaborations and finding local experts
• Training staff and volunteers
• Additional resources
• Evaluating your event
• Promotional and marketing materials
Safety Guide

Use this guide as you plan your Let’s Do Chemistry event and as a resource before training, demonstrating, or facilitating the activities.

Guide covers
• Let’s Do Chemistry kit safety practices and protocols
• General chemistry safety guidelines, protocols, and precautions
• Additional safety tips
• Chemistry materials and supplies
• Additional resources
Framework and Strategies

Research to Practice Guide

This guide will help you and your facilitators run a fun, successful Let’s Do Chemistry event and to encourage positive attitudes toward learning chemistry. Within the guide

Guide covers
• Let’s Do Chemistry project overview
• Learning chemistry in museums
• Creating the framework
• Understanding the framework
• Using the framework
Training videos
Training videos for each hands-on activity intended for staff and volunteer educators

Facilitation video
Chem-Attitudes with Dr. Braxton Hazelby facilitation training video
This funny video will help you and your facilitators run activities in a way that encourages participation and positive attitudes towards learning about chemistry.
Digital Materials

Physical kits
Include USB drive

Digital Download
www.nisenet.org/chemistry-kit
Explore Science: Let’s Do Chemistry kits

250 physical kits distributed across the US museums, universities, ACS Local Sections & Student Chapters
Events across the United States

Science Museum of Minnesota

Let’s Do Chemistry

Sciencenter

Discovery Station

Museum of Science
Events across the United States

Museum of Science, Boston, MA

Science Museum of Minnesota, Saint Paul, MN
Events across the United States

Children's Discovery Museum, Normal, Illinois

University of Arkansas Center for Mathematics and Science Education

Discovery Station, Hagerstown, Maryland

Fairbanks Children’s Museum, Alaska

Fairbanks Children’s Museum
Who hosted Let’s Do Chemistry events?

### Organization type

- **Museum / science center / informal science education organization**: 77%
- **College / university**: 17%
- **Professional chemistry / chemistry outreach program**: 11%
- **Other**: 7%

### Museum type

- **Science or technology museum**: 51%
- **Children's museum**: 49%
- **Planetarium**: 18%
- **Natural history museum**: 14%
- **N/A**: 12%
- **Art or history museum**: 7%
- **Emerging or developing**: 6%
- **Observatory**: 4%
- **Other**: 4%
- **NASA visitor center**: 2%

### Chemistry organization

- **ACS Local Section**: 12%
- **College / university**: 9%
- **ACS Student Chapter**: 8%
- **Other chemistry organization**: 6%
- **High school chemistry**: 0%
Where were events hosted?

**Event location**

- **Museum or science center**: 80%
- **Other**: 28%
- **University or college**: 15%
- **Planetarium**: 4%

**Other locations** included:
- Public library, K-12 schools, school district family science events
- Day camps, afterschool programs, outdoor field classroom
- Boys and Girls Clubs, Scouts
- Church, church camp
- Community organizations, community centers, local street markets, festivals, malls
- Fair grounds
- Hospital clinic
- State park, National laboratory

Shared by Keri Book @keribook, University of Arkansas Center for Mathematics and Science Education
Public audiences reached through events

Event audiences

- Girls: 89%
- Low-income: 87%
- Racial and ethnic minorities /…: 84%
- Rural: 51%
- Spanish-speaking audiences: 50%
- Disabled / differently abled: 39%
- At-risk youth: 39%
- Inner city: 37%
- Other non-native English speakers: 33%
- American Indian / Alaska Native: 16%
- Other underserved audiences: 7%
- N/A: 1%
Public audiences reached through events

- **210,526 people reached** through October-November 2018 Let’s Do Chemistry events across the US

- **6,121 volunteers participated** in and facilitated hands-on activities

- Many partners are already been using the materials in other ways following the Fall 2018 events
More Opportunities for Special Events

nisenet.org/national-chemistry-week
National Chemistry Week and Let’s Do Chemistry events

“The kit provided an easy way for NISE Network partners and ACS groups to make new connections and learn about each other” - David Horwitz, Outreach Programs Manager, ACS

69% of Explore Science: Let’s Do Chemistry kit recipients reported using their activities during National Chemistry Week (October 21st-27th, 2018)

40% of kit recipients reported utilizing ACS volunteers (ACS Local Sections or Student Chapters) for their events

30% of kit recipients reported collaborating with either a museum or ACS group
Thank you to museum and chemist partners for hosting Explore Science: Let’s Do Chemistry events!
This work is supported by the National Science Foundation under award number 1612482.

Any opinions, findings, and conclusions or recommendations expressed in this presentation are those of the authors and do not necessarily reflect the views of the Foundation.
Patti Galvan
American Chemical Society
Washington, DC
Leverage ACS resources and *Let’s Do Chemistry* for National Chemistry Week 2019

Patti Galvan
22 September 2019
Who We Are

• A congressionally chartered professional society for chemists and related professionals, and the world’s largest scientific society.

• **Vision:** To improve people’s lives through the transforming power of chemistry

• **Mission:** To advance the broader chemistry enterprise and its practitioners for the benefit of Earth and its people
Who We Are

More than 2,500 ACS members in Canada

1 Student Chapter at the University of Toronto Mississauga

81% of membership is in the US
Why NCW?

• National Chemistry Week (NCW) unites us in communicating the importance of chemistry to the public at the local, national, and global levels to make a positive change in the public's impression of chemistry.
NCW Reach in the U.S.

- **NCW 2017**
  - 81% of ACS local sections participated
  - 163K+ issues of the *Celebrating Chemistry* were distributed

- **NCW 2018**
  - 91% of ACS local sections participated
  - 167K+ issues of the *Celebrating Chemistry* were distributed
  - ACS local sections interacted with more than 75K+ people at in-person events
  - NCW reached more than 25M+ online
The New York Local Section teams up with 19 universities and nonprofit organizations to host an annual NCW event at the New York Hall of Science for 1,200 attendees.
The Northeast Tennessee Local Section works with Eastman Chemical to provide 1,400 students a day of chemistry.
The Puget Sound Local Section teams up a local student chapter to visit 23 middle school classrooms.
The Permian Basin Local Section works with three high school ChemClubs to host tables of activities at the local mall and during the annual homecoming float parade.
NCW Resources

NCW Coordinator Lookup Platform

www.ncwlookup.acs.org
NCW Resources

Educational Resources

www.acs.org/ncw
NCW Resources

Digital Celebrating Chemistry

www.acs.org/celebratingchemistry
NCW Resources

Illustrated Poem Contest

www.acs.org/ncw
NCW Resources

Promotional Items

www.store.acs.org
NCW Resources

Design Toolkit

Social Media
• #NCW
• #NationalChemistryWeek
• Marvelous Metals
• Twitter - @ACS_NCW
• Facebook - National Chemistry Week

www.acs.org/ncw
Are you planning a chemistry event during National Chemistry Week 2019?
NCW Resources

Find an Event

www.acs.org/ncw
Thank You!

NCW 2019 – October 20-26
Questions? Contact outreach@acs.org
Celebrating the International Year of the Periodic Table of Chemical Elements (IYPT 2019)

Patti Galvan
22 September 2019
IYPT 2019

- 2019 is the 150th anniversary of the publication of Mendeleev’s Periodic Table of Chemical Elements in 1869

- IYPT is a celebratory year designated by the United Nations

- IUPAC is the coordination hub for all IYPT events

- ACS is working with IUPAC and other societies on international engagement
What's So Special About the Periodic Table?

- Mendeleev’s table predicted properties of undiscovered elements
- Final row is complete
- The table continues to evolve
What Tools are Available

• **IYPT Resources**
  - [www.acs.org/iypt](http://www.acs.org/iypt)
    - **Register your event, get free press!**
    - Educational resources by age group
    - Links to interactive tables from around the web
    - Fun facts and videos
  - Email: iypt@acs.org
    - Send us your questions
    - Get IYPT graphics
What’s Already Planned

• **IYPT Merchandise**
  - ACS Online Store: Periodic Table Goods, Element Pins
  - IYPT Calendar
  - IYPT Periodic Table Pins
  - IYPT Periodic Table Wallet Cards
  - IYPT Member-get-a-member blanket
  - IYPT Cupcake Mix
What’s Already Planned

• Recurring Events
  – Tuesday Trivia Twitter posts
  – Monthly history posts on ACS Axial
  – Social Media graphics released by ACS Axial
  – C&EN articles
What’s Already Happened

• **First Quarter**
  - Jan 29: ACS and IUPAC Opening Ceremony, Livestreamed from Paris
  - Feb 11: IUPAC symposium “Women and the Periodic Table of Elements”
  - Feb 12: ACS and IUPAC Global Women’s Breakfast
  - Feb 16 -17: AAAS Family Science Days
  - Feb 26 - 27: Special IYPT Program in a Box
  - Feb 28: Capitol Hill Briefing and Reception
What’s Already Happened

• **Spring National Meeting**
  - #IYPT2019 Social Media Wall
  - Periodic Table giveaways at the ACS Booth
  - HIST Talks on IYPT
  - Mar 30: CCA Presidential Outreach Event
  - Mar 31: Celebratory IAC Reception
  - Mar 31: Student Awards Ceremony theme
  - Apr 1: CCA Outreach Workshop: IYPT and CCEW
  - Apr 2: National Awards Ceremony/Banquet theme
  - Apr 2: C&EN IYPT Trivia Night
What’s Already Happened

• Fall National Meeting
  – Periodic Table lanyard giveaways at the ACS Information Booths
  – CCA Presidential Outreach Event
  – Grady-Stack Award for Interpreting Chemistry for the Public awarded to Sir Martyn Poliakoff and the Periodic Table of Videos: From Test Tube to YouTube
  – Symposium: 150 Years of the Periodic Table, HIST Division
  – IAC Reception: Celebrating IYPT 2019
  – C&EN and ACS on Campus present Periodic Table Bingo
What’s Already Happened

• **ACS and Government**
  - Capitol Hill receptions and briefings
  - State resolutions from South Carolina, Massachusetts, and Puerto Rico
  - July 24: Senate resolution unanimously passed!
  - House resolution in the works, voting after August Recess
  - ACS & Battelle Joint Congressional Briefing and Reception, Elements and National Labs, October 23, 2019
  - ACS & NSF: IYPT Colloquium “Perspectives in Chemistry: 150 Years of the Periodic Table” at National Academies, November 2019
IYPT Resolutions: U.S. Senate

S. RES. 283

Resolving support for the designation of 2019 as the “International Year of the Periodic Table of Chemical Elements.”

IN THE SENATE OF THE UNITED STATES

JULY 31, 2019

Mr. Coons of Delaware, Sen. Cory, Sen. Cory, Sen. Peters, and Sen. Heinrich submitted the following resolution, which was considered and agreed to:

RESOLUTION

Expressing support for the designation of 2019 as the “International Year of the Periodic Table of Chemical Elements.”

Whereas, on December 30, 2015, the United Nations General Assembly designated 2019 as the “International Year of the Periodic Table of Chemical Elements” (referred to in this preamble as the “International Year of the Periodic Table”), recognizing that—
1. the development of the periodic table was one of the most significant achievements in science; and
2. the periodic table is a unifying scientific concept with broad applications and implications in astronomy, chemistry, physics, biology, and other natural sciences;

NOW, THEREFORE, be it

RESCOLVED, That the Senate—

1. recognizes the periodic table as a unifying scientific concept that has provided a framework for the classification and understanding of elements and has facilitated the development of new technologies and applications; and
2. encourages educators, scientists, and policymakers to celebrate the “International Year of the Periodic Table” through educational programs, public outreach initiatives, and collaborative research projects to further promote the understanding and appreciation of the periodic table.

[Additional text may follow, but it is not included in this sample.]
What Are Others Doing?

• HIST Division
  – “The particular item I wanted to report is searchable online map of places associated with the developers of the periodic table and with the chemical elements. Each entry contains links to further information about the person, place, or event described. The map is called Places of the Periodic Table”
  – https://www.google.com/maps/d/viewer?mid=1Xey19Nt9afpdL6wc1ysM_ZNhKQpQ5ilv&ll=28.563083397360725%2C-38.502264702109414&z=2

• Western Michigan Local Section
  – “Our local section of the ACS is organizing an event in October to make the World's Largest Periodic Table in honor of National Chemistry Week and IYPT2019. Details on the event can be found our local section website and Facebook page.”
  – https://www.facebook.com/events/2261489874120479/
  – https://westernmichigan.sites.acs.org/
What Are Others Doing?

• **California Local Section**
  – National Historic Chemical Landmark rededication in honor of the discovery of more than a dozen elements at Lawrence Berkeley National Lab (LBNL)
  – 150 guests attended ceremony and reception which included hands-on science experiments.
  – Attendees included:
    • Yumi Nakagawa, LHS Advisory Council Chair
    • Korey Carter, LBNL
    • David Seaborg (Son of the late Glenn Seaborg)
    • Jim Postma, Chair of ACS CA Local Section
    • Attila Pavlath, ACS Past President
What Can I Do?

- Tweet or post about chemistry using #IYPT2019
- Host social event(s) celebrating IYPT 2019
- Connect your chemistry programming to the United Nations Sustainable Development Goals
- Organize event(s) in your community specifically to improve public awareness of chemistry's contributions to sustainability
- Organize hands-on science outreach event(s) in your community
- Participate in National Chemistry Week
How Will **YOU** Celebrate IYPT 2019?

www.acs.org/iypt
#IYPT2019
iypt@acs.org
Emily Belle
Sciencenter
Ithaca, NY
Chemsations!
Chemistry-based Partnerships
Program Sustainability

Red Green Reaction

NARRATOR: Magicians can make colors appear and disappear, and so can a chemist.

DEMONSTRATOR: Watch the liquid in this bottle. Do you think I can make it change color? (Wait for audience response. Pick up the bottle of yellow solution and swirl it gently until the liquid turns orange or reddish.) What color is it now? (Audience: red!) Right! Now it’s red. Do you think I can change it again? (Wait for mixed audience response. Shake the bottle vigorously up and down until the liquid turns green.) What color is it now? (Audience: Green!) Yes, it’s green!

NARRATOR: This bottle contains a dye called indigo carmine, which reacts with the oxygen that’s in the air to cause the color to change. When we swirl the bottle like this (demonstrates swirling motion) a small amount of oxygen reacts with the indigo carmine to slowly change it from yellow to red. When the bottle is shaken (demonstrates shaking motion), more oxygen mixes with the liquid and it causes the red to change to green.

(Then place the bottle in a visible location.) Keep an eye on that bottle and let us know if anything happens during the show. (After a few minutes, the liquid should become red and then yellow again. When an audience member notices, swirl or shake the bottle again.)

When the bottle is not shaken, sugar, or dextrose, in the solution reacts with the indigo carmine to slowly change it back to yellow and release the oxygen so the reaction can take place all over again. Eventually the dextrose gets used up and the reverse chemical reaction can no longer take place. (Note to demonstrators: This last section can be explained later when the color changes back and the audience notices.)
Accessibility
Expanding the opportunities for everyone to engage with science by removing barriers

Family Science Nights
Chemistry-themed Outreach
Upstate New York: Tompkins, Schuyler and Tioga Counties
Partnering with Underserved Schools

Enfield Elementary Family Science Night

Thursday, October 3
6:30 - 7:30 p.m.

Chemistry hands-on activities with the Sciencenter!

Enter a raffle to win a family membership to the Sciencenter!

Sciencenter
601 1st St, Ithaca, NY • 607-272-0600 • www.sciencenter.org
Darrell Porcello
Children’s Creativity Museu
San Francisco, CA
To nurture creativity and collaboration in all children and families.
Boom-Fizz: Sounds of Chemistry workshop

Rocket Reactions
Boom-Fizz: Sounds of Chemistry workshop

Sublimation Bubbles

Fizzzz!!!
Boom-Fizz Workshop

Rocket Reactions

Sublimation Bubbles

Boom-Fizz Workshop
Boom-Fizz Workshop

Sublimation Bubbles Workshop

Chemistry is Colorful Workshop
This work is supported by the National Science Foundation under award number 1612482.

Any opinions, findings, and conclusions or recommendations expressed in this presentation are those of the authors and do not necessarily reflect the views of the Foundation.
Discussion
Questions

Addressing fears about chemicals and chemistry?
Questions

Getting support from institution stakeholders and decision makers for chemistry?
Questions

Event Safety?
Questions

Special Training?
Questions

Materials handling and storage ?