

# EDUCATOR *GUIDE*

## Choose a Potential Water Reservoir to Explore & Share Out (15 min)

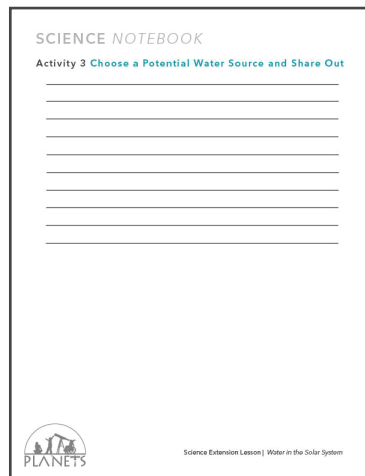
### Overview

Where can we find accessible and usable water in our solar system that may support life? In this activity, youth will combine what they have learned in the Science Series: Water in the Solar System to propose an extraterrestrial water reservoir to explore for primitive life or human use.

### In this activity:



Planetary Cards



Science Notebook

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## Introduction (5 min)

Tell youth to imagine that NASA is holding a contest for youth that will determine the next object in the solar system for exploration. You and your fellow young people have decided that you want to choose a place that has the potential for life and that humans could possibly visit one day.

Let youth know that today they will need to consider all the data they have collected and content they have learned over the previous activities and use this to choose a water reservoir on one planetary body in the solar system. Let youth know that as they review their data, they should keep in mind that they will need to share their results with the whole group, so they should think about the evidence they use to make their decision and how they will explain their reasoning.

Shuffle one deck of planetary cards and deal out all cards to youth. Alternatively, lay all the cards out on one table and have youth choose at least 3.

## Choose a Water Reservoir in the Solar System to Explore (15 min)

1. Explain to youth that they will address each of the following considerations in their science notebook and record evidence for their water source on how available, accessible, usable, and potentially habitable their water reservoir is.

- » How much water is available in this resource? How does the water drop value compare to Earth's water reservoirs?
- » Is the water buried under a layer of rock or ice that would make it difficult to extract, study from afar (remote sensing), or gather samples?
- » In what state of matter does the water in this reservoir occur? Is it already liquid or is it gas (water vapor) or solid (ice)? Is it possible that it could support primitive life or be used by humans as it is?
- » Is the water in this reservoir mixed with another substance like hydrocarbons or carbon dioxide? Does it have salinity? How would this affect potential habitability for life or

**Note:** Use the original option if you want to keep the planets, moons, and reservoirs together as an orderly cohesive learning unit. Use the alternative option if you have an odd number of groups or want to better distribute actions and timing among youth.



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usability for humans?

- » What more do you need to know about this planetary body and its water reservoir to help you make your decision?

2. Have the youth record information in the table outlined in the science notebook for up to 3 cards.

3. Ask youth to consider all the information they have learned on water usability and habitability and consider if their water reservoirs are most promising to explore for humans (usability) or primitive life (potential habitability).

4. Tell the youth they will need to choose only one reservoir from their entire group based on evidence (availability, accessibility, usability, habitability) or another condition the youth have deemed more important for consideration than those listed in the table.

5. Tell youth they also need to choose why they are exploring this reservoir, human use, primitive life, or both. Remind youth that human use does not only include drinking, it also includes hygiene (cleaning things, washing clothes, showering, toilets) and irrigating crops.

## **Prepare for the Presentation (15 min)**

1. Ask groups to review the card for their top choice and lines of evidence recorded in their Science Notebooks. Have youth use these to help them prepare a presentation about the water reservoir they selected. Let them know they will share their presentation with the whole group and invited guests, if it is possible to do so at your site.
2. As groups are working, help guide their thinking by asking:
  - » What evidence did you look at to help you choose your water reservoir?
  - » Which reservoir will provide the most usable

**Note:** The presentation is a chance for youth to explain their thinking and reflect on what they learned about water in the solar system throughout the unit. Youth can present and share in a variety of ways, including:

- » Invite youth to rank the water sources based on all the available information.
- » Ask youth to write a compelling argument to NASA about which planetary water reservoir should be selected.

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or habitable water? Why?

## Share Out and Discussion (25 min)

1. Ask groups to share which reservoir they determined to be the most accessible, usable and/or habitable water in the solar system. As each group shares, ask them to refer to their card and Science Notebook and provide examples of evidence that led to their recommendation and to explain their thinking. After each group presents, ask questions like:
  - » What surprised you about working with the information?
  - » What is one thing you will remember about the planetary bodies in the solar system?
2. After all groups have shared, ask:
  - » Is there a common type of reservoir in the solar system that multiple groups identified as promising?

## Wrap Up (5 min)

Lead a discussion about what else we should consider when choosing a new location to explore in the solar system besides the availability and usability of water. Consider one planetary body that the whole group identified as a popular choice for a water reservoir. Use the following questions to guide the discussion.

1. Discuss other potential habitability issues that might affect the possibility of life on other planetary bodies like gravity, weather, extreme temperatures, radiation, etc. Ask:
  - » How would this change your answer?
2. Discuss: how does the limited information we have about water reservoirs on planetary bodies negatively impact our attempts to explore these places for the possibility of life?  
*It's important to acknowledge your data gaps in science so that you don't make a costly wrong decision*
3. Congratulate youth on their excellent scientific work. Let them know that identifying places to explore based on evidence is important so that we don't waste precious time and resources.

