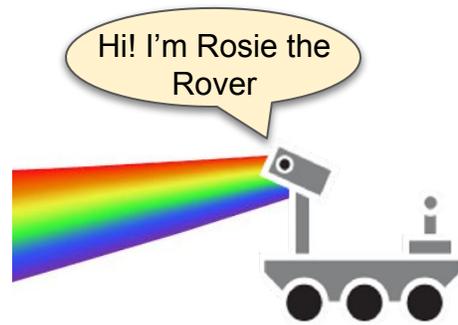


Get excited! This investigation is about how NASA uses remote sensing to make discoveries about other planets.



First let's make a device that splits up different wavelengths of light!

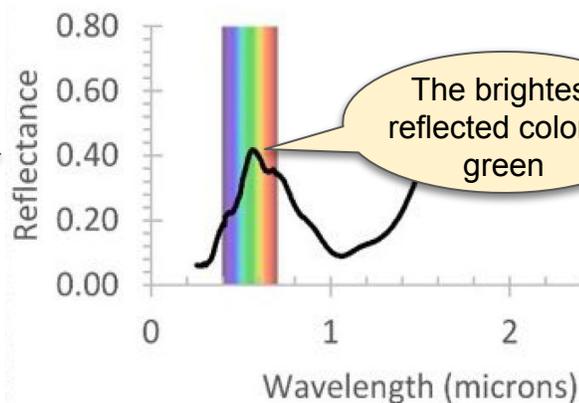
- ★ Find a piece of cardboard you can bend into a right angle.
- ★ Cut a window smaller than the diffraction grating slide and tape it on.
- ★ Go to a sunlit area, and angle your device so the sun shines through the grating to make a rainbow.
- ★ Next hold up white paper where the rainbow shows up and try it again. Is the rainbow brighter?
- ★ Try different colored surfaces in place of the paper and see how that changes the brightness of the colors in the rainbow.



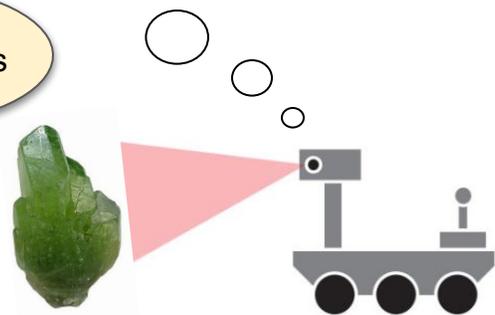
1000 lines per mm? woah!



Did you know NASA measures the brightness of different wavelengths of light to learn what's on other planets? They measure the light reflected off rocks on the surface like Rosie is doing below.



Brightness

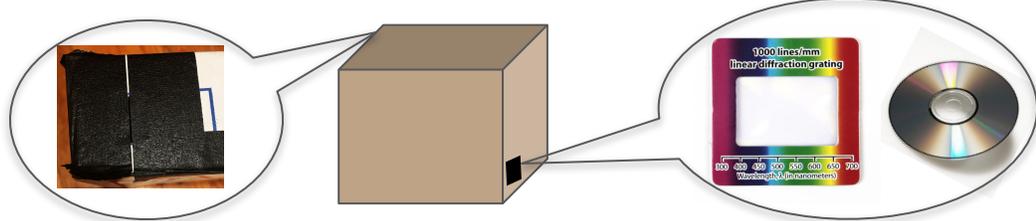


Level Up! Investigate Different Light Sources

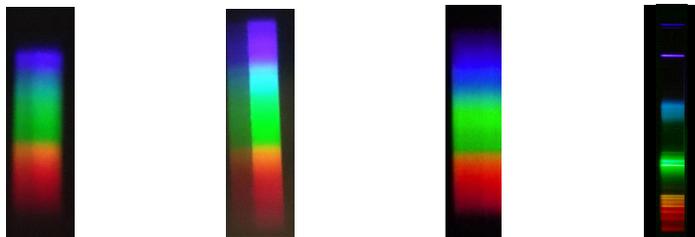
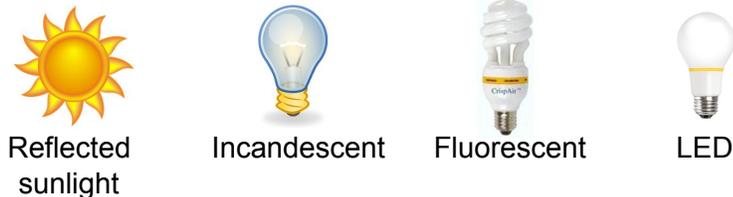


Let's make a device that detects differences in light!

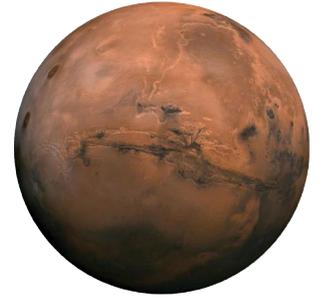
- ★ Find a small box (<1 foot on the longest side)
- ★ On the shortest side, cut a small window near the corner for your diffraction grating slide or use old CD (label peeled off).
- ★ Tape your diffraction grating to the window so you can look into the box.
- ★ On the opposite side, cut a small slit on the opposite corner
- ★ Use black tape (or tape colored black) to make your slit really small



- ★ Look into the box and tape up all other places where light is coming in.
- ★ Look through the window and point the slit end at a bright light source or somewhere in bright sunlight (do not look directly at the sun!!!).
- ★ Is there a spectrum (rainbow) on the side?
- ★ Investigate different light sources. **Can you draw lines to match 1 or 2 of the light source with its spectrum?**



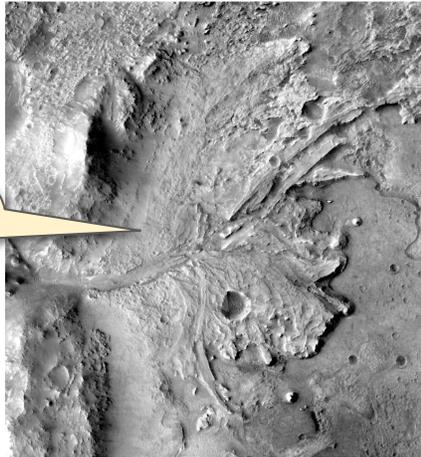
Level Up! Use light to investigate what's on Mars



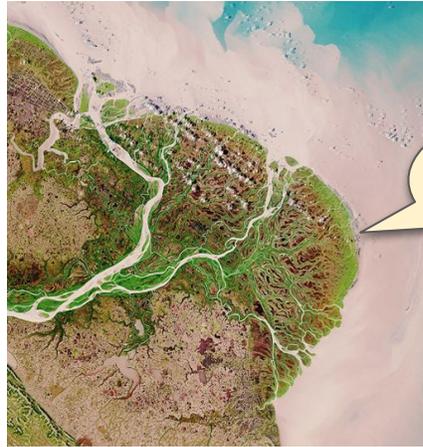
Let's use light graphs to find out what minerals are on Mars!

- ★ Check out the landing site for the Perseverance Rover (Visual Data, Jezero Crater, Mars)
- ★ This image shows a delta landform, Deltas usually form from rivers meeting a sea.

Jezero Crater delta on Mars



Modern delta on Earth



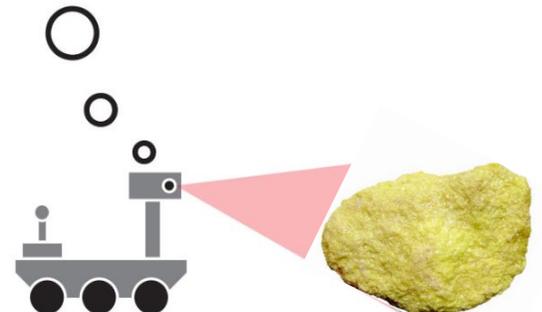
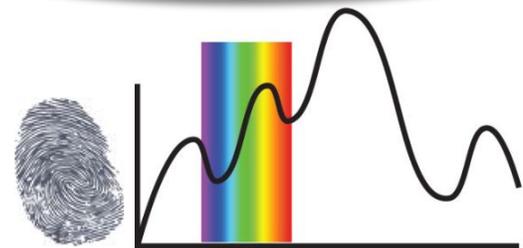
- ★ Can you identify any other evidence that running water used to be on Mars?
 - Look at your Mineral Fingerprints Data Sheet
 - Compare it to the CRISM Data, Jezero Crater, Mars.
 - Draw an X on the visual data sheet where you would land the Perseverance Rover to look for water-related minerals.

- ★ Did you make any discoveries? Show your family or post to share them with NASA #PlanetsSTEM

Follow the mission to see what Perseverance discovers!
<https://mars.nasa.gov/mars2020/>



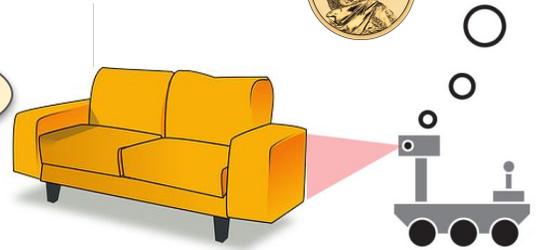
Compact Reconnaissance Imaging Spectrometer for Mars



Level up! Engineer a way to get sunlight to a dark place!



Wow, NASA can use remote sensing to discover things on different planets



I wonder if I can use remote sensing to discover things in my own home?

Like what's lost under the couch or the bed when I don't have a flashlight?

What your design needs to do:

- ★ Reflect sunlight to a dark place in your home (like under a heavy piece of furniture)

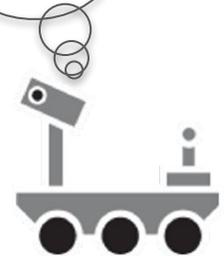
Engineer it:

- ★ Draw your plan on the back of this page
- ★ Find materials around your house & set it up

Hmm... what materials reflect light? Mirrors, aluminum foil, a shiny pan?

Test it:

- ★ Try it out. Can you see anything under there?



Improve:

- ★ If it did work, can you add another reflection?
- ★ If your setup didn't work too well, that's okay! Failure teaches engineers how to improve their designs and processes.
- ★ Talk to your family about how to improve your process

Wow, you engineered a process to move light! Show it off or post a picture #PlanetsSTEM

