Fuel Comparison Worksheet

Complete this worksheet by supplying for each fuel, the missing molar masses, H to C, and O to H ratios, and the kJ of energy released per gram of fuel that burns. Set your printer to Landscape mode to print this page.

Combustion fuel	Molar mass of fuel	H to C ratio	O to H ratio	kJ released per mole of fuel burned	kJ released per gram of fuel burned (see p 179)
carbohydrates					
$C_6H_{12}O_6$ (glucose)				2800	
$C_{12}H_{22}O_{11}$ (table sugar)				5640	
C_2H_5OH (ethanol)				1370	
wood	---	typical carbohydrate	typical carbohydrate	---	10-15
coal $C_{135}H_{96}O_9NS$				---	30
oil/natural gas					
C_8H_{18} (gasoline)				5450	
C_2H_6 (nat. gas)				1560	
CH_4 (nat. gas)				---	50 (p 179)
hydrogen, H_2				240	

Provide answers for the following questions, using your completed table and information from pp. 178-9 and Sec. 4.6-4.8 and 4.10. Defend your answers below with clear reference to information from your completed table above.

1. Why is energy per gram important for comparing fuels?
2. What effect does higher O content have on energy per gram?
3. What effect does higher H to C ratio have on energy per gram?
4. Which fuel will produce more H_2O and less CO_2?
5. Which fuel is likely to produce undesirable pollutants?
6. What advantage does a higher O content offer?

7. Why does the human body store unused sugar as fat (Hint: Sec. 11.10), and how is this related to information summarized in the above table?