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## Case Study: Hickory High School

### The "A-Ha" in AP Biology

"The response from students and teachers has been overwhelming! I've seen the class average come up and I can see a noticeable increase in student motivation, participation and time spent on task."

*Gena Barnhardt, AP biology teacher*

### Challenges and Goals

Gena Barnhardt teaches biology to sophomores and Advanced Placement (AP) biology to juniors and seniors. She is one of 16 teachers participating in a nationwide pilot of "Biology-Exploring Life," new curricula under development by Pearson Prentice-Hall, which is being evaluated by the National Science Foundation.

As part of the curricula, Barnhardt must be able to present Web content to her students. Hickory High School, however, has only one computer with Internet access in each classroom. Most teachers participating in the pilot have at least four or five.

"I could demonstrate the Web content to my students with an LCD projector, but it was limiting because I was tied to my mouse," said Barnhardt. "I needed a better classroom management solution so I could make the curricula accessible to students and monitor what they were doing at their seats."

Barnhardt first glimpsed the Activclassroom System at the North Carolina Educational Technology Conference (NCETC) in December 2002. "As soon as I saw the Activboard, I began dreaming about all the wonderful things I could do in the classroom if I had one," she said.

The Activclassroom System includes: the Activboard interactive whiteboard; Activstudio software tools and resources; Activslate, which allows teachers and students to control the whiteboard from anywhere in the classroom; and Activote, hand-held voting devices that provide teachers with instant student feedback. Additionally, the system includes the Activ prep-pad, which allows teachers to develop lesson plans and flip charts when away from the board or at home.

"I saw so many things the Activboard could do that the other interactive whiteboards couldn't," said Barnhardt. "The first day I used the Activotes with my students was the biggest eye opening day I've ever had in my teaching career. You can do so many things in the classroom with the Activclassroom System. You can lecture, do hands-on activities, quiz students orally, conduct guided practice, and so much more. Plus, you can really see when students understand a concept and when they don't."

### Implementation

Barnhardt implemented the Activclassroom System in February 2003. Today she uses the system to deliver instruction aligned to the North Carolina Standard Course of Study in biology and to the AP curricula in biology.

"The Activboard is very intuitive. I plugged it in and was ready to go after 15 minutes," she said. "We had several other interactive whiteboards in the school and the teachers needed professional development before they felt comfortable implementing them in the classroom."

Barnhardt and the science department head explored the built-in curricular materials and familiarized themselves with the tools available in the Activclassroom System. She created a number of flipcharts for use in her biology classes and made extensive use of annotating software programs, Internet sites and PowerPoint presentations.

"I've used the Activboard and Activslate every day since they arrived. The Activslate is one huge advantage that Activboard has over other boards because it's such a powerful classroom management tool — particularly in a one-computer classroom," she said. "Using the Activslate, I can be anywhere in the classroom and still direct and control the whiteboard. I have large classes this year. There is no way I could use an interactive whiteboard if I couldn't be in the midst of students and move around to them while I'm teaching."

Barnhardt also utilizes the Activote in her classes. The Activote, which comes in class

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sets of 32, works wirelessly with the Activboard to allow for class feedback and participation.

"The Activote has altered the way I view my role in the classroom. I feel empowered with the knowledge that, finally, all students are held accountable for their responses, and that both my students and I are given immediate feedback about their level of understanding. I have seen individual students grow through the use of these devices and see them as a means of addressing the accountability standards of the 'No Child Left Behind' legislation. It gives me a way to teach, assess and meet the needs of every student," she said.

In addition, Barnhardt uses the Activote to check students' homework. How? She opens a new flipchart and uses Adhoc voting for students to submit their responses. She found that a 15-second wait is optimal as it gives enough "think time" for all students to process information while minimizing the game of waiting until the last second to key a response.

"Using this method has transformed correcting homework from routine drudgery to an exciting competition of sorts. Many students literally cheer when they respond correctly. I am encouraged as to how well I can motivate students, keep them engaged, and monitor their understanding and progress through the use of the Activote and Activboard," she said.

The Activote also improves accountability in the classroom for both teachers and students, alike. "Using the Activote, I can better monitor how and what students are learning. It has changed the way I prepare my lessons. If I see that students have a problem with a certain area, we can address that right away. I no longer have to wait until I get the test results to adjust my lesson. It helps with just-in-time teaching. That's a huge benefit," she said.

According to Barnhardt, polling students via the Activote is better than doing so with a show of hands, like other teachers do. "When you do a poll with a show of hands, students look around and then raise their hands at what everyone else says. Since the Activote is anonymous, students are held accountable for the content. They're accountable for every single answer," she said.

Another feature Barnhardt appreciates is the ability to use the camera feature to capture pictures on the Web. She often captures pictures from the Exploring Life curricula on the Web, copies the pictures to a flipchart page, and then asks questions based upon the concept in the illustration in each picture. She then exports all the Activote scores to an Excel spreadsheet at the end of the period, and reviews each student's scores.

Thanks to Barnhardt's enthusiasm and success with the Activclassroom System, Hickory Public Schools purchased six more Activboards for the high school. Beginning in fall 2003, the Activboards will be used in core curriculum areas as well as Exceptional Education and English as a Second Language.

### Results

"The response from students and teachers has been overwhelming! I've seen the class average come up and I can see a noticeable increase in student motivation, participation and time spent on task. Other students are stopping by my class on a regular basis to see exactly what their classmates are raving about and at least one teacher has asked for the Activboard instead of the 'other' whiteboard he previously requested," said Barnhardt.

"The big 'a-ha' is how I've evolved as a teacher," she continued. "I plan my lessons differently now. I've always been a big proponent of using assessment, but I've always thought of it as an 'after the fact' activity, rather than something you do as you go along. That's probably the biggest benefit of the Activclassroom System — being able to use assess students as you teach. I am even more impressed with the functionality of the Activboard and accessories as time goes by. I just think they're wonderful. I cannot imagine my classroom and teaching without them.

