

Lesson Plan = "Renewable resources"

This lesson plan uses an oil impeller and sunflower seeds to extract sunflower oil and discuss its uses and impacts. We use a regular bag of birdseed-quality sunflower seeds that most students have seen before (if not, at least all are familiar with the idea of feeding birds), and we use a Pitba hand cranked oil expeller to produce raw sunflower oil. We do this outside and while students take turns at the crank, we discuss where sunflowers could be grown around us, and what impacts it would have on the landscape; further, we discuss the energy involved in growing them. As we start to get 200-300 ml of oil, the discussion turns to the amount of energy the students are providing to extract the oil, and the energy involved in the lamp used to heat the expelling chamber. Also, by this time we have a growing pile of presscake resulting from the expulsion process: what do we do with this? Is it waste, or can we use it in some way? As we wind down with about 500-600 ml of oil, the concept of biodiesel is introduced, and how it can be used for a need such as transportation, such as school buses. Students are encouraged to think about how much energy is involved in just the small amount of oil we extracted versus the many gallons of fuel needed everyday to power just the high school buses - is this a good trade? What are other options?

E.Q. : I understand the flow of energy from resource to utilization, and relate that to costs, both monetary and ecological, of powering our society.

SCOS GOALS & OBJECTIVES: To understand the consequences of our present levels of fuel use, even with renewable resources.

ACTIVATING STRATEGIES : To follow the process of biodiesel production as one example of how we can fuel our society, and tie it to other, often unseen, consequences such as land degradation and waste products.

INSTRUCTIONAL PROCEDURES : Hands-on production of oil from seed to see the process, see the end result and byproduct, and to physically connect with the otherwise abstract idea of energy to produce energy by turning the crank (it takes some force).

ASSESSMENT STRATEGIES : Summative through written exercise to discuss individual views on energy consumption and renewable resources.