

# NASA Resources for 6th Grade Science classes

**For NC 6th Grade Sci. Obj. 6.P.1** Understand the properties of waves and the wavelike property of energy in earthquakes, light and sound.

- **Lesson Plan: Making Waves** - This interactive, online activity provides a method for generating waves using a computer. Students can select the energy they want the waves to have, observe how the waves appear on the screen, and then measure the frequency and wavelength of the observed waves.  
<http://amazingspace.org/resources/explorations/light/makewaves-frames.html>
- **Lesson Plan: Space Based Educator Guide** - Starting on page 23 there is background information on the electromagnetic spectrum plus activities such as building a simple spectroscope, projecting visible spectra, analyzing mystery spectra, a demonstration of the Doppler Effect and others. [https://www.nasa.gov/pdf/58277main\\_Space.Based.Astronomy.pdf](https://www.nasa.gov/pdf/58277main_Space.Based.Astronomy.pdf)

**For NC 6th Grade Sci. Obj. 6.P.2** Understand the structure, classifications and physical properties of matter.

- **Lesson Plan: Heat: An Agent of Change** - This science module is about heat and its effects on space flight. These 10 activities start with students reading the myth of Daedalus and Icarus, emphasizing their technological challenge. It then draws a parallel with the challenge of designing the Genesis spacecraft to prevent damage caused by heat.  
<https://genesismission.jpl.nasa.gov/educate/scimodule/heat/index.html>
- **Lesson Plan: Properties of Matter** - Students explore the conditions required for water to be in a liquid state. They discover that temperature is the essential variable. They then explore how temperature is not a measure of heat but of the average motion of molecules of a substance.  
<http://wayback.archive-it.org/5717/20140812010345/http://astroventure.arc.nasa.gov/teachers/pdf/AV-AstronoLesson-Part2.pdf>
- **Lesson Plan: Density** - Students explore the properties that allow objects and liquids to float and use this information to infer the composition of the Earth's layers. <http://wayback.archive-it.org/5717/20140812005418/http://astroventure.arc.nasa.gov/teachers/pdf/AV-GeoLesson-3.pdf>

**For NC 6th Grade Sci. Obj. 6.P.3** Understand characteristics of energy transfer and interactions of matter and energy.

- **Lesson Plan: Building a Thermometer** - Students will construct a soda-bottle thermometer, which is similar to the thermometer used by GLOBE schools. Both are based on the principle that most substances expand and contract as their temperature changes. This experiment also demonstrates the principle of heat transfer. <https://www.globe.gov/documents/348614/e28a888c-830f-484a-8997-a660a3d48fe1>

**For NC 6th Grade Sci. Obj. 6.E.1** Understand the earth/moon/sun system, and the properties, structures, and predictable motions of celestial bodies in the Universe.

- **Lesson Plan: The Solstices** - Compare near surface temperature at the time of the solstices in two different hemispheres. Find the maximum and minimum temperature for a given year. Compare temperatures to the area's solstice dates and Draw conclusions about the differences between the two hemispheres' seasons. [https://mynasadata.larc.nasa.gov/?page\\_id=474?&passid=62](https://mynasadata.larc.nasa.gov/?page_id=474?&passid=62)
- **Lesson Plan: Our Neighborhood in the Universe** - This can be used as an introductory engagement or an initial formative assessment activity, as students use stickers of celestial objects to create a Venn diagram classifying objects in our solar system, galaxy, and universe. <https://www.lpi.usra.edu/education/step2012/participant/neighborhoodUniverse.pdf>
- **Lesson Plan: Strange New Planet** - Students find out how human curiosity in planetary exploration results in science questions, engineering solutions, and teamwork. This activity demonstrates how planetary features are discovered by the use of remote-sensing techniques. [http://marsed.asu.edu/sites/default/files/stem\\_resources/Strange\\_New\\_Planet\\_MS\\_Lesson.pdf](http://marsed.asu.edu/sites/default/files/stem_resources/Strange_New_Planet_MS_Lesson.pdf)

**For NC 6th Grade Sci. Obj. 6.E.2** Understand the structure of the earth and how interactions of constructive and destructive forces have resulted in changes in the surface of the Earth over time and the effects of the lithosphere on humans.

- **Lesson Plan: Temperature, Pressure & Earth** - Students explore the effects of pressure on temperature and states of matter and use this information to infer the conditions of the interior of the Earth. <http://wayback.archive-it.org/5717/20140812004710/http://astroventure.arc.nasa.gov/teachers/pdf/AV-Geolesson-2.pdf>
- **Lesson Plan: Mystery Planet** - In this activity, students step into the shoes of real planetary scientists and explore crustal samples from a "Mystery" planet. Using sorting/classification, students will interpret the geologic history of a region from which a sample has been collected and make inferences about past life or the potential for life on the "Mystery" planet. [http://marsed.asu.edu/sites/default/files/stem\\_resources/Mystery%20Planet%20Lesson\\_0.pdf](http://marsed.asu.edu/sites/default/files/stem_resources/Mystery%20Planet%20Lesson_0.pdf)

**For NC 6th Grade Sci. Obj. 6.L.1.2** Explain the significance of the processes of photosynthesis, respiration and transpiration to the survival of green plants and other organisms.

- **Lesson Plan: Phytoplankton in the Gulf of Maine** - Use satellite data to explore and determine the correlation between sea surface temperature, sunlight, and the amount of chlorophyll(phytoplankton) in the Gulf of Maine at various times of year.  
[https://mynasadata.larc.nasa.gov/?page\\_id=474?&passid=88](https://mynasadata.larc.nasa.gov/?page_id=474?&passid=88)
- **Lesson Plan: What Factors Affect Macroinvertebrate Life in Big Darby Creek?** - Students use real data to identify trends and make predictions about the possible influence of climatic factors and vegetative growth on macroinvertebrates.  
[https://mynasadata.larc.nasa.gov/lesson-plans/?page\\_id=474?&passid=86](https://mynasadata.larc.nasa.gov/lesson-plans/?page_id=474?&passid=86)

**For NC 6th Grade Sci. Obj. 6.L.2** Understand the flow of energy through ecosystems and the responses of populations to the biotic and abiotic factors in their environment.

- **Lesson Plan: How Does the Earth's Energy Budget Relate to Polar Ice?** - Use satellite data to understand how the net flux of the radiation budget relates to the amount of ice present in the Northern Hemisphere. [https://mynasadata.larc.nasa.gov/lesson-plans/lesson-plans-middle-school-educators/?page\\_id=474?&passid=101](https://mynasadata.larc.nasa.gov/lesson-plans/lesson-plans-middle-school-educators/?page_id=474?&passid=101)

#### Videos:

- **Our World: Plants in Space** - Find out how plants use light to make their own food in a process called photosynthesis. See how NASA uses LED lights to help grow plants in space. Design your own plant growth chamber like the ones used by NASA.  
<https://nasaclips.arc.nasa.gov/video/ourworld/our-world-plants-in-space>
- **Real World: History of Winter - Abiotic Conditions** - Join scientists and teachers as they learn how to measure some of the abiotic conditions of winter. Find out about latent heat, low thermochrons can be used to collect data points and the importance of snow:water equivalents.  
<https://nasaclips.arc.nasa.gov/video/realworld/real-world-history-of-winter-abiotic-conditions>
- **Real World: Earth Systems** - Our Earth is a dynamic system with diverse subsystems that interact in complex ways. <https://nasaclips.arc.nasa.gov/video/realworld/real-world-earth-systems>
- **Why Scientists Study Plants in Space** - An agronomist on the space station plant research team explains how researchers are trying to find a way to simplify, yet maximize the growing of plants in space.  
[https://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Why\\_Scientists\\_Study\\_Plants.html](https://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Why_Scientists_Study_Plants.html)

#### Articles & Other Resources:

- **Tour of the Electromagnetic Spectrum Book** - This booklet introduces electromagnetic waves, their behaviors, and how scientists visualize these data. <https://smd-prod.s3.amazonaws.com/science-green/s3fs-public/atoms/files/Tour-of-the-EMS-TAGGED-v7.pdf>

- **Solar Week** - Solar Week, a week of online curriculum, games and activities about the Sun for grades 5-9, happens twice a year, approximately mid-to-late March and mid-to-late October. [Daily Facts, Games and Activities are available all year] <http://multiverse.ssl.berkeley.edu/Solar-Week>
- **NASA Global Climate Change Education Modules** - Modules that are based on NASA climate science and data. <https://esseacourses.strategies.org/module.nasa.html>