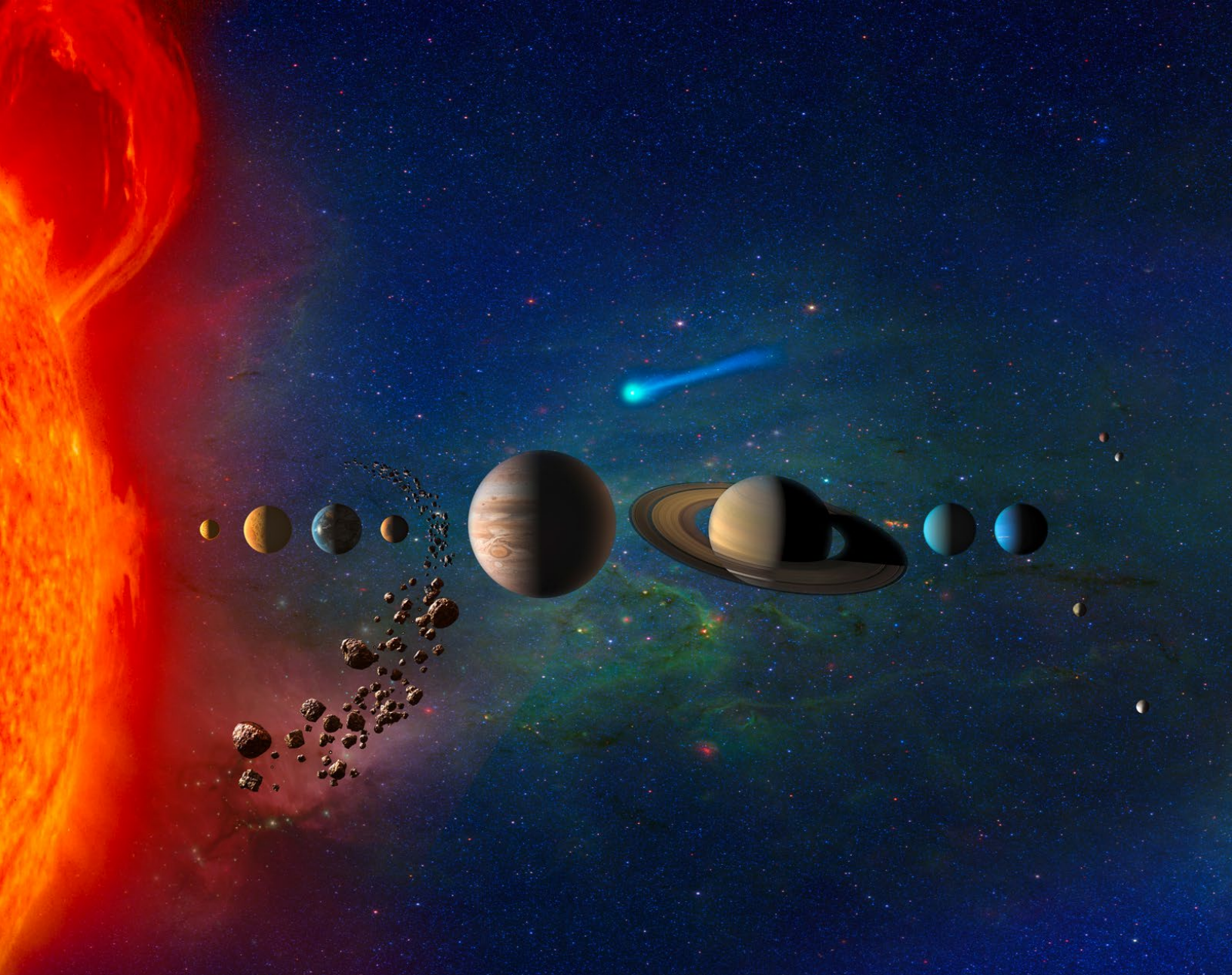




# Our Solar System

## *Implementation Guide*



Source: [NASA](#)

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## Our Solar System: Implementation Guide

**Overview:** Our Solar System engages students in activities at different stations to learn about the properties of the Sun, the characteristics of the planets, other bodies in the solar system, the structure of the solar system, and space exploration. Each station has 3-4 activities, and students are encouraged to try as many activities as possible. The activities do not need to be completed in any specific order, and students do not need to complete all activities. Resource links are included at the end of this implementation guide.

### **Assumptions:**

The following will be readily available:

- Internet Connection
- Printer Paper
- Printer
- Pencils or Pens
- Colored Pencils, Markers, Crayons
- Stapler
- Scissors
- Glue
- Aluminum Foil
- Plastic Wrap
- Dark Colored Paper

### **Format:**

Activities in this packet can be accessed freely online. Any materials needed beyond the basic supplies listed above were included with previous engagement day or mission supplies. The activities are intended to be delivered face-to-face at Challenger Learning Centers, but suggestions for additional delivery methods are included with each activity. Each station has multiple activities to allow for flexibility. You may choose to set up all activities at each station or choose one or two to suit your audience and specific situation.

### **Setup and Staffing:**

All in-person activities can be completed independently by participants or with a facilitator. It is recommended to have a staff member at each station to supervise, answer questions, and provide guidance. Activities intended to be delivered virtually should have a facilitator to ask probing questions and direct the flow.



# Our Solar System: Implementation Guide

## Activity Outline

### Stations:

1. The Sun
  - True or False
  - Anatomy of the Sun
  - Radiation Shielding
  - The Sun's Energy
2. The Planets
  - Memory
  - Who Am I?
  - Planet Fan
3. Other Bodies
  - Hot Seat
  - Large Moons and Dwarf Planets
  - Comets and Orbits
4. Structure & Scale
  - Planet Size Comparison
  - Walk the Solar System
  - Formation and the Outer Limits
5. Exploration
  - Mission to the ISS
  - Design a Mission Patch
  - Space Telescopes – Hubble, Spitzer, and Webb
  - SLS – To the Moon and Mars

### Survey:

Regardless of delivery method or scenario, please have participants complete the survey linked below after delivery of these engagement activities.

LINK: <https://www.surveymonkey.com/r/ChallengerEngagementDaySurvey>



## Our Solar System: Implementation Guide Materials

Below is a list of needed materials for all stations, along with suggested quantities. Materials to be printed will be included with the activity files.

<b>Station 1: The Sun</b>		
Item	Source	Suggested Quantity
True or False Statement Cards	file included	1 set per group
Sun Layers	file included	1 set per student, 5 pages per set
Colored Pencils, Markers, Crayons	common items	1 set of colors per student
Scissors	common items	1 per student
Glue Stick	common items	1 per student
Sun Model Example Images (to be printed)	file Included	2-3 to display
Heat Lamp	Our Blue Marble	1 per setup
Heat Lamp Bulb	Our Blue Marble	1 per setup
Black Tiles	Our Blue Marble	5 per setup
Infrared Thermometer	Our Blue Marble	1 per setup
Aluminum Foil	common items	1 6-inch by 6-inch square per setup
Plastic Wrap	common items	1 6-inch by 6-inch square per setup
Dark Colored Paper	common items	1 sheet per student
White Paper	common Items	1 6-inch by 6-inch square per setup

## Station 2: The Planets

Item	Source	Suggested Quantity
Memory Cards (to be printed)	file included	1 set per group
Solar System Fact Sheet (to be printed)	file included	1 per student
Planet Fan Template (to be printed)	file included	1 set per student, 5 pages per set
Colored Pencils, Markers, Crayons	common items	1 set of colors per student
Stapler	common items	2-3
Images of the Planets	file included	1 of each to display

## Station 3: Other Bodies

Item	Source	Suggested Quantity
Vocabulary Cards (to be printed)	file included	1 set of 12 cards per pair or small group
Large Moons and Dwarf Planets Activity Sheet	file included	1 per student
Dwarf Planet Infographic	file included	1 to display
Writing Utensils	common items	1 per student
Digital Tablets	Center resource provided by NASA CAN	1 per pair or small group

### Station 4: Structure & Scale

Item	Source	Suggested Quantity
Food Cards (to be printed)	file included	1 set of 8 cards per group
Planet Images (to be printed)	file included	1 of each planet
Solar System Distances Table	file included	1 per group
Long Space (minimum 60 feet)	facility	1 per group

### Station 5: Exploration

Item	Source	Suggested Quantity
“Rocket Science: Ride to Station” App	free download	1 per student
Digital Tablets	Center resource provided by NASA CAN	1 per student
Writing Utensils	common items	1 per student
Images of Previous Mission Patches	file included	1 set to display
Mission Patch Design Templates (to be printed)	file included	1 per student
Colored Pencils, Markers, Crayons	common items	1 set of colors per student



## Our Solar System: Implementation Guide Source Links

Cover Image: [https://www.nasa.gov/sites/default/files/thumbnails/image/edu\\_solar\\_system\\_large.png](https://www.nasa.gov/sites/default/files/thumbnails/image/edu_solar_system_large.png)

Mercury Image: <https://spaceplace.nasa.gov/review/all-about-mercury/mercury3.en.jpg>

Venus Image:

<https://www.nasa.gov/press-release/nasa-selects-2-missions-to-study-lost-habitable-world-of-venus>

Earth Image: [https://www.nasa.gov/sites/default/files/1-blumarmble\\_west.jpg](https://www.nasa.gov/sites/default/files/1-blumarmble_west.jpg)

Mars Image: <https://mars.nasa.gov/resources/7808/global-color-views-of-mars/>

Jupiter Image: <https://www.nasa.gov/sites/default/files/thumbnails/image/stsci-h-p2042a-f-1663x1663.png>

Saturn Image: [https://solarsystem.nasa.gov/system/stellar\\_items/image\\_files/38\\_saturn\\_1600x900.jpg](https://solarsystem.nasa.gov/system/stellar_items/image_files/38_saturn_1600x900.jpg)

Uranus Image: [https://www.nasa.gov/sites/default/files/thumbnails/image/uranus\\_and\\_neptune.jpg](https://www.nasa.gov/sites/default/files/thumbnails/image/uranus_and_neptune.jpg)

Neptune Image: <https://www.nasa.gov/sites/default/files/thumbnails/image/pia01492-main.jpg>

Planet Symbols: <https://solarsystem.nasa.gov/resources/680/solar-system-symbols/>

Pea Image: <https://www.pexels.com/photo/green-peas-plant-on-white-surface-768093/>

Blueberry Image: <https://www.pexels.com/photo/person-holding-black-currants-45908/>

Tomato Image: <https://www.pexels.com/photo/cherry-tomatoes-in-polyethylene-bag-isolated-on-white-background-4033112/>

Grape Image: <https://www.pexels.com/photo/crop-woman-with-cluster-of-grape-5946086/>

Apple Image: <https://www.pexels.com/photo/red-and-orange-apple-fruit-102104/>

Orange Image: <https://www.pexels.com/photo/orange-fruit-161559/>

Coconut Image: <https://www.pexels.com/photo/close-up-photo-of-a-cracked-coconut-husk-5702602/>

Watermelon Image: <https://www.pexels.com/tr-tr/fotograf/karpuz-meyvesi-1313267/>

Infographic: Dwarf Planets: <https://www.jpl.nasa.gov/infographics/what-is-a-dwarf-planet>

“Rocket Science: Ride to Station” App:

[https://play.google.com/store/apps/details?id=gov.nasa.ksc.itc1&hl=en\\_US&gl=US](https://play.google.com/store/apps/details?id=gov.nasa.ksc.itc1&hl=en_US&gl=US)

Apollo Patches: <https://solarsystem.nasa.gov/resources/2293/apollo-mission-patches/>

STS-51-L Patch: <https://www.nasa.gov/sites/default/files/thumbnails/image/s85-46260.jpg>

STS-135 Patch: <https://www.nasa.gov/sites/default/files/thumbnails/image/sts135-s-001.jpg>

STS-42 Patch: <http://history.nasa.gov/patches/shuttle/STS-42.jpg>

STS-44 Patch: <https://history.nasa.gov/patches/shuttle/STS-44.jpg>



# Our Solar System: Implementation Guide

## Extension Links

### The Sun

- [https://www.nasa.gov/mission\\_pages/sunearth/science/Sunlayers.html](https://www.nasa.gov/mission_pages/sunearth/science/Sunlayers.html)
- [https://www.nasa.gov/mission\\_pages/sunearth/science/solar-anatomy.html](https://www.nasa.gov/mission_pages/sunearth/science/solar-anatomy.html)
- <https://science.gsfc.nasa.gov/670/aboutheliophysics.html>
- [https://www.nasa.gov/mission\\_pages/sunearth/the-heliopedia](https://www.nasa.gov/mission_pages/sunearth/the-heliopedia)
- <https://solarsystem.nasa.gov/solar-system/sun/overview/>
- <https://solarsystem.nasa.gov/solar-system/sun/in-depth/>
- <https://spaceplace.nasa.gov/menu/sun/>
- <https://www.jpl.nasa.gov/edu/learn/project/space-origami-make-your-own-starshade/>
- <https://spaceplace.nasa.gov/aurora/en/>
- <https://spaceplace.nasa.gov/spaceweather/en/>
- <https://spaceplace.nasa.gov/solar-activity/en/>
- <https://www.nasa.gov/image-feature/goddard/2018/solar-wind-and-corona-timeline>
- <https://science.nasa.gov/heliophysics/mission-fleet-diagram>
- <https://www.nasa.gov/content/goddard/parker-solar-probe-videos>

### The Planets

- <http://market.android.com/details?id=gov.nasa.jpl.spaceimages.android>
- <https://eyes.nasa.gov/apps/orrery/#/home>
- <https://solarsystem.nasa.gov/planets/overview/>
- <https://science.nasa.gov/get-involved/toolkits/planetary-mission-posters>

### Other Bodies

- <https://spaceplace.nasa.gov/kuiper-belt/en/>
- <https://spaceplace.nasa.gov/comets/en/>
- <https://spaceplace.nasa.gov/asteroid/en/>
- <https://spaceplace.nasa.gov/asteroid-or-meteor/en/>
- <https://spaceplace.nasa.gov/meteor-shower/en/>
- <https://www.jpl.nasa.gov/edu/learn/slideshow/whats-that-space-rock/>
- [https://www.nasa.gov/audience/forstudents/k-4/more\\_to\\_explore/Asteroids-Comets-Meteorites.html](https://www.nasa.gov/audience/forstudents/k-4/more_to_explore/Asteroids-Comets-Meteorites.html)
- <https://solarsystem.nasa.gov/resources/336/space-shorts-what-is-a-dwarf-planet/>
- <https://spaceplace.nasa.gov/ice-dwarf/en/>
- <https://www.nasa.gov/audience/forstudents/5-8/features/nasa-knows/what-is-orbit-58.html>
- [https://www.nasa.gov/mission\\_pages/station/news/orbital\\_debris.html](https://www.nasa.gov/mission_pages/station/news/orbital_debris.html)
- <https://orbitaldebris.jsc.nasa.gov/photo-gallery/>



## Structure & Scale

- <https://www.youtube.com/watch?v=KtwVlqIkz2s>
- <https://www.youtube.com/watch?v=DMZ5WFRbSTc>
- <https://www.youtube.com/watch?v=4q4ocW7tuG8&list=PL887C1C3BAAD53F17&index=19>

## Exploration

- [https://www.nasa.gov/sites/default/files/thumbnails/image/artemis\\_i\\_comm\\_nav\\_milestones.jpg](https://www.nasa.gov/sites/default/files/thumbnails/image/artemis_i_comm_nav_milestones.jpg)
- [https://play.google.com/store/apps/details?id=gov.nasa.jpl.spacecraftAR&hl=en\\_US&gl=US](https://play.google.com/store/apps/details?id=gov.nasa.jpl.spacecraftAR&hl=en_US&gl=US)
- <https://www.youtube.com/watch?v=VDhyYy8Z00I&list=PL887C1C3BAAD53F17&index=16>
- [https://solarsystem.nasa.gov/resources/all/?order=pub\\_date+desc&per\\_page=50&page=0&search=&condition\\_1=1%3Ais\\_in\\_resource\\_list&fs=&fc=324&ft=&dp=&category=324](https://solarsystem.nasa.gov/resources/all/?order=pub_date+desc&per_page=50&page=0&search=&condition_1=1%3Ais_in_resource_list&fs=&fc=324&ft=&dp=&category=324)
- <https://spaceplace.nasa.gov/dsn-antennas/en/>
- <https://spaceplace.nasa.gov/dsn-game/en/>
- <https://www.nasa.gov/specials/you-are-going/>
- <https://www.jpl.nasa.gov/edu/learn/slideshow/mysteries-of-the-solar-system/>
- <https://youtu.be/69uT90tEJdE>
- <https://stem.nasa.gov/artemis/>
- [https://www.nasa.gov/sites/default/files/atoms/files/0772\\_diy\\_sls\\_-\\_artemis\\_10222020\\_with\\_pics.pdf](https://www.nasa.gov/sites/default/files/atoms/files/0772_diy_sls_-_artemis_10222020_with_pics.pdf)
- <https://www.nasa.gov/stem/nextgenstem/webb-toolkit.html>
- <https://spaceplace.nasa.gov/james-webb-space-telescope/en/>
- [https://www.youtube.com/watch?v=WvT3hMVrSzs&list=PL2aBZuCeDwiQDM6x6FpHE\\_X0iL7hvoRpR&index=5](https://www.youtube.com/watch?v=WvT3hMVrSzs&list=PL2aBZuCeDwiQDM6x6FpHE_X0iL7hvoRpR&index=5)
- [https://www.nasa.gov/mission\\_pages/station/main/suni\\_iss\\_tour.html](https://www.nasa.gov/mission_pages/station/main/suni_iss_tour.html)
- <https://solarsystem.nasa.gov/missions/hubble-space-telescope/in-depth/>
- <https://solarsystem.nasa.gov/news/1147/10-things-spitzer-taught-us-about-our-solar-system/>
- <https://www.youtube.com/watch?v=o2FFtPPM3iY>
- <https://www.nasa.gov/feature/goddard/2022/first-images-from-nasa-s-webb-space-telescope-coming-soon>



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