

# Earthteaching News, Winter 1999

## Earthteaching News

from the University of Wisconsin-Madison Arboretum

Earth Partnership for Schools Program

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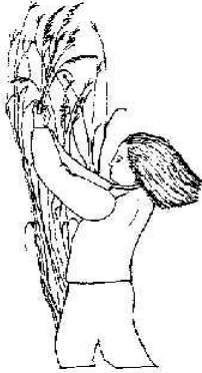
### From Field Observations to Data Analysis:

#### Making the Leap with *TableTop* Software

Bridging the gap between primary observation and numerical analysis is a critical step in our understanding of the world around us. This challenge is inter-disciplinary, including subjects such as social studies, mathematics, and science. It is found at all grade levels, from elementary through graduate studies. Also, current academic standards repeatedly emphasize the importance of data collection and analysis.

In the contemporary research and business world, modern database and spreadsheet computer programs have greatly facilitated data analysis by providing flexible methods for data entry, and the ability to rapidly manipulate the data in a variety of ways, including through the generation of graphs. As the use of computers in our society grows, it becomes increasingly important for us to bring their use into the classroom.

Perhaps the greatest value in incorporating computer aided-data analysis into the classroom is the opportunity to help students see the relationship between what they *observe* with their eyes and what they can *learn* through the analysis of data that they have collected. Without the use of a computer, the organization, mathematical manipulation, and subsequent graphing of data can quickly become a long and onerous process. By the end, it is easy to have lost the original "intuitive sense" of the data. It is also likely that this initial analysis will reveal further ideas of how the data should have been analyzed, however, because the prospect of going back and starting over with the raw data is frequently too much to face, we make do with what we have. Through the use of a computer, such changes are much easier to make and "playing with the data" is encouraged.



## Enter *TableTop*<sup>™</sup>

As useful as standard computer database and analysis programs are, it is still a daunting task to bring them into classroom use. In addition to being expensive and frequently requiring higher priced hardware, the functioning of such software is frequently not user friendly and requires extensive training. Luckily, TERC, a nonprofit science education program based out of Boston, has developed *TableTop*<sup>™</sup> as a user-friendly database-spreadsheet-graphing software package for K – 12 student use.

While *TableTop*<sup>™</sup> provides many of the features of standard data analysis software, it has its unique aspects as well. Throughout the program, the commands are presented in an intuitive, friendly manner, and the graphing functions are intentionally inviting and playful, encouraging the process of looking at the data in "just one more way." The user is presented with the opportunity of easily switching from X-Y axis graphs, to Venn diagrams, to bar graphs with a click of the mouse. While making changes in the graphs, you can watch the data-points shift positions on the screen.

If you are already using some other data analysis software, *TableTop*<sup>™</sup> makes it easy to export or import your data. It is also possible to customize *TableTop*<sup>™</sup> for your specific needs. In addition to *TableTop*<sup>™</sup>, there is also *TableTop Jr.*<sup>™</sup> which is tailored for the K – 6 classroom. This version focuses more on the basic concepts of graphing and data analysis, and is exceptionally inviting and fun. Both versions come with excellent operating manuals, supplementary curriculum materials, and a teachers guide.

## *TableTop*<sup>™</sup> in the School Prairie: An Example

Any of the activities associated with ecological restoration involve data analysis and manipulation, and we are finding *TableTop*<sup>™</sup> to be very useful for this purpose. Uses range from the initial analysis and mapping of the site, to designing seed mixes, and analyzing and tracking the development of the resulting planting.

In a recent teacher workshop, we analyzed a portion of the vegetation in a two-year old prairie at Savanna Oaks School in Verona, WI. Our experience provides a good example of the potential for *TableTop*<sup>™</sup>. The participants in the workshop identified all of the species in ten randomly located quadrats. These were defined by the space inside Hoola Hoops which had been tossed high into the air to ensure randomization. The presence or absence of each species found in each quadrat was easily entered into *TableTop*<sup>™</sup> along with corresponding background information such as whether it is "Native or Exotic," and an "Invasiveness Index." This index ranks each species from zero to four. The higher the ranking, the more aggressive (or weedy) the species.

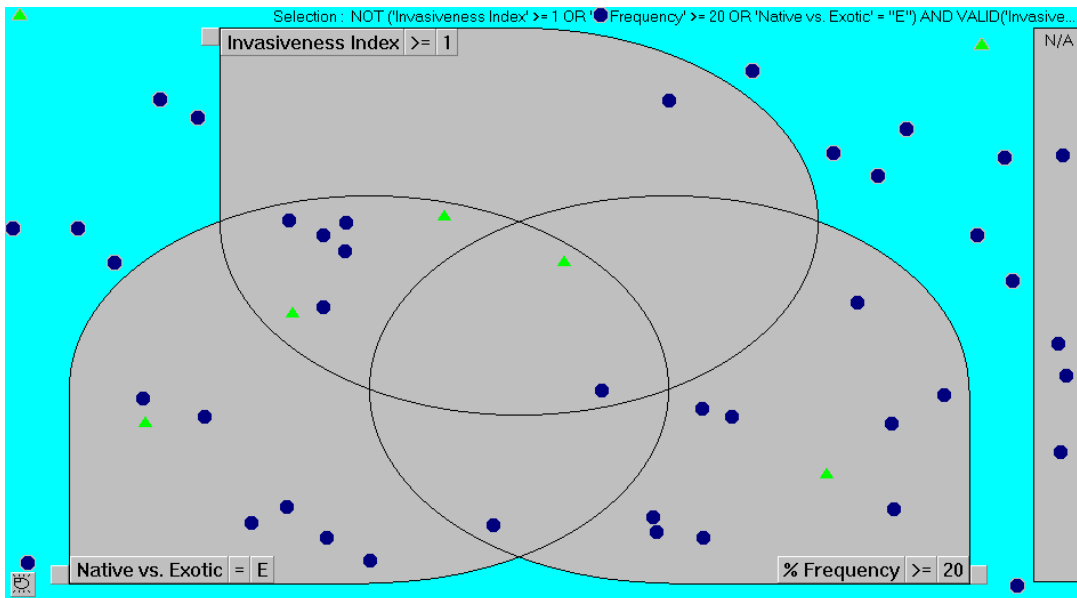
The accompanying table shows a portion of the data, and the graph shows a *TableTop*<sup>™</sup> generated Venn diagram with three circles. The upper circle contains all of the species which have an Invasiveness Index greater than or equal to one; the lower left circle contains all of the species which are exotic (not native) to this area; and the lower right circle contains all of those species which had a frequency of 20% or more at the site. As you can see, there are several species which have one or more of these properties, and are thus within one or more circles at the same time. One of the indications from this graph is that there are certain species which are exotic, at least somewhat invasive, and are present in 20% or more of the quadrats sampled. Given this set of characteristics, we can conclude that these species may end up being problems in this planting.

Common Name	Family	Exotic vs. Native	Invasiveness Index	% Frequency
Annual RyeGrass	Grass	E	0	0
Bergamont	Mint	N	0	0
Big Bluestem	Grass	N	0	10
Black-eyed susan	Daisy	N	0	0
Blazing star	Daisy	N	0	0
Blue vervain	Vervain	N	0	0
Brome Grass	Grass	E	4	10
Bull thistle	Daisy	E	2	10
Burdock	Daisy	E	2	0
Canada thistle	Daisy	E	4	10
Canada wild rye	Grass	N	0	20
Chicory	Daisy	E	0	0
Common boneset	Daisy	N	0	10
Common milkweed	Milkweed	N	0	0
Common rag weed	Daisy	N	0	50
Compass plant	Daisy	N	0	20
Cotton wood	Willow	E	3	20
Cup-plant	Daisy	N	0	10
Curly dock	Milkwort	E	0	10
Daisy fleabane (spp.)	Daisy			0
Dandelion	Daisy	E	0	10
Evening primrose	Evening	N	0	30

	Primrose			
Fox tail	Grass	E	1	100

**Portion of the data collected at Savanna Oaks School in Verona, WI.** All species present in randomly selected quadrats were recorded. Information entered later included "Family," "Exotic vs. Native," and an "Invasiveness Index" for each species. "% Frequency" indicated in how many of the 10 sampled quadrats the species were present.

There are other characteristics of these species in this database which are not shown in this graph, including plant family, time of flowering, and wildlife attractability. By graphically comparing the associated data through *TableTop* it is possible to study, and come to a greater understanding of the dynamics of this restoration planting.



**Venn Diagram of Savanna Oaks School Data.** Diagrammatic representation of the overlap of three characteristics of species sampled. The dots (forbs) and triangles (grasses) represent: all species which are exotic (lower left circle), frequency of 20% or more (lower right circle), or have an Invasiveness Index of one or more (upper circle). The spaces within the circles' intersections represent species that contain two or more of the characteristics.

## Availability of *TableTop*™

*TableTop*™ is marketed by Broderbund Software (500 Redwood Boulevard, Novato, CA 94848, [www.broderbund.com/education](http://www.broderbund.com/education), 1-800-474-8840). An individual copy of *TableTop*™ (including *TableTop Jr.*™) is currently \$99.95, while a "lab pack" is \$199.95.

## Winter Resources

Every so often someone asks, "What can we do on the prairie in the winter?" In the classroom, students can begin growing prairie plants for a spring planting or design a prairie species seed mix. In the schoolyard, students can study winter taxonomy, animal tracks, insect activity in the winter, and perform cold weather field experiments. The following books will help you explore and learn about your schoolyard in the winter.

*A Guide to Nature in Winter* by Donald Stokes, 1976, Little, Brown and Company, ISBN 0-316-81723-6.

This guide discusses fascinating discoveries students can observe in winter and consists of eight small field guides covering animal tracks, snow, birds, evidence of insects, winter trees, weeds and wildflowers, and mushrooms.

*A Guide to Wildflowers in Winter* by Carol Levine, 1995, Yale University Press, ISBN 0-300-0560-4.

Students can identify plants in winter with this beautifully illustrated field guide. Many plants have distinguishing features in winter making plant identification a year round activity.

*Winter: An Ecological Handbook* by James Halfpenny and Roy Ozanne, Johnson Publishing Co., ISBN 0-555-66036-3. Learn about winter ecology, plant, animal, and insect survival strategies, and cold-weather adaptations. Students can try out several of the suggested winter field experiments in their schoolyard.

## News and Events

### Integrating a Prairie Fire into Education 1999 Continuing Education Conference

April 17, 9:30 a.m. to 3:30 p.m.

Experience a real-life prairie fire (weather permitting) and practice activities your students can use at school prairie burns such as "*Prescription for a Prairie Burn*," where students learn what weather conditions are needed for a prairie fire. Investigate with "*Prairie Observations*," an activity where students record and monitor change before, during, and after a fire. Conduct "*Snap, Crackle, and Pop*," a research activity where students set out burn tags with heat sensitive paints to see how hot a prairie fire burns at different heights. Learn how fires affected early pioneers and why fires are beneficial for the prairie.

Call (608) 262-9925 or e-mail [epp@macc.wisc.edu](mailto:epp@macc.wisc.edu) to reserve a space. Open to all teachers.

*Preapproved for equivalency clock hours.*

## 1999 Native Landscaping Conference

Saturday, March 20, 9 a.m. to 4:15 p.m.

The UW-Madison Arboretum and Wild Ones (Madison Chapter) are co-hosting Native Landscaping Conference at the Memorial Union on the University Campus. This year's keynote speaker is Neil Diboll, Ecologist and President of Prairie Nursery, with an honorary guest appearance by Lorrie Otto, native landscape activist and founder of Wild Ones. Neil will talk about *Ecology and Gardening—Partnership for the Future*. The focus of Neil's presentation will be on the historical aspects of people's relationships with the earth, in particular our gardens.

This year concurrent sessions are grouped into the following four themes:

- 1) restoration for beginners—site analysis, design, and implementation;
- 2) management—how to diversify and enrich your site, controlling weeds, and management with or without fire;
- 3) ecosystems—how to restore prairies, woodlands and savannas, or wetlands;
- 4) special interests—fern propagation, attracting butterflies, and phenology (the study of the occurrence of natural events).

Push winter doldrums aside and step into spring at the Native Landscaping Conference on March 20th.

Call **263-7888** for registration information. Cost: \$22.00 (Member of the *Friends of the Arboretum* \$20.00).

***Preapproved for equivalency clock hours.***

## Sea World-Busch Gardens Environmental Excellence Awards Available to

### School-based Restoration Projects

Environmental Excellence Awards from the Anheuser-Busch Adventure parks recognize outstanding efforts of students across the country who are working to protect and preserve the environment.

Previous award winners planted native gardens in their schoolyards, restored local river banks, or monitored wildlife populations as they enhanced a woodland.

Awards for \$10,000 are given to ongoing projects developed by January 29, 1999. Projects should offer creative solutions to environmental problems where students are actively involved in all phases and demonstrate a significant environmental and educational impact.

Deadline for submitting applications is January 29, 1999. Call (407) 363-2389 for an application or connect to [www.seaworld.org](http://www.seaworld.org) on the World Wide Web.



## **International School Grounds Day**

**May 7, 1999**

Join school communities around the world in celebrating the schoolyard as an exciting educational resource. Post your event at: [www.nwf.org/habitats/isgd](http://www.nwf.org/habitats/isgd) or [www.gbr.org/school/postit](http://www.gbr.org/school/postit).



## **Adopt-A-Watershed's Leadership Institute**

**July 24-31, 1999, Bend, Oregon**

Adopt-A-Watershed invites you to apply for their 1999-2000 Leadership Institute which provides skills to lead the implementation of Adopt-A-Watershed. The Institute offers professional development on how to engage K-12 students in watershed curriculum based on national science standards. It is applicable to the local environment and emphasizes field studies, restoration projects, service learning and reflection. It also provides training in program sustainability such as fund-raising, partnership development and curriculum adaptation.

The Institute selects teams made up of two teachers, one community coordinator, and preferably a faculty member in a local teacher preparation program. The institute consists of eight days of training during the summer, a four-day follow-up retreat in the spring, four days of on-site professional development workshops, and ongoing support throughout the year.

Applications are available for the 1999-2000 session and can be obtained by **email at [aaw@Adopt-A-Watershed.org](mailto:aaw@Adopt-A-Watershed.org)**, calling Carol Dawes at 530/628-5334, or by FAX: 530/628-4212.

Earth Partnership teachers who are interested in applying to Adopt-A-Watershed should contact us for collaboration opportunities.

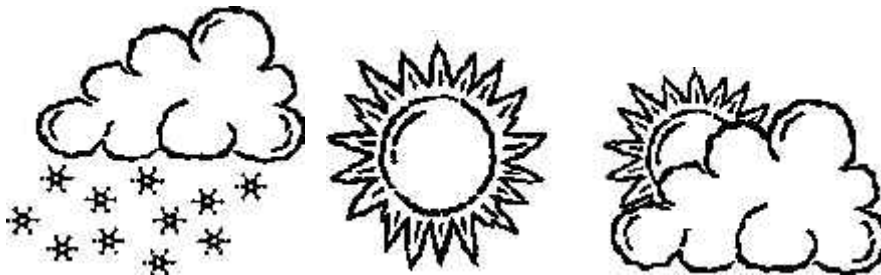
## **River of Words National Environmental Poetry & Poster Contest for Students**

The River of Words project is an international environmental poetry contest designed to nurture respect and understanding of the natural world by encouraging children to describe, through poetry and art, their own "ecological address." This annual contest is open to children ages 5-19. Co-sponsored by International Rivers Network, The Library of Congress Center for the Book, and United States Poet Laureate (1995-1997) Robert Hass, the project hopes to foster responsibility, imagination, and action in young people and to publicly acknowledge their creativity and concerns.

The River of Words poetry and art contest application postmark deadline is February 15, 1999. For more information **contact River of Words, P.O. Box 4000-J, Berkeley, CA 94704. Phone: (510) 433-7020 Email: [row@irn.org](mailto:row@irn.org); Web site: [www.irn.org/row/row.html](http://www.irn.org/row/row.html)** (Complete application and guidelines are available at this web site.)

## **Ecosystem Observations for Elementary Students**

An important first step in restoring an area is to get out and see what is happening. It is useful to see an example of the ecosystem you are planning to restore (a remnant or restoration) as well as your own future restoration site before any work is done. While classroom material is important, students must get out for the experience.



**What's the Weather?**

<u>Temperature</u>	COLD	In Between	HOT
<u>Wind</u>	WINDY	In Between	STILL
<u>Humidity</u>	HUMID	In Between	DRY
<u>Light</u>	SUNNY	In Between	CLOUDY

Another activity called "**Show Me**" asks students to draw the smallest thing they see, the biggest thing they see, and their favorite thing.

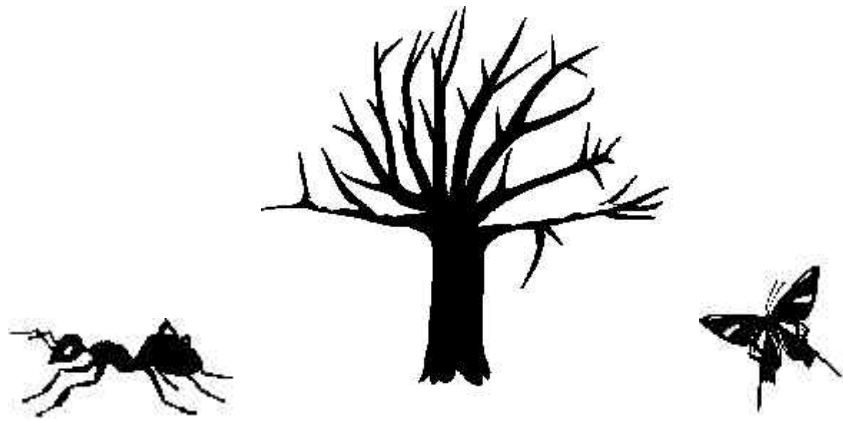
Simply going out and sitting in an area is not likely to hold students' attention. These Observation Cards can provide a direction and focus which will help your students personalize their experience. The cards shown here are only a beginning. Modify, expand and customize them to fit the needs of your students, ecosystem, season, and available time. Challenge students to look at color, texture, patterns, seasonal changes, plant-plant or plant-animal interactions and wind movement.

## Take A Look

Flowers	Plants that reach your knees	Leaves bigger than your hand	Plants that reach the top of your shoes
Bird Calls	Insects	Butterflies	Spiders

## Tally how many you find.

After returning to the classroom, these cards could be compiled to make a class book. The words generated on the *What's Happening* card can form the basis for a creative writing or poetry exercise. Data from the *Take a Look* cards can be used as the basis for a biodiversity study. *What's the Weather?* cards can be filled out on the same day each year and students can compare weather through the years.



## What's Happening?

Look	Feel	Smell	Listen
Write 4 words that describe what you <u>see</u>	Write 2 words that describe what you <u>feel</u>	Write 2 words that describe what you <u>smell</u>	Write 3 words that describe what you <u>hear</u>
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