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Curricular Goals

Two primary curricular goals arose as a result of the Fulbright-Japan ESD program.

First, lessons on sustainability will be incorporated into all curriculum. See specific details below. The ESD program opened my eyes to a deeper understanding of *sustainability* and made me aware that *most students in the world* study and practice sustainability. American schools need to do a better job of incorporating sustainability issues into curriculum.

Second, students will continue to be given opportunities to connect with others around the world. Middle school students tend to be self-centered. This is one of the markers of adolescence. When possible, students in my classes are given the chance to connect with scientists, various professionals, students, and classes. This is done when guests visit the classroom to talk to and work with students, students follow researcher online and read blogs, email questions, and participate in video chats, collect and share data online (see Schoolyard Season program), and create a wiki page about local ecosystems (butterflybonds.pbworks.com)

By interacting with others beyond their local community, students gain a better understanding of the complexities of the world and the common ties that bind us. With a better global understanding, students will hopefully learn that their actions do indeed impact other living things on Earth, and make lifestyle choices with more care and responsibility.

Progress in Implementing Revised Curricula

New to our school this year is concurrent teaching among grade level teachers. That is, I am expected to teach the same topic at that same time as other science teachers. I do have freedom to expand and broaden my curriculum, but the topic needs to be in line with other teachers.

That said, sustainability practices are ingrained in my classroom routine: Materials are repurposed and recycled, both sides of paper is used before recycling, and single sided print jobs are done on paper that already was printed on once. My students grow and harvest vegetables at school and maintain a native plant garden. When food is served, we use "real" dishes, glasses, and utensils, not throw away products whenever possible. Paper products are a second choice, and these are added to compost.

Seventh grade life science: California seventh grade science standards include the topics *history of Earth* and *classification of living things*. These are taught in the spring.

When teaching history of Earth, I connect the changes in environment and species over time to changes in climate. Students then learn how their actions (high use of natural resources, energy use that leads to carbon emissions) affect the environment and impact climate (and species) changes.

Sixth grade earth science: Professor Gregory Smith's presentation on place-based learning is inspiring my lessons this year. Earth science units include lessons on how the material is applied on a local level. My goal is for students to research and visit a local nature preserve, the Springtown Nature Preserve, write a book about this special place, and present their book to elementary students to teach the younger students about the preserve.

On September 23, the autumn equinox, my students made observations on temperature, weather, leaf color, time of sunrise and sundown, and amount of daylight. Data was posted to the Schoolyard Seasons Google site that I created. Similar data was received from fifteen other locations from around the world, included three Japanese schools. The call for data will go out again near the winter solstice. It will be interesting to compare amount of daylight at different latitudes.

Natural resources and ecology are two topics included in sixth grade California science standards. Students study these in the spring. Sustainability lessons will include the "Represent a Country" lesson presented at the San Francisco ESD meeting. Students will look at our local ecosystems and use of resources and suggest ways we can improve stewardship both on campus and in the community.

When teaching the natural resources unit, I focus heavily on the use of renewable energy sources and reducing our impact on climate change. Students research the pros and cons of an energy source and teach this to classmates. Students build a solar-powered, energy efficient and earthquake safe model house. This year a new requirement will be added to the report students create on their house. Students will need to describe the way their house and its proposed inhabitants will demonstrate sustainable practices.

Seventh and eighth grade STEM Exploration Elective Class: (STEM = science, technology, engineering and math). Students started the year in this engineering class by studying renewable energy. I expanded the curriculum I was given for this class and changed the unit name to *Engineering for Sustainability*. ESD concepts were added to the curriculum. Students participated in the "Represent a Country" lesson, given to us at the San Francisco meeting. Students raised many excellent questions and comments with this activity. I think that they will remember it for a long time.

Students researched energy sources and the environmental impact use of these resources has. Posters were created to share their findings.

Students will next research natural disasters, and create a solar powered device that can be put into use after a natural disaster hits. Students are entering their work into the Applied Materials *Clean Tech Competition*. Only schools in the San Francisco area and Xi'an China may participate in this inaugural event.

The STEM class meets in a school area that is away from the science classrooms. I plan to create a "sustainability area" near the STEM classroom and send a message to the teachers and students in this part of school to incorporate sustainability principals into their lives. A new recycling station is outside of the classroom. I plan to add a butterfly garden, solar water fountain, and, perhaps, a roof-top wind turbine. Grant funding is being sought to support this project.

Go Green Team extra-curricular Group: These energetic students are focusing on improving the school's recycling program. They currently are collecting the plastics used on campus over one week and will build a tower out of the bottles. Hundreds of bottles have been collected so far. The final product should be impressive! Students will create posters for campus that teach how much water and petroleum was used to make these bottles, and to suggest that students bring reusable containers to school instead of plastic bottles. The idea for giving information about resources used in plastics production was sparked by ESD participant [REDACTED]'s presentation.

Students will also plant a butterfly garden at school once rain returns and our soil can be dug. The butterfly garden is part of the collaborative "Bonding Through Butterflies" project for my

students and students of ESD teachers [REDACTED], Wisconsin, [REDACTED], Nevada, and [REDACTED], Saga.

Students are creating a pamphlet about our school. This will be mailed to the Bonding Through Butterflies schools. Information will also be posted on the project wiki page. Students took pictures and are writing copy for the pamphlet. One student is translating the work into Japanese. She was in Saga [REDACTED], and is very excited to have a connection with a Japanese school.

How I Plan to Use the Fulbright-Japan Experience

When ESD alumni teachers told us that our trip to Japan would be life changing, I was skeptical. That is a big promise to make. But the teachers were right, my life has been changed by this experience. I think of Japan and the people I came to know many times a day. The food I eat, decorations around me (both souvenirs brought back and the regular addition of flower arrangements to my classroom), things I read, people I communicate with, mannerisms, all have changed in a positive way since this trip.

I was humbled by this experience. I learned much more through my interactions with Japanese teachers, students, and citizens than I could teach. I was impressed by continual shows of generosity, appreciation of nature, attention to detail when serving meals, trust, kindness, politeness, and playful spirit. I'd like to think that these positive traits were added to my personality, and wish that I could again meet the ESD teachers. I feel able to connect with others more readily after being in Japan.

I will continue to publicize the Fulbright-Japan ESD experience. A regional newspaper and the school district website carried stories about my experience. After my students plant a butterfly garden and a Japanese garden (most of the flowers seen in the garden near our hotel in Kobe also grow in California) at school, I will send a press release about ESD and our connections to other schools. Any resulting articles will be forwarded to you.

The display of items sent by the Saga school will permanently be displayed in my classroom, along with the photo from a meeting at the Soja Board of Education.

I will continue to follow and contribute to the ESD Gmail group, and will stay in contact with ESD teachers via email and Facebook. I will continue to stay in touch with my host family and others met in Japan. We have traded letters and photos.

I am enrolled in the Sustainability Education Concepts and Teaching Methods class, mentioned in the Gmail group. It will be good to learn more ways to teach sustainability and enable students to embrace the ideals of sustainability.

Next week I travel to Pacific Grove, California, a migration spot for monarch butterflies. Materials and information from this visit will be passed along to the schools in the collaborative butterfly project.

I took a Japanese language class in the fall, and am on a waiting list for another class. Next year, I will try to return to Japan as a teacher chaperone for a student exchange program. Our city's sister city is Yotsukaido. Eighth grade students spend one week in Japan, then host students here.

I plan to submit a presentation proposal on incorporating ESD lesson in science curriculum for a national meeting of the National Science Teachers Association, and will ask other ESD teachers to collaborate on this.