Purpose

• To Provide Overview and Operating Model of Science Activation
• To Provide Examples of Impact and Reach
SMD Science Activation Desired Outcome:
To further enable NASA science experts and content into the learning environment more effectively and efficiently with learners of all ages.
Science Activation

• Baseline in November 2016, this collaborative model leverages over 200 partnerships through network of science and community-based institutions using “multiplier effect” across U.S. to achieve objectives

• 24 Competitively-selected awardees enables NASA science experts and content to engage more effectively and efficiently with learners of all ages

• Each agreement uses independent evaluators to validate performance; new community of practice established

• Volunteer networks, such as Solar System Ambassadors and Night Sky Network, mobilized across the U.S.

• National Academies assessment scheduled for 2019

• Annual SMD funding $45M for Science Activation activities
Partnering Opportunities

Heliophysics
Astrophysics
Planetary
Earth

Cross-divisional

Examples:
- Translate Datasets to useful information for users
- Alignment to education Standards and Decadal Questions
- Enable SMEs to share science with target audiences
- Effective Dissemination
- Open/transparent reporting
- Timely evaluation/relevant assessment
- Development of materials, per Needs Assessments

SMD Assets (Content, SME's, etc) *

Science Activation Provider(s)

Enable STEM Education
Improve U.S. Science Literacy
Advance National Education Goals
Leverage Through Partnerships

Outcomes to Meet these SMD Science SciAct Objectives

Evaluation

SMD Science Activation Model

* Divisions responsible for science content datasets, Subject Matter Expert (SME) selection, and enabling flight opportunities.
2018 SMD Collective Relationships

SMD

NASA Hq

SMD Earth

SMD Space

Independent Evaluation

Leads/PI's

Content

- Heliophysics
- Astrophysics
- Mars
- Astrobiology
- Earth
- Planetary

Dissemination

- Universe of Learning
- PBS Learning Media
- NASA eClips
- Infiniscope
- Surveys
- NESSP
- LabVentures

Audiences

- Planetariums
- Science Centers/Museums
- Public and State Libraries
- Challenger Centers
- Girl Scouts
- Educators

Infrastructure

SMD Science Activation 2017 Partnership Map Includes Over 200 Partners
Reach Maps

2016

2017

- AAA-SETT (2016)
- Aggregated Organizations (2016)
- AREN PROJECT (2016)
- Challenger Center NASA CAN (2018)
- Heliohysics Citizen Science (2016)
- Museum Alliance Institutional Members (2018)
- NAML Partner Libraries (2018)
- NESEC (2016)
- Night Sky Network (2016)
- NISE Network Museum Partners (2016)
- NSSEC (2016)
- Planet CAN (2016)
- Reaching for the Stars: NSGS (2016)
- Smokey Mountain STEM (2016)
- Universe of Learning, STScI (2016)
- Viewspace (2016)
Perspectives

Baselined in November 2016, this collaborative model enables over 200 partnerships through a network of science and community-based institutions using a “multiplier effect” across the U.S. to achieve Objectives. Includes a number of digital learning approaches maximizing SMD’s unique capabilities. Each agreement uses independent evaluators to validate performance.

Other Agencies/Partners

NASA

SciAct Collective

(2016/17+)

(2018+)

(~2018+)

We Are Here
Alignment Between SMD and Agency Activities

• SMD’s STEM-related activities align with the agency’s 2018 Strategic Plan
  • Objectives 1.1, 3.3 and 4.1
• Also aligning with new STEM engagement framework currently under development, for example
  • Authentic experiences
  • Student collaborations
• All Science Activation awards are evidence-based, contribute to science literacy and advance national goals
• For Science Activation, our experts, content, and authentic experiences are what we uniquely contribute into the education ecosystem. For stronger connections:
  • New Hotline and mapping tools posted on http://science.nasa.gov/learners;
  • New GPRAMA metrics established for 2020
  • Assessment by the National Academies in 2019 will help inform future decisions
Impact Examples

2017 STEM Science Activation Meeting
Impact of Eclipse Box program

Evidence-based Highlight
Sharing the Science with Learners (of any age)
using NASA Science Assets

2017 Toolkit
Reach 250 Toolkits
4,535 Event volunteers
324,140 Public reached

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NN narcotics, DESE, PI: F. Martin, Education Museums of Science, Science and Science Museum of Minnesota (Reinowitz et al.)

Meet the Scientist Sessions by the numbers 2016-2017

4 Classroom connected to NASA SMaRT across urban and rural Alaska to a topic related to each classroom's GLOBE project

9 Students interacting in real-time with NASA SMaRT discussing research of mutual interest and learning about each other's science journey

138 Students engaged in climate change learning using Arctic and Earth SIGNS activities

192 formal and informal science educators and community members trained

853 students engaged in climate change learning using Arctic and Earth SIGNS activities

Enlisted 6 of 112 councils to either develop unique space science programs, or embed eclipse-related activities into existing offerings.

4766 girls
421 girls
13,703 total

8156 girls
6426 girls
47 troops borrowed boxes

We really loved the boxes...It made it SO much easier to plan such a specialized event taking place amid all our other outdoor programs.

407 events
96 camps
47 troops borrowed boxes

Educator and community member workshops by the numbers 2017

Arctic & Earth SIGNS workshops delivered

13 Arctic & Earth SIGNS workshops delivered

Ongoing efforts by more than 60 Council will increase numbers in girls engaged in Sun, Earth, Moon activities by 50% - 20,000.

Impact Examples
Back-up

“Education is not the filling of a pail, but the lighting of a fire...and NASA is the spark”
# SMD Science Activation Program - Summary

## External Assessment

National Academy of Science: Board of Science Education and Space Studies Board

## Opportunities

- Enabling of SMD content and experts into additional areas and venues
- Improved coordination across SMD science education
- Reduction in fragmentation and duplication of efforts
- Increased support of targeted audiences based on needs assessments
- Improvement in the understanding of science literacy

## Risks/Areas of Concern

- More dynamic education environment post ESSA
- Budget uncertainty until restructuring progress is demonstrated. Need $42M/year to successfully restructure
- Stakeholders disconnecting Science and combining with Education
- Identification of milestones to fill gaps in Formal and Underserved areas

## Measurable Achievement

- Progress towards CoSTEM goals by 2020
- Statistical Improvement in applicable S&E Indicators by 2020
- Statistical improvement in scientific literacy surveys by 2020
- Budgets increase reflect progress towards Desired Outcome (Goal is $50M/year by 2020)
Map of NASA Science Mission Directorate Science Activation Selections, including Co-Is
SMD Science Activation Awardees: Cross-Discipline

Space Science Institute – Boulder, CA. Paul Dusenbery, Principal Investigator for “NASA@ My Library: A National Earth and Space Science Initiative that Connects NASA, Public Libraries and their Communities”

University Of Washington, Seattle –Seattle, WA. Robert Winglee, Principal Investigator for “Northwest Earth and Space Sciences Pipeline (NESSP)”

Arizona State University– Saint Paul, MN. Paul Martin, Principal Investigator for “NASA Space and Earth Informal Science Education Network (SEISE-Net)”

University of Michigan, Ann Arbor –Ann Arbor, MI. Jon Miller, Principal Investigator for “Demonstration of the Feasibility of Improving Scientific Literacy and Lifelong Learning through a Just-in-Time Dissemination Process”

University Of Colorado, Boulder – Boulder, CO. Douglas Duncan, Principal Investigator for “Enhancement of Astronomy and Earth Science Teaching Using High Resolution Immersive Environments”

WGBH Educational Foundation – Boston, MA. Rachel Connolly, Principal Investigator for “NASA and WGBH: Bringing the Universe to America’s Classrooms”

American Museum of Natural History - New York City, NY. Rosamond Kinzler, Principal Investigator for “OpenSpace: An Engine for Dynamic Visualization of Earth and Space Science for Informal Education and Beyond”

National Institute of Aerospace Associates – Hampton, VA. Shelley Spears, Principal Investigator for “NASA eClips 4D Multi-Dimensional Strategies to Promote Understanding of NASA Science: Design, Develop, Disseminate and Discover”
Astrophysics – Lead: Hashima Hasan

SETI Institute - Mountain View, CA. Pamela Harman, Principal Investigator for “Reaching for the Stars: NASA Science for Girl Scouts”

SETI Institute – Mountain View, CA. Dana Backman, Principal Investigator for “Airborne Astronomy Ambassadors (AAA)”

Space Telescope Science Institute - Baltimore, MD. Denise Smith, Principal Investigator for “NASA’s Universe of Learning: An Integrated Astrophysics STEM Learning and Literacy Program”

Earth Science – Lead: Lin Chambers

Gulf of Maine Research Institute - Portland, ME. Leigh Peake, Principal Investigator for “Real World, Real Science: Using NASA Data to Explore Weather and Climate”

Institute for Global Environmental Strategies – Arlington, VA. Theresa Schwerin, Principal Investigator for “NASA Earth Science Education Collaborative”

University of Alaska, Fairbanks – Fairbanks, AK. Elena Sparrow, Principal Investigator for “Impacts and Feedbacks of a Warming Arctic: Engaging Learners in STEM using NASA and GLOBE Assets”

University of Texas, Austin – Austin, TX. Margaret Baguio, Principal Investigator for “STEM Enhancement in Earth Science”

University of Toledo – Toledo, OH. Kevin Czajkowski, Principal Investigator for “Mission Earth: Fusing GLOBE with NASA Assets to Build Systemic Innovation in STEM Education”

Wayne County Intermediate School District – Wayne, MI. David Bydlowski, Principal Investigator for “AEROKATS and ROVER Education Network (AREN)”
Space Science – Lead: Hakeem Oluseyi

**Arizona State University – Tempe, AZ.** Ariel Anbar, Principal Investigator for “NASA SMD Exploration Connection”

**Challenger Center for Space Science Education – Washington, DC.** Denise Kopecky, Principal Investigator for “CodeRed: My STEM Mission”

**Jet Propulsion Laboratory – Pasadena, CA.** Michelle Viotti, Principal Investigator for “NASA Active and Blended Learning Ecosystem (N-ABLE)”

**Northern Arizona University – Flagstaff, AZ.** Joelle Clark, Principal Investigator for “PLANETS (Planetary Learning that Advances the Nexus of Engineering, Technology, and Science)”

**Exploratorium – San Francisco, CA.** Robert Semper, Principal Investigator for “Navigating the Path of Totality”

**NASA Goddard Space Flight Center - Greenbelt, MD.** C. Alex Young, Principal Investigator for “Heliophysics Education Consortium: Through the Eyes of NASA to the Hearts and Minds of the Nation”

**Southwestern Community College – Sylva, NC.** Matt Cass, Principal Investigator for “Smoky Mountains STEM Collaborative: Bridging the Gaps in the K-12 to Post-Secondary Education Pathway”
NASA’s Universe of Learning Reach Map

UoL Institutions & Partners
ViewSpace
Science Olympiad
Informal Learning Network
Girls STEAM Ahead with NASA
Science Briefing
MicroObservatory
AstroViz