



# The Nucleus

*Official Quarterly Newsletter of the  
Texas Association of Biology Teachers*

**Volume 17, Issue II**

**Summer, 2004**

## **President's Message:**

Congratulations to Texas science teachers for your students' successful performance on TAKS! The exit level TAKS showed gains over 2003 and the commended levels increased significantly. To see how scores this year compared to last year take a look at the state results at the following website: <http://www.tea.state.tx.us/student.assessment/reporting/results/swresults/taks/2004/index.html>. This report shows the scores at 2 SEM, 1 SEM, and Panel Recommendations, allowing you to see the real progress that was made by all groups. The exit level TAKS was scored at 2 SEM as it was in 2003, but students taking the 10<sup>th</sup> and 5<sup>th</sup> grade TAKS were scored at 1 SEM. That makes it appear that scores in some cases declined, but if you see the comparisons at 2 SEM, you can see that gains were made, even if they were not great enough to meet the 1 SEM standard. With the exit level moving to 1 SEM next year and the 5<sup>th</sup> and 10<sup>th</sup> at panel recommendations, you can see what the projections are and our challenge is.

Summer 2004 will be an intense time for science education in Texas, so please stay connected. In the recent special session which failed to find a means of funding public education, there were several disturbing developments. One of primary concern to us as science teachers was the insertion of the language from HB 11 removing the square foot requirements for classrooms into the version of the finance bill passed by the House. (HB 11 did not come out of committee, but the language from the bill was in the

finance bill that passed.) The proposed Senate finance bill by Shapiro did not modify the square foot requirements, but if the bill had gone to a conference committee, the compromise might have used the House version. We must be diligent in keeping our representatives informed of our concerns on behalf of safety for Texas students. You can find the information regarding your representatives at <http://www.capitol.state.tx.us/fyi/fyi.htm>.

The recent TABT alert regarding the funding of textbooks is another concern. As biological knowledge continues to grow and change, it is imperative that students have access to materials that reflect the most current information possible. Please share your concerns for textbook funding with your representatives also.

In July the State Board of Education will vote on whether to require a fourth year of science for the recommended high school program. The SBOE voted 11 to 1 to require a fourth year of science which can come from any of the science elective courses. TABT does not take political positions, but we encourage the informed participation of our members in the process. SBOE members are very glad to have comments from teachers. You can be sure that other special interest groups make their views known. Too often we are silent. To know whom to contact check the TABT website and click on "SBOE Contacts" at <http://www.texarkana.college.edu/~mstorey/TABT/index.html>

Best wishes for a rejuvenating summer!

Anita Gordon, TABT President

## THANKS TO OUR SPONSORS!

### Corporate Members

Carolina Biological  
Fisher Science Education  
Flinn Scientific  
George Seidel & Associates  
Glencoe/McGraw-Hill  
Holt, Rinehart, and Winston  
Kendall/Hunt Publishing Company  
Prentice Hall School Division  
Science Kit/Boreal Laboratories

### Sustaining Member

Ward's Natural Science Establishment

## Did You Know?

“Darwin founded a new branch of life science, evolutionary biology. Four of his contributions to evolutionary biology are especially important, as they held considerable sway beyond that discipline. The first is the non-constancy of species, or the modern conception of evolution itself. The second is the notion of branching evolution, implying the common descent of all species of living things on earth from a single unique origin. Up until 1859, all evolutionary proposals, such as that of naturalist Jean-Baptiste Lamarck, instead endorsed linear evolution, a teleological march toward greater perfection that had been in vogue since Aristotle’s concept of *Scala Naturae*, the chain of being. Darwin further noted that evolution must be gradual, with no major breaks or discontinuities. Finally, he reasoned that the mechanism of evolution was natural selection.”

- Ernst Mayr, September 23, 1999

From a lecture that Mayr delivered in Stockholm on receiving the Crafoord Prize from the Royal Swedish Academy of Science



### A Mother's Love

- Holly Duggins

Holly Duggins produced the above cartoon in April 1998 in Alton Biggs's Biology I class at Allen High School in Allen, Texas. Holly explained that she was trying to express that even a mother skunk would be pleased with her offspring's first efforts - even if the first effort went somewhat awry.

Members of the Texas Association of Biology Teachers are encouraged to submit their own original cartoons, photos, laboratory ideas, essays, or the original work of their students.

## Check That Label!

You are reminded to check your label to see if your dues are approaching their expiration. All members are highly encouraged to submit an E-mail address. Members with E-mail addresses receive notice of publication of *The Nucleus* via E-mail. You can then download and print your own copy, or you can read your copy directly from the TABT Web site. In addition, Members who have E-mail addresses receive a weekly update of information important to biology teachers and a URL that may be useful for you and your students.

## Evolution Cards - A Review Strategy Debbie Richards

Thanks to Joe Stanaland for encouraging Debbie Richards (who is enjoying her break from being the TABT Secretary for a decade!) for supplying the "Evolution Cards" on the next page. The cards can be given to small groups or to individual students to review terms associated with this important concept. Debbie tells us that she created the cards while working on a TEXTEAMS Biology Institute for the DANA Center.

# Evolutionary Terms Cards – KEY

Teacher should cut out, mix up and have students connect them in the correct sequence.

<b>Adaptation</b>	 <p>Number &amp; relative abundance of species in a biological community.</p> <b>Diversity</b>	<b>Variation</b>	 <p>Differential reproductive success of phenotypes resulting from interaction with the environment.</p> <b>Natural Selection</b>	<b>Phylogeny</b>	 <p>The hypothetical evolutionary history of a species.</p> <b>Species</b>	<b>Evolution</b>	<p>The origin of new species through evolution.</p> <b>Speciation</b>
<b>Extinction</b>	<p>The death of a species or other taxon.</p> <b>Extinction</b>	 <p>Differences in characteristics among individuals of a species.</p> <b>Variation</b>	 <p>Any genetic change of structure, behavior, or function that makes an organism more reproductively successful.</p> <b>Adaptation</b>	<b>Natural Selection</b>	 <p>Any genetic change of structure, behavior, or function that makes an organism more reproductively successful.</p> <b>Diversity</b>	<b>Speciation</b>	<p>The origin of new species through evolution.</p> <b>Speciation</b>
<b>Extinction</b>	<p>Example: Seven species of grass plants in the same prairie.</p> <b>Extinction</b>	 <p>Differences in characteristics among individuals of a species.</p> <b>Variation</b>	 <p>Any genetic change of structure, behavior, or function that makes an organism more reproductively successful.</p> <b>Adaptation</b>	<b>Natural Selection</b>	 <p>Any genetic change of structure, behavior, or function that makes an organism more reproductively successful.</p> <b>Diversity</b>	<b>Speciation</b>	<p>The origin of new species through evolution.</p> <b>Speciation</b>
<b>Species</b>	 <p>The sum of all the changes in organisms that have occurred since the origin of life.</p> <b>Evolution</b>	 <p>A group of individuals that is found together in nature and is capable of interbreeding to produce fertile offspring.</p> <b>Species</b>	 <p>Example: the dodo bird (<i>Raphus cucullatus</i>)</p> <b>Extinction</b>	<b>Natural Selection</b>	 <p>Example: the dodo bird (<i>Raphus cucullatus</i>)</p> <b>Extinction</b>	<b>Speciation</b>	<p>The origin of new species through evolution.</p> <b>Speciation</b>
<b>Variation</b>	 <p>The sum of all the changes in organisms that have occurred since the origin of life.</p> <b>Evolution</b>	 <p>A group of individuals that is found together in nature and is capable of interbreeding to produce fertile offspring.</p> <b>Species</b>	 <p>Example: the dodo bird (<i>Raphus cucullatus</i>)</p> <b>Extinction</b>	<b>Natural Selection</b>	 <p>Example: the dodo bird (<i>Raphus cucullatus</i>)</p> <b>Extinction</b>	<b>Speciation</b>	<p>The origin of new species through evolution.</p> <b>Speciation</b>

# I LOVE TEACHING PLANTS

Nadine Dickson  
Jersey Village High School  
Houston, Texas

Like many of my colleagues, I have often dreaded the plant unit. Plants always fall at the wrong time of year or take time away from topics I find more exciting. I have finally found an activity that has changed my attitude toward plants – an inquiry based laboratory that explores stomata.

After learning basic leaf structures, students are given a homework assignment where they are asked to find out something about stomata and they are to bring the information to class the next day. My homework that night is to find as many different kinds of leaves as I can. I search my yard, the grocery store, the neighborhood parks, and local garden centers. I want to have leaves from as many habitats as possible. I try to find leaves from food plants and photosynthetic stems. I want to have plants that every student will be familiar with and some plants that they may have never noticed before.

The next day students are asked to share their homework with the class. As a warm up activity the students condensed their “Google™ search print outs” to one Post-it™ Notes sheet that they hang up somewhere in the room. I will pick one or two students to record as the class compiles a list of stomata facts. At this point in the class I am just an observer even though every student will turn to look at me to validate their answers.

After a brief discussion I then begin asking the students questions about the leaf specimens that are scattered around the room. I will hold up two leaves and ask the students to compare the plants. We discuss leaf adaptations to their habitat. I will then ask them if they think that the structure of stoma also show variation due to habitat. I will ask the students if plants used for agriculture would have stomata different than plants used for landscaping. What about poisonous or injurious plants, do they have variations in their stomata? The textbook that I am using states that stomata are only found on the topside of leaves. I will ask students if they agree with that statement just because they read it in their textbook. I will address the information that the students shared with the class leading them to question the facts in their homework and to wonder who in the class has correct information, if anyone. Just when the frustration level of the students has reached its pinnacle, (this discussion often takes half of a class) I will tell

them that there is a way to determine the answers to all their questions – science.

They are then assigned the task of creating an experiment to learn something about stomata. By coating a leaf with clear fingernail polish and allowing the polish to dry, you may peel the imprint of stoma from a leaf and create a wet mount slide to examine them under a microscope. Each student spends the rest of the class period designing an experiment. They turn in their design for me to check overnight and they spend the next day experimenting. At the end of the second day students gather their data and spend their own time outside of class perfecting a narrative report. (I usually give them a couple of days).

## What about stomata?

You should write a summary that includes each of the following:

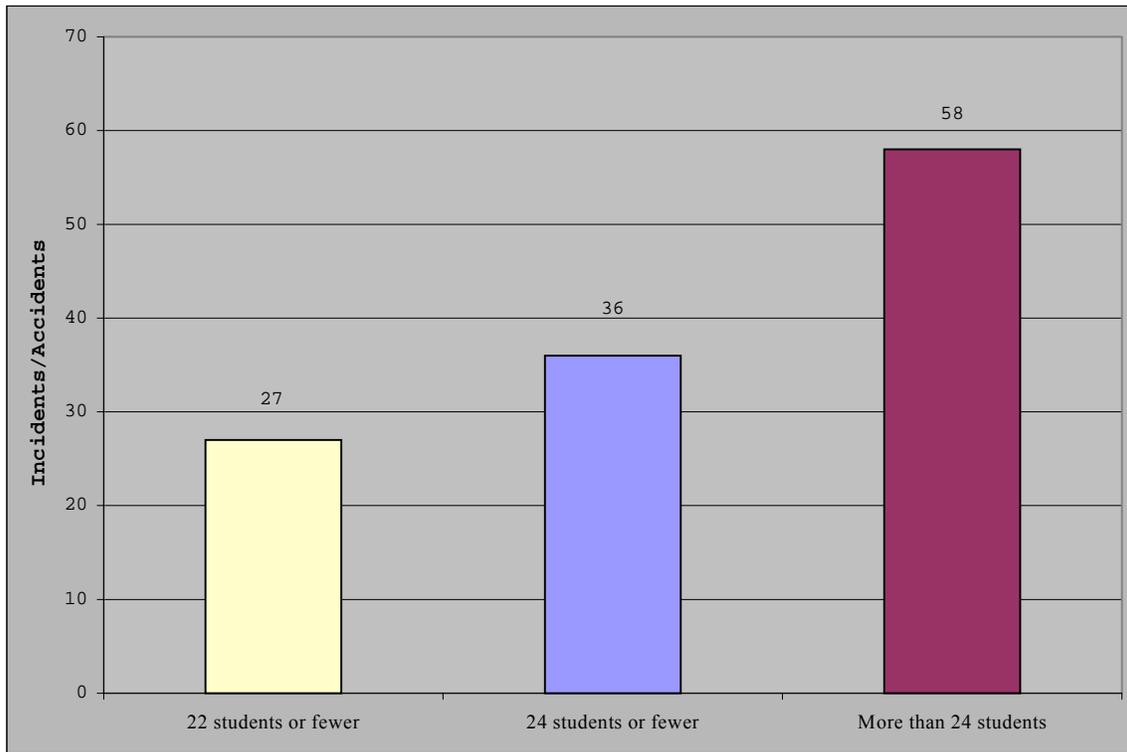
1. What did you want to find out about stomata? (*i.e. hypothesis*)
2. How did you explore your ideas? (*i.e. your experiment*)
3. What did you observe? (*i.e. data → drawings*)
4. What does all this mean? (*i.e. explain your results*)

One of the exciting parts of this activity is that every year I have different leaf representatives, teach different students, and have different questions to answer. This activity energizes me more every year and I find myself looking forward to teaching plants when I used to dread this unit. The emergence of experts, the pride of ownership, and the expressions of collaboration and discussion are so rewarding for the students and myself that this joy of learning carries us through to the end of the year.

The idea for imprinting stomata using fingernail polish came from *Holt Biology* “Observing the behavior of stomata.” Quick Lab, © 2004, p. 503. I acknowledge the creative assistance of Suzanne P. Thacker, Dept. Chair at Klein Collins High and the technical support of Robert Dennison at Jersey Village High School.

# Mishaps Increase as Class Size Increases

Dr. Sandra S. West, Texas State University-San Marcos

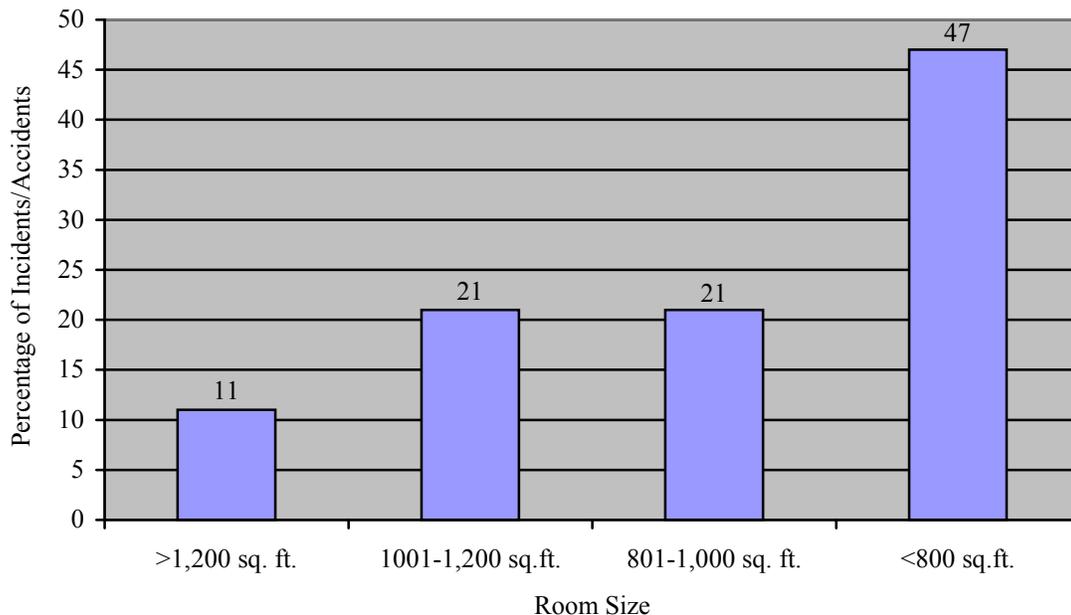


# Mishaps Increase as Room Size Decreases

Comparison of room size (ft.<sup>2</sup>) and percentage of incidents/accidents reported.

$$X^2 (3, N = 56) = 15.44, p < .05$$

NOTE: Incidents/Accidents increase as room size decreases.

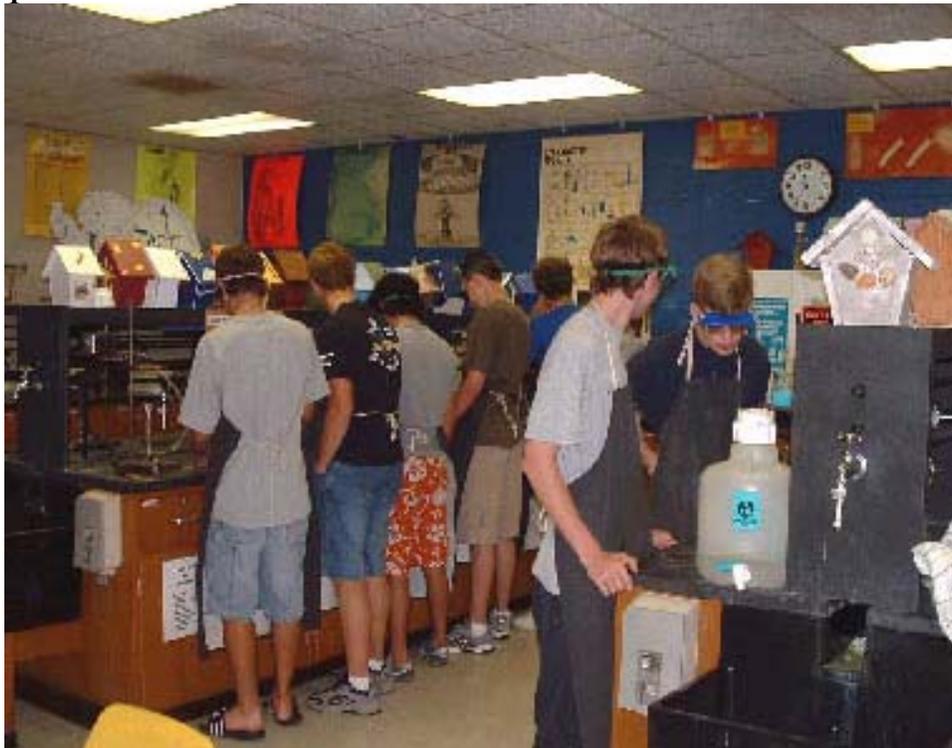


# Visual Evidence That Size Does Matter

- 58 Square Feet/Student



- 43 Square Feet/Student



## ***TABT Member Among Top 50 in Toyota Teacher Program***



**Daniel Bryant, Incarnate Word Academy Science Teacher, is among 50 teachers selected to participate in the Toyota International Teacher Program in Japan this summer.**

Daniel Bryant, TABT member from Pasadena, Texas, has been selected to participate in the *Toyota International Teacher Program* to take place in Japan this summer. This opportunity is offered only to secondary school teachers from the eight states where Toyota operates major facilities: Alabama, California, Indiana, Kentucky, Michigan, Missouri, West Virginia, and, for the first time, Texas. Out of 700 finalists, only 50 teachers have been selected to participate in this program.

Mr. Daniel stated in his proposal abstract that *“My experiences in Japan will enrich my work as an educator in several ways. I will gain valuable first-hand knowledge of how history and education have influenced environmental attitudes in Japan. I will be able to see how these attitudes have been brought to the workplace and witness an industry that reflects these attitudes. I will be given*

*given a variety of real life examples for use in the classroom and can show students that people of other cultures share similar environmental concerns with them. My major focus will be to understand the Japanese approach to environmental education, and how historic events, such as World War II and the Kyoto Conference have shaped environmental concerns and attitudes in Japan. Upon my return, I will begin work on various projects designed to best use the knowledge gained during my time in Japan. I will also share this knowledge with teachers throughout Texas via my affiliation with different teacher organizations. Finally, I will present a summary of my experience to participants in the Texas State Naturalists Certification Program.”*

The *Toyota International Teacher Program* will take place June 16 through July 3, 2004. Participants will travel to Japan and remain for a two-week period to study Japan’s history, education, environment, and technology. Activities will include guided visits to historical and cultural sites; discussions with Japan historians and cultural experts; exposure to elementary, secondary, and technical schools; review of land reclamation projects; tours of environmental protection areas; visits to automotive and textile manufacturing industries; lectures on ancient to modern industrial development; and visits to Tokyo, Toyota City, Kyoto, and other areas of the south central region of Japan.

Toyota has provided grants to K-12 science and math teachers for several years, and continues its support by offering this international development opportunity for secondary school teachers. This information and more details can be found on the *Institute for International Education* website at: <http://www.iie.org>.



Texas Association of Biology Teachers  
c/o Alton Biggs, Computer Records Clerk  
1002 Madera Court  
Allen, Texas 75013-3639



**Membership Application**  
**(Please Print)**

Name: \_\_\_\_\_ Telephone: (\_\_\_\_) \_\_\_\_\_

Home Street Address, City, State, Zip: \_\_\_\_\_

E-mail address (if available): \_\_\_\_\_

Type of membership:  Active (\$10)  Student (\$5)  Retired (\$5)  Life (\$250)

Please complete the following to assure balanced representation in planning TABT activities.

1. Professional Class (**Check one only**)

Biology Teacher  Department Chairman  Curator/Interpreter  
 Supervisor/Administrator  Teacher Training  Student  
 Other \_\_\_\_\_

2.  Male  Female (**OPTIONAL**)

3. Have you ever received the OBTA?  No  Yes If yes, what year? \_\_\_\_\_

4. Number of years teaching? \_\_\_\_\_

5. Organizational Class (**Check one only**)

Elementary  Middle/Junior High  Secondary  College/University  Zoo/Aquarium  
 Business/Institution  Other \_\_\_\_\_

6. Special Interests (**Check no more than 2**)

Cellular/Molecular  Botany/Plant Science  Laboratory Science  Reproduction/Evolution  Zoology  
 Computer Instruction  Environmental Biology  Teaching Materials  Other \_\_\_\_\_

7. I am also a member of (**Check all that apply**)

National Association of Biology Teachers (NABT)  
 National Science Teachers Association (NSTA)  Science Teacher Association of Texas (STAT)

**Make all checks payable to: Texas Association of Biology Teachers**

**Please send membership application and your dues to:**

Alton L. Biggs, TABT Records Clerk – 1002 Madera Court – Allen, Texas 75013-3639