Space Science Lesson Plans
Please click on the blue to go to the site.

A. Jet Propulsion Laboratory (NGSS Engineering in the Classroom | NASA/JPL Edu)

1. Soda-Straw Rockets gr. 4-8 Students practice the engineering design process.
2. Modeling the Earth-Moon System gr. 6-8 Using an assortment of playground and toy balls, students measure diameter, calculate distance and scale, and build a model of the Earth-Moon system.
3. Moon Phases gr. 1-6 Students learn about the phases of the moon by acting them out.
4. Using Light to Study Planets gr. 6-11 Students will build a spectrometer using basic materials to observe the light emitted and absorbed by several source.
5. Graphing Sea-Level Trends gr. 5-12 Students use sea-level rise data to create models and compare short-term trends to long-term trends.
6. gr. 3-8 Students learn about Mars surface features and use their knowledge to create a Mars exploration game using the Scratch programming language.
7. Pi in the Sky 4 gr. 6-12 Students use the mathematical constant pi to solve real-world science and engineering problems related to craters on Mars, a total solar eclipse, a daring orbit about Saturn and the search for habitable worlds.
8. Feel the Heat gr. 4-12 Students design and build a solar hot water heater and see how big a temperature change they can get.
9. Whip Up a Moon-Like Crater gr. 1-6 Teacher uses baking ingredients to whip up a moon-like crater as a demonstration for students.
10. Hovering on a Cushion of Air gr. 3-8 Students construct CD hovercraft and apply Newton's Laws of Motion to make them work.
11. On Target gr. 6-12 Students modify a paper cup so it can zip down a line and drop a marble onto a target.
12. Planetary Pasta Rovers gr. 3-8 Using pasta and glue, students design a rover that will travel down a one-meter ramp and an additional one meter on a smooth, flat surface.
13. Looking for Life gr. 4-8 Students use research to develop an operational definition of life and then use the fundamental criteria for life to examine simulated extraterrestrial soil samples for signs of life.
14. Pixels on Fire gr. 4-8 Students use measurement and area skills to learn about remote detection of wildfires from space.
15. Solar System Bead Activity gr. 1-6. Students construct and where appropriate, calculate a scale model of the solar system using beads and string.
16. Lava Layering: Making and Mapping a Volcano gr. 5-8 Students learn about Earth processes by simulating and examining lava flows from a volcano model made of play dough.

B. NASA Wavelenght - A Full Spectrum of NASA Resources for Earth and Space Science Education (http://nasawavelength.org) (Click on “Go to Resource” for lesson plans.)

1. Elementary

1. What is a Year? Learners act out the motions of Earth as it orbits around the Sun over the course of one year, starting with modeling one day, then one year, and finally the months.

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2. What Color is the Sun? This comic explores questions relating to colors of light from the Sun.
3. Kinesthetic Astronomy Learners act out the rotation and revolution motions of Earth around the Sun over the course of one year.
4. Powering the Satellite Learners first use computers to research and learn how solar panels convert sunlight into electricity. (Part of MMS Mission Educator's Instructional Guide)
5. Project Summary MMS Tic-Tac-Toe Learners choose and complete three activities about the MMS mission. (Culminating lesson in the MMS Mission Educator's Instructional Guide)
6. Searching for the Sun This is an activity about sunlight as an energy source.
7. Reasons for the Seasons This is an activity about seasons.
8. Think Scientifically: Adventures in the Attic This is a book about seasons in which learners will read or listen to a story about two twins who are tasked with creating a model of the Earth-Sun system for a science fair project.
9. Think Scientifically: The Day Joshua Jumped Too Much This is a book about the importance of the Sun's energy as it relates to its impact on the Earth's environment. Learners read or listen to a story about a young boy who finds out that the Sun provides the Earth with energy in the form of light and heat, which is necessary for all forms of life, for maintaining Earth's environment, and for allowing humans to produce their own forms of energy.

2. Middle School

1. Solar Week Friday: How Well Do You Know Our Scientists? This is a scavenger hunt game to acquaint learners with Solar Week female scientists and their backgrounds.
2. Model of the MMS Satellite In this lesson, learners will construct a 3D scale model of one of the MMS satellites.
3. Design Challenge - Deploying the Satellites' Antennae This is an activity about using models to solve a problem.
4. Design Challenge - Arrangement in Space This is an activity about using models to solve a problem.
5. Introduction to Magnetism This is an activity about magnetism.
6. Introduction to Magnetic Fields This is an activity about magnetic fields.
7. Electricity and Magnetism This is an activity about electromagnetism and the Sun.
8. Magnetic Fields of the Earth and Sun This is an activity that compares the magnetic field of the Earth to the complex magnetic field of the Sun.
9. Understanding the Sun In this activity, learners use the online Space Weather Media Viewer to research answers to a set of questions about space weather, solar flares, coronal mass ejections, and sunspots, and explain their impact on Earth and how Earth's magnetosphere serves to protect our planet.
10. In the News This is an activity about challenges that humans face in future space travel as analyzed through news articles highlighting discoveries about the Sun.

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11. Take the MMS Challenge This is a challenge-based activity set designed to have students explore and research the Magnetospheric MultiScale Mission (MMS).

C. Space & Astronomy Lesson Plans - (www.teach-nology.com/teachers/lesson_plans/science/astronomy)

1. Exploring Planets in the Classroom gr. K-12 25 hands-on science activities are provided in classroom-ready pages for both teachers and students for exploring Earth, the planets, geology, and space sciences.
2. How Astronauts Suits Have Changed gr. 6 Students learn about the improvements made to Astronaut's Space Suits over the years.
3. Objects in Our Solar System gr. 4 Students have an understanding of the main components of our solar system and how they interact.
4. Planet Brochures gr. 6 Students become more familiar with the other planets in our Solar System (size, color, distance from the Sun, distance from Earth, etc).
5. The Earth and its Moon gr. 4 Students understand that the Earth rotates once each day on its axis, this is cause of night and day.
6. The Sun gr. 3 We are going to use our Safe "sun" glasses experiment to view the sun but not actually look directly at it.

D. Activities for the Classroom :: NASA Space Place (Need to download Adobe Reader.)

1. Make a Pinhole Camera - Students make their own pinhole cameras from a pattern given in the activity article.
2. Evil-doer or Do-gooder: Getting the Goods on Ozone - Students build a spectroscope from poster board, construction paper, and using a CD or DVD as the diffraction grating.
3. Designing for the Barely Imaginable - Students are ask to imagine and describe an alien world, then design a pretend mission to explore that world, and give the results!
4. The Abracadabra of Engineering: Strong Structures from Flimsy Materials - Students build a strong, simple truss model using plain paper and string.
5. Designing Nature's Way - Using artificial evolution, students create a perfect, tiny antenna for some tiny satellites.
6. Teaching Machines to Think Fuzzy - Explains the difference between how humans think and how machines think. Humans understand complex problems with seemingly unquantifiable parameters, then manipulate the input parameters to come up with a probable solution. If that doesn't work, they take the less-than-perfect result as a new input and tweak the answer some more until satisfied with the result. This article and activity show how you could teach a computer--or a robot--to solve problems that way.
7. Rising Above the Problem - Students think about how very high-resolution images of Earth from space might be used, and about the political and economic aspects of studies using this type of data.
8. Solve the Mystery of the Gases! - Students play some gas identification games that help them understand how spectrometers work, using both ordinary light and lasers.

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9. Packing for a L-o-o-o-ng Trip to Mars - Students decide what they will need to take on a 2-1/2 year journey to Mars and plan how to fit everything into a 1-cubic-meter box, using only a measuring tape, pencil and paper, and math.
10. Keeping Nine Eyes on the Weather - Students build and demonstrate a simple working model of an Earth-orbiting instrument that scientists are using to study the atmosphere and the pollutants that could be contributing to global warming.
11. Put Your Own Spin on Technology - Students understand how technologies developed for space can be used to create beneficial new products and materials for everyday life.

E. Steve Spangler Science Experiments – The Lab - Various hands-on activities and demonstrations.