Welcome to the NGCP National Webinar

Participation in Structured and Unstructured Out-of-School-Time (OST) Activities

Tuesday, August 18, 2020

Please respond to the poll below:
Vision

The National Girls Collaborative Project brings together organizations committed to informing and encouraging girls to pursue careers in science, technology, engineering, and mathematics (STEM).
NGCP Goals

1. **Maximize access** to shared resources within organizations interested in engaging girls in STEM.

2. **Strengthen the capacity** of programs by sharing exemplary practice research and program models.

3. **Use the leverage of a network** to achieve gender equity in STEM.
NGCP Activities

Virtually:

- Distribution and Content Projects
- *The Connectory – Collaboration Tool*
- FabFems – *Role Model Tool*
- E-Newsletter and Social Media
- Webinars – *Exemplary Practices*

Local Collaboratives:

- Professional Development: *Conferences and Forums*
- Incentives to Collaborate: *Mini-Grants*
- Newsletters and Local Resources
National Network of Collaborative Teams
Today’s Presenters:

Dr. Susan Sunbury: Educational Researcher and Project Manager

Jacqueline Doyle: Post-Doctoral Fellow
Who Does What, and When?
A look at relative participation rates in out-of-school time activities by gender and racial/ethnic group

Susan Sunbury, Ed.D. and Jacqueline Doyle, Ph.D.
August 18th, 2020
This is a toolkit

• We’re providing a starting point, and how to use the information we’ve collected
• Way more stuff here than we can go through all at once
• You’ll have the slides after the presentation to be able to go through at your leisure, approx. 90 extra slides
Female Representation in Out-of-School Time Science (FROSTS)

- Advance understanding of female representation in out-of-school time (OST) activities

- Identify and test the OST-related factors that are hypothesized to strengthen interest, identity and career interest in STEM, particularly for female students

- For this webinar, we will focus on advancing understanding of representation in OST activities, for both female students and students of different racial/ethnic groups.
Evaluating large-scale and long-term impacts of OST activities

• Evaluation efforts often:
  • occur on a program-by-program basis
  • have small numbers of subjects limiting statistical power
  • use measures of short-term student satisfaction

• Longitudinal studies can:
  • be expensive
  • take a long time
FROSTS
a retrospective cohort study

• Large scale - can obtain representative samples
• More generalizable than small-scale evaluations of specific programs
• Can test the strength of multiple hypotheses
• Can be completed in a short time frame
The FROSTS survey

• Asked students to recall earlier experiences
• Questions based on review of relevant literature, survey of stakeholders and survey students
• Survey pilot tested then sent to over 30,000 students in compulsory first-year courses (English/writing)
• Schools chosen from a stratified random sample of two-year and four-year community colleges and universities
Final nationally representative sample
15,725
Survey questions

• Comprehensive survey - 33 questions (20 minutes)
  • STEM interest
  • STEM identity
  • Career interest and motivation
  • Participation in OST activities – structured and unstructured
  • Subjects taken in school/grades/scores
  • Family interest and involvement in STEM
  • Access and barriers to participation
  • Demographics
## Items about ‘unstructured’ activities

If you participated in any of these activities, please mark how often and during which grades you participated

<table>
<thead>
<tr>
<th>Activity</th>
<th>K-4</th>
<th>5-8</th>
<th>9-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using tools to tinker with/take apart <strong>mechanical</strong> devices (e.g., bicycle, watch, door lock)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Using tools to tinker with/take apart <strong>electrical</strong> devices (e.g., hair dryer, hand mixer, TV, computer)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Baking/cooking/kitchen chemistry</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Using science equipment (e.g., microscope, telescope)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Using STEM toys/kits (e.g., building/construction sets, circuit boards, model rockets, science kits)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
## Items about ‘structured’ activities

<table>
<thead>
<tr>
<th></th>
<th>5-8</th>
<th>9-12</th>
<th>This activity increased my interest in STEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>If you participated in any of these activities, please mark how often and in which grades you participated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEM-related extracurricular clubs/teams at school</td>
<td>Sometimes: 0</td>
<td>Often: 0</td>
<td>Sometimes: 0</td>
</tr>
<tr>
<td>STEM-related clubs/teams outside of school</td>
<td>Sometimes: 0</td>
<td>Often: 0</td>
<td>Sometimes: 0</td>
</tr>
<tr>
<td>Group organization (e.g., Girl Scouts, Boy Scouts, 4H)</td>
<td>Sometimes: 0</td>
<td>Often: 0</td>
<td>Sometimes: 0</td>
</tr>
<tr>
<td>Maker/DIY STEM activities/events</td>
<td>Sometimes: 0</td>
<td>Often: 0</td>
<td>Sometimes: 0</td>
</tr>
<tr>
<td>Overnight STEM programs (museums, science centers etc.)</td>
<td>Sometimes: 0</td>
<td>Often: 0</td>
<td>Sometimes: 0</td>
</tr>
</tbody>
</table>
Items about opportunities within STEM activities

<table>
<thead>
<tr>
<th></th>
<th>I experienced this STEM opportunity</th>
<th>This opportunity increased my interest in STEM</th>
<th>This opportunity showed the real-life relevance of STEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interacting with a STEM mentor</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Interacting with a STEM role model</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Taking on a leadership role</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Participating in hands-on STEM activities</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Using STEM equipment to collect data</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Learning about STEM careers</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>
Q20. If you did NOT attend any STEM programs/activities outside of school, please indicate why. *Mark all that apply.*

- [ ] I didn’t know STEM opportunities were available in my area
- [ ] I looked, but there were no STEM opportunities available in my area
- [ ] STEM opportunities were available but I didn’t have the time (other commitments: work/home/other activities) to attend
- [ ] STEM opportunities were available but I didn’t have the resources (transportation/finances) to attend
- [ ] STEM opportunities were available but I was not interested in the specific topics offered
- [ ] STEM opportunities were available but I was not interested in STEM
- [ ] STEM opportunities were available but I didn’t feel welcome/comfortable attending

Unknown
Unavailable
No time
No resources
Not interested in that topic
Not interested in STEM
Felt unwelcome
Identifies as White, 'unstructured' activities or hobbies

- Explore nature in person
- Photo/video nature
- Observe/study weather
- Observe/study stars
- Collecting nature things
- Observe/document animals
- Indoor/outdoor gardening
- Train/raise animals
- Collect/analyze data for scientists
- Program computer games / apps / websites
- Write/blog about STEM
- Use STEM apps
- Follow STEM social media
- Play STEM computer or video games
- Watch online STEM videos
- Watch STEM TV/movies
- Read science fiction
- Read non-fiction science
- Solve puzzles or play with board/strategy games
- Play with STEM toys or kits
- Using scientific equipment (e.g., microscope, telescope)
- Cooking / Baking
- Electronic tinkering
- Mechanical tinkering

Time period

- 9-12
- 5-8
- K-4

Significantly different from equally likely
Identifies as Black or African-American, 'unstructured' activities or hobbies

Explore nature in person: 9-12, 5-8, K-4
Photo/video nature: 9-12, 5-8, K-4
Observe/study weather: 9-12, 5-8, K-4
Observe/study stars: 9-12, 5-8, K-4
Collecting nature things: 9-12, 5-8, K-4
Observe/document animals: 9-12, 5-8, K-4
Indoor/outdoor gardening: 9-12, 5-8, K-4
Train/raise animals: 9-12, 5-8, K-4
Collect/analyze data for scientists: 9-12, 5-8, K-4
Program computer games/apps/websites: 9-12, 5-8, K-4
Write/blog about STEM: 9-12, 5-8, K-4
Use STEM apps: 9-12, 5-8, K-4
Follow STEM social media: 9-12, 5-8, K-4

Digital/Internet media

Play STEM computer or video games: 9-12, 5-8, K-4
Watch online STEM videos: 9-12, 5-8, K-4
Watch STEM TV/movies: 9-12, 5-8, K-4
Read science fiction: 9-12, 5-8, K-4
Read non-fiction science: 9-12, 5-8, K-4
Solve puzzles or play with board strategy games: 9-12, 5-8, K-4

Traditional media

Play with STEM toys or kits: 9-12, 5-8, K-4
Using scientific equipment (e.g., microscope, telescope): 9-12, 5-8, K-4
Cooking/Baking: 9-12, 5-8, K-4
Electronic tinkering: 9-12, 5-8, K-4
Mechanical tinkering: 9-12, 5-8, K-4

Significantly different from equally likely stars.
Identifies as female, 'unstructured' activities or hobbies

- Explore nature in person
- Photo/video nature
- Observe/study weather
- Observe/study stars
- Collecting nature things
- Observe/document animals
- Indoor/outdoor gardening
- Train/raise animals

- Collect/analyze data for scientists
- Program computer games / apps / websites
- Write/blog about STEM
- Use STEM apps
- Follow STEM social media

- Play computer or video games
  - Watch online STEM videos
- Watch STEM TV/movies
- Read science fiction
- Read non-fiction science
- Solve puzzles or play with board/strategy games
- Play with STEM toys or kits
- Using scientific equipment (e.g., microscope, telescope)
- Cooking / Baking
- Electronic tinkering
- Mechanical tinkering

Engagement with nature

Digital / Internet media

'Strict' media

Hands-on engagement

Time period
- 9-12
- 5-8
- K-4

* Significantly different from equally likely
## Participation by activity

<table>
<thead>
<tr>
<th>Activity</th>
<th>K-4</th>
<th>5-8</th>
<th>9-12</th>
<th>Any</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical tinkering</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Read science non-fiction</td>
<td></td>
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<tr>
<td>Use STEM apps</td>
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<tr>
<td>Collect nature things</td>
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<tr>
<td>Club or team (school)</td>
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<tr>
<td>STEM summer camp</td>
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<tr>
<td>Robotics competitions</td>
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<tr>
<td>STEM job shadowing</td>
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<tr>
<td>Work w/older STEM student</td>
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<tr>
<td>Use equip. to collect data</td>
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<tr>
<td>Electronic tinkering</td>
<td></td>
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<tr>
<td>Read science fiction</td>
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<tr>
<td>Write/blog about STEM</td>
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<tr>
<td>Observe or study stars</td>
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<tr>
<td>Observe or study weather</td>
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<tr>
<td>Group orgs. (e.g., Scouts)</td>
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<tr>
<td>STEM talks or lectures</td>
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<tr>
<td>Computing/IT competitions</td>
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<tr>
<td>STEM work or volunteering</td>
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<tr>
<td>Take on leader role</td>
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<tr>
<td>Build STEM models</td>
<td></td>
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<td></td>
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<tr>
<td>Cooking and baking</td>
<td></td>
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<tr>
<td>Watch STEM TV / movies</td>
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<tr>
<td>Program games/apps</td>
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<tr>
<td>Observe or study weather</td>
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<tr>
<td>Photo or video nature</td>
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<tr>
<td>Maker/DIY STEM events</td>
<td></td>
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<tr>
<td>STEM courses or workshops</td>
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<tr>
<td>STEM research prog.</td>
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<tr>
<td>Interact with STEM mentor</td>
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<tr>
<td>Do hands-on STEM activity</td>
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<tr>
<td>Work on a team</td>
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<tr>
<td>Program with art or design</td>
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<tr>
<td>Present data to others</td>
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<tr>
<td>Learn about STEM careers</td>
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<tr>
<td>Using STEM equipment</td>
<td></td>
<td></td>
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<tr>
<td>Watch online STEM videos</td>
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<td></td>
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</tr>
<tr>
<td>Train/raise animals</td>
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<tr>
<td>Explore nature</td>
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<tr>
<td>Gardening</td>
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<tr>
<td>STEM cafes</td>
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<td>STEM cafes</td>
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<td>STEM cafes</td>
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<tr>
<td>Maker/DIY STEM events</td>
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<tr>
<td>STEM career days</td>
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<td>STEM career days</td>
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<tr>
<td>Interact with role model</td>
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<td>STEM career days</td>
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<tr>
<td>STEM career days</td>
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<tr>
<td>STEM leaders conf.</td>
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<tr>
<td>Overnight programs</td>
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<tr>
<td>STEM career days</td>
<td></td>
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<tr>
<td>Tour of STEM settings</td>
<td></td>
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<tr>
<td>Real world problems</td>
<td></td>
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<tr>
<td>STEM research prog.</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Learn about STEM careers</td>
<td></td>
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</tbody>
</table>

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**Note:** The table above categorizes various STEM-related activities by age group, indicating the typical range of interest or participation for different age categories (K-4, 5-8, 9-12, Any). The table includes activities such as tinkering, reading, calculating, building, and engaging with STEM in various forms and contexts.
Activity or opportunity: Solve puzzles or play with board/strategy games

**Gender**

- Female

**Race and Ethnicity**

- White
- Black
- Asian
- Hispanic
- American Indian or Alaskan Native
- Another racial or ethnic group
- More than one racial or ethnic group

**Time period**

- K-4
- 5-8
- 9-12

Significantly different from equally likely

- *
We realize this was a lot of information to take in at once.

Any questions?
Discussion Questions

What actions can you take as a result of what you learned/heard at the webinar?

What questions still need to be answered, but require additional research?
Thank you

This work was supported by NSF Grant Nos. 1612375 and 1611985. Any views are the authors' own and do not necessarily reflect the views of the National Science Foundation.
Upcoming NGCP Webinars

Gender Equity in Online STEM Learning
Wednesday, September 2, 2020

Neurodiversity and STEM Education
Monday, September 21, 2020

Register on the NGCP Website
Participation by demographic

<table>
<thead>
<tr>
<th>Student identifies as...</th>
<th>Female</th>
<th>Asian or Pacific Islander</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White</td>
<td>Native American or Alaskan Native</td>
</tr>
<tr>
<td></td>
<td>Black</td>
<td>Another racial/ethnic group not listed</td>
</tr>
<tr>
<td></td>
<td>Hispanic</td>
<td>More than one racial and/or ethnic group</td>
</tr>
<tr>
<td>Identified as female, 'unstructured' activities or hobbies</td>
<td>Engagement with nature</td>
<td>Time period</td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
<td>------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Explore nature in person</td>
<td></td>
<td>9-12</td>
</tr>
<tr>
<td>Photo/video nature</td>
<td></td>
<td>5-8</td>
</tr>
<tr>
<td>Observe/study weather</td>
<td></td>
<td>K-4</td>
</tr>
<tr>
<td>Observe/study stars</td>
<td></td>
<td>9-12</td>
</tr>
<tr>
<td>Collecting nature things</td>
<td></td>
<td>5-8</td>
</tr>
<tr>
<td>Observe/document animals</td>
<td></td>
<td>K-4</td>
</tr>
<tr>
<td>Indoor/outdoor gardening</td>
<td></td>
<td>9-12</td>
</tr>
<tr>
<td>Train/raise animals</td>
<td></td>
<td>5-8</td>
</tr>
<tr>
<td>Collect/analyze data for scientists</td>
<td></td>
<td>K-4</td>
</tr>
<tr>
<td>Program computer games / apps / websites</td>
<td></td>
<td>9-12</td>
</tr>
<tr>
<td>Write/blog about STEM</td>
<td></td>
<td>5-8</td>
</tr>
<tr>
<td>Use STEM apps</td>
<td></td>
<td>K-4</td>
</tr>
<tr>
<td>Follow STEM social media</td>
<td></td>
<td>9-12</td>
</tr>
<tr>
<td>Play STEM computer or video games</td>
<td></td>
<td>5-8</td>
</tr>
<tr>
<td>Watch online STEM videos</td>
<td></td>
<td>K-4</td>
</tr>
<tr>
<td>Watch STEM TV/movies</td>
<td></td>
<td>9-12</td>
</tr>
<tr>
<td>Read science fiction</td>
<td></td>
<td>5-8</td>
</tr>
<tr>
<td>Read non-fiction science</td>
<td></td>
<td>K-4</td>
</tr>
<tr>
<td>Solve puzzles or play with board/strategy games</td>
<td></td>
<td>9-12</td>
</tr>
<tr>
<td>Play with STEM toys or kits</td>
<td></td>
<td>5-8</td>
</tr>
<tr>
<td>Using scientific equipment (e.g., microscope, telescope)</td>
<td></td>
<td>K-4</td>
</tr>
<tr>
<td>Cooking / Baking</td>
<td></td>
<td>9-12</td>
</tr>
<tr>
<td>Electronic tinkering</td>
<td></td>
<td>5-8</td>
</tr>
<tr>
<td>Mechanical tinkering</td>
<td></td>
<td>K-4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Half as likely</td>
</tr>
</tbody>
</table>

* Significantly different from equally likely
Identifies as White, 'unstructured' activities or hobbies

- Explore nature in person
- Photo/video nature
- Observe/study weather
- Observe/study stars
- Collecting nature things
- Observe/document animals
- Indoor/outdoor gardening
- Train/raise animals

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- Write/blog about STEM
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- Follow STEM social media

- Play STEM computer or video games
- Watch online STEM videos
- Watch STEM TV/movies
- Read science fiction
- Read non-fiction science
- Solve puzzles or play with board/strategy games

- Play with STEM toys or kits
- Using scientific equipment (e.g., microscope, telescope)
- Cooking / Baking
- Electronic tinkering
- Mechanical tinkering

Time period:
- 9-12
- 5-8
- K-4

* Significantly different from equally likely
Identifies as White, opportunities during OST

- Learning about STEM careers
- Presented STEM data/info to others
- Worked with others on a team
- Designed and carried out own project
- Building/constructing STEM models
- Used STEM equipment to collect data
- Worked on real world STEM problems
- Participating in programs w/art or design
- Participating in hands-on STEM activities

Mentoring/tutoring younger students in STEM
- Taking on a leadership role
- Working w/older STEM students
- Interact w/someone who works in a STEM career
- Interact with a STEM role model
- Interact with a STEM mentor

Time period:
- Any

Interactions with STEM
- Significantly different from equally likely

Interactions with people

Half as likely
Equally likely
Twice as likely
Identifies as Hispanic or Latinx, opportunities during OST

- Learning about STEM careers
- Presented STEM data/info to others
- Worked with others on a team
- Designed and carried out own project
- Building/constructing STEM models
- Used STEM equipment to collect data
- Worked on real world STEM problems
- Participating in programs w/art or design
- Participating in hands-on STEM activities
- Mentoring/tutoring younger students in STEM
- Taking on a leadership role
- Working w/older STEM students
- Interact w/someone who works in a STEM career
- Interact with a STEM role model
- Interact with a STEM mentor

Time period:
- Any

Interactions with STEM
- Interactions with people

Significantly different from equally likely

49
Identifies as Asian or Pacific Islander, 'unstructured' activities or hobbies

- Explore nature in person
- Photo/video nature
- Observe/study weather
- Observe/study stars
- Collecting nature things
- Observe/document animals
- Indoor/outdoor gardening
- Train/raise animals
- Collect/analyze data for scientists
- Program computer games/apps/websites
- Write/blog about STEM
- Use STEM apps
- Follow STEM social media
- Play STEM computer or video games
- Watch online STEM videos
- Watch STEM TV/movies
- Read science fiction
- Read non-fiction science
- Solve puzzles or play with board/strategy games
- Play with STEM toys or kits
- Using scientific equipment (e.g., microscope, telescope)
- Cooking/Baking
- Electronic tinkering
- Mechanical tinkering

Engagement with nature

<table>
<thead>
<tr>
<th>Time period</th>
<th>9-12</th>
<th>5-8</th>
<th>K-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Half as likely</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Equally likely</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Twice as likely</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

Significantly different from equally likely
Identifies as American Indian or Alaskan Native, 'unstructured' activities or hobbies

- Explore nature in person
- Photo/video nature
- Observe/study weather
- Observe/study stars
- Collecting nature things
- Observe/document animals
- Indoor/outdoor gardening
- Train/raise animals

- Collect/analyze data for scientists
- Program computer games/apps/websites
- Write/blog about STEM
- Use STEM apps
- Follow STEM social media

- Play STEM computer or video games
- Watch online STEM videos
- Watch STEM TV/movies
- Read science fiction
- Read non-fiction science
- Solve puzzles or play with board/strategy games

- Play with STEM toys or kits
- Using scientific equipment (e.g., microscope, telescope)
- Cooking/Baking
- Electronic tinkering
- Mechanical tinkering

Time period:
- 9-12
- 5-8
- K-4

* Significantly different from equally likely

Hands-on engagement
Equally likely
Half as likely
Twice as likely
Identifies as American Indian or Alaskan Native, opportunities during OST

- Learning about STEM careers
- Presented STEM data/info to others
- Worked with others on a team
- Designed and carried out own project
- Building/constructing STEM models
- Used STEM equipment to collect data
- Worked on real world STEM problems
- Participating in programs w/art or design
- Participating in hands-on STEM activities
- Mentoring/tutoring younger students in STEM
- Taking on a leadership role
- Working w/older STEM students
- Interact w/someone who works in a STEM career
- Interact with a STEM role model
- Interact with a STEM mentor

Time period:
- Any

Significantly different from equally likely

Interactions with STEM
- Half as likely
- Equally likely
- Twice as likely

Interactions with people
Identifies as something other than White, Black, Asian, American Indian, or Alaskan Native, ‘unstratified’

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explore nature in person</td>
<td>9-12</td>
</tr>
<tr>
<td>Photo/video nature</td>
<td>5-8</td>
</tr>
<tr>
<td>Observe/study weather</td>
<td>K-4</td>
</tr>
<tr>
<td>Collect nature things</td>
<td></td>
</tr>
<tr>
<td>Observe/document animals</td>
<td></td>
</tr>
<tr>
<td>Indoor/outdoor gardening</td>
<td></td>
</tr>
<tr>
<td>Train/raise animals</td>
<td></td>
</tr>
<tr>
<td>Collect/analyze data for scientists</td>
<td></td>
</tr>
<tr>
<td>Program computer games/apps/websites</td>
<td></td>
</tr>
<tr>
<td>Write/blog about STEM</td>
<td></td>
</tr>
<tr>
<td>Use STEM apps</td>
<td></td>
</tr>
<tr>
<td>Follow STEM social media</td>
<td></td>
</tr>
<tr>
<td>Play STEM computer or video games</td>
<td></td>
</tr>
<tr>
<td>Watch online STEM videos</td>
<td></td>
</tr>
<tr>
<td>Watch STEM TV/movies</td>
<td></td>
</tr>
<tr>
<td>Read science fiction</td>
<td></td>
</tr>
<tr>
<td>Read non-fiction science</td>
<td></td>
</tr>
<tr>
<td>Solve puzzles or play with board strategy games</td>
<td></td>
</tr>
<tr>
<td>Play with STEM toys or kits</td>
<td></td>
</tr>
<tr>
<td>Using scientific equipment (e.g., microscope, telescope)</td>
<td></td>
</tr>
<tr>
<td>Cooking/Baking</td>
<td></td>
</tr>
<tr>
<td>Electronic tinkering</td>
<td></td>
</tr>
<tr>
<td>Mechanical tinkering</td>
<td></td>
</tr>
</tbody>
</table>

Significantly different from equally likely

Half as likely | Equally likely | Twice as likely

Back
Identifies as more than one racial group, 'unstructured' activities or hobbies

- Explore nature in person
- Photo/video nature
- Observe/study weather
- Observe/study stars
- Collecting nature things
- Observe/document animals
- Indoor/outdoor gardening
- Train/raise animals

- Collect/analyze data for scientists
- Program computer games / apps / websites
- Write/blog about STEM
- Use STEM apps
- Follow STEM social media

- Play STEM computer or video games
- Watch online STEM videos
- Watch STEM TV/movies
- Read science fiction
- Read non-fiction science
- Solve puzzles or play with board/strategy games

- Play with STEM toys or kits
- Using scientific equipment (e.g., microscope, telescope)
- Cooking / Baking
- Electronic tinkering
- Mechanical tinkering

Time period:
- 9-12
- 5-8
- K-4

* Significantly different from equally likely
## Participation by activity

<table>
<thead>
<tr>
<th>Mechanical tinkering</th>
<th>Electronic tinkering</th>
<th>Cooking and baking</th>
<th>Using STEM equipment</th>
<th>Playing with STEM toys</th>
<th>Puzzles and board games</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read science non-fiction</td>
<td>Read science fiction</td>
<td>Watch STEM TV / movies</td>
<td>Watch online STEM videos</td>
<td>Play STEM video games</td>
<td>Follow STEM social media</td>
</tr>
<tr>
<td>Use STEM apps</td>
<td>Write/blog about STEM</td>
<td>Program games/apps</td>
<td>Train/raise animals</td>
<td>Gardening</td>
<td>Observe animals/birds</td>
</tr>
<tr>
<td>Collect nature things</td>
<td>Observe or study stars</td>
<td>Observe or study weather</td>
<td>Photo or video nature</td>
<td>Explore nature</td>
<td>Collect data for scientists</td>
</tr>
<tr>
<td>Club or team (school)</td>
<td>Club or team (outside)</td>
<td>Group orgs. (e.g., Scouts)</td>
<td>Maker/DIY STEM events</td>
<td>Overnight programs</td>
<td>STEM cafes</td>
</tr>
<tr>
<td>STEM summer camp</td>
<td>‘Citizen science’ prog.</td>
<td>STEM talks or lectures</td>
<td>STEM courses or workshops</td>
<td>STEM leaders conf.</td>
<td>Science fairs</td>
</tr>
<tr>
<td>Robotics competitions</td>
<td>Engineering competitions</td>
<td>Computing/IT competitions</td>
<td>STEM research prog.</td>
<td>STEM career days</td>
<td>Tour of STEM settings</td>
</tr>
<tr>
<td>STEM job shadowing</td>
<td>STEM internships</td>
<td>STEM work or volunteering</td>
<td>Interact with STEM mentor</td>
<td>Interact with role model</td>
<td>Interact w/ STEM career</td>
</tr>
<tr>
<td>Work w/older STEM student</td>
<td>Take on leader role</td>
<td>Mentor/tutor young student</td>
<td>Do hands-on STEM activity</td>
<td>Program with art or design</td>
<td>Real world problems</td>
</tr>
<tr>
<td>Use equip. to collect data</td>
<td>Build STEM models</td>
<td>Design/do own project</td>
<td>Work on a team</td>
<td>Present data to others</td>
<td>Learn about STEM careers</td>
</tr>
</tbody>
</table>

K-4 5-8 9-12

5-8 K-12

Any
Activity or opportunity: Using scientific equipment (e.g., microscope, telescope)

Gender

Race and Ethnicity

Time period

- K-4
- 5-8
- 9-12

* Significantly different from equally likely

Significantly different from equally likely

Half as likely

Equally likely

Twice as likely

Female

White

Black

Asian

Hispanic

American Indian or Alaskan Native

Another racial or ethnic group

More than one racial or ethnic group
Activity or opportunity: Read non-fiction science

Gender

Race and Ethnicity

Time period
- K-4
- 5-8
- 9-12

Significantly different from equally likely

Half as likely
Equally likely
Twice as likely

Student identifies as...
Activity or opportunity: Follow STEM social media

Half as likely | Equally likely | Twice as likely

Gender
- Female

Race and Ethnicity
- White
- Black
- Asian
- Hispanic
- American Indian or Alaskan Native
- Another racial or ethnic group
- More than one racial or ethnic group

Time period
- K-4
- 5-8
- 9-12

Significantly different from equally likely

Student identifies as...
Activity or opportunity: Observe/study weather

Gender

Female

White

Black

Asian

Hispanic

American Indian or Alaskan Native

Another racial or ethnic group

More than one racial or ethnic group

Time period

K-4

5-8

9-12

Race and Ethnicity

Half as likely

Equally likely

Twice as likely

Significantly different from equally likely

*
Activity or opportunity: Photo/video nature

Gender

Race and Ethnicity

Time period
- K-4
- 5-8
- 9-12

Significantly different from equally likely

Half as likely
Equally likely
Twice as likely

Female
White
Black
Asian
Hispanic
American Indian or Alaskan Native
Another racial or ethnic group
More than one racial or ethnic group

Center for Astrophysics
Harvard & Smithsonian

Student identifies as...
Activity or opportunity: STEM-related clubs outside school

Gender

Female

White

Black

Asian

Hispanic

American Indian or Alaskan Native

Another racial or ethnic group

More than one racial or ethnic group

Race and Ethnicity

Time period

5-8

9-12

Significantly different from equally likely

Half as likely

Equally likely

Twice as likely
Activity or opportunity: 'Citizen science' programs

Gender

Race and Ethnicity

Time period
- 5-8
- 9-12

Significantly different from equally likely

*
Activity or opportunity: Interact with a STEM role model

- Gender
- Female

- Race and Ethnicity
- White
- Black
- Asian
- Hispanic
- American Indian or Alaskan Native
- Another racial or ethnic group
- More than one racial or ethnic group

Time period
- Any

Significantly different from equally likely

Half as likely
Equally likely
Twice as likely
Activity or opportunity: Interact with someone who works in a STEM career

Gender

Female

Race and Ethnicity

White

Black

Asian

Hispanic

American Indian or Alaskan Native

Another racial or ethnic group

More than one racial or ethnic group

Time period

Any

* Significantly different from equally likely
Activity or opportunity: Taking on a leadership role
Activity or opportunity: Designed and carried out own project

Time period

- Any

Significantly different from equally likely

Gender

- Female

Race and Ethnicity

- White
- Black
- Asian
- Hispanic
- American Indian or Alaskan Native
- Another racial or ethnic group
- More than one racial or ethnic group

Half as likely

Equally likely

Twice as likely
Activity or opportunity: Worked with others on a team

Gender

- Female

Race and Ethnicity

- White
- Black
- Asian
- Hispanic
- American Indian or Alaskan Native
- Another racial or ethnic group
- More than one racial or ethnic group

Time period
- Any

Significantly different from equally likely