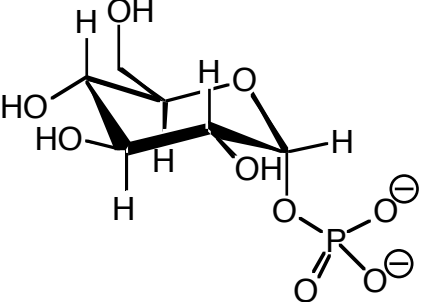
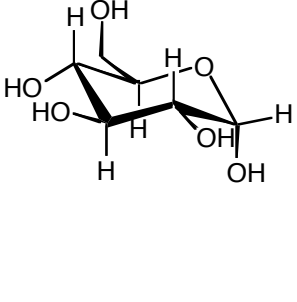
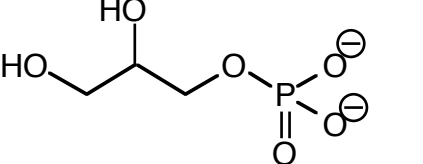
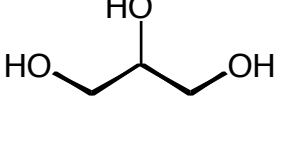


Phosphorylated Biological Energy Carriers... the myth of ATP revealed!

Or, how the chemist analyzes the energy carrying capacity of molecules:

It's the Leaving Group, man!

Name Free Energy of Hydrolysis Type of phosphate group	Structure	Leaving Group	Additional Chemistry Happening to LG (usually very favorable acid-base rxns)
phosphoenolpyruvate -14.8 kcal/mole (phospho-enol ester)			
1,3-diphosphoglycerate -11.8 kcal/mole (mixed anhydride)			
acetyl phosphate -11.3 kcal/mole (mixed anhydride)			
phosphocreatine -10.3 kcal/mole (phosphoramidate)			
adenosine triphosphate: ATP -7.5 kcal/mole (phosphoric anhydride)			Note: ATP ---> ADP and ADP ---> AMP are similar; AMP does not readily hydrolyze to adenosine.

<p>glucose-1-phosphate -5.0 kcal/mole (phosphate ester with an acetal)</p>			
<p>glycerol-3-phosphate -2.2 kcal/mole (simple phosphate ester)</p>			

Note: The leaving group leaves from a phosphate group wherein the P=O is analogous to C=O in the carboxylic acid family. The free energy of hydrolysis is ΔG° for the reaction of each molecule with water under certain standard conditions which facilitates comparisons. None of these would be hydrolyzed directly *in vivo* but would trade phosphate groups with each other or other molecules. The entries at the top of the table have the greatest ability to donate phosphate.