NASA’s Authentic Data Sites: A Guide for Any Classroom

By

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Endeavor: STEM Teaching Certificate Program
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NASA's Authentic Date Sites: A Guide for Any Classroom

The title of my project was NASA's Authentic Data Sites: A Guide for Any Classroom. The curriculum topic covered was how to use NASA date websites in any classroom setting, ranging from cores classes to extracurricular classes. The websites included data and information for all five of Earth's spheres: atmosphere, biosphere, geosphere, hydrosphere, and cryosphere. The Professional Development (PD) was implemented for Center Consolidated Schools in Center, Colorado with a focus for secondary education teachers.

Participants and Professional Development Summary

The participants that attended my PD included nine Center School staff members. These staff members represented core teachers, extracurricular teachers, support staff, and a high school principal. Core teachers were represented from the high school language arts, high school science, and the high school math departments. The extracurricular teachers and support staff were represented from a k-12 art teacher, secondary academic counselor/high school culinary teacher, a high school Spanish teacher/middle school CLD (Culturally and Linguistically Diverse) teacher, k-12 librarian, and our district suicide preventions coordinator. (See Appendix A: PD Attendance and Contact Information)

I selected to share this PD topic because I have enjoyed learning about the vast amount of resources the Endeavor classes have shared. I wanted this PD to be able to give other classes a chance to use relevant data that students can connect with. These resources can show students the "why" they are learning content. The websites and information that was shared will show students how this data is being used in the real world and introduce students to jobs that are in the STEM fields of study. My learning goal was to show teachers how to navigate NASA websites and how to use this information in all classes. The STEM websites included information about Earth's Spheres, Space Math, Mar Rovers, Climate, and Ocean concepts. In the future I hope to see fellow educators using NASA material embedded into their units. These STEM concepts can fit across the Colorado State Standards for Science, Math, and ELA. (See Appendix B: Colorado State Standards Addressed) If the material does not fit into any current units I hope the teachers would create a single class day for a portion of the materials. An example of a single day lesson could be on National Space Day which is the first Friday in May.

Pre-Survey Data

The pre-survey included questions about teachers past NASA data uses in their classroom, how familiar and comfortable they are with using NASA data, if they feel NASA data would be of interest to the students, what barriers prevent them from using NASA data in your classroom, and what supports are needed to be in place to help them as a teacher feel more confident in using NASA data resources in their classroom's. Responses ranged from using a small amount of NASA data to zero use of NASA data used in classrooms but all staff agreed that NASA data could enhance student interest and the student learning. But, with overcoming barriers of not knowing about NASA resources they all felt that using NASA data in a classroom setting would benefit all students. (See Appendix C: Pre-Survey Responses)

Professional Development

For the PD training, staff looked at various NASA websites and choose to investigate activities that they could integrate within their content area. The websites reinforce real life accurate data that is updated throughout the year and contains interesting subject matter. These sites are also students friendly across multiple grade levels.

The PD was started with welcome snacks and completing the pre-survey. Next was our introduction and icebreaker. The icebreaker was a question about choosing an item to take on a mission to Mars. There were some great responses that ranged from electronic books with every possible download, solitary games, and a grandson picture because her kids pictures are already sent there with the earlier Mars missions! I then walked the staff through the set-up of the Google Classroom and NASA websites that were linked there. As I demonstrated the site I showed them the navigations and content for the different sites. The class was then allowed to pick and choose sites that they felt correlated to their content areas. Art found some NASA space projects, Culinary found space themed food like moon phase Oreo cookies and sun spot cookies, Language Arts found some reading for creating short responses, Science was excited to find some anatomy related readings, Spanish found some games in Spanish, our HS Principal was excited about the cross curricular learning, the Librarian was excited for space themed decoration and interactive learning games, and the Suicide Preventions Coordinator was excited to share these sites with families to help bust student engagement and belonging. I then pulled everyone back together and we shared out implementations plans for each other's classes. This sharing session concluded our PD time but before leaving they completed the Professional Development post-survey.

NASA Assets/Endeavor Resources

I choose five different NASA assets/Endeavor resources to showcase in my PD. The first website was My NASA Data (https://mynasadata.larc.nasa.gov/). This site included information about the atmosphere, biosphere, geosphere, hydrosphere, and cryosphere. Staff found the graphs and diagrams useful. The next website was Space Math @ NASA (https://spacemath.gsfc.nasa.gov/planets.html). This site contains specific math related problems with real world context. Staff found it very helpful that the math questions included grade level and math content topics. The next website was Space Place: Explore Earth and Space (https://spaceplace.nasa.gov/mars-rovers/en/). This site contains space games, crafts, activities, and videos. This activities were helpful for the extracurricular teachers and the librarian. The next website was Climate Kids (https://climatekids.nasa.gov/). This website contains information about climate change and compares how today's climate is different from past climate and also has games that revolve around climate issues like coral bleaching and ocean currents. This site was useful with real-world problem issues and problem solving. The last website use was Aquarius: Sea Surface Salinity from Space (https://aquarius.oceansciences.org/cgi/ed_activities.cgi). This site contains hands-on activities, online activities, and articles. This website was useful with articles that could support sustained research projects.

Follow-Up Activities and Post-Survey Responses

As the PD was finishing staff answered and shared with the group the google classroom question, "How do you see this fitting into your profession?" Responses included finding quality text for a non-fiction unit, student exposure to new scientific vocabulary, practice reading and analyzing text, and practicing real-world algebra skills. The post-survey questions were then answered. (See Appendix D: Question Responses and full Post-Survey Responses)

Professional Development Analysis

Upon comparing the survey results there was definite growth for staff members. All people were able to move from "not very familiar" to either "somewhat familiar" or "very familiar" with NASA data. Everyone agreed they felt confident integrating NASA data into a lesson and they felt there was adequate access to the needed resources to use NASA date effectively in a classroom. They also agreed the only barrier to implementing these resources into their classrooms was finding time for NASA specific lesson planning and more time to practice navigating of these sites.

These websites and resources have increased teachers pedagogy by introducing websites that allow new content for classes. These sites help incorporate diverse teaching methods with active learning, hands on activities, and real-world engagement. These aspects help to foster a positive learning environment for all students.

I feel my Professional Development was a success! I measure this success based on the post-survey participation results of how these websites fit into each teacher's profession and that each teacher found activities that fit their personal classes. I feel some of this success stems from the Endeavor Leadership Seminar class's readings. This PD hit upon aspects of the article "5 Ways to be a Good Teacher". This PD had me showing interest in others classrooms, helping others with resources, and advocating for growth in curriculum (*5 Ways to Be a Good Teacher Leader*, 2018). Another reading from this course that help the implementation of the PD was "Not Another Inservice". This article helped me in the setup of my PD by following the stages of a successful professional development: "readiness, planning, training, implementation, and maintenance" (Jenkins & Yoshimura, 2010).

I feel the teachers will use these resources that were shared with them in their classes. Based on their feedback everyone enjoyed different aspects of the websites. I feel the collection of sites gave a large variety of activities and resources that fit into the different classes that the teachers represented.

Personal Reflection and the Future of this Professional Development

According to the pre-survey, teachers were unfamiliar with NASA sites and how to implement NASA data into their classes. I set up this PD with a small introduction to each website and then gave individual work time for teachers to navigate these sites. By offering this time it allowed teacher to understand the sites content and how the information fits into the personal teacher's classes. According to the post-survey results teacher felt familiar with NASA data and had created ideas about how to implement this data into their classes.

I feel this PD helped teachers to assess the pedagogy with new and interesting content material. These websites create an opportunity to bring STEM into the non-STEM content area

such as language arts and history classes. This is helping to bridge the gap and strengthen all learning content as students make interdisciplinary real world content connections.

If this PD was to be presented again, I would make some changes that include time for teachers to lesson plan and create a NASA activity and time for teachers to practice their introduction and delivering of the lesson they chose for their students. These changes would increase the current PD time from one hour to two hours. This could either be completed by having a longer single session PD or breaking up this current PD into two sessions. One session for the research/exploring phase and a second session with the practicing student delivery phase. I feel these changes would give more time for teacher to navigate and exploring the websites and help to create a confident and successful lesson delivery to their students.

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Appendix A
PD Attendance and Contact Information

Sign-In Sheet

Date: 3/26/25 400 - 500

Location: Archaletai Room

	Name	Contact Information	Signature
1)	Elizabeth Soden	salicrupea15@gmail.com	
2)	Brian Roberts	broberts@center.k12.co.us	
3)	Hanna Hays	hhays@center.k12.co.us	
4)	Amanda Alanis	aalanis@center	
5)	Kevin Hagan	khagan@center.k12.co.us	
6)	Nicole Neufeld	nneufeld@center.k12.co.us	
7)	Chris Hintz	chintz@centerk12co.us	
8)	Abigail Brandon	abrendon@center...	
9)	Adele Alfson	aalfson@center.k12.co.us	

Audience

1) Art Teacher
2) Science Teacher/Math Teacher
3 - 5) English
6) HS Principal
7) Librarian
8) Academic Counselor / Culinary Teacher
9) Suicide Preventionist
4) CDL/Spanish Teacher

Appendix B
Colorado State Standards Addressed

a. **2020 Colorado Science Standards:**
    i. SCIENCE High School, Standard 3. Earth and Space Science
        1. 1. All stars, including the sun, undergo stellar evolution, and the study of stars' light spectra and brightness is used to identify compositional elements of stars, their movements, and their distances from Earth.
        2. 7. The role of radiation from the sun and its interactions with the atmosphere, ocean, and land are the foundation for the global climate system. Global climate models are used to predict future changes, including changes influenced by human behavior and natural factors.
        3. 8. The biosphere and Earth's other systems have many interconnections that cause a continual co-evolution of Earth's surface and life on it.
        4. 12. Global climate models used to predict future climate change continue to improve our understanding of the impact of human activities on the global climate system.
b. **2020 Colorado Math Academic Standards**
    i. 3. Data, Statistics, and Probability
        1. HS.S-ID.C. Interpreting Categorical & Quantitative Data: Interpret linear models.
        2. HS.S-IC.B. Making Inferences & Justifying Conclusions: Make inferences and justify conclusions from sample surveys, experiments, and observational studies.
c. **2020 Colorado ELA Standards:**
    i. RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (HS-ESS2-2)
    ii. RST.11-12.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. (HS-ESS2
    iii. WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-ESS2-5)

Appendix C
Pre Survey Data Responses

Pre-Survey: Using NASA Data in the Classroom (Responses)

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Form_Responses1

Timestamp	Score	Section 1: Background Information Your Name (optional):	Subject and Grade Level(s) Taught:	Years of Teaching Experience:	Have you ever used NASA data in your classroom before?
3/26/2025 14:34:52		Brian Roberts	Math and Science, High School	5	No
3/26/2025 14:44:09		Kevin Hagan	English Language Arts -- 10th & 11th	12	Yes
3/26/2025 14:48:01		Nicole neufeld	Secondary Special Education (previously)	10	No
3/26/2025 14:52:01		Amanda Alanis	CLD (6-8) & Spanish 1 (9-12)	18 years	No
3/26/2025 14:59:36		Chris Hintz	PK-12 Library	24	No
3/26/2025 15:24:30		Adele Alfson	9-12 Culinary Arts	22	No
3/26/2025 15:42:15		Elizabeth Soden	Art K-12	7	Yes
3/26/2025 16:01:57		Abby Rendon	Suicide Prevention	Education experience 20 years	No
3/26/2025 16:03:58		Hanna Hays	HS Language Arts	11	No

Pre-Survey: Using NASA Data in the Classroom (Responses)

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If yes, please briefly describe how you have used NASA data in your teaching:	How familiar are you with NASA data?	Please indicate your level of agreement with the following statements regarding NASA data in the classroom: [I believe NASA data can enhance student learning.]	Please indicate your level of agreement with the following statements regarding NASA data in the classroom: [I feel confident integrating NASA data into my lessons.]	Please indicate your level of agreement with the following statements regarding NASA data in the classroom: [I have access to the resources needed to use NASA data effectively.]
	Somewhat Familiar	Agree	Disagree	Neutral
Analyzing climate change graph alongside a text about the same topic.	Not Very Familiar	Agree	Disagree	Disagree
	Not Very Familiar	Agree	Neutral	Neutral
	Not Very Familiar	Neutral	Strongly Disagree	Strongly Disagree
	Not Very Familiar	Strongly Agree	Disagree	Disagree
	Not Very Familiar	Strongly Agree	Agree	Strongly Disagree, Disagree
We would use NASA games, Nasa international space shuttle, and reading documents.	Not Very Familiar	Strongly Agree	Neutral	Neutral
NA	Not Very Familiar	Agree	Disagree	Disagree
	Not Very Familiar	Agree	Strongly Disagree	Disagree

Pre-Survey: Using NASA Data in the Classroom (Responses)

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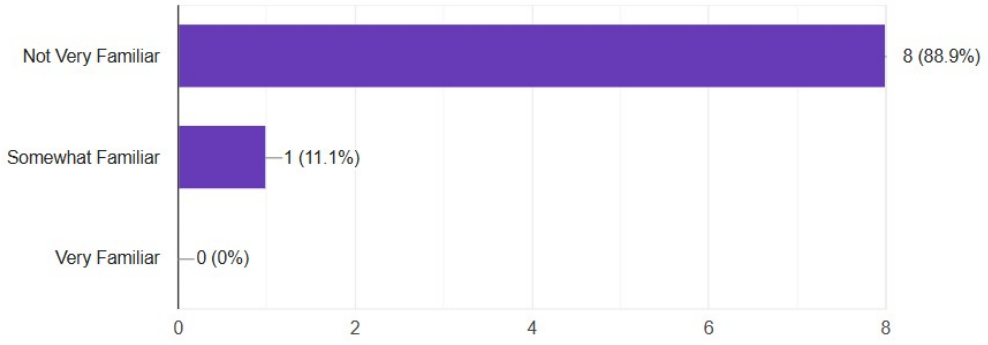
F15

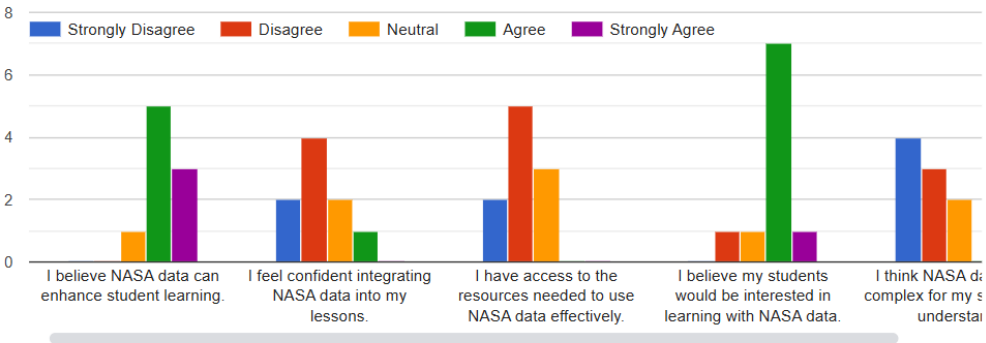
	L	M	N	O	P
1	Please indicate your level of agreement with the following statements regarding NASA data in the classroom: [I believe my students would be interested in learning with NASA data.]	Please indicate your level of agreement with the following statements regarding NASA data in the classroom: [I think NASA data is too complex for my students to understand.]	What barriers, if any, prevent you from using NASA data in your classroom?	What types of support or training would help you feel more confident in using NASA data?	Please share any additional thoughts or suggestions regarding the use of NASA data in the classroom:
2	Agree	Strongly Disagree	Uncertainty how to access grade-level data.	Learning where/how to access the data formatted for students.	
3	Agree	Strongly Disagree	For me, probably familiarity with the platform and how to access data relevant to our text.	I think an overview of the platform and some modeling of how access specific things.	What kind of data / topics does NASA track outside of climate change?
4	Agree	Disagree	No longer a classroom teacher	not sure	
5	Agree	Neutral	Perhaps, training of how to utilize the data to target my population.	Unsure of right now until training occurs.	
6	Strongly Agree	Disagree	None	As much training as possible to be able to use NASA data in my classroom	
7	Agree	Strongly Disagree	Not sure. It might slow the class down considering the ELL and IEP students trying to synthesize the NASA data along with applying it to culinary projects.	Exposure to the information, and help with how to use it.	? Sounds interesting. Hope Stephanie will help explain.
8	Neutral	Neutral	Incorporation into the arts	not sure.	
9	Disagree, Agree	Disagree	I don't really teach science	NA	NA
10	Agree	Strongly Disagree	Just not knowing about the resource!	THIS training!	I think this seems like a very real world and applicable resource that will catch students' interest.

How familiar are you with NASA data?

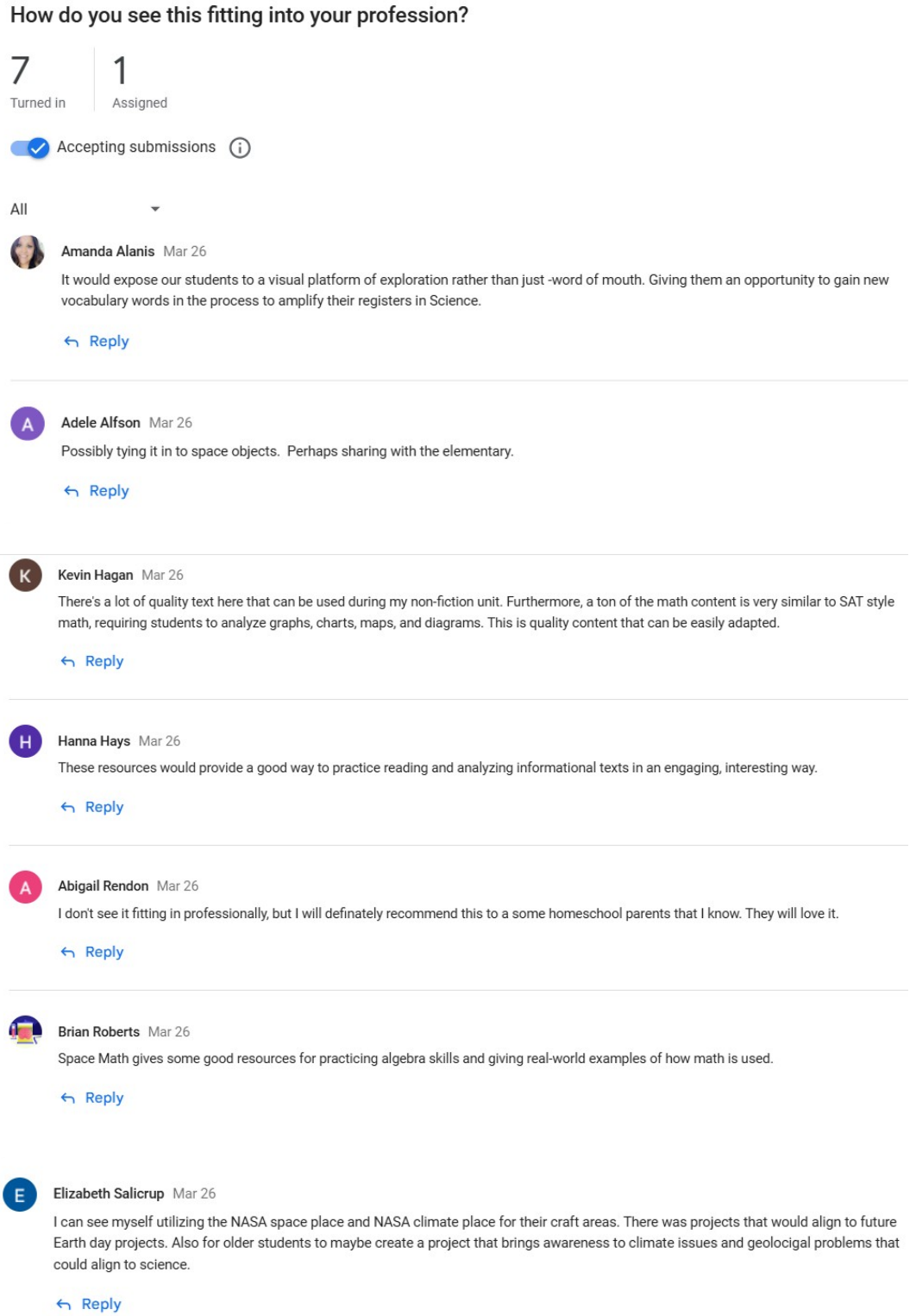
9 responses



Please indicate your level of agreement with the following statements regarding NASA data in the classroom:



Appendix D
Google Response and Post Survey Data Responses



How do you see this fitting into your profession?

7 Turned in | 1 Assigned

Accepting submissions

All

Amanda Alanis Mar 26

It would expose our students to a visual platform of exploration rather than just -word of mouth. Giving them an opportunity to gain new vocabulary words in the process to amplify their registers in Science.

Reply

Adele Alfson Mar 26

Possibly tying it in to space objects. Perhaps sharing with the elementary.

Reply

Kevin Hagan Mar 26

There's a lot of quality text here that can be used during my non-fiction unit. Furthermore, a ton of the math content is very similar to SAT style math, requiring students to analyze graphs, charts, maps, and diagrams. This is quality content that can be easily adapted.

Reply

Hanna Hays Mar 26

These resources would provide a good way to practice reading and analyzing informational texts in an engaging, interesting way.

Reply

Abigail Rendon Mar 26

I don't see it fitting in professionally, but I will definately recommend this to a some homeschool parents that I know. They will love it.

Reply

Brian Roberts Mar 26

Space Math gives some good resources for practicing algebra skills and giving real-world examples of how math is used.

Reply

Elizabeth Salicrup Mar 26

I can see myself utilizing the NASA space place and NASA climate place for their craft areas. There was projects that would align to future Earth day projects. Also for older students to maybe create a project that brings awareness to climate issues and geolocigal problems that could align to science.

Reply

Post-Survey: Using NASA Data in the Classroom (Responses)

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Form_Responses1

	Timestamp	Score	Section 1: Background Information Your Name (optional):	Subject and Grade Level(s) Taught:	Years of Teaching Experience:	Have you ever used NASA data in your classroom before?
2	3/26/2025 16:52:26		Amanda Alanis	CLD (6-8) Spanish 1 (9-12)	18 years	No
3	3/26/2025 16:52:29		Hanna Hays	HS Language Arts	11	No
4	3/26/2025 16:52:31		Abby Rendon	K-12 Suicide Prevention	20	No
5	3/26/2025 16:52:48		Nicole Neufeld	HS Principal	10 Teaching, 3 Principaling	No
6	3/26/2025 16:53:52		Kevin Hagan	10th & 11th ELA	12	No
7	3/26/2025 16:54:44		Adele Alfson	9-12	22	No
8	3/26/2025 16:54:46		Chris Hintz	Pk-12	24	No
9	3/26/2025 16:55:21		Elizabeth Soden	Art K-12	7	Yes
10	3/26/2025 16:56:46		Brian Roberts	Math and Science, High School	5	No

Post-Survey: Using NASA Data in the Classroom (Responses)

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	If yes, please briefly describe how you have used NASA data in your teaching:	How familiar are you with NASA data?	Please indicate your level of agreement with the following statements regarding NASA data in the classroom: [I believe NASA data can enhance student learning.]	Please indicate your level of agreement with the following statements regarding NASA data in the classroom: [I feel confident integrating NASA data into my lessons.]	Please indicate your level of agreement with the following statements regarding NASA data in the classroom: [I have access to the resources needed to use NASA data effectively.]
2		Somewhat Familiar	Strongly Agree	Strongly Agree	Agree
3		Somewhat Familiar	Agree	Agree	Agree
4	I have not used it	Somewhat Familiar	Strongly Agree	Agree	Agree
5		Somewhat Familiar	Strongly Agree	Agree	Strongly Agree
6		Somewhat Familiar	Strongly Agree	Strongly Agree	Agree
7		Somewhat Familiar	Strongly Agree	Agree	Strongly Agree
8		Somewhat Familiar	Strongly Agree	Agree	Agree
9	Nasa games	Very Familiar	Agree	Agree	Strongly Agree
10		Somewhat Familiar	Agree	Agree	Agree

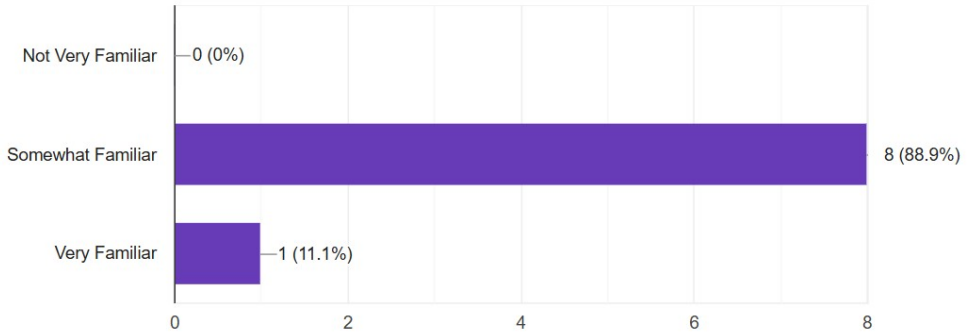
Post-Survey: Using NASA Data in the Classroom (Responses)

File Edit View Insert Format Data Tools Extensions Help

	Please indicate your level of agreement with the following statements regarding NASA data in the classroom: [I believe my students would be interested in learning with NASA data.]	Please indicate your level of agreement with the following statements regarding NASA data in the classroom: [I think NASA data is too complex for my students to understand.]	What barriers, if any, prevent you from using NASA data in your classroom?	What types of support or training would help you feel more confident in using NASA data?	Please share any additional thoughts or suggestions regarding the use of NASA data in the classroom:
2	Strongly Agree	Disagree	Finding time to lesson plan	Lesson planning on a science unit	
3	Agree	Strongly Disagree	Now there are none!	More time to look into it and maybe some more support in finding specific aspects/features of these websites.	This are great resources!
4	Strongly Agree	Disagree	language might be a barrier, also some of the websites were very wordy	Unsure	I can see the videos and the charts and graphs being really helpful.
5	Strongly Agree	Strongly Disagree	Not a classroom teacher currently	spending more time looking through the websites and resources to decide how best to use them.	Great training, Steph. I will keep this in mind when I recommend resources to classroom teachers.
6	Strongly Agree	Strongly Disagree	I just need more time and practice navigating and I should be good to go.	None now that I've had this training.	Great materials and very good tutorial of how to access and apply the materials in different content areas.
7	Strongly Agree	Strongly Disagree	I need to look into the links provided and see how I can incorporate the information/suggestions.	Perhaps more help with using site links.	Interesting project that you are working on. It would be good to share your resources for an hour PD day opportunity.
8	Strongly Agree	Strongly Disagree	None	Support from other staff as they navigate around	Research projects, earthday projects.
9	Agree	Strongly Disagree	I don't believe their are any barriers when using NASA data in the classroom, it appears to be very user friendly.	Finishing content for each grade level	
10	Agree	Strongly Disagree	None	More ways to find upper grade level resources for NASA data, since most high school resources are geared to freshmen and sophomores.	

How familiar are you with NASA data?

9 responses



Please indicate your level of agreement with the following statements regarding NASA data in the classroom: