



PUNCH Team Cards: Meet Diverse People on a NASA Mission Team

“The pursuit of science, and scientific excellence, is inseparable from the humans who animate it.”

-Pathways to Discovery in Astronomy and Astrophysics for [the 2020s](#)

Activity Overview: Our Team Cards introduce some of the folks who make the [NASA PUNCH mission](#) Possible. PUNCH is designed to study the Sun’s outer atmosphere, the [solar corona](#), and the [space weather](#) between the Sun and Earth that could harm astronauts or trigger the northern lights. During a total solar eclipse, human eyes can see the same beautiful solar corona that the PUNCH mission studies. Thus, our Team cards are a great **addition to your eclipse event, or any event for observing, learning, and celebrating the Sun and its relationship to Earth.**

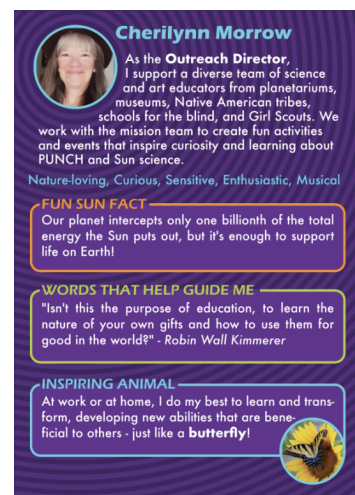
Our field testing revealed that adults enjoy these activities as much as children, particularly in a family-learning context. Field test collaborators include: Planetarium visitors, Girl Scouts, and classroom and community events at Boys & Girls clubs and at the Pueblo of Acoma, New Mexico.

We recommend using the [PUNCH Team Cards online](#) and/or in physical form ([printable cards here](#)) to achieve the goals. Team Cards can happen **indoors or outdoors at a tabletop station** as part of a larger outreach event, or used in breakout activities in **small groups of 4-5** (one deck per group).

| | |
|-----------------------|---|
| Venue(s) | A tabletop station or small groups |
| Ages | 6 + in groups and families |
| Materials | Tabletop, Card prints or website display, Create Your Own templates |
| Participants | 5-25 |
| Time | 10 min - 1 hour (activity depending) |
| NGSS - support | See Appendix C, pg. 5 |

Goals for the PUNCH Team Cards:

1. Showcase the diverse community supporting the NASA PUNCH mission
2. Demonstrate the wide range of skills needed to make a NASA mission successful
3. Reveal the broader humanity of leading-edge NASA PUNCH professionals in a light-hearted way
4. Provide inspiring, relatable role models about whom young people choose to learn more





Materials for Tabletop Station or Breakouts:

1. [Deck\(s\) of printed PUNCH Team Cards](#) (1 deck per ~5 people).
[Find printing instructions in **Appendix B**].
2. Optional digital display of [online PUNCH Team cards](#)
3. Pens, pencils, or non-toxic markers
4. Blank paper and/or Sticky notes [at least 1 per participant]
5. “Create Your Own Card” Templates. Download [here](#).
6. Sign: QR code for online access. Optional: “Do not take the cards”



Activity Suggestions:

1. Create your own card
2. Card Sort by Category
3. Find Your Favorite Sun Fun Fact

Remember: *The PUNCH cards represent a small sample of hundreds of hardworking people in a variety of roles on our team. The Cards feature professionals in 4 areas: Mission Management, Mission Development, Science, and Outreach (see **Appendix A**). Our Cards invite discussion on values like diversity and teamwork, and help emphasize that **NASA space science is for everyone!***

1. Create your own card!

Ages 6 +, Physical Cards. Step 1d can be added to Activities 2 and 3

- a. Invite participants to search the PUNCH Team Cards, front and back, for one person they’re particularly drawn to.
- b. Ask them to share why they chose that Card and what they learned about the PUNCH team member featured. (They could share with the facilitator, a family member, or others in a small group).
- c. On a sticky note or paper, ask participants to write the name of their team member and one question they would like to ask that person. Post the stickies to the table or nearby wall for easy viewing.
- d. Invite participants to make their own card: See **Materials** for “Create Your Own Card templates.”



Ages 6-9:

Name: _____

Draw here!

Activity I enjoy doing

Animal that inspires me

My favorite thing I have learned about the Sun:

Ages 9+:

My name: _____

Draw a picture of yourself!

If I were a PUNCH mission team member, I'd like to be in a role where I:

Three words to describe myself:

FUN SUN FACT

WORDS THAT HELP GUIDE ME

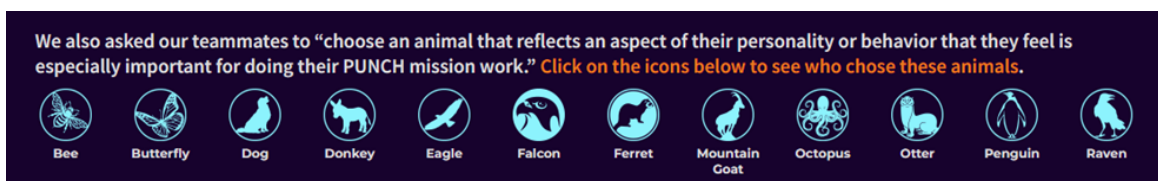
ANIMAL THAT INSPIRES ME, AND WHY

Draw a picture of the animal inside the circle.



2. Sort the Cards by Categories • Ages 6 +, Online or Physical Cards.

- Place cards into groups based on the animal on their card or by the mission categories: Mission management (**green diamonds**), Mission development (**red crosses**), Science (**blue dots**), Outreach (**purple stars**). (See **Appendix A** for category descriptions.) Below are the animals chosen so far:



- Find your own categories: ask participants to organize the cards based on something those cards have in common *beyond* their mission roles + choices of inspiring animal.
- Ask: “Why do you think there’s so many different types of people supporting this mission?”
- Inquire further: “Have you ever been part of a team? What makes a good team?”

3. Find your Favorite Sun Fun Fact • Ages 11 + Table Top or Small Group

- Invite participants to tell you one thing they already know about the Sun.
- Ask them to read some *Sun Fun Facts* on the back of several cards and find a favorite.
- Invite them to read aloud their favorite fact to someone or their small group
- Say: “Now you and this PUNCH team member have the same favorite Sun Fun fact!”
- Ask: “Read the rest of that card. Do you have anything else in common with this person?”
- Say: “Imagine that this PUNCH team member is right here with us - what would you like to ask them? About the Sun, about the PUNCH mission, or otherwise?”
- Ask participants to write their question on a sticky note addressed to this person, for others to read.
- Ask: “Who in your life do you like to learn from? What makes them a good teacher?”



Summarize the significance of teamwork in supporting a NASA mission (and any collaborative endeavor) and thank participants for their engagement. Emphasize that people with diverse skills and cultural backgrounds can collaborate and learn from each other to achieve something much larger than any individual person could do by themselves. Each individual team member is united in their team commitment to make the PUNCH mission successful and beneficial to our world. The PUNCH team brings the Sun a little closer to each of us.



Appendix A: PUNCH Team Member Categories

Mission Management Team (green trim - diamonds): Oversees and guides all aspects of PUNCH to ensure mission success. Note that some of these people are also trained as scientists or engineers so could have had blue or red trim as well as the green.

Outreach Team (purple trim - stars): Collaborates with the whole PUNCH team to create products and events that inspire diverse people to learn about NASA science.

Science Team (blue trim - dots): Conducts and coordinates scientific research that uses PUNCH data to learn new things about the Sun's corona and heliosphere.

Mission Development Team (red trim - crosses): Supports the mission, including design and development of the four PUNCH spacecraft and their components. This category includes a vast variety of skills in domains such as engineering, technology, administration, finances, graphic art, and others.

Our trim is embellished with patterns to ease identification for color-blind learners.

Appendix B: Printing the Cards and the “Create Your Own Card” Templates

1. Access the current batch of printable pdf cards and “Create Your Own Card” template [here](#)
2. Ensure that the printer can print and cut two-sided baseball card-sized prints.
3. Give the instructions below to the printer (note: 100# = 100 lbs card thickness)
4. Pay to print the cards (5 sets of 10 cards is around \$45)

PUNCH Team Cards printing:

Color copies on 2 sides
White 100#, Satin Cover
Laminate Gloss - Flush cut
Cut to crop
3.2" x 4.5"

“Create Your Own Card” Templates printing:

Ages 9+: Color copy on 1 side
Ages 6-9: Color copy on 2 sides
White 80#, Matte Cover
Cut to crop
5.7" x 8"



Appendix C: Interdisciplinary connection to NGSS - *not a standalone standard*

“Instruction that builds on prior interest and identity is likely to be as important as instruction that builds on knowledge alone.”¹

Our PUNCH Team Cards emphasize that science is a human endeavor and further understanding about the nature of science. These topics have been incorporated into the Next Generation Science Standards in the fundamental practices and crosscutting concepts to the standards and integrated throughout this guide. Some examples include recognizing patterns, obtaining, evaluating, and communicating information, and exploring the interdependence of science, engineering, and technology. The table below presents grade level understandings about one of eight major themes that we found to be most relevant to the PUNCH Team Cards. The full table can be found in [Appendix H: Nature of Science](#) of the NGSS Standards.

Adapted from the full table [here](#)

| Categories | K-2 | 3-5 | Middle School | High School |
|------------------------------------|---|--|--|---|
| Science is a Human Endeavor | <p>People have practiced science for a long time.</p> <p>Men and women of diverse backgrounds are scientists and engineers.</p> | <p>Men and women from all cultures and backgrounds choose careers as scientists and engineers.</p> <p>Most scientists and engineers work in teams.</p> <p>Science affects everyday life.</p> <p>Creativity and imagination are important to science.</p> | <p>Men and women from different social, cultural, and ethnic backgrounds work as scientists and engineers.</p> <p>Scientists and engineers rely on human qualities such as persistence, precision, reasoning, logic, imagination and creativity.</p> <p>Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism and openness to new ideas.</p> <p>Advances in technology influence the progress of science and science has influenced advances in technology.</p> | <p>Scientific knowledge is a result of human endeavor, imagination, and creativity.</p> <p>Individuals and teams from many nations and cultures have contributed to science and to advances in engineering.</p> <p>Scientists’ backgrounds, theoretical commitments, and fields of endeavor influence the nature of their findings.</p> <p>Technological advances have influenced the progress of science and science has influenced advances in technology.</p> <p>Science and engineering are influenced by society and society is influenced by science and engineering.</p> |

References & Further reading:

¹ National Academies of Sciences, 2012



Hertz, Paul. (2021). *Explore Astrophysics and Beyond: NASA Astrophysics Update*, https://exoplanets.nasa.gov/internal_resources/2290/

Lave, J., and Wenger, E. (1991). *Situated Learning: Legitimate Peripheral Participation*. New York: Cambridge University Press. <http://dx.doi.org/10.1017/CBO9780511815355>

"11: Equity and Diversity in Science and Engineering Education." National Research Council. (2012). *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. Washington, DC: The National Academies Press. doi: 10.17226/13165. <https://nap.nationalacademies.org/read/13165/chapter/16#286>

"Appendix H - Understanding the Scientific Enterprise: The Nature of Science in the Next Generation Science Standards" (2013). <https://www.nextgenscience.org/resources/ngss-appendices>

STEMist trading cards (another STEM card project): <https://www.stemtradingcards.org/about>