



**EDUCATION**

**Climate Through the Ages**

When you're up to your floorboards in floodwater, the weather next year or next century isn't very important. But climatologists have to take the long view to decipher past changes and predict the human impact on future climate. The Climate Time Line Information Tool introduces students and the public

to the study of long-term patterns in temperature and precipitation, helping them understand issues such as the debate over global warming. "There are a lot of misunderstandings about climate change out there," says site co-author Mark McCaffrey of the National Geophysical Data Center in Boulder, Colorado.

Using a powers-of-10 approach, the site explores variability on time scales ranging from daily to 100,000 years. Each unit describes scientific findings about climate variation at that scale and discusses how such changes might have influenced human history or evolution. For example, the 1000-year section considers whether a protracted drought in the Southwestern U.S. led to the demise of the Anasazi civilization about 700 years ago. Backgrounders cover topics such as the "paleo proxies" used to infer past climate, including ice cores and tree rings. The sections wrap up with a handy page of links and questions for further investigation. Students can also access data sets, like 30 years of weather records for major cities. The site is still under development, McCaffrey says, and he welcomes suggestions.

[www.ngdc.noaa.gov/paleo/ctl/index.html](http://www.ngdc.noaa.gov/paleo/ctl/index.html)

**LINKS**

**Emergency Bioterrorism Kit**

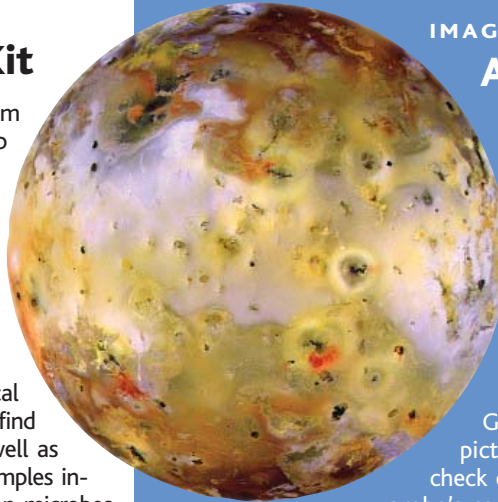
This new cache of bioterrorism resources from the National Academy of Sciences won't help catch last fall's anthrax killer, but it might help prevent illnesses and deaths from future attacks. The site is loaded with annotated links, from treatments to training courses, aimed at "first responders"—paramedics, emergency room doctors, police, and others who would probably be the first to deal with victims of a biological attack.

Although the collection focuses on practical advice, researchers and policy-makers can also find information about potential bioweapons as well as evaluations of our preparedness for attack. Examples include University of Minnesota backgrounders on microbes that could be "weaponized," such as the botulism bacterium and smallpox virus, and an account of an exercise 2 years ago that simulated an assault on Denver with bubonic plague, leaving a virtual death toll of more than 100.

[bob.nap.edu/shelves/first](http://bob.nap.edu/shelves/first)

**IMAGES**

**Adieu to Io**



Jupiter's moon Io has a complexion even Clearasil couldn't help: pock-marked and stained with cream, purple, and orange splotches. These blemishes excite astronomers because they're caused by some 120 volcanoes spewing sulfurous lava, making Io the most volcanically active place in the solar system.

After observing Jupiter and then detouring to Io nearly 3 years ago, NASA's Galileo spacecraft has snapped its last pictures of this turbulent moon. You can check out the final haul of images here. The probe's cameras have discovered scores of new volcanoes—13 craters in one recent flyby alone. The data have also raised plenty of puzzles for planetary geologists to mull, including how nonvolcanic mountains arise on a world without plate tectonics. Running short on fuel and toasted by radiation, Galileo will circle Jupiter once more before diving into the planet's atmosphere in September 2003.

[galileo.jpl.nasa.gov/images/io/ioimages.html](http://galileo.jpl.nasa.gov/images/io/ioimages.html)

**DATABASE**

**Gateways to the Plant Cell**

Plant cells slurp up iron, calcium, potassium, and other goodies through transporter proteins that span the cell membrane. Plants produce a profusion of these proteins. For example, the mustard *Arabidopsis* boasts more than 1100 transporter genes constituting nearly 10% of all its genes.

Researchers trolling for information on the sequences, functions, and phylogenetic relationships of these vital proteins should visit PlantsT, a year-old database of plant and yeast transporter genes run by the San Diego Supercomputer Center. PlantsT holds data on more than 60 plant species, many of them farm and garden staples such as rice, corn, peas, petunias, and spinach. Entries provide the protein's length, weight, sequence, and what's known about its activity, along with genetic maps and references. Users can also sort through the data by gene family or add their own contributions.

[plantst.sdsc.edu](http://plantst.sdsc.edu)

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