Southwestern Community College
EXPLORE YOUR PATH TO SUCCESS

Smoky Mountains STEM Collaborative

NASA Resources for Chemistry classes

For NC Chem. Obj. Chm.1.1 Analyze the structure of atoms and ions.

Lesson Plan: Science in a Box - The idea behind this guide is to bridge the gap between laboratory science research and the classroom and to expose students to the purpose and use of real space research. There is a standards matrix to help identify which activities such as investigating colloidal suspensions most meet your curriculum needs and interests.
https://www.nasa.gov/pdf/143714main_Science.in.a.Box.pdf

Lesson Plan: ELECTROLYSIS OF SALT WATER - "The Nature of Salt" is a good preparatory activity to acquaint students with the ionic bonds that occur between Na+ and Cl- ions.
https://aquarius.umaine.edu/activities/electrolysis.pdf

Lesson Plan: THE NATURE OF SALT - Students construct a model of a typical sodium chloride compound. Students can check their results by viewing the Naval Research Laboratory's 3-D interactive salt crystal lattice structure, found online at https://homepage.univie.ac.at/michael.leitner/lattice/struk/b1.html - They will need to download the JMOL Applet first. Activity website is: https://aquarius.umaine.edu/activities/nature_of_salt.pdf

Videos:

- **Launchpad: Neon Lights - Spectroscopy in Action -** Discover how scientists use spectroscopy to determine what elements are present in remote objects in space by studying emission or absorption lines.
  https://nasaeclips.arc.nasa.gov/video/launchpad/launchpad-neon-lights-spectroscopy-in-action

For NC Chem. Obj. Chm.1.2 Understand the bonding that occurs in simple compounds in terms of bond type, strength, and properties.

Lesson Plan: Lesson Plan: A BREATH OF FRESH AIR Lab Activity - One part of the Environmental Control and Life Support System on the International Space Station is production of breathable oxygen for the crewmembers. In this lab activity Students will learn about the electrolysis process that is used on the ISS to produce oxygen and will then perform their own electrolysis.
https://www.nasa.gov/audience/foreducators/mathandscience/research/Prob_BreathFreshAir_detail.html

For NC Chem. Obj. Chm.2.1 Understand the relationship among pressure, temperature, volume, and phase.

Lesson Plan: Density: Sea Water Mixing and Sinking - If you dissolve salt into the water, the salt will increase the fluid's mass, while its volume will remain the same. Thus, the liquid's density will increase. In the oceans, the salinity varies over time and from place to place. Students examine a Temperature-Salinity (T-S) Diagram and find the temperature and salinity for the two surface seawater samples. https://aquarius.umaine.edu/activities/density_SWmix_sink.pdf

Videos:

- **Launchpad: Phase Diagrams and Why You Cannot Make a Snowball on Mars:** Join NASA scientists who study the History of Winter to learn about phase changes and the unique properties of water. Find out why ice floats and why this is important to life on Earth. See what pressure and temperature have to do with making snowballs. https://nasaeclips.arc.nasa.gov/video/launchpad/launchpad-phase-diagrams-and-why-you-cannot-make-a-snowball-on-mars

Other Resources:

Mars Student Imaging Project - The Mars Student Imaging Project (MSIP) is inquiry-based and student-centered allowing students to create and investigate their own research question about the martian surface. The project is flexible and allows for many avenues of investigation that connect with the traditionally taught disciplines, such as Earth science, biology and chemistry.
http://marsed.asu.edu/content/about-msip

Water's Family Tree: Where Did it Come From? - This article explores the recipe for water: hydrogen (present in space from the earliest moments after the Big Bang), oxygen (spewing out from supernovae) and a mighty source of ignition (the explosion) to combine the two.
https://pmm.nasa.gov/education/articles/waters-family-tree-where-did-it-come

Designing a Spectroscopy Mission - This is a math-science integrated unit about spectrographs. Learners will find and calculate the angle that light is transmitted through a holographic diffraction grating using trigonometry. After finding this angle, the students will build their own spectrographs in groups and research and design a ground or space-based mission using their creation. After the project is complete, student groups will present to the class on their trials, tribulations, and findings during this process. The activity is part of Project Spectra, a science and engineering program for middle-high school students, focusing on how light is used to explore the Solar System.
http://lasp.colorado.edu/home/wp-content/uploads/2011/08/Designing_Spectroscopy_Mission.pdf