

Understanding Spectroscopy-How do we know what elements are in stars or other planet's atmospheres?

Emission vs. Absorption- When elements are burned each element has its own unique fingerprint. That fingerprint can be imaged by a spectroscope (instrument used to measure light) and shown as a visible light spectrum (rainbow). Emission refers to the colors emitted by the burned elements. Absorption is represented by black lines.

Go to <http://lasp.colorado.edu/home/education/K-12/project-spectra/> Scroll down and click on Graphing the Rainbow PDF under the "Student Handout" column. Read through the first page explaining how a spectrum is graphed and examples of the line plots showing different spectra. On the third page try and match the spectra in column A with the correct graph in column B.

Click back and then click on the "Flash Interactive" to the far right of the "Using Spectral Data to Explore Saturn and Titan" lesson. Click start after it uploads. On the next page is the Cassini Probe used to study Saturn and its moons, click on the enlarge link to enlarge the probe. Open a new window <http://lasp.colorado.edu/home/cassini/instrument/basic/> on your computer explore and answer:

- 1) What is the electromagnetic spectrum?
- 2) Explain what UV light is.
- 3) Explain in your own words what UVIS is and what it does.

Scroll down and pick two of the other instruments

- 4) Explain what the instrument of your choice is and what it does.
- 5) Explain what the instrument of your choice is and what it does.

Go back to Flash Interactive and watch each video and click through until you get to [Explore the Spectrum of Saturn's Rings and Titan's Atmosphere](#), click on Saturn's Rings, watch the video. Click continue and complete the interactive activity.

- 6) What was the gas in the Rings?

Click on Explore the Spectrum of Titan's Atmosphere, watch the video of Huygen's decent onto Titan, then click continue and go through the interactive activity.

- 7) What are the two elements in Range 1 and Range 2 of Titan's atmosphere?

Click through and then click start on the next page. Answer the 3 questions. Click on each question to get a link to a website to help answer the question.

- 8) Why is hydrogen so abundant in these spectra?
- 9) Why do you think nitrogen is present in the spectra from Titan but not in the spectra of Saturn's rings?
- 10) Using the tables on the interactive, compare and contrast the composition of Titan's atmosphere and Earth's atmosphere. What are some reasons why these differences might exist?