iPods in Science

By Jared Mader and Ben Smith

Students should not have to "power down" when they come into our classroom.

In our school, students may bring their mp3 players, use them in the hallways, and relax to them in their study halls. As with any of the gadgets that our students bring to school, we try to leverage mp3 players to create productive learning experiences and reach students at their own level.

As a Photo Album

Expanding its capabilities beyond the average mp3 player, the iPod is not just for music, as all but the iPod Shuffle have video and photo capabilities. Taking advantage of these features, we allow our students the opportunity to put a form of digital flashcards onto their iPods. Instead of photos, we use our daily lesson PowerPoint presentation to generate jpeg images of each slide.

Each of these "photos" can be saved in separate albums using iPhoto, named appropriately to match the lesson of each presentation. Each time the students sync their iPod to their computers, the newest albums are updated, providing them access to their class lecture notes, problems, diagrams, and charts at any time.

This creates many possibilities for integrating science content in the hands of students. One type of assignment might allow all students to create their own periodic table. Working in groups, students create a PowerPoint slide for each chemical element, including images and descriptions along with the standards of atomic weight and number. They draw electron shell diagrams and include common uses of the element. If students work individually, the teacher can then compile the images into one album in iPhoto with each picture named according to the corresponding element. Upon syncing their iPod, students can use the scroll wheel to scan through their own periodic table.

Other possibilities for iPod flashcards include pictures of a biological dissection, body parts for anatomy and physiology, or formula sheets identifying each of the variables in a chemistry or physics formula. Students create their own glossary—making sure to organize the slides into alphabetical order for searching.

Identification of rocks and minerals in geology, images of space for earth science, pictures of wildlife for environmental studies—all are meaningful ways to place the vivid images and topics of a classroom discussion or lab onto a portable format for student access on their personal device.

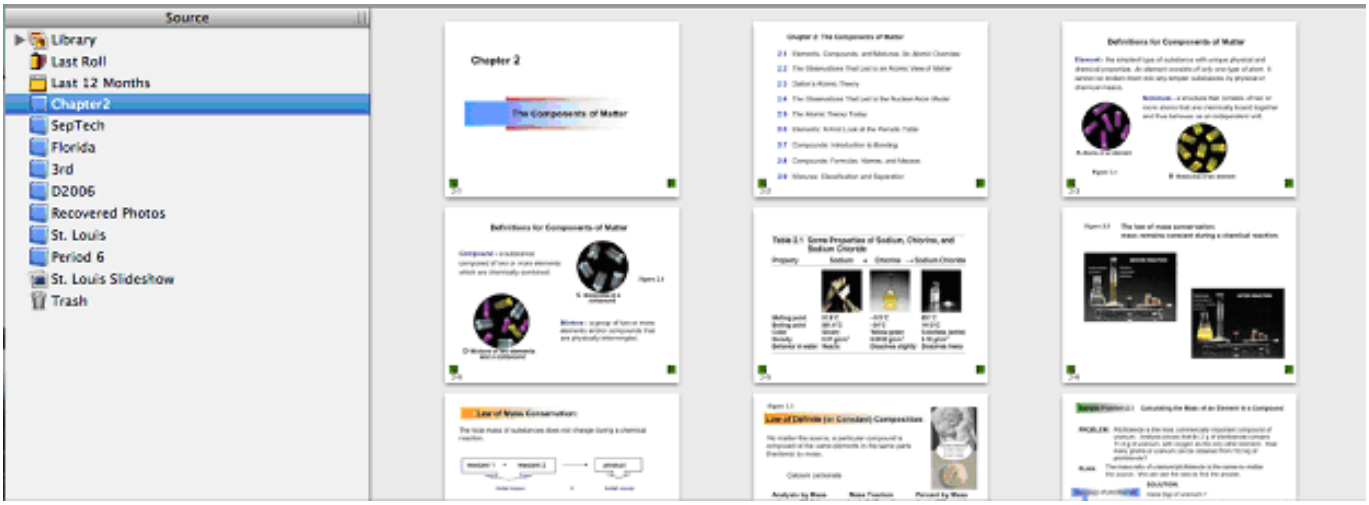
As a Voice Archive

Another way to manipulate content to match the features of the iPod is through podcasting. In its simplest forms, students or teachers record their voice using a microphone, saving the file in mp3 format. We use Audacity (http://audacity.sourceforge.net) as our audio recorder, although many others exist. With Audacity, simply click record, begin talking, and when finished, hit stop. No different than those old cassette decks that are collecting dust in your attic.

On a technical note, there is a small bit of preparation involved for the first time you use Audacity to create an mp3. You must download LameLib [http://spaghetticode.org/lame/]. We suggest putting this file into the program folder, with Audacity. The first time that you attempt to save your track as an mp3, Audacity will ask you to locate LameLib before exporting. Once this is done, you should not need to do it again.

After making the recording, choose Export As mp3. You can fill in the title, artist, and album however you would like. These entries will show up in iTunes and on the iPod as the item description.

A typical manner in which we use podcasts is to record our daily lectures. We do this syncronously with one of our classes—simply begin recording at the beginning of class and



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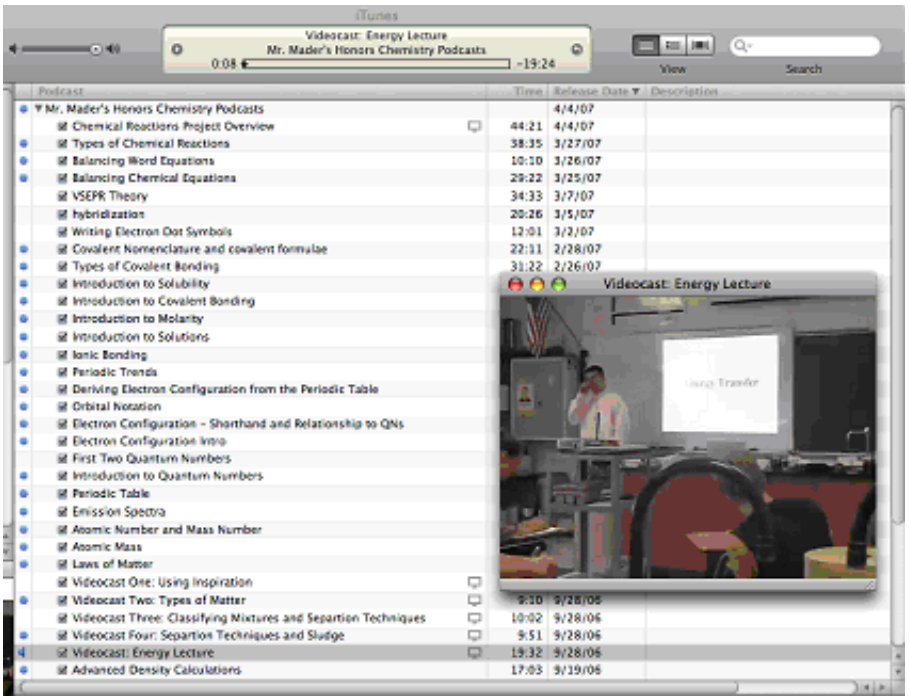

Vodcasts are automatically organized in iTunes.

stop at the end. We've actually had students claim to have been able to catch up on missing lectures, notes, and homework assignments (when out ill) before they would have actually had class on their day of absence.

On occassion, we've recorded short sets of notes or directions for students. We've used this to provide them with advice on a lab setup, homework advice to commonly missed problems, project directions, science fair topic ideas and descriptions, and more. When determining what types of things to podcast, think about all of the times that you repeat the same thing to students. Rest assured, it is probably something from which the students would benefit should you choose to record it as a podcast.

Given our constructivist approach to teaching, we believe that students should get involved in podcasting as well. They can record daily logs of what is happening in class, or simply provide some helpful advice to the next year's students about projects or labs that they had just completed. We've often found that students often rush through or overlook the critical skill of observering during labs and demonstrations. By having students record their observations, we've found that they have become more cognizant of the "self-talk" that they should be experiencing when conducting a laboratory investigation.

It couldn't be easier to create these podcasts, even without computer access. The iPod and an attached microphone becomes a digital voice recorder, with content recorded onto its own categorizable and unique track for future access in the iTunes playlist. What better way to allow students to utilize the "toys" that they already bring with them?

One final approach takes advantage of video podcasts, or vodcasts. We record the video of our daily lectures, screencapture every step of our projected lesson, or archive interactive directions on how to use a computer program in the lab.

The potential is endless, as it al-

lows students to vividly see the details of a lesson that once was incapable of being repeated. How many times have students missed that great demonstration or been confused about how to set up an experiment that you explained during their field trip? Now, students can come back to class with the details afforded by image, sound, and process.

The key to any of the components that we've discussed is that they are rarely an "add-on" to the routine of our daily lessons. Often, the PowerPoint is already created or the lesson is already being taught. Setting up the recording media is the only additional step needed in an increasingly busy day for a classroom teacher. It is also important to note that although the application topics we've discussed related directly to science instruction, a mulitude of transferable uses exist in all content areas, at all grade levels.

Students should not have to "power down" when they come into our classroom. Tapping the resources by which our students learn, we will meet them at their level, allowing them to experience and interact with our content material using their generation's tools of productivity and efficiency.

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Ben Smith has been a physics teacher at Red Lion Area High School for 18 years. He and Mader are the science curriculum specialists for L&L.

Simulations as Action Learning

In no subject is the effect of technology on the education process more apparent than in business education. Where textbooks and lectures fail to engage and teach business comprehensively to today's technology-oriented students, computer simulations provide logical and user-friendly platforms for learning.

Business simulations work by dividing high school business classes into teams that each manage a simulated company. The students, functioning as company managers, compete for market share and profits by making business decisions (from finance to marketing) that affect bottom lines.

In business simulations, students learn how to interpret financial statements and examine the competitive market. They devise business plans and make decisions in marketing. They hire and fire personnel and negotiate labor contracts. And they see how each choice affects the profitability of their simulated company. In short, they learn by doing—by far the best approach for young people.

"As an instructor of a college preparatory high school business management program, I use [business] simulations with students preparing for graduation to teach the big picture of how the separate functional areas, such as marketing and finance, fit together on a management team," says Wendi Howell, international business instructor for the satellite program of Eastland-Fairfield Career and Technical Schools located at Gahanna Lincoln High School in Ohio. "This knowledge helps students see how decisions affect other departments and how to run a business. The average business person does not have the opportunity to understand these concepts until later in their careers."

By Dan Smith

Business simulations involve basic knowledge—including reading comprehension and mathematics—and applied skills such as critical thinking, problem solving, and teamwork and collaboration. Depending on related activities planned by educators, business simulations also can improve oral and written communications.

Other applied skills addressed by business simulations include:

- ***Information Technology Application***: Business simulations are computerized and on the Internet—a good application of information technology.
- ***Leadership***: Each management team has leaders. Students either *are* leaders or are associated *with* leaders. Either way, they experience how leadership works.
- ***Lifelong Learning/Self Direction***: Defined as acquiring knowledge and learning from one's mistakes. Business simulations allow students to do both. In addition, assessment tools can help demonstrate mistakes, and through that, help students acquire knowledge.
- ***Professionalism/Work Ethic:*** Defined as personal accountability, punctuality, working productively with others, and time and workload management—all requirements of a successful team member.
- ***Ethics/Social Responsibility***: Incorporating integrity and ethical behavior, simulations teach students to act responsibly with the interests of the larger community. A management team requires each member to act with the interests of the team.

The learning process for Management Simulations, Inc.'s Foundation