Worlds Apart: Designing Remote Sensing Technologies

Tips for Interactivity highlight free digital resources that educators and youth can access to compliment the work completed in the Engineering Journal. These resources offer opportunities to use technology to support youth as they collect data on their designs and processes, communicate about their engineering work, and visualize scientific concepts. Use the tips below to build on these learning goals and leverage resources to further engage in planetary science!

Access to the Internet and a digital tool, such as a phone, iPad, and/or computer, are required. Suggestions for when to use the tip during the teaching of the unit are highlighted in red.

ALL ACTIVITIES

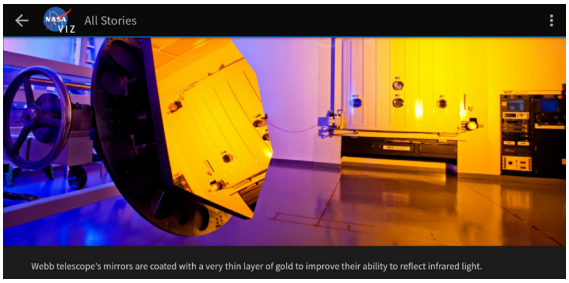
Photo and Video Documentation

Have youth use a digital notebooking tool or their smartphone to record data that they can share during the Engineering Showcase (**A6**). Youth can:

- Take a photo and trace the pattern in the straws to better see the cross section in 2D. (**A3**)
- Take a short video of how their materials performed during the *Investigate* step. (**A1, A2, A3**)
- Take photos to keep track of different versions of designs. Consider drawing on top of these to plan improvements! (**A4, A5**)
- Take a video of their technologies as they are in the *Create* step. (**A4**)
- Document the testing of their technologies with photo and slow-motion video. Youth can annotate photos to show what worked, what did not work, and what they will change after each test. (**A4, A5**)

ACTIVITY 1

NASA Visualization Explorer (Android, Apple)

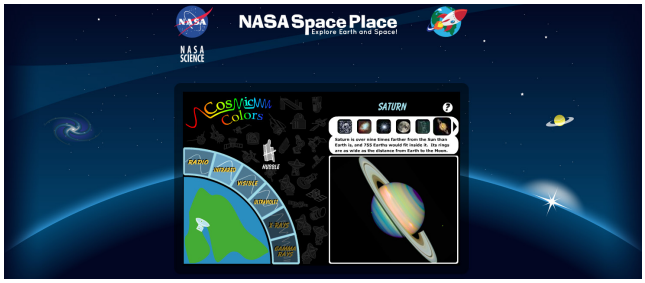


This free mobile app was developed by NASA to highlight current and upcoming NASA missions. Youth can explore the visualizations, animations, images, and articles to learn more about remote sensing technologies. Have youth check out the section *'The Beauty of Webb's Mirrors'* to find out more about the James Webb Space Telescope (mentioned on **p. 5** of the Engineering Notebook).

ACTIVITY 2

Cosmic Colors on NASA Space Place

https://spaceplace.nasa.gov/cosmic-colors/en/#

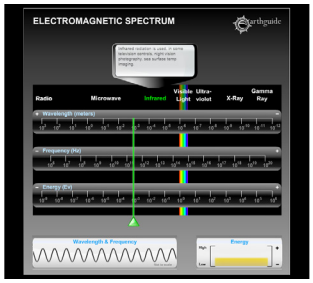


NASA's Space Place website was designed for students to explore science through hands-on activities, interactive games, videos, and articles. In Cosmic Colors, youth can view images of the solar system that scientists have taken using remote sensing technologies, which detect light our eyes cannot see. Youth can use this web-based interactive to compare enhanced images taken by telescopes and satellites to what the planets look like with the naked eye.

ACTIVITY 2

Electromagnetic Spectrum Interactive

http://earthguide.ucsd.edu/eoc/special_topics/teach/sp_climate_change/p_emspectrum_interactive.html



Earthguide's online classroom features this interactive resource and discussion questions that can help youth learn more about wavelengths and visualize forms of light on the Electromagnetic Spectrum.

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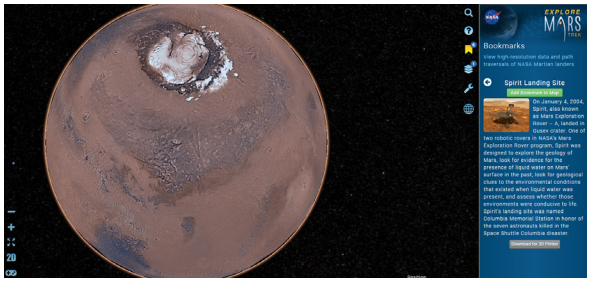
ACTIVITY 3

Explore Mars Trek

https://mars.nasa.gov/maps/explore-mars-map/fullscreen/



Mars Trek is an application that allows youth to interact with an accurate 3D rendering of Mars. Youth can explore the suite of analytical tools to learn more about Mars's surface and the tools that collected this data.

Consider using satellite view on Google Maps to make additional connections to Earth's surface.

ACTIVITY 4

Spacecraft AR app (Android, Apple)

This free augmented reality (AR) mobile app, developed by JPL and Google, allows youth to take a closer look at NASA's robotic missions, like the Curiosity Rover. Simply find a flat surface for the app to detect, and a model will be projected there.