The Imagine Mars Project

A creative, community-based project that integrates science, technology and the arts.

INTERAGENCY COOPERATION:
Co-sponsored by NASA & the National
Endowment for the Arts, with participation
from HUD Neighborhood Networks

What is Imagine Mars?

The Imagine Mars Project is a hands-on, STEM-based project that asks students to work with NASA scientists and engineers to imagine a community on Mars and express their ideas through the arts and humanities.

Many types of projects to fit any group

DESIGN ARTS, PERFORMANCE ARTS, VISUAL ARTS, LANGUAGE ARTS

What is Imagine Mars?

The Imagine Mars Project enables students to explore their own community and decide which arts, scientific and cultural elements will be important on Mars. Then, they develop their concepts relating to a future Mars community from an interdisciplinary perspective of arts, sciences, and technology.

Student Outcomes

Knowledge: Students demonstrate application of relevant STEM standards in their Imagine Mars learning experiences.

Engagement: Students demonstrate an interest in Earth/Mars and/or in STEM-related careers necessary to a community through their Imagine Mars learning activities.

Attitude: Students have a greater sense of self-efficacy in STEM-related topics and their own career potential from exposure to them through Imagine Mars.

Skills: Students demonstrate relevant digital-age technology skills (as outlined by the National Educational Technology Standards) and use of relevant 21st Century Tools (as outlined by the Partnership for 21st Century Skills) in their Imagine Mars learning experiences.
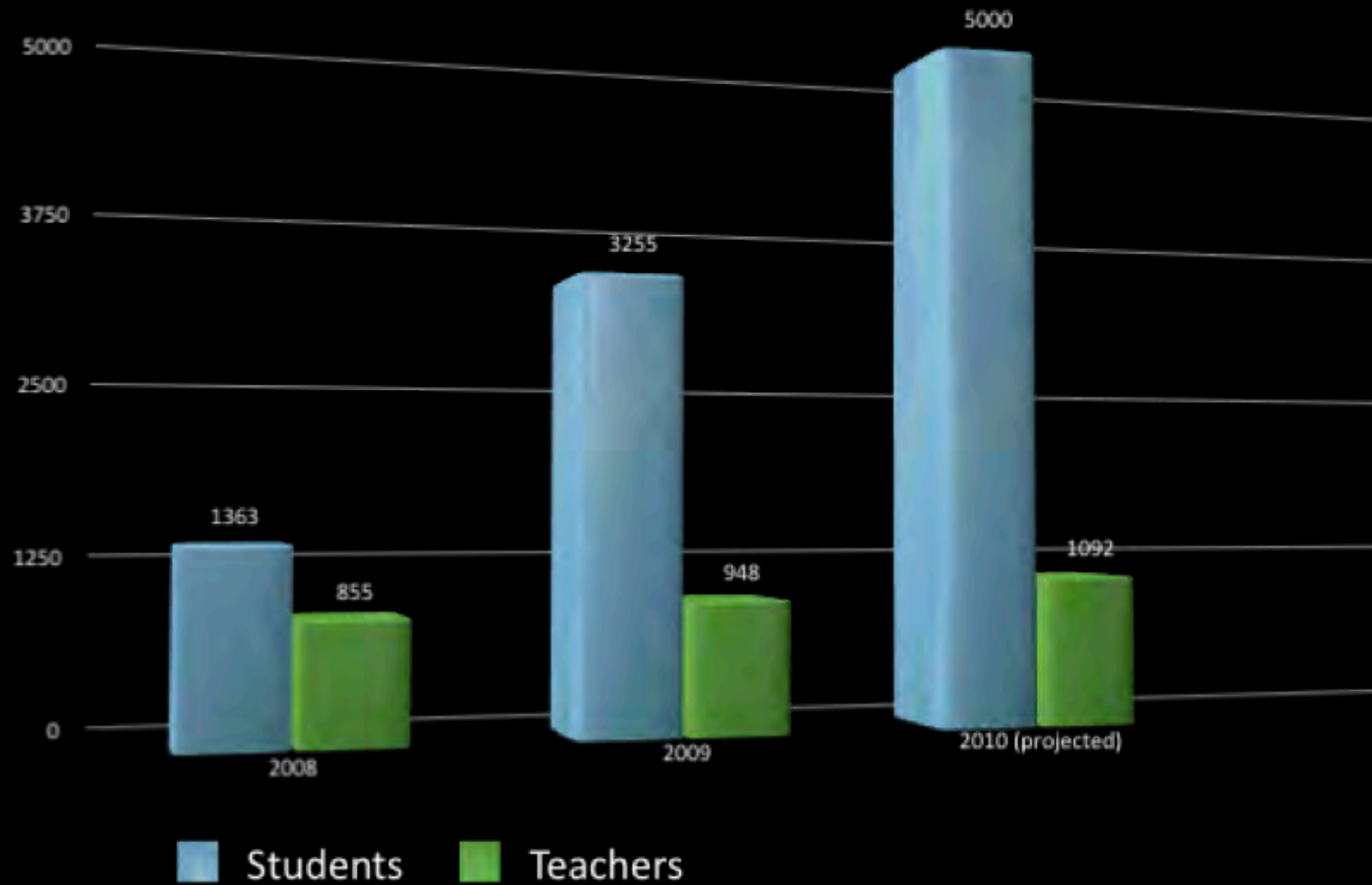
Locations:

California, Texas, Louisiana, North Carolina, Massachusetts, Hawaii

Developing: Arizona, New Mexico, Florida, Pennsylvania

Imagine Mars Student Reach:

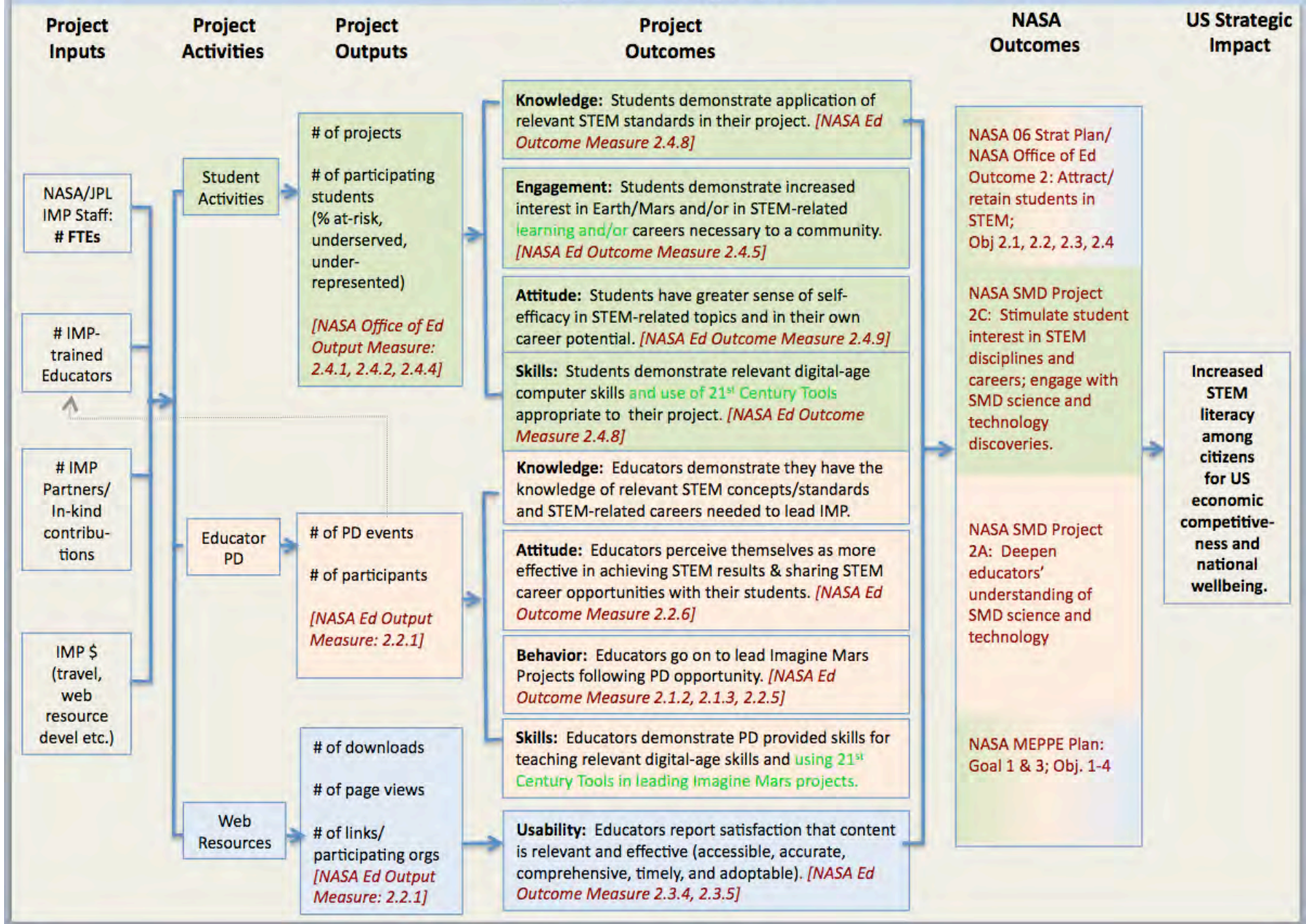# Aligns to the following National Science Education Standards:

	K-4	5-8	9-12
Science & Technology			
Develop abilities of technological design	●	●	●
Develop understanding about science and technology		●	●
Science in Personal and Social Perspectives:			
Understanding of types of resources	●		
Understanding of changes in environments	●		
Understanding of science and technology in local challenges	●		
Science and technology in society		●	●
Understanding of natural resources			●
Understanding of environmental quality			●
History & Nature of Science			
Understanding of science as a human endeavor	●	●	●
Understanding of the history of science		●	
Understanding of historical perspectives			●

Additionally aligns with Physics, Life Science, Earth and Space Science standards.
Aligns with the science-related 21st Century Skills. Promotes use of 21st Century Tools

Imagine Mars Logic Model

Alignment with NASA measures/guiding docs in red.

Project Inputs	Project Activities	Project Outputs	Project Outcomes	NASA Outcomes	US Strategic Impact

Project Inputs

NASA/JPL IMP Staff: **# FTEs**

IMP-trained Educators

IMP Partners/ In-kind contributions

IMP $ (travel, web resource devel etc.)

Project Activities

Student Activities

Educator PD

Web Resources

Project Outputs

# of projects

# of participating students (% at-risk, underserved, under-represented)

[NASA Office of Ed Output Measure: 2.4.1, 2.4.2, 2.4.4]

# of PD events

# of participants

[NASA Ed Output Measure: 2.2.1]

# of downloads

# of page views

# of links/ participating orgs
[NASA Ed Output Measure: 2.2.1]

Project Outcomes

Knowledge: Students demonstrate application of relevant STEM standards in their project. *[NASA Ed Outcome Measure 2.4.8]*

Engagement: Students demonstrate increased interest in Earth/Mars and/or in STEM-related learning and/or careers necessary to a community. *[NASA Ed Outcome Measure 2.4.5]*

Attitude: Students have greater sense of self-efficacy in STEM-related topics and in their own career potential. *[NASA Ed Outcome Measure 2.4.9]*

Skills: Students demonstrate relevant digital-age computer skills and use of 21st Century Tools appropriate to their project. *[NASA Ed Outcome Measure 2.4.8]*

Knowledge: Educators demonstrate they have the knowledge of relevant STEM concepts/standards and STEM-related careers needed to lead IMP.

Attitude: Educators perceive themselves as more effective in achieving STEM results & sharing STEM career opportunities with their students. *[NASA Ed Outcome Measure 2.2.6]*

Behavior: Educators go on to lead Imagine Mars Projects following PD opportunity. *[NASA Ed Outcome Measure 2.1.2, 2.1.3, 2.2.5]*

Skills: Educators demonstrate PD provided skills for teaching relevant digital-age skills and using 21st Century Tools in leading Imagine Mars projects.

Usability: Educators report satisfaction that content is relevant and effective (accessible, accurate, comprehensive, timely, and adoptable). *[NASA Ed Outcome Measure 2.3.4, 2.3.5]*

NASA Outcomes

NASA 06 Strat Plan/ NASA Office of Ed Outcome 2: Attract/ retain students in STEM; Obj 2.1, 2.2, 2.3, 2.4

NASA SMD Project 2C: Stimulate student interest in STEM disciplines and careers; engage with SMD science and technology discoveries.

NASA SMD Project 2A: Deepen educators' understanding of SMD science and technology

NASA MEPPE Plan: Goal 1 & 3; Obj. 1-4

US Strategic Impact

Increased STEM literacy among citizens for US economic competitive-ness and national wellbeing.

What is Imagine Mars? *Five Easy Steps:*

1 Reflect: Students reflect on their home community – the people, careers, natural and human made resources - in an effort to understand what makes a community not only survive, but thrive.

2 Discover: Students discover the challenging environmental conditions Mars presents to a human community and work with scientists and engineers to uncover possible solutions.

3 Imagine: Students combine what they learned in the "reflect" and "discover" steps and propose ideas for a plausible and successful community on Mars.

4 Create: Students create a representation of their Martian community or of some aspect of the community.

5 Share: Students use technology and communication skills to present their solution to a community on Mars.

Students interact with NASA scientists & engineers

- We help to connect students with NASA scientists and engineers, work through the details of their ideas, think critically and solve problems.
- Exposes students to new career paths

Ways to interact:
- Face-to-face with volunteers from NASA centers
- Face-to-face with volunteers from universities
- Video conferencing (WEBEX)
- Digital Learning Network
- Network of volunteer Solar System Ambassadors

Architecture on Mars

Academy Homes, Roxbury MA.

1 Week | 4th – 11th Grade
13 Students | Moderate Resources

Students worked with 3D-design software to create a community on Mars. The students worked with local architects and scientists to understand the nature of a healthy community and how life may change while living on Mars. Students created cardboard models and then created their community in 3D software.

Support/Mentors:

Diane Geogopolis (Architect)
Jim Zebrowski (Scientist/ Solar System Ambassador)
Bob Mercerou (Scientist)

STEP 1: REFLECT

Consider what students value in their community, including people, careers, culture, natural and human-made resources, and the environment. Students reflect on their home community in an effort to understand not only what makes a community survive, but also thrive!

STEP 2: DISCOVER

Learn about how Mars compares to Earth from NASA scientists, engineers, and community leaders, who serve as career role models for participating students. Students discover the challenging environmental conditions Mars presents to a human community and work with scientists and engineers to uncover possible solutions, as well as consider potential careers.

STEP 3: IMAGINE

Imagine what a vibrant community on Mars would be like, including ideas about necessary resources, the surrounding environment, cultural factors, and careers. Students synthesize what they learned in the "reflect" and "discover" steps and propose ideas for a scientifically and technologically plausible and successful community on Mars.

$2 NICKELS $2

Post Office

Tel

H

Train Station

PENNIES 50¢

SUBWAY

Pool

STEP 4: CREATE

Express ideas creatively through the arts and humanities, using STEM principles and digital-age skills. Students create a representation of their Martian community, following principles of technological design and themes related to science and technology in society.

hospital

solar panels

school water storage

the people live here

post office

library

row?

polar ice cap
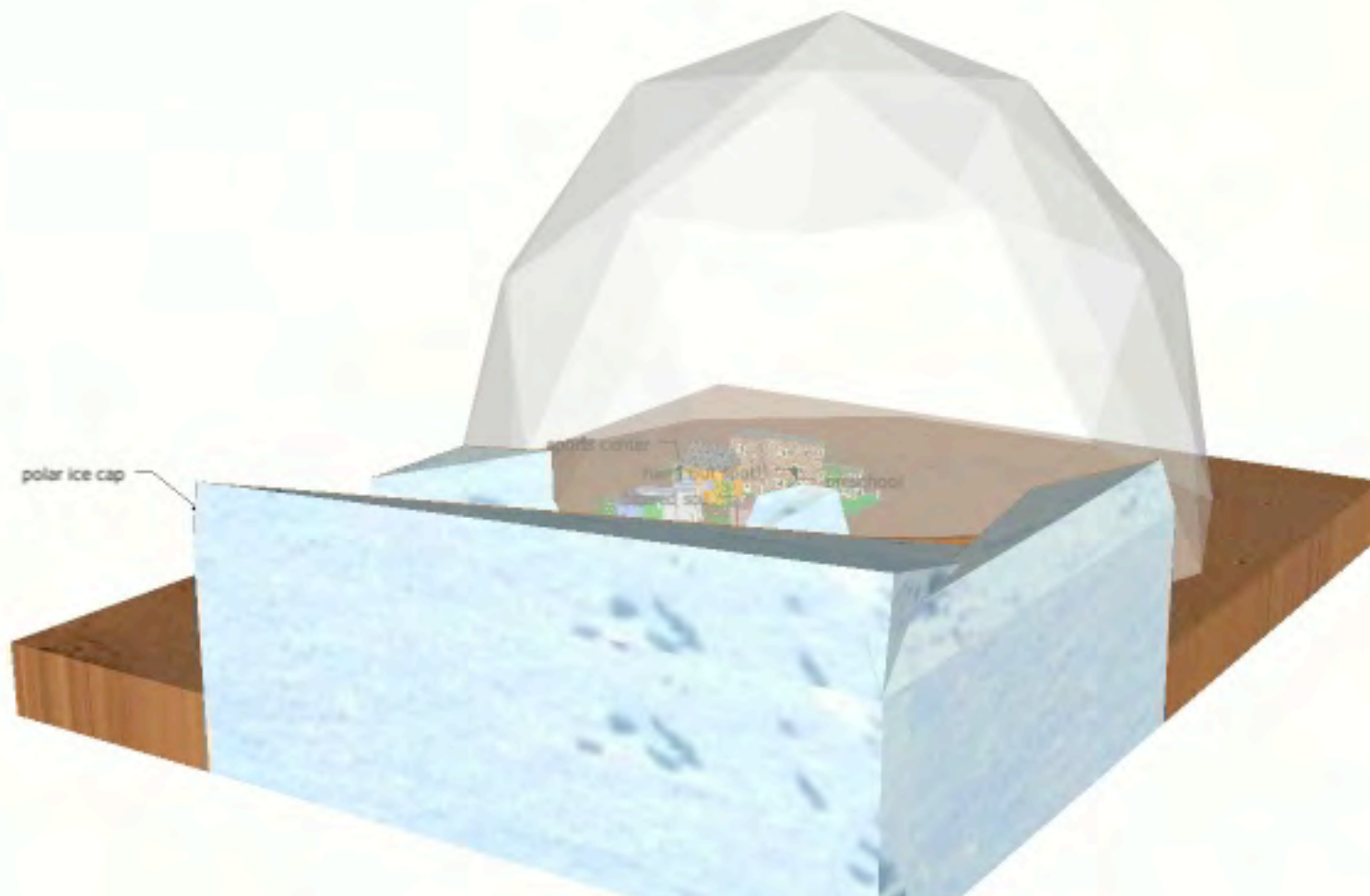
STEP 5: SHARE

Develop career-enhancing, digital-age communications skills and public presentation skills needed in all 21st Century jobs, by presenting the final project at home or online. Students demonstrate these skills in presenting their ideas about an ideal "life on Mars" to members of their own community (parents, teachers, business and civic leaders).

Project Example : Plan a Mars Community

Buchannan Elementary, Los Angeles CA.
1 week | 2nd Grade
20 Students | Minimal Resources

Students researched Mars online and created a model of their martian community. They built stores, homes, farms, even a t.v. station! Before construction began, the students studied Mars and thought about the elements needed to sustain a community. They developed mission badges and voted on necessities.

Support/Mentors:
NASA Scientists and Engineers

Project Example : Mars Inventions using PicoCrickets

Caldwell Elementary, Tyler TX.
3 Weeks | 5th Grade
252 students | Moderate Resources

Students invented products that would serve the needs of a Mars community. They then modeled their ideas using found materials and had to learn how to program PicoCrickets to make their model work.

A PicoCricket is a tiny computer that can be programmed to make things spin, light up, and play music.

Support/Mentors:
Solar System Ambassadors
Scientists from Hudnall Planetarium

Project Example : Design A Mars Garden

Art Center Saturday High
10 weeks | 9-12th Grade
10 Students | Moderate Resources

Students visited local botanical garden to research the various ways that gardens could help to support communities on Mars. Their research focused on creating environments suitable for plant growth and community entertainment. The students worked with NASA scientists, local horticulturalists and landscape architects to design a Mars garden.

Support/Mentors:
JSC Space Farmer
Huntington Botanical Gardens
Local Architects

List of Current Partners

National:
- HUD Neighborhood Networks
- Citizen Schools
- Kids Science Challenge
- Upward Bound

Regional:
- NHP Foundation
- Boys and Girls Club of Boston
- New Orleans Recovery School District
- Open Dream Ensemble
- Art Center College of Design
- Baseball Hall Of Fame and Museum
- LA's BEST
- Youth Policy Institute
- Pasadena School District
- HESTEC
- ICEE Success

Who can participate?

- Schools: individual K-12 classrooms or school-wide teams

- Out-of-School Groups: mixed-grade teams in extra-curricular organizations such as after-school arts and science clubs

- Community Organizations: mixed-grade teams in programs sponsored by museums, libraries, local businesses, and local civic organizations

We have a commitment to working with underserved and at-risk students.

Potential Support Networks: *Solar System Ambassadors*

500 Volunteer ambassadors in 50 states

https://informal.jpl.nasa.gov/museum/Visiting/index.cfm?FileName=Overview

Potential Support Networks: *The Museum Alliance*

More than 700 professionals at over 400 U.S. museums, science centers, planetariums

Project Implementation

No cost for participation.

We Offer:

• Imagine Mars curriculum (project duration is flexible)

• Project Leader Training

• Mars Science Training

• Project Planning

• Connection to NASA scientists and engineers

• Connection with Museums Alliance network

• Materials – Earth/ Mars Comparison Poster,
  3D Glasses, Activity Guide, Mars Compilation DVD

• Help posting your project to the online gallery

More Information

Resources via the Imagine Mars website:
Activity Guides, Mars Images and Videos, Interactive
Games, Student Project Gallery

Mars Student Imaging Project

Tier 1:
On-Site
Investigations
(10,000 Participants)

Tier 2:
Distance Learning
(25,000 Persons Reached)

Tier 3:
Archival Image Investigations
(~500,000 Participants)

http://msip.asu.edu/

Mars Exploration Student Data Teams

http://mesdt.asu.edu/

Mars Robotics Education

http://robotics.nasa.gov/