

# Infusion Tips

The late Dick Brinckerhoff suggested the following criteria for ways to infuse societal topics into our science courses: items should be a) challenging, b) relevant, c) brief, and d) require a value judgment. Consider the following:

An article in *The New York Times* on 8 September 2006, titled "Redesigning Crops to Harvest Fuel," certainly presents a societally-related science topic requiring a judgment. With ethanol viewed as an eventual replacement for oil as a transportation fuel, biotechnology is now being brought to bear in a number of ways: increasing the yield per acre of ethanol-producing crops, designing the crop to increase its production of ethanol or the efficiency with which ethanol can be produced. On the other hand, there is concern about cross-breeding of bioengineered crops with already-existing varieties that could endanger them. For example, reducing the lignin in crops would increase their ethanol yield, but trees in standing forests need lignin to stand up. Bioengineering corn to produce its own amylase to convert its starch to sugar would facilitate ethanol production but would not be desirable in a food crop. Depleting the soil by repeated growing of corn without crop rotation is also undesirable. Even converting the entire corn crop to ethanol production would replace only about 15 percent of present petroleum use. What kind of restrictions need to be imposed on the bioengineering of crops to meet energy needs?