

The Kohelet Prize
Alternative Energy Exploration Reflection
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I am a fifth grade teacher at Denver Jewish Day School, where I teach writing, science, and math. I design my own writing and science curricula, aligning them with Common Core and Colorado state standards. The Alternative Energy Exploration unit which I designed and led last spring was a great success: it engaged and challenged the students, integrated different disciplines, and promoted critical and creative thinking. Our driving question, “How and why should we use energy resources wisely?” directly addresses Colorado science standards, and the final products and work throughout align with a wide variety of Common Core writing and speaking standards for fifth grade. Students researched sources of energy available to us, determined the one they felt had the best potential, and argued for it in persuasive essays and in a structured debate. They demonstrated understanding through diverse modalities with both individual and group projects. They worked together to create and carry out tikkun olam service-learning plans to make a positive difference in our community’s use of energy. As scientists and writers, students were inspired to consider their effect on the world around them, decide how to best ameliorate potentially negative impact, and take the opportunity to put their ideas into action.

The unit incorporated four major components over a period of nine weeks:

- a persuasive essay arguing for the use of a specific sustainable energy source
- a billboard advertising the power source of each debate team
- a debate to determine the best alternative energy judged by community members and industry experts
- a tikkun olam service-learning project designed, chosen, and executed by the students.

We kicked off the unit by building background knowledge, first learning about what energy is, where it comes from, and how we use it. The fifth grade scientists visited the National Renewable Energy Laboratory in Golden, CO, and investigated the nature and efficacy of various forms of energy. Xcel Energy, Colorado’s energy utility, provided us with energy efficiency information and kits for each student’s home. We conducted experiments, played games, used jigsaw readings, and learned songs to understand the physical concepts of energy and electricity. Students conducted research with library and internet resources, read and interpreted non-fiction texts, and used a note catcher to hold their thinking on each of five different renewable fuel sources: wind, solar, hydroelectric, geothermal, and biomass.

The fifth grade authors wrote persuasive essays. After mini-lessons on types of persuasion (e.g. pathos, ethos, logos, etc.), students considered examples of persuasion around us, and practiced convincing their peers about less vitally important topics (in one case, the merits of Twizzlers vs. M&Ms). We learned how to create and support a thesis statement, and students used an outline scaffold to build the framework of their persuasive essays. The fifth grade writers pushed themselves to

strengthen their critical thinking skills as they analyzed and evaluated their research, drafted their arguments, engaged in peer critiques, revised their work to incorporate responses, received additional teacher feedback, further revised and edited, and submitted their final essay.

In teams, the students created billboards to promote their energy source. Students explored commercial and public service advertisements and other types of visual persuasion. The class discussed why certain images were more convincing, and how our intellectual reasoning might be subverted by attractive packaging or irrelevant celebrity endorsements. They created team logos and included at least one outstanding feature of their energy in their signs. As with the persuasive essays, the billboards went through a process of drafting, critique and feedback, and revision.

Debate teams used their initial individual investigations, and researched further to deepen their critical thinking process. They compiled compelling evidence to support their position on the superiority of a specific renewable energy source, and the flaws of other options. Students learned about debate format, analyzed the facts at hand, composed arguments, evaluated and countered their opponent's potential case against them, and practiced delivering their case. Their hard work was showcased in a debate judged by energy professionals (including a representative from the coal / gas industry, an energy efficiency expert from an energy service company, and a scientist from the National Renewable Energy Laboratory) and community members experienced in debate, in front of an audience of students, family members, teachers, administrators, and other community members.

Our tikkun olam service-learning was driven by student voice and choice. We began by discussing how our service could support our school's middot. To decide on a project, different teams of students used a planner to determine what problems they saw in our community's use of energy, and how they could address them. They created proposals and drafted posters to advocate for their plans. Students engaged in a gallery walk to ask questions and offer feedback about each group's ideas, the groups used the feedback to improve their proposals, and the students voted on their favorites. The winning projects included educating the school community about electricity and water conservation through a poster campaign, performing songs and skits about conservation for the student community, and presenting a petition and proposal for electronic faucets to the administration and board of the school. The latter prompted the school to investigate the financial feasibility of conversion to new automatic faucets. Unfortunately, at this time a full-scale plumbing replacement does not appear to be possible within our budget. The fifth graders' public service campaigns appeared to be quite effective in teaching students throughout the school; many fifth graders had younger students approach them and to report on their successes in conserving resources.

In a unit of this magnitude, there is potential for excellence and failure. I was pleased that we mostly experienced the former, and I learned a great deal from the latter. Most gratifying was that the students were genuinely invested in their learning throughout the

unit. They were passionate in their advocacy of particular energy sources, and were determined to make a difference in their community. They demonstrated a deep understanding of our planet's renewable and nonrenewable resources through the lens of verbal and written persuasion. I was surprised (and not a little disheartened) to learn from their work that there may be drawbacks to every potential renewable energy source, but happy to know that they all can be viable, worthwhile choices for our civilization to pursue.

Most of the weaknesses of the unit seemed to be of degree, not kind. As writers, the fifth graders would have benefitted from more exploration of persuasive essay exemplars; we reviewed several samples, but could have taken more time to understand what worked, what didn't, and why. The authentic audience of judges and observers at our debate raised the stakes for our students considerably, and they truly wanted to impress and make themselves and the audience proud. In the future I would like to provide more formal rehearsal opportunities for the students before the main event, so they feel comfortable and confident with the debate format and what they plan to say. The peer feedback process was vital to improving students' work: both giving and receiving constructive criticism helps students grow as writers and thinkers. I've learned that the process needs even more scaffolding to make it as useful as it has the potential to be, including examining more models of constructive suggestions to emphasize the necessity of focusing on the strengths and needs of the work. Group work, which was a feature of several components of the unit, requires supportive structures and opportunities for communication and process refinement. Although I tried to provide these, I plan to build in dedicated time and space for them in the future, rather than working in support on the fly. Several aspects of the unit would have benefitted from additional time, including one that had to be tabled, much to my chagrin: I had planned for students to create their own models of steam-driven turbines. I would have liked more time to execute the tikkun olam service-learning plans, so students could have put more planning, effort, and craftsmanship into their projects. I would also incorporate more study of the origin of Jewish environmentalism, particularly relationships between the precept of bal tashchit to our own school's middot. I would like to investigate potential learning opportunities with Jewish environmental groups like the Coalition on the Environment and Jewish Life and Jewcology.org.

I debuted the Alternative Energy Exploration unit last year with our fifth graders. The unit comprises a myriad of learning and assessment opportunities that address a variety of intelligences and approaches to learning. It integrates science, writing, reading, tikkun olam, and our middot in a critical approach to one of our planet's greatest challenges. In addition to incorporating these disciplines, the unit could be extended to include social studies based investigations of different cultures' approaches to resource allocation, conservation, and energy use. Students could also delve more deeply into the tradition and history of Jewish environmentalism, including reading and interpreting the relevant Torah, and talmudic and mishnaic texts. Different aspects of this unit may be emphasized at various developmental levels. Younger students can contribute their voice and choice productively with the tikkun olam

service-learning component and would be drawn to more visual/artistic endeavors like the billboard project. Advanced students may engage more fully with the research, analysis, evaluation, and synthesis involved in creating a persuasive essay and debate.

Our students learned and grew as writers, scientists, and critical thinkers throughout the Alternative Energy Exploration unit. Through my experience learning with the students and considerable community and individual reflection throughout, I've developed a more profound understanding of both energy issues and how best to support students in their inquiry process and presentation of their learning. I'm proud of the unit I created, and eager to apply all I've learned to make this year's investigation even more compelling and successful.