Urban Ecology Magazine

High Tech Middle, 6th Grade

Nicole Costa and Bobby Shaddox

Starting with a Teacher's Passion

Nicole: The idea for this project was sparked after I spent a week on an organic farm in the Santa Cruz area. There I was exposed to practical "green building" technologies such as cob plastered buildings, permeable surface grey water recycling, compost toilets and even a solar thermal hot tub. I quickly realized these technologies shouldn't be relegated to remote farms. They should be put to use in bigger ways so that cities and new suburban developments can be cleaner and healthier as well as leave us with natural resources for years to come. I wanted to get my students excited about these adult-world technologies and inspire them to be environmentally active in a real, much needed way.

During the spring after my visit to the farm, I introduced a project that was designed to help students discover ways that could make our urban ecosystems more efficient and sustainable. Students worked in teams to research "green building" techniques and then shared their findings to the class using PowerPoint presentations. In many ways the project was a success: the students were motivated, the topic was engaging, and real learning took place. But in other ways it fell flat. Here the students were, researching how to create "greener" cities -- a topic at the forefront of adult world concern-- but they were not sharing their ideas with a useful, authentic audience.

Stretching Across Content Areas

Nicole: When I discussed my initial foray into a sustainability project with Bobby Shaddox, my teaching partner, he was intrigued. He saw enormous potential for creating a cross-curriculum project—something that would bring together the science learning from my class with the literacy skills Bobby teaches in his humanities block and allow students to share their understanding with an authentic audience. Together, we hatched the idea of creating a magazine. The magazine would focus on teaching others about green technology and encouraging sustainable practices, with a focus on urban communities. To be effective, we knew that the students' articles would need to be thorough in their research, purposeful in their design, and conscious of their audience. Working collaboratively across our curricular areas would allow us to address multiple dimensions of the students' learning.

Bobby: I came into teaching from a background in art and graphic design and was particularly motivated by the idea of teaching these skills to our students. Together Nicole and I coined the name "Urban Ecology Magazine." To maximize student interest, we decided to launch the project by turning our classrooms into the magazine headquarters. On the first day of the project students were given name tags and contracts uniting them in their mission as

employees of "Urban Ecology Magazine." As a class we discussed goals and created a calendar with deliverables and due dates stretching from the research, to the edited drafts, and finally, to having our magazine published, printed and exhibited at the annual High Tech Middle Exhibition Night.

Green Roofs, Compost Toilets and Hydrogen Fuel Cells?

Nicole: To encourage student engagement in the science content, I introduced the concept of green technology through a gallery walk. I searched books and the internet to find pictures and texts that would give students a glimpse of what "green building" techniques and alternative fuel sources look like as well as what science they involve. Pairs of students then identified their top areas of interest from which they were assigned a focus research topic. Students were given four questions to drive their research: 1) What is (your topic)? Explain how it works. 2) Explain why/how (your topic) is sustainable and efficient. 3) What are the pros and cons of (your topic)? 4) How could (your topic) improve modern cities? I had websites and books picked specifically for each topic ahead of time. We also had regular meetings, called "job alikes" where students could chat with me or each other in order to fact check their research.

Gradually, students began to transform into experts on their topics. The expectations for the magazine were high and in order to effectively communicate to their audience, students needed to develop a deep understanding of the research. The hydrogen fuel cells group, for example, brilliantly compared the workings of a fuel cell to being at a party where all of your friends are in another room that you're dying to get into, but when you get there you realize you've lost something. The students used this analogy to explain how in a fuel cell, hydrogen atoms are attracted to oxygen atoms so they pass through the membrane of the cell and loose an electron, which creates electricity.

Students were researching and reporting on a wide variety of science topics from carbon emissions to ethanol production, from the nutrient cycle and how it is applied in compost toilets to how passive solar uses the natural tilt and positioning of the planet to heat or cool buildings. Each group was required to research on the pros and cons of their topics and to analyze the potential costs and benefits of going "green." Without the vehicle of the magazine, I could never have covered such a variety of content in such depth. The magazine invested students in becoming experts in their topics of interest, and then they were able to teach information about those topics to the rest of the class.

Approximating the Publishing World

Bobby: While students were researching the content of their articles in Nicole's class, I engaged students in investigating how science articles are written in my humanities classroom. We took a constructivist approach. Students read several different articles from various science magazines to identify organizational strategies and writing techniques employed by authors. We talked about what we liked, what we didn't like, and why. We developed steps for writing

our articles and checklists of what we wanted to include in our writing (topic sentences, supporting details, dialogue, etc.) as well as what we wanted to avoid.

The next step was for students to translate their research into an article. Nicole and I worked to create a template with sentence starters and guidelines to help students make this transition. At this point of the project we often opened the wall that separates our classrooms to create one big workspace. Students edited independently, consulted Nicole for content checks, and came to me for feedback on mechanics and grammar. It was starting to look like a real magazine work room. This same process continued as we moved the students through several edits of their articles, placed the text into Adobe InDesign, and created the magazine artwork.

The Power of Peer Critiques

Nicole: Have you ever lived the nightmare of trying to revise dozens of lengthy essays in one night? Bobby and I realized that delegating this responsibility to students was not only going to save our sanity; it would also empower students and help them practice reading, writing and thinking skills. Borrowing on ideas from Ron Berger's "An Ethic of Excellence," we created a protocol for peer critique and held regular peer critique sessions that focused on key structural elements in the articles.

Our first critique focused on the introductory paragraph. After analyzing multiple models students generated a checklist that stated that a successful article should include 1) an attention getter, 2) a thesis statement, and 3) a mini-story about a character who used or experienced the technology. Students utilized this list to guide their peer critique. They assessed their peers' articles by answering questions like "How did the student get our attention in the intro?" and "What was the student's thesis statement?" Students would then take this feedback from critiques to inform their next revision. This process was repeated with a variety of focused checklists throughout the writing and publishing stages.

As students moved back and forth between analyzing models, drafting their own writing, and engaging in peer critique they became more comfortable with the writing process and confident in their own work. Students began to manipulate structural elements within the text to more effectively communicate their ideas. One student, Kenny, explained, "The biggest challenge for me was creating the artwork. I learned how to better organize information in a visual way. My cartoon about compost toilets compares self-contained and centralized systems in two columns with clear labels."

Goal-Oriented Revision

Bobby: Publishing for a real audience added authenticity and authentic pressure to the writing process. We knew that students' work would be read and critiqued by others, and everyone wanted to make sure the writing was coherent and professional. This demanded a rigorous and consistent process involving brainstorms, multiple drafts, revisions, and edits for

grammar/punctuation. We had noticed in earlier projects that it was often difficult to hold students accountable for making revisions. Many students preferred to write something once and then call it quits. Second drafts were often identical to first drafts. Sometimes this was laziness, but more often, our sixth grade students just weren't sure how to revise; they didn't know how to use feedback to improve their writing.

To remedy this obstacle for this project, we introduced the idea of goal-oriented revision. Each student created goals for their writing (based on feedback) before beginning the next revision. After completion, students would check to see if they had met their goal. For example, Karla needed to include more examples of the negative effects of carbon emissions in her article. Before she began the next revision, she articulated her objective: "Goal #1 - I will write two more examples of the negative effects of carbon emissions." By introducing this process of goal setting we found that students hit the mark more consistently in their revisions.

Nicole: The development of this peer critique and goal oriented revision process wasn't nearly as streamlined as it sounds. It was through a process of experimentation, reflection and tweaking, that we eventually developed a system that helped the majority of students produce quality work. One of the greatest affirmations of the power of peer critique was when Reilly, a vocal opponent of the revision process through much of the project, held his paper up and exclaimed, "Now I understand why we did so many versions. This is a lot better than my first draft!"

Publication!

Bobby: In the last few days before printing we felt a transformation take place. Nicole and I sat in the center of the classroom with red pens in hand. We were more like head editors than teachers. Students scurried around us scanning their artwork, using Adobe InDesign to iron out kinks in their articles, and most importantly, helping each other. Everyone was proofreading, revising and racing to make the magazine deadline.

Nicole: The day we unloaded the boxes of printed magazines was priceless. "Oohs," "aahs," and cheers of excitement and pride rang around the classroom. The culmination of all of their hard work was manifested in a tangible product that they could now share with their peers and parents. On exhibition night each pair of students used their articles to educate a real world audience about their "green" technology. In addition to the science content, students explained the process of writing and creating the magazine. We heard numerous positive comments from the parents, teachers, and community members in attendance, with adults regularly observing, "I can't believe these 6th graders know about this stuff!"

Our students were so proud to explain advanced adult-world concepts to an audience that was genuinely intrigued by the information they were presenting. Whitney commented, "My favorite part of exhibition night was when we got to explain how we wrote our magazine and share what we'd learned in the project. Adults were surprised by the information we knew and had lots of questions about how green technology works." As students presented their work

and responded to questions, they could see the real value of their work in the eyes of their audience. These sixth grade students had become researchers, writers, editors and now they were teachers themselves, spreading the word about innovative technologies that could change the world.