

Free Innovative Science Resources to Engage Student Learners



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<http://www.csusm.edu/cyberteam/> & <http://www.csusm.edu/iquest>

Physical Science Resources

Scratch

<http://scratch.mit.edu/>



Scratch allows students to be 21st Century learners and become digital citizens. Students create and share projects, as they learn important mathematical and computational ideas, think creatively, reason systematically, and work collaboratively. Through collaborations, investigations and product development, they learn real world skills and become interested and engaged in technology supported science activities. Hands-on experiences lead to deeper understanding and application of science concepts. This photo shows iQUEST students working with Scratch software to develop projects related to elements.

Roller Coasters

<http://www.funderstanding.com/coaster>



This simulation allows students to apply physics concepts through an interactive Web application. Students design their own roller coaster and, as designers, they set the height of three hills, the size of a loop, the initial speed of the coaster, its mass, the gravity at work and the amount of friction on the track. A free java-enabled browser is required. There is help available to students by clicking on a ? button next to each setting tool bar. Another roller coaster site maintained by the Annenberg Foundation is called Amusement Park Physics, located at <http://www.learner.org/interactives/parkphysics/coaster/>

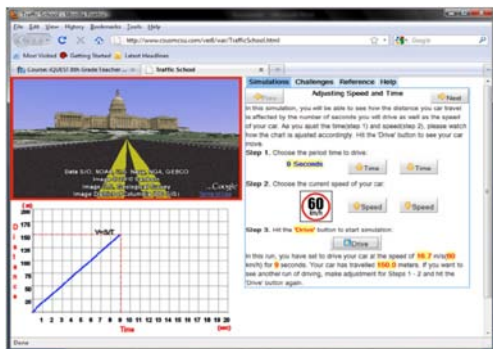
Energy Skate Park

phet.colorado.edu/simulations/sims.php?sim=Energy_Skate_Park



Explain the Conservation of Mechanical Energy concept using kinetic and gravitational potential energy. Students can learn about the conservation of energy with a “skater dude!” They can build tracks, ramps and jumps for the skater and view the kinetic energy, potential energy and friction as he moves. They can also take the skater to different planets or even space! The teacher's guide contains tips for teachers created by the PhET team.

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iQUEST Driving Simulation

<http://www.csusmcsu.com/ver9/war/TrafficSchool.html>

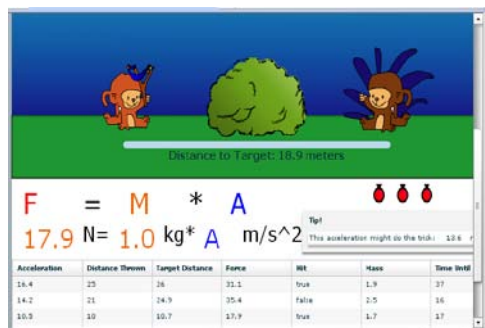
The Driving Simulation was created to capture 8th grade students' interest in driving. Students are engaged in discovery learning as they investigate relationships among speed, time, and distance. The application simulates the driving experience through Google Earth Browser Plug-in as it puts students "on the road." The application enables students to assess their understanding of force and motion as they solve various challenges for speed, time, and/or distances.



Physical Process: Forces

http://www.bbc.co.uk/schools/ks2bitesize/science/physical_processes/forces_action/play.shtml

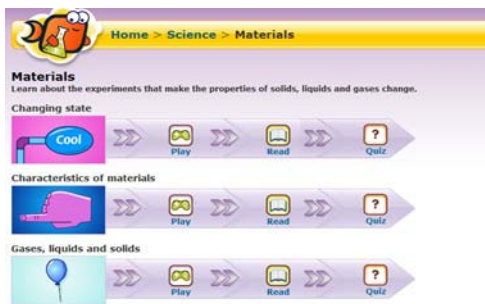
On this interactive site, students explore; gravity, mass and weight, balanced forces, and unbalanced forces. They can experiment with variables and record their observations. The site also includes html code to put the activities on your blog or website. The site is maintained by the British Broadcasting System.



Water Balloon for Newton's 2nd Law

<http://projects.cs.csusm.edu/techquest/balloon/balloon.swf>

This game allows students to investigate relationships among force, mass, and acceleration. With six chances to hit the target with a water balloon sling shot, the activity relates to fun adolescent experiences. Performance is recorded to allow class discussions on the underlying physics. This game was field-tested in 8th grade classrooms and revised based on student and teacher feedback.



Materials: Changing states, Solids, Liquids, and Gases

<http://www.bbc.co.uk/schools/ks2bitesize/science/materials/>

On this interactive site, students have multiple opportunities to explore the states of matter. They can experiment with variables and record their observations. The site also includes html code to put the activities on your blog or website. The site is maintained by the British Broadcasting System.

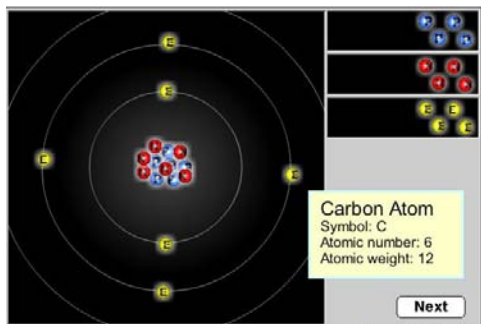


Chemistry: The pH Factor

<http://miamisci.org/ph/>

Students are involved in virtual explorations as they investigate acids and bases. The site is organized around Seven E's: Excite, Explore, Explain, Expand, Extend, Exchange, and Examine. The Es can be used in chronological order or provide stand-alone activities. Each E contains an interactive screen for students to use, as well as lesson plans for teachers. The site is maintained by the Miami Museum of Science.

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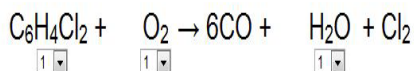


Exploring Earth: Build Atoms Yourself

http://www.classzone.com/books/earth_science/terc/content/investigations/es0501/es0501page04.cfm

In this interactive model, students construct atoms of different elements from a collection of subatomic particles. There is a brief tutorial on how the model works. Then students can drag protons, neutrons and electrons to create a Bohr model of various atoms. This program requires the free Macromedia Shockwave Player.

Balance this equation!
(Equation number 1 of 10)

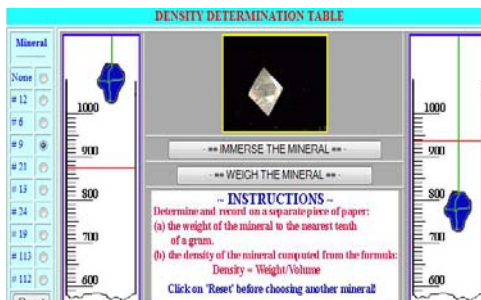


Check my answer!

It's Elemental - Balancing

Act <http://education.jlab.org/elementbalancing/index.html>

In this interactive game, the computer gives students incomplete chemical equations. They can choose the number of equations they want to solve and the level of difficulty. They balance the chemical equations by selecting coefficients from the pull-down menus. Once they think the equation is balanced, they press the 'Check my answer!' button. Other games are available on the site. A JavaScript enabled web browser is required (free).



Virtual Density Testing Lab!

http://academic.brooklyn.cuny.edu/geology/leveson/core/graphics/density/density_sim3.html

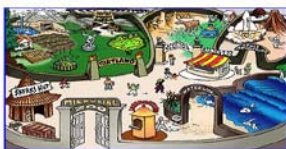
On this interactive site, students measure the density of an unknown mineral. They submerge the mineral in a virtual graduated cylinder of water and they measure the mass of the mineral on a virtual triple beam balance.

Life Science Resources

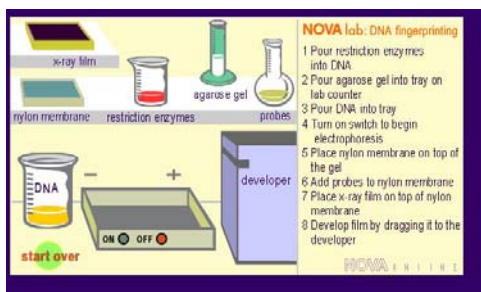


The Microbe Zoo

<http://commtechlab.msu.edu/sites/dlc-me/zoo/>



Students explore the world of microbes that live in nature and are represented in this "zoo." Students can explore the Animal Pavilion, Dirtland, The Snack Bar, Space Adventure and Water World. The Microbe Zoo is part of an NSF project at Michigan State University.



DNA fingerprinting Simulation

<http://www.pbs.org/wgbh/nova/sheppard/analyze.html>

On this site students gather DNA evidence to solve a mystery. They explore how DNA fingerprints are created and use a fingerprint to identify the culprit of a crime. There is also a link to the "DNA Workshop form Science Odyssey, a NOVA production (free Shockwave plugin required).

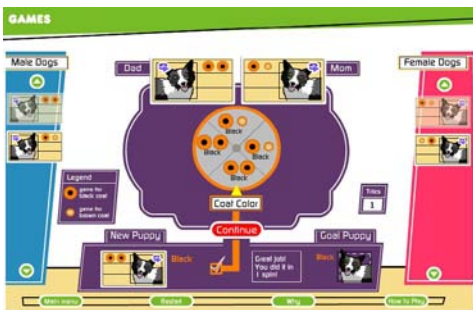
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Interactive Body

www.bbc.co.uk/science/humanbody/body/index_interactivebody.shtml

This interactive site contains information, games and challenges about the body's organs, muscles, skeleton, nervous system and puberty to increase student understanding of their relationships. The games require Flash 5 and take 5-10 minutes each. This site is maintained by the British Broadcasting Company.



Dog Breeding

http://pbskids.org/dragonflytv/games/game_dogbreeding.html

On this site students try to breed a dog with specific traits using Punnett squares. There are three levels using one genetic trait and three more levels that use multiple genetic traits. The site is maintained by PBS's Dragonfly TV.

CLICK AND CLONE



Click and Clone

<http://learn.genetics.utah.edu/content/tech/cloning/clickandclone/>

On this site students use an interactive cloning simulation to clone a mouse! They isolate donor cells, remove and discard the nucleus from the egg cell, transfer the somatic cell nucleus into the enucleated egg cell, stimulate cell division and implant the embryo in the surrogate mother. Finally, they deliver the baby mouse clone.



Parks Online Resources for Education

<http://www.ports.parks.ca.gov/>

California State Parks PORTS program provides teachers and students with complete units of study and live videoconferences. PORTS allows rangers to look directly into the eyes of children and engage them in conversation as the students sit in their classrooms and study science, history, language arts and other academic content standards. This program allows student access to park experts regardless of their geographic location or economic status.



Environmental Kids Club

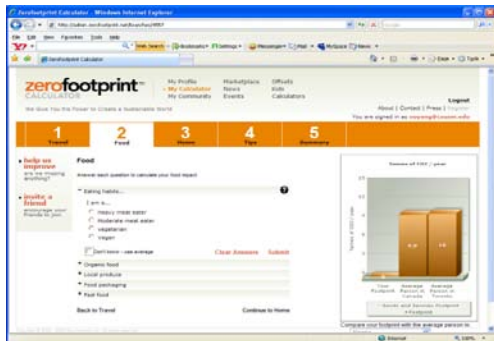
<http://www.epa.gov/kids/>

The U.S. Environmental Protection Agency has developed interactive games and visualizations for kids to learn more about climate change that are related to human choices. The image shown to the left is a global warming movie that illustrates greenhouse gases. Such resources allow teachers to bring high quality scientific presentations into classrooms and expose students to national organizations.

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Carbon Footprint Calculator

http://www.zerofootprintkids.com/kids_home.aspx

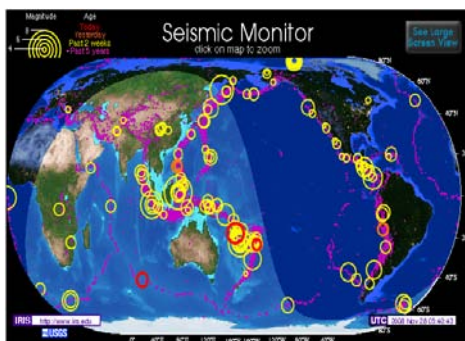


The Zerofootprint's vision is to engage communities around climate change using technology. Students can use the Carbon Footprint Calculator developed by Zerofootprint to investigate how their choices in travel, food, and home living impact the environment. The web site also supports classrooms in the creation of online communities of their own, where members of each community can compare their footprints and engage in discussions on various topics of their own interest.

Earth Science Resources

IRIS Seismic Monitor

<http://www.iris.edu/dms/seismon.htm>



This site can be used to help students understand the patterns formed by recent earthquake movement all over the Earth. Links under the map provide access to instructions for optimum use of the site. Students can zoom into an area to analyze data more closely. The color-coding of the chart provides information to further explore details. A news link provides additional information for further exploration.

U. S. Geological Survey: Volcanoes Hazards Program

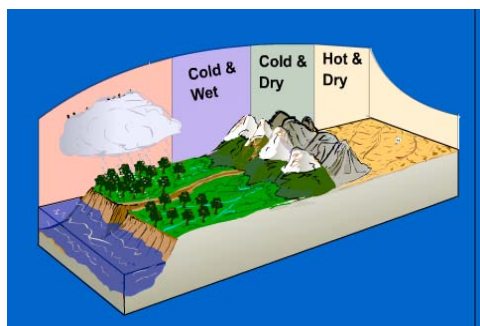
<http://volcanoes.usgs.gov/>



Students can use this site to find out about recent volcanic activities around the world. Real-time images of several U.S. volcanoes are available through Web cams. Links to U.S. volcano observatories provide additional resources. In particular, each observatory collects and archives its own images to provide a basis for comparison. Maps, graphics, images and text on this website are public domain.

Physical Geology Animations

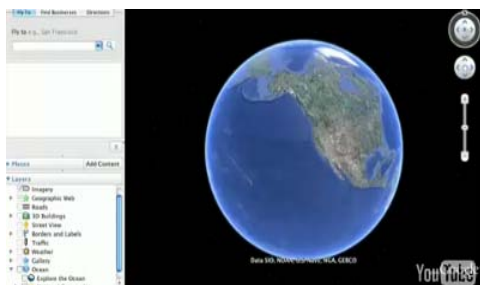
<http://www.uky.edu/AS/Geology/howell/goodies/elearning/>



This site provides links to interactive Flash animations and exercises that cover topics including characteristics and types of rocks, rock cycle, minerals, plate tectonics, faults and folds, Earth structure, and weathering. The image shown left is the first of a 12-step animation illustrating physical and chemical weathering. Students can control the progress of module activities based on their interest and need.

Google Earth Download: <http://earth.google.com/>

Google Earth Lessons: <http://www.gelessons.com/lessons/>



Search for Lessons by Content Area. Sample lessons under science include titles such as Exploring Hurricane Dean in Google Earth, Climate Change and Endangered Planet. Customized tours can be created and saved in KMZ format. The CyberTEAM project has developed tours related to Earth Science (available on the project Web page).

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CyberHawk Adventure

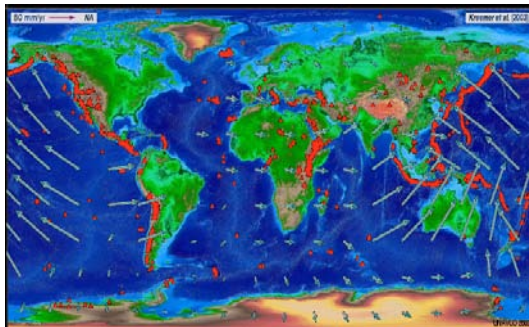
<http://www.csusmcsu.com/anzaborrego/>



The CyberHawk Adventure, a virtual exploration of the Anza-Borrego Desert State Park, was developed by the CyberTEAM project. It supports standards for science through investigations into the geologic features, habitats, and resources found in the Anza-Borrego Desert. Students visit eight stations, navigating their hawk through the desert to view pictures, answer questions, and keep a notebook of their findings as they earn points. Supporting activities and points of interest were provided by California State Parks Rangers. Requires Google Earth free plugin.

Jules Verne Voyager Jr. Earth

<http://jules.unavco.org/VoyagerJr/Earth>



This interactive map supports the study of global-scale geodynamic processes. A base map can be selected, features can be added and velocities can be overlaid using the options at the top of the screen. Features such as volcanoes, plate boundaries, and earthquakes can be explored. Click on the **Make Changes** button to activate your selections.

Web 2.0 Links:

Bubbl.us: concept Mapping. <http://bubbl.us/>

Zoho Show: create, edit and share presentation online. <http://show.zoho.com/>

Google Docs: collaborative word-processor and document sharing. <http://docs.google.com>

YouTube: <http://www.youtube.com/>

Videoconferencing Links:

CILC database of VC links: http://www.cilc.org/c/education/videoconferencing_site_directory.aspx

CAHSN (CA High Speed Network, KIDS Program: <http://www.k12hsn.org/conferencing/training/kids.php>

Visualization Workshop Links and lessons by Russ Bird: <http://sites.google.com/site/8thgradesimulations/>



Presenters

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