



# Moody's Mega Math Challenge 2008

A contest for high school students

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## Energy Independence Meets the Law of Unintended Consequences

The replacement of gasoline by ethanol, particularly corn-derived ethanol, is an important element of U.S. energy independence. The increased production of corn-derived ethanol has led to a dramatic unanticipated rise in farm commodity prices. Because corn is a staple food for many countries, this has raised serious concerns about future food supplies in developing nations.

There are many background articles on energy independence, such as “Who’s Fueling Whom?” by Richard Conniff in the November 2007 issue of *Smithsonian*  
<<http://www.smithsonianmag.com/science-nature/presence-biofuel-200711.html>>.

Your team has been asked by your local newspaper to discuss the issues and quantify the concerns. Among the issues you should discuss are the following:

1. How much ethanol is needed to replace 10% of annual U.S. gasoline usage?
2. What effect will this fuel substitution have on carbon dioxide emissions?
3. Is corn-derived ethanol a cost-efficient way of producing fuel?
4. Estimate the effect of this policy on grain prices and developing nations over the next five years.
5. Are there better ways for the U.S. to attain national energy independence?

Develop and defend your models, cite sources for your data, and justify your conclusions.

Your Summary (in the form of a newspaper article) should present your results and the methodology used to develop them, and indicate the extent of uncertainty in your conclusions.