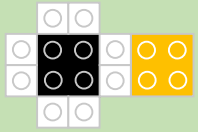


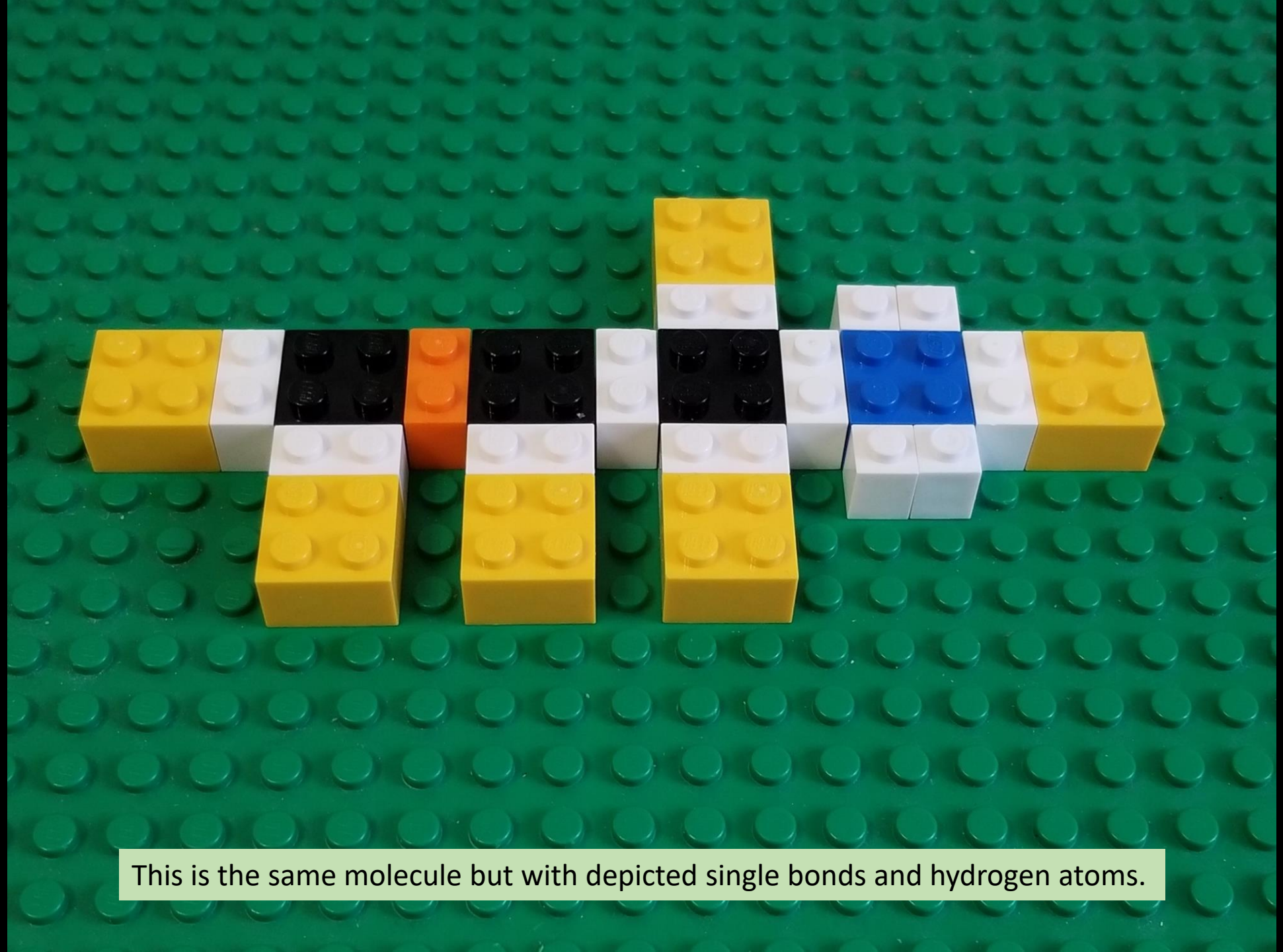
Organic Chemistry



rick y rick

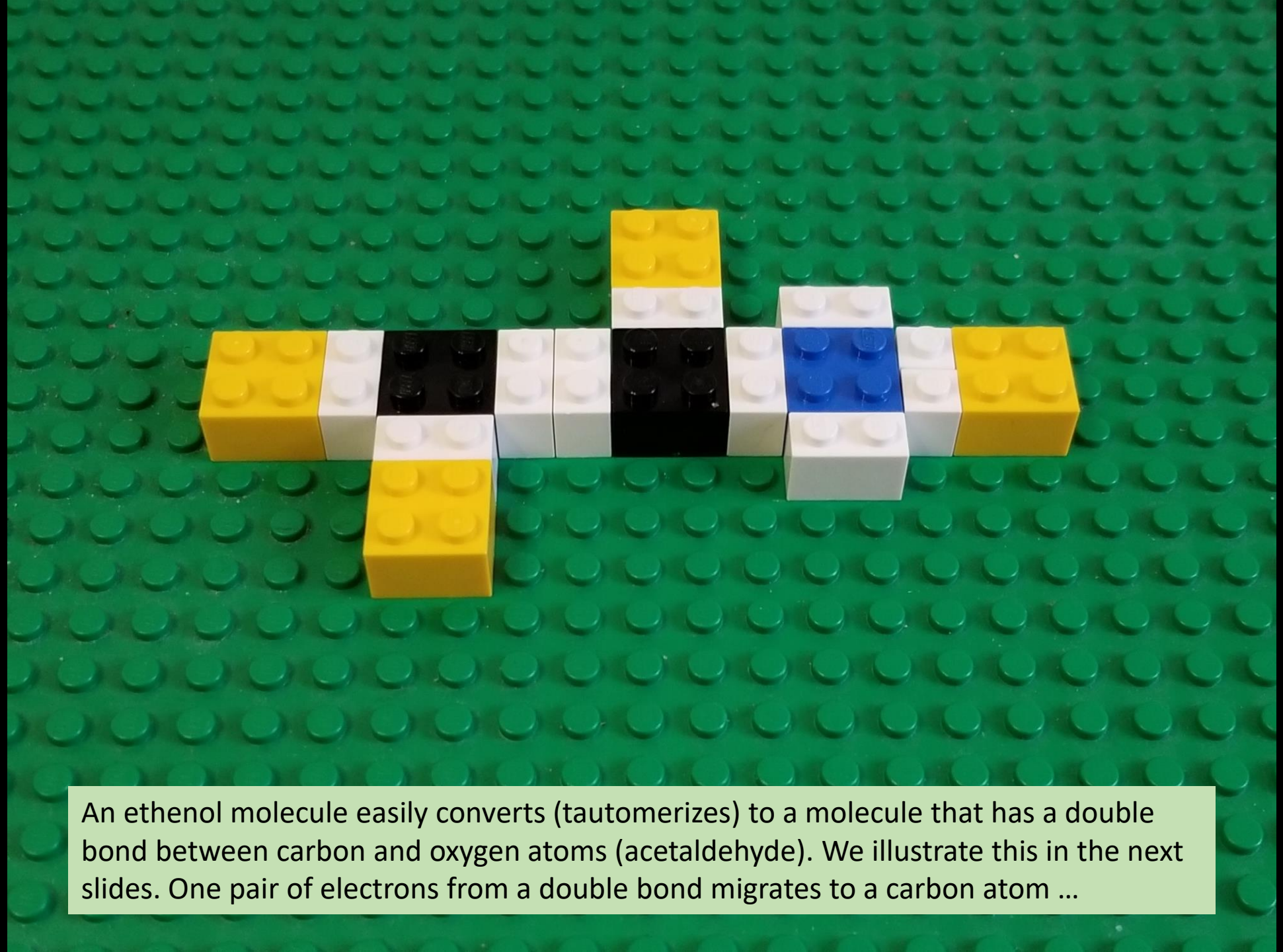
Part 10

This is an example of an alkenol (an alcohol molecule with a double bond) – prop-2-en-1-ol (**CH_2=CH-CH_2-OH**).



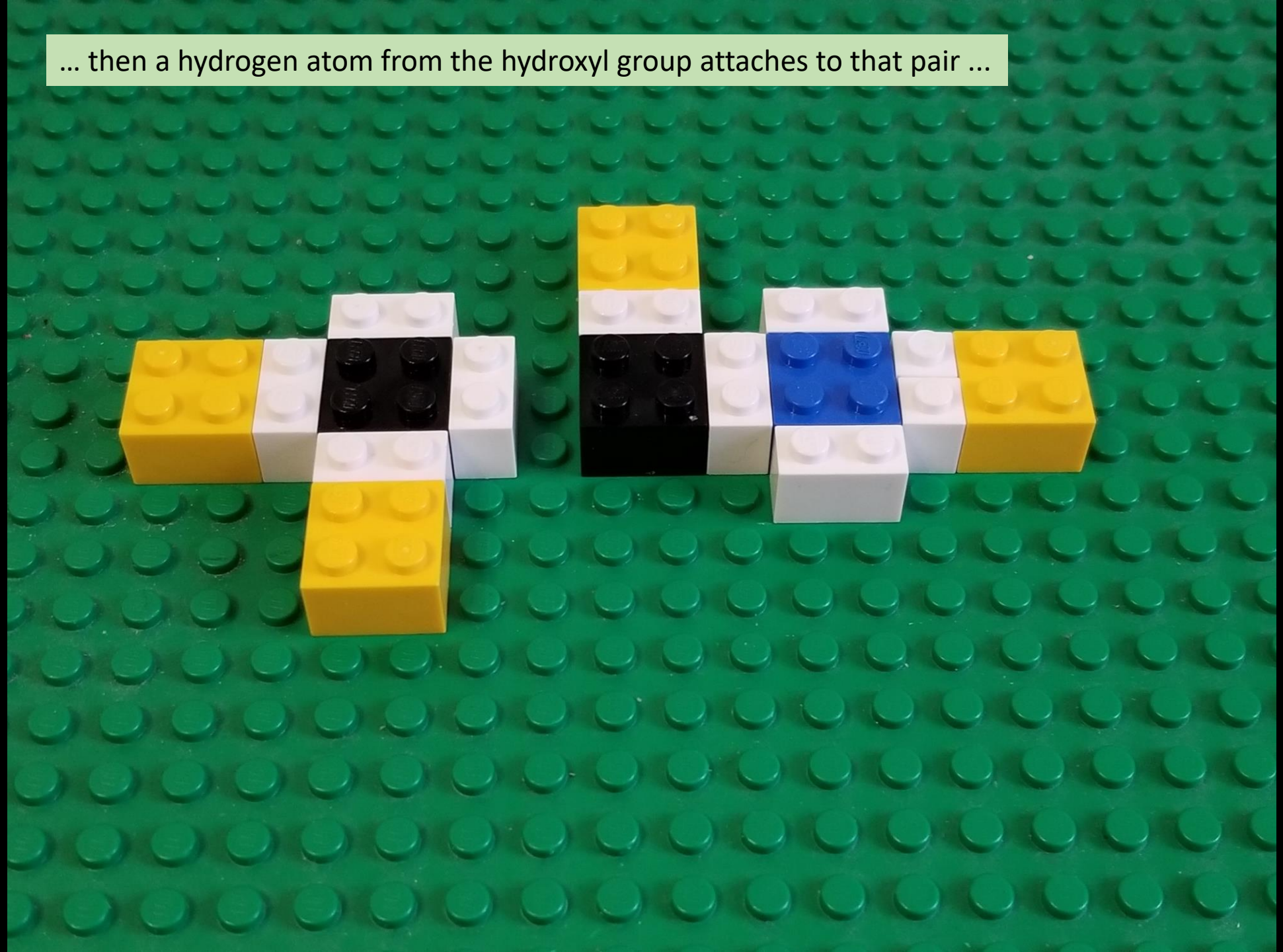
This is the same molecule but with depicted single bonds and hydrogen atoms.

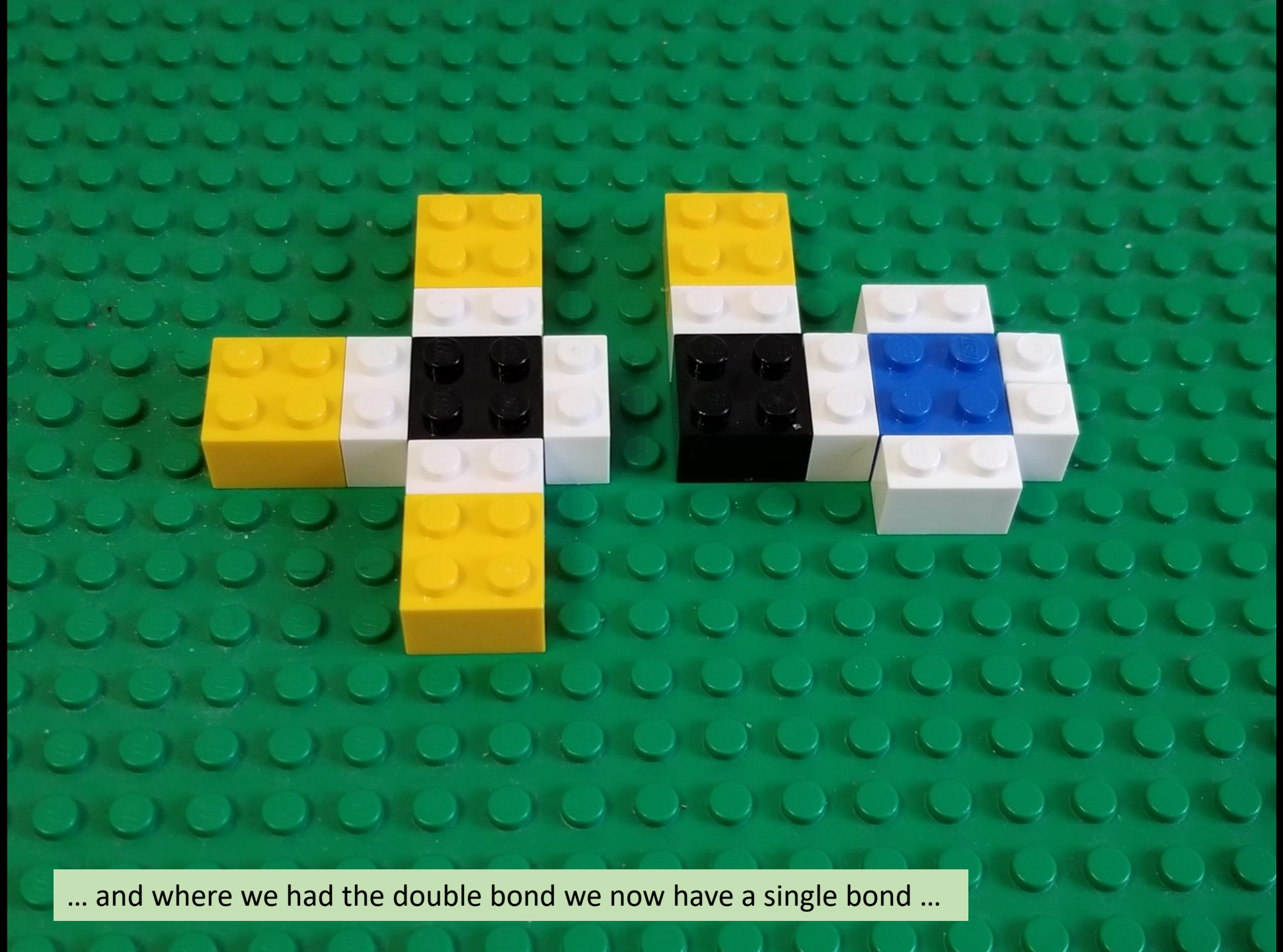
This is a molecule of vinyl alcohol (ethenol, **CH_2=CH-OH)**.



An ethenol molecule easily converts (tautomerizes) to a molecule that has a double bond between carbon and oxygen atoms (acetaldehyde). We illustrate this in the next slides. One pair of electrons from a double bond migrates to a carbon atom …

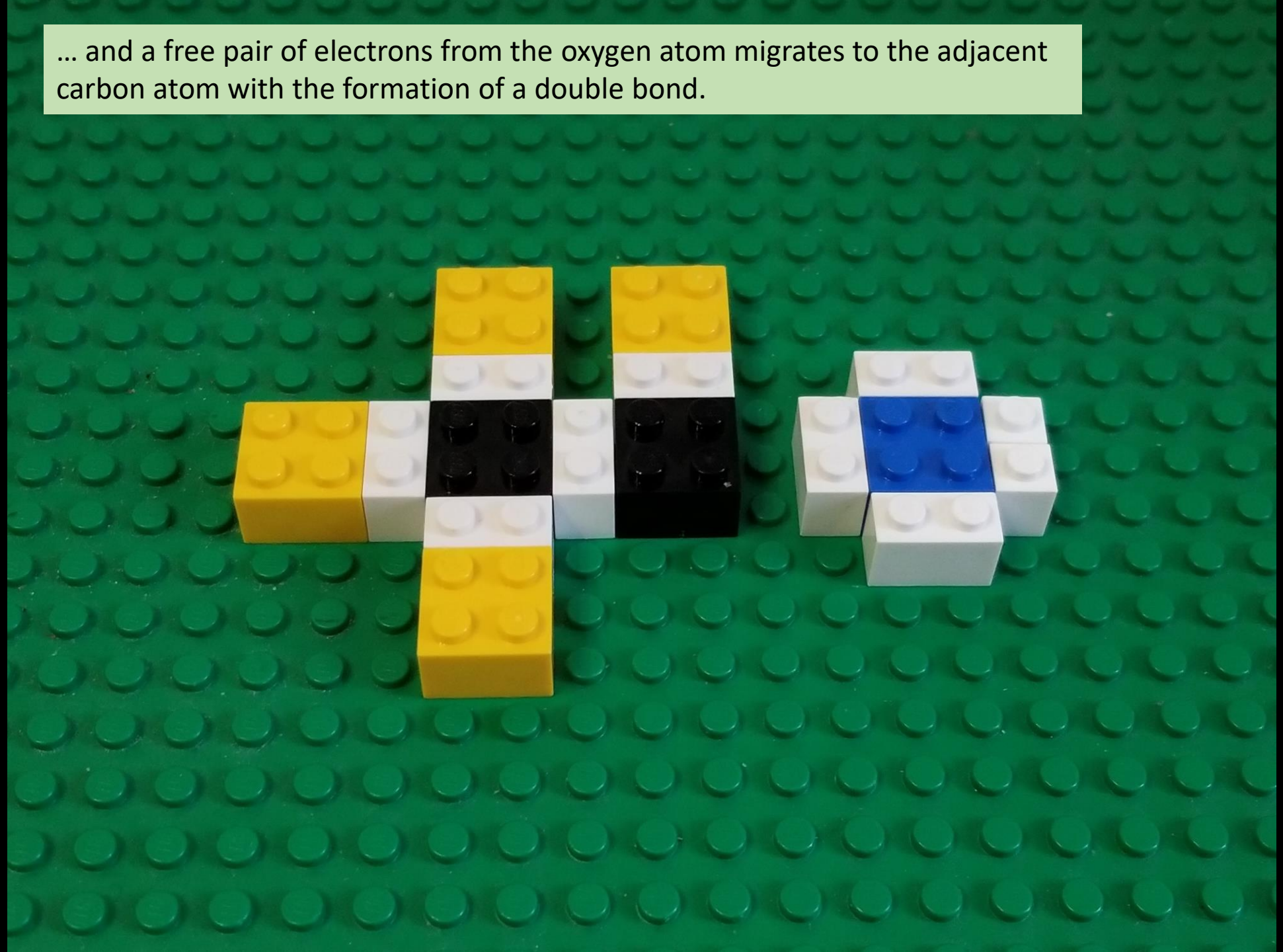
… then a hydrogen atom from the hydroxyl group attaches to that pair ...

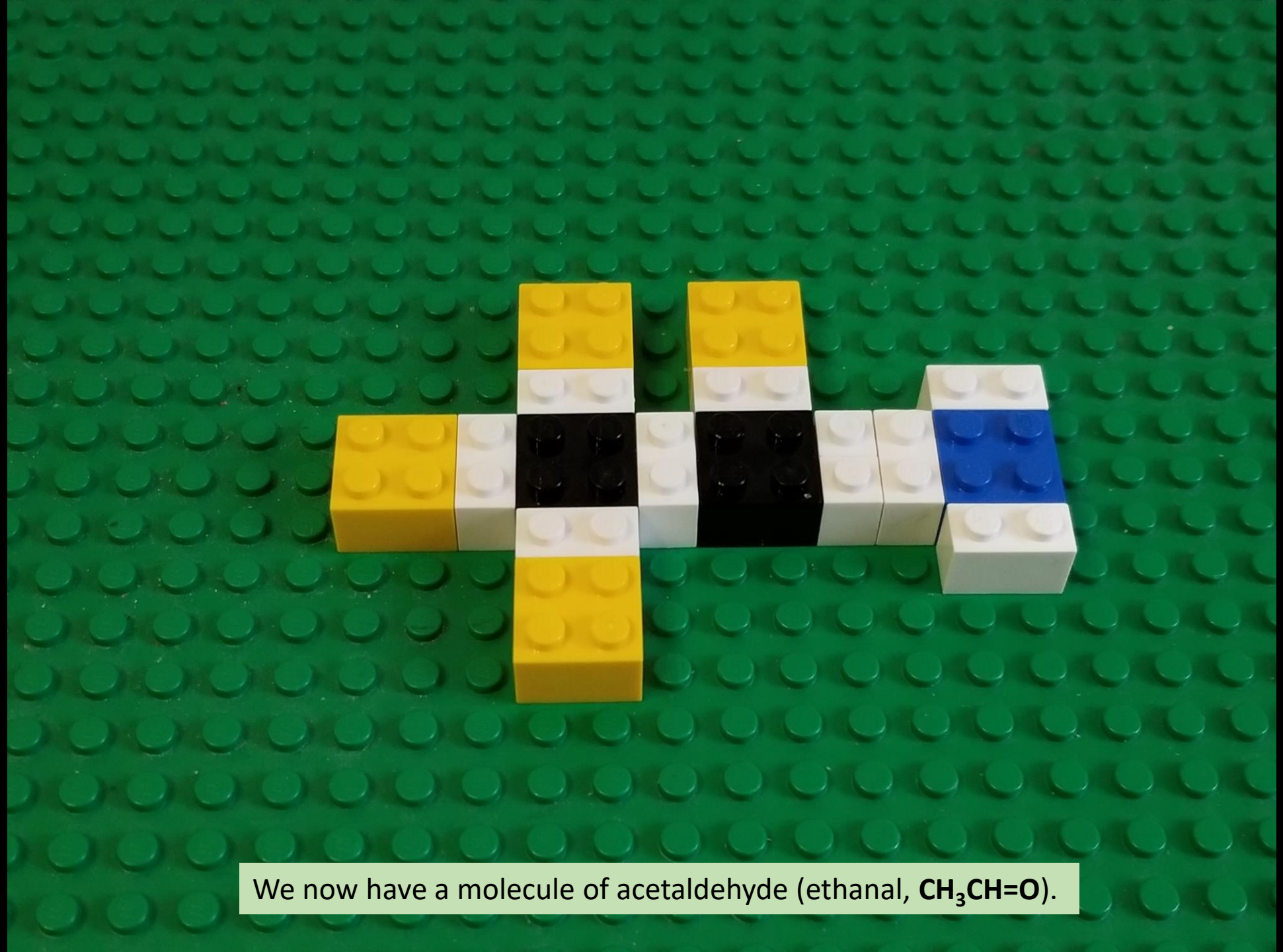




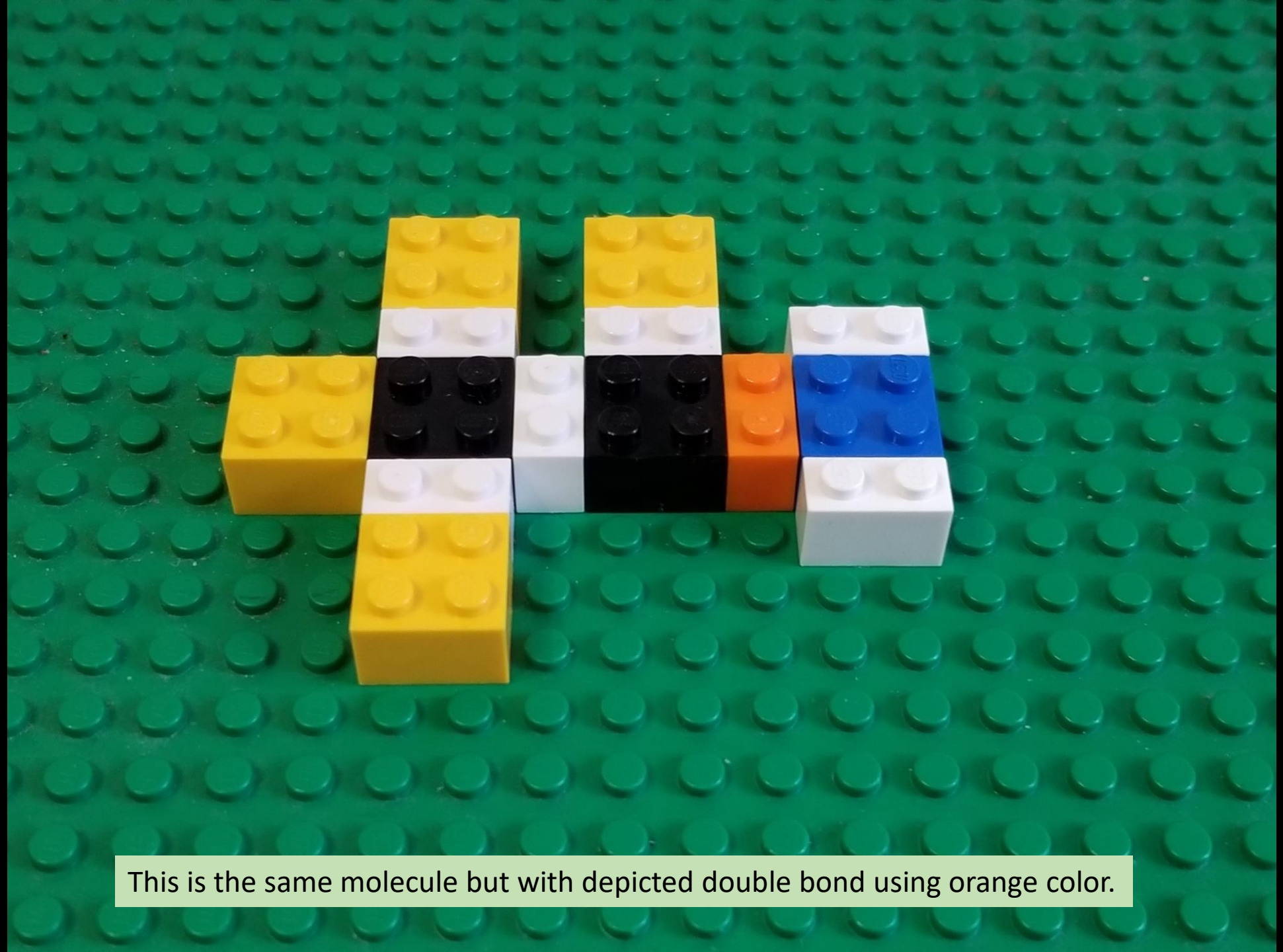
… and where we had the double bond we now have a single bond …

… and a free pair of electrons from the oxygen atom migrates to the adjacent carbon atom with the formation of a double bond.

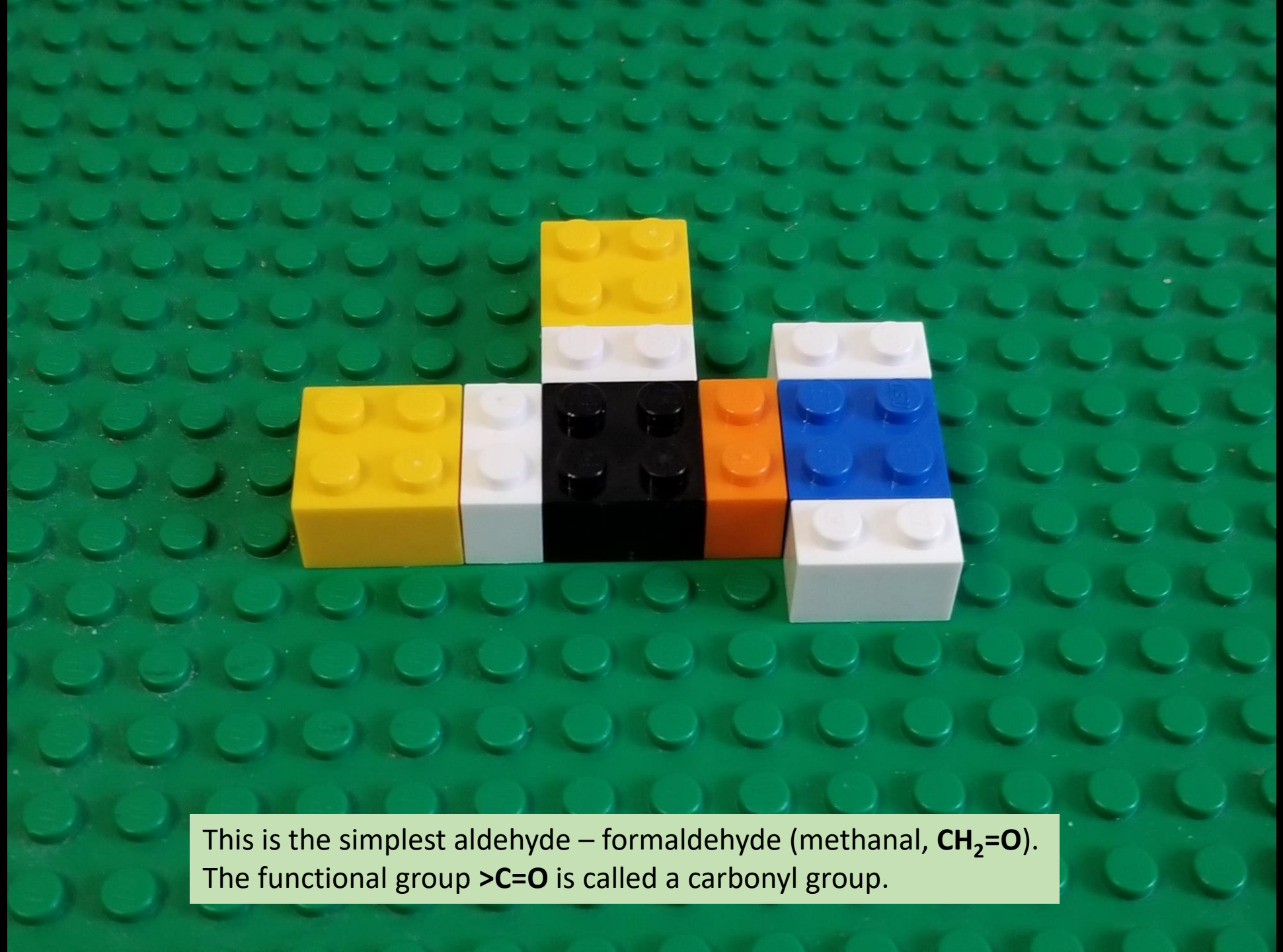




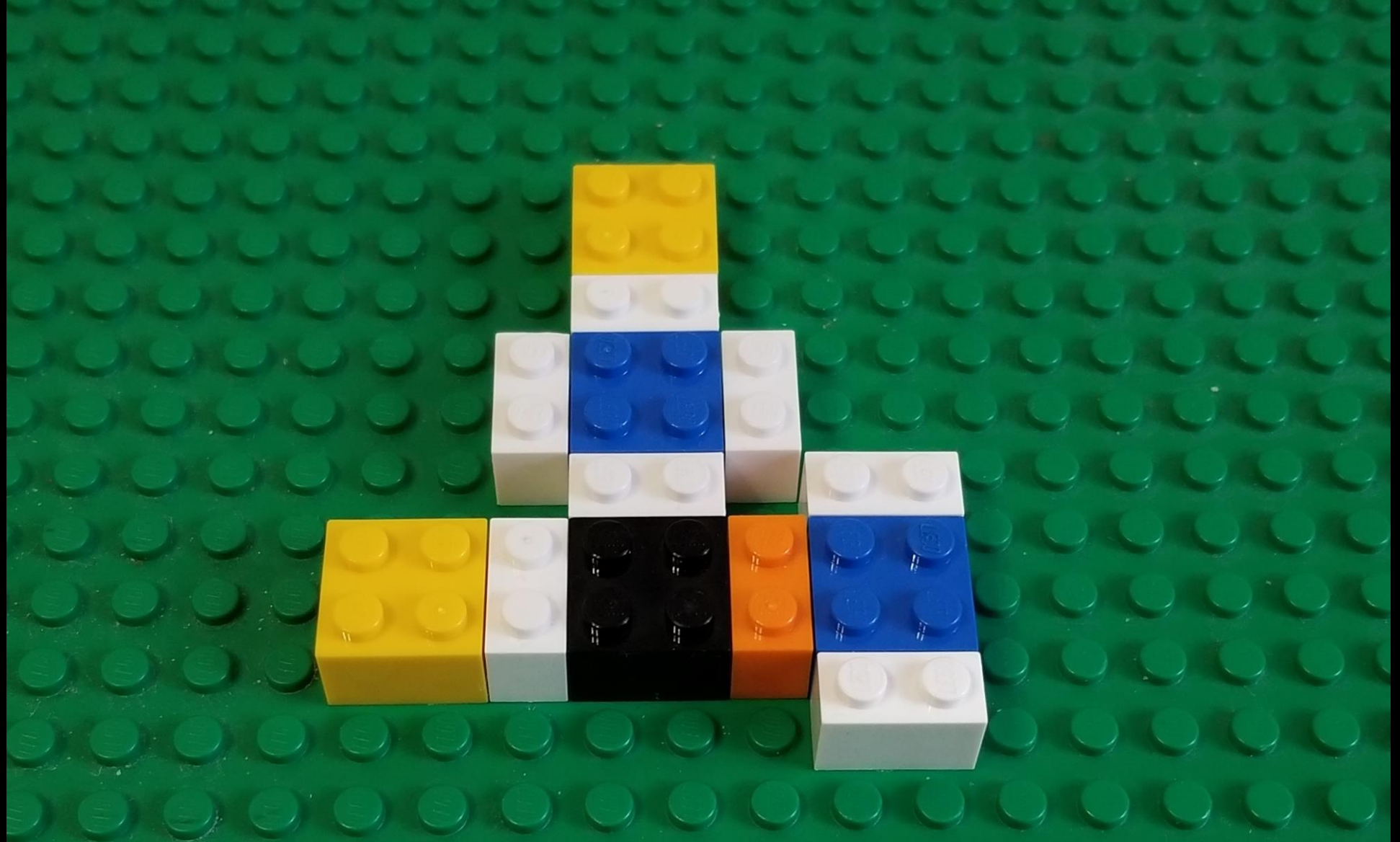
We now have a molecule of acetaldehyde (ethanal, **$CH_3CH{=}O$**).



This is the same molecule but with depicted double bond using orange color.

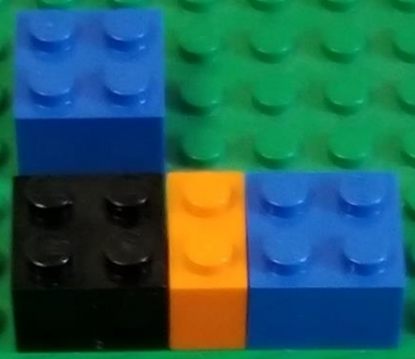


This is the simplest aldehyde – formaldehyde (methanal, **CH_2=O**).
The functional group **>C=O** is called a carbonyl group.



This is an example of a carboxylic acid – a formic acid (methanoic acid, **HCOOH**). The functional group **-COOH** is called a carboxyl group. It “contains” a carbonyl (**>C=O**) and hydroxyl groups (**-OH**).

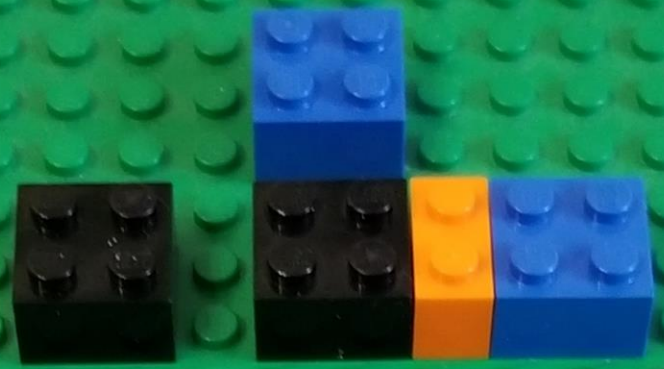
Methanoic acid (**HCOOH**)



Methanal (**HCHO**)

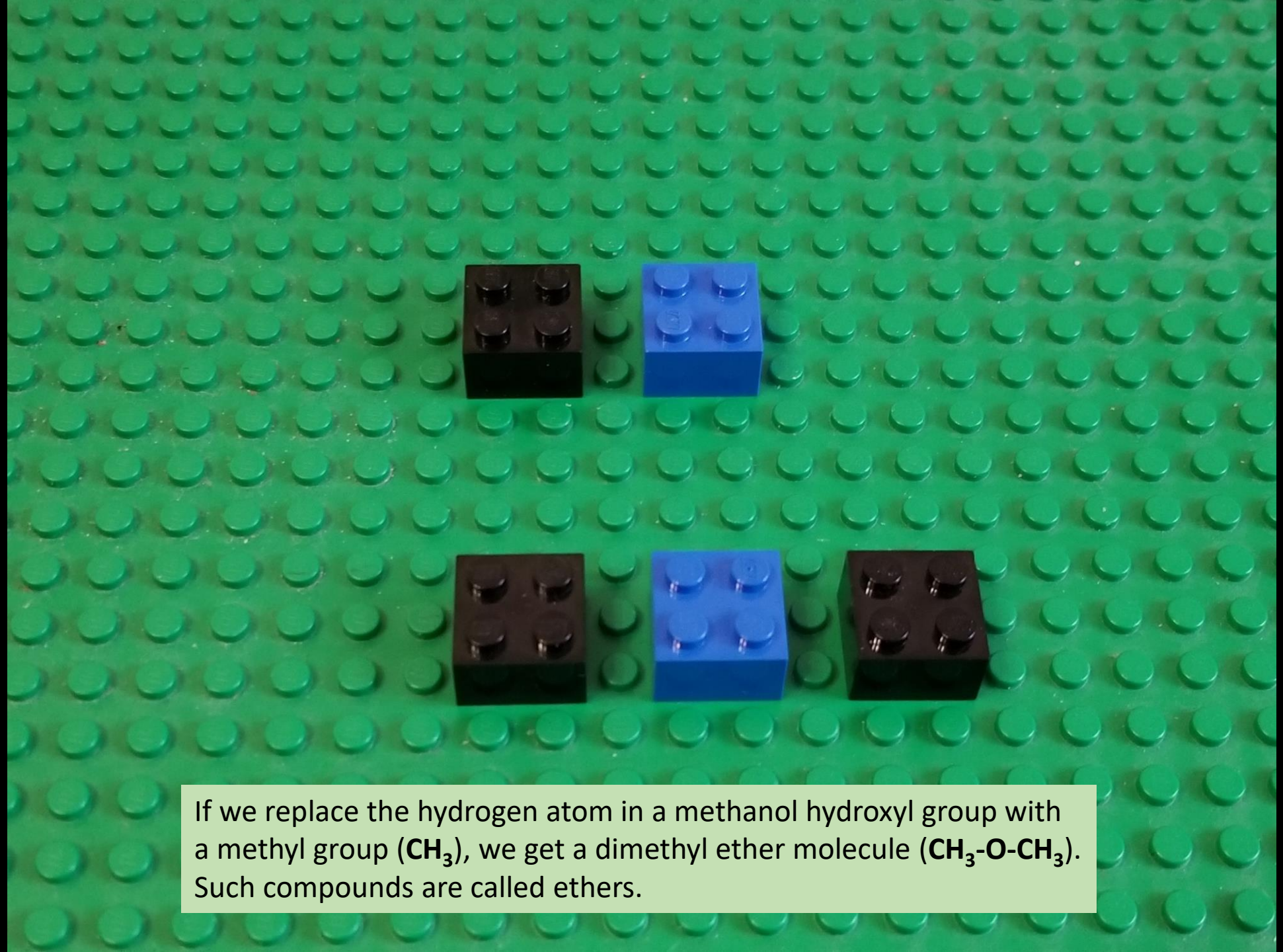
Methanol (**CH_3OH**)

Acetic acid (ethanoic acid, **CH_3COOH**)

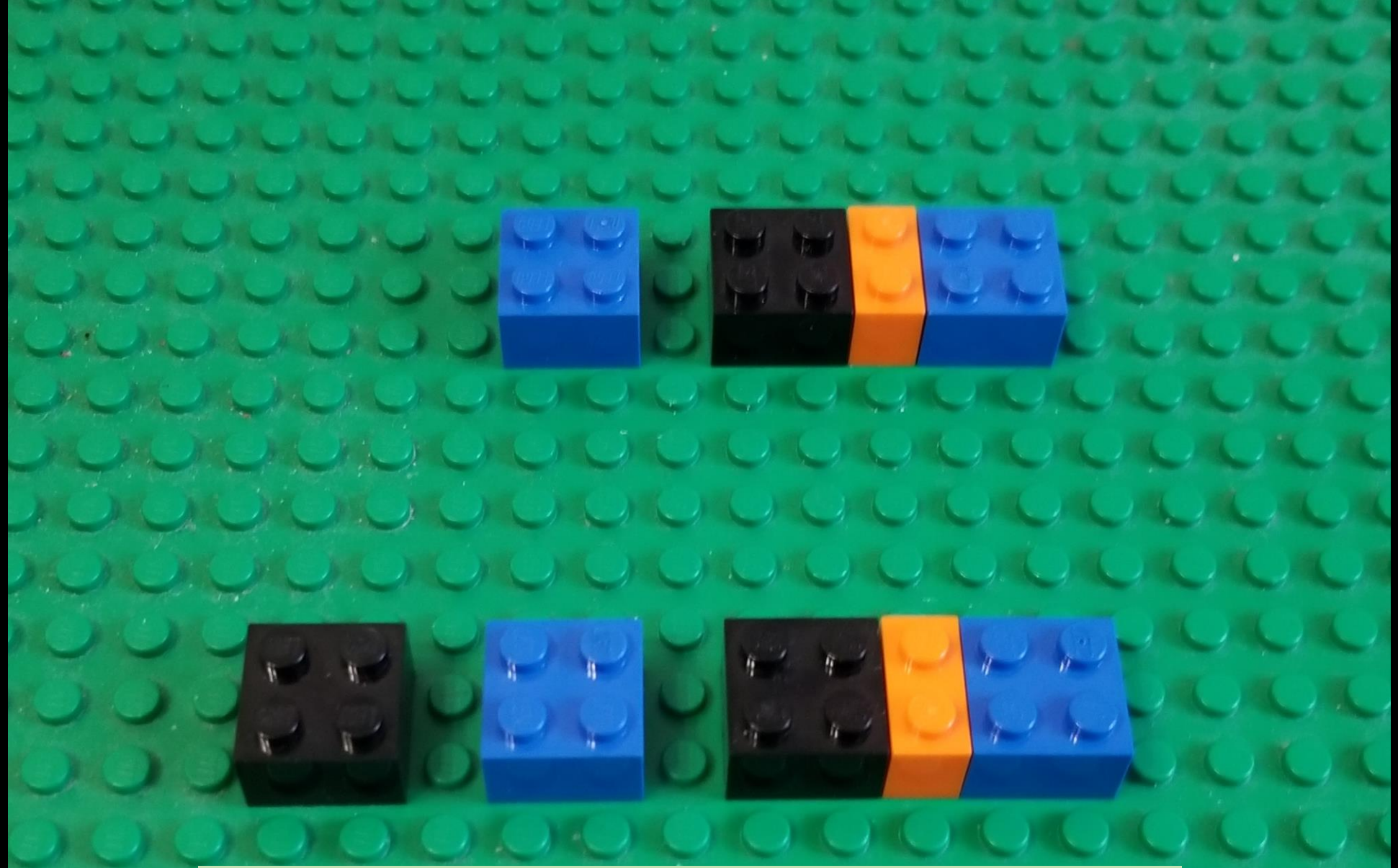


Acetaldehyde (ethanal, **CH_3CHO**)

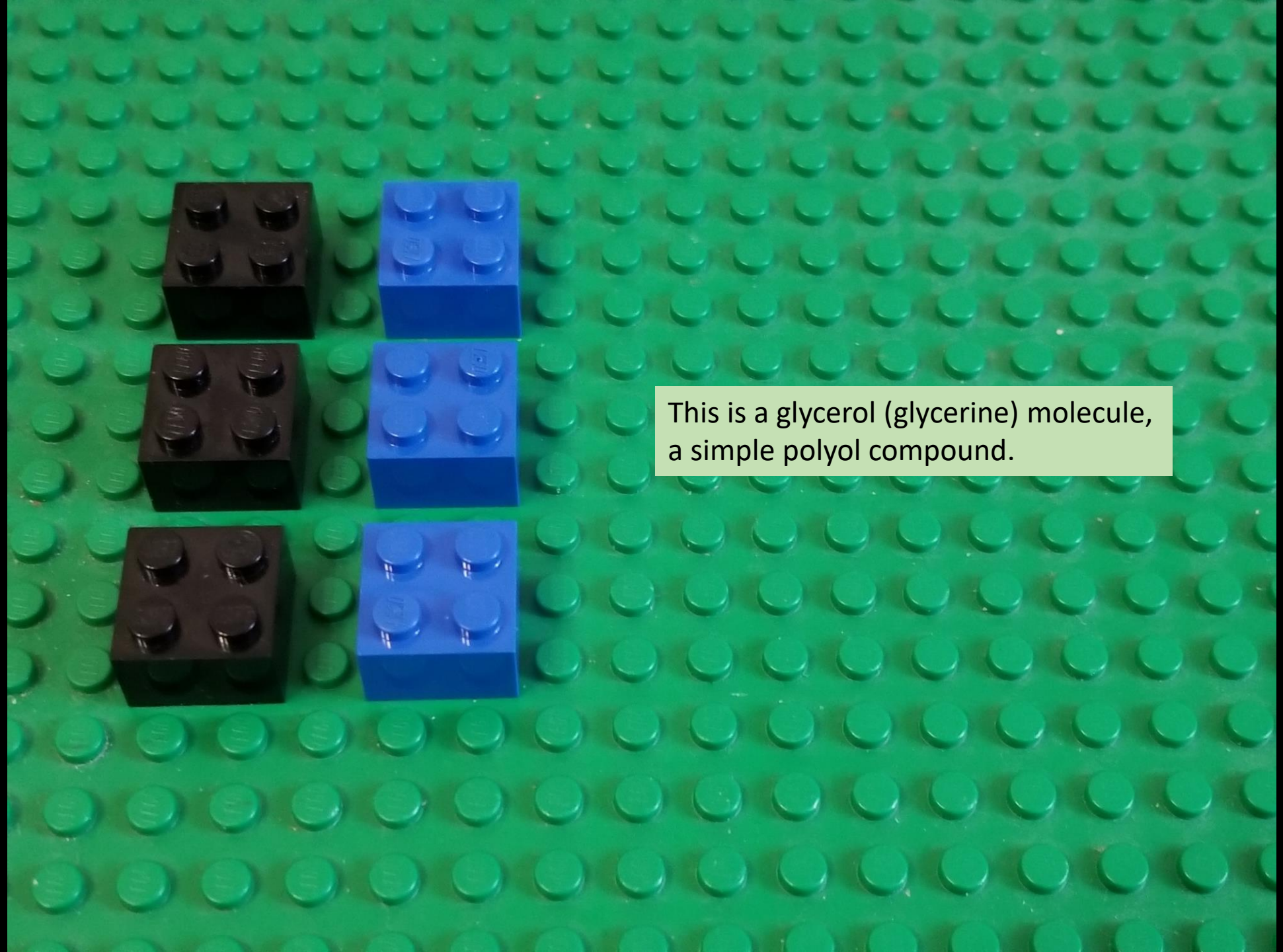
Ethanol (**CH_3CH_2OH**)



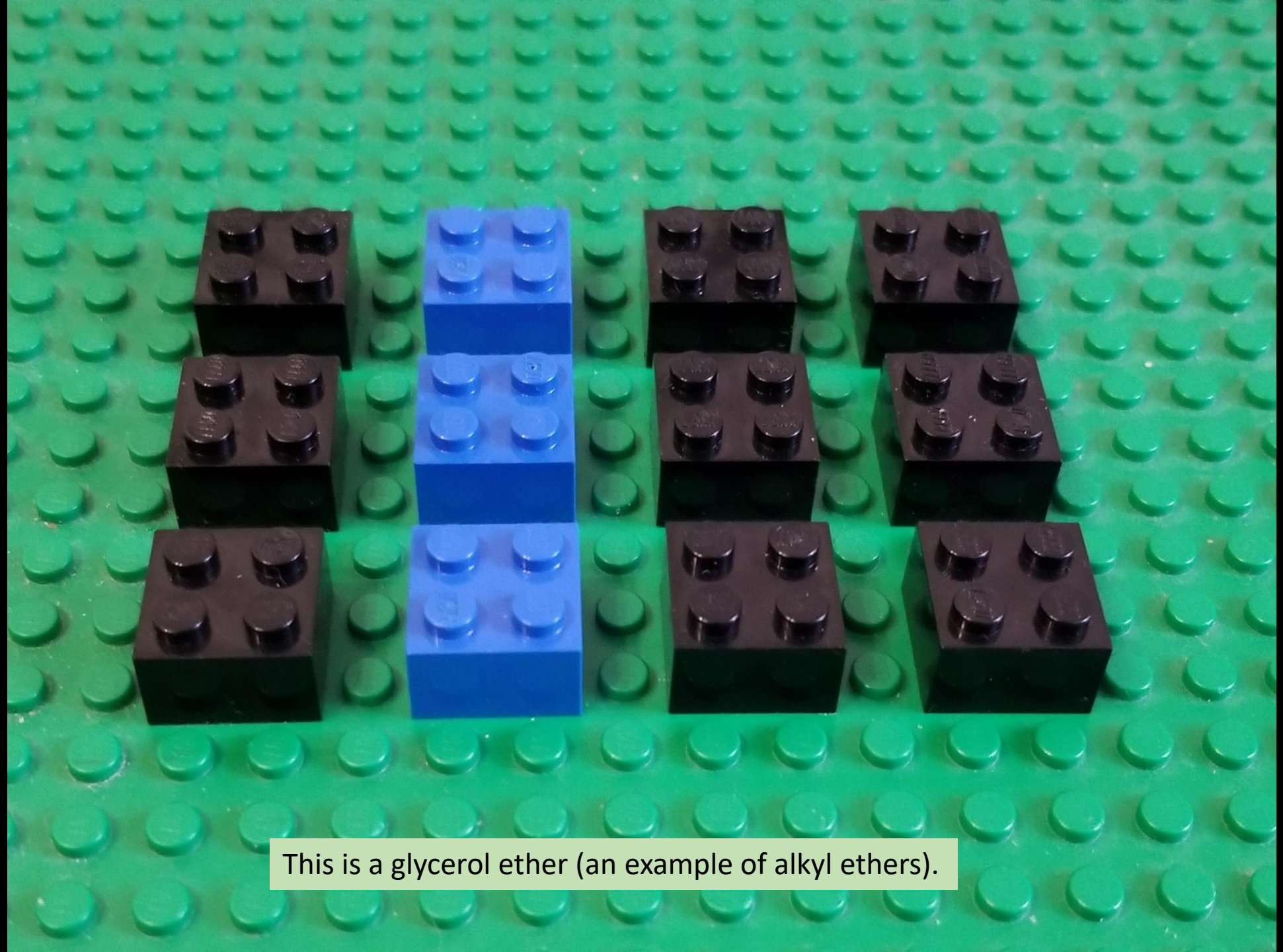
If we replace the hydrogen atom in a methanol hydroxyl group with a methyl group ($\mathbf{CH_3}$), we get a dimethyl ether molecule ($\mathbf{CH_3\text{-}O\text{-}CH_3}$). Such compounds are called ethers.



If we replace the hydrogen atom in a methanoic acid carboxyl group with a methyl group ($\mathbf{CH_3}$), we get a methyl formate molecule (methyl methanoate, $\mathbf{HCOOCH_3}$). Such compounds are called esters.

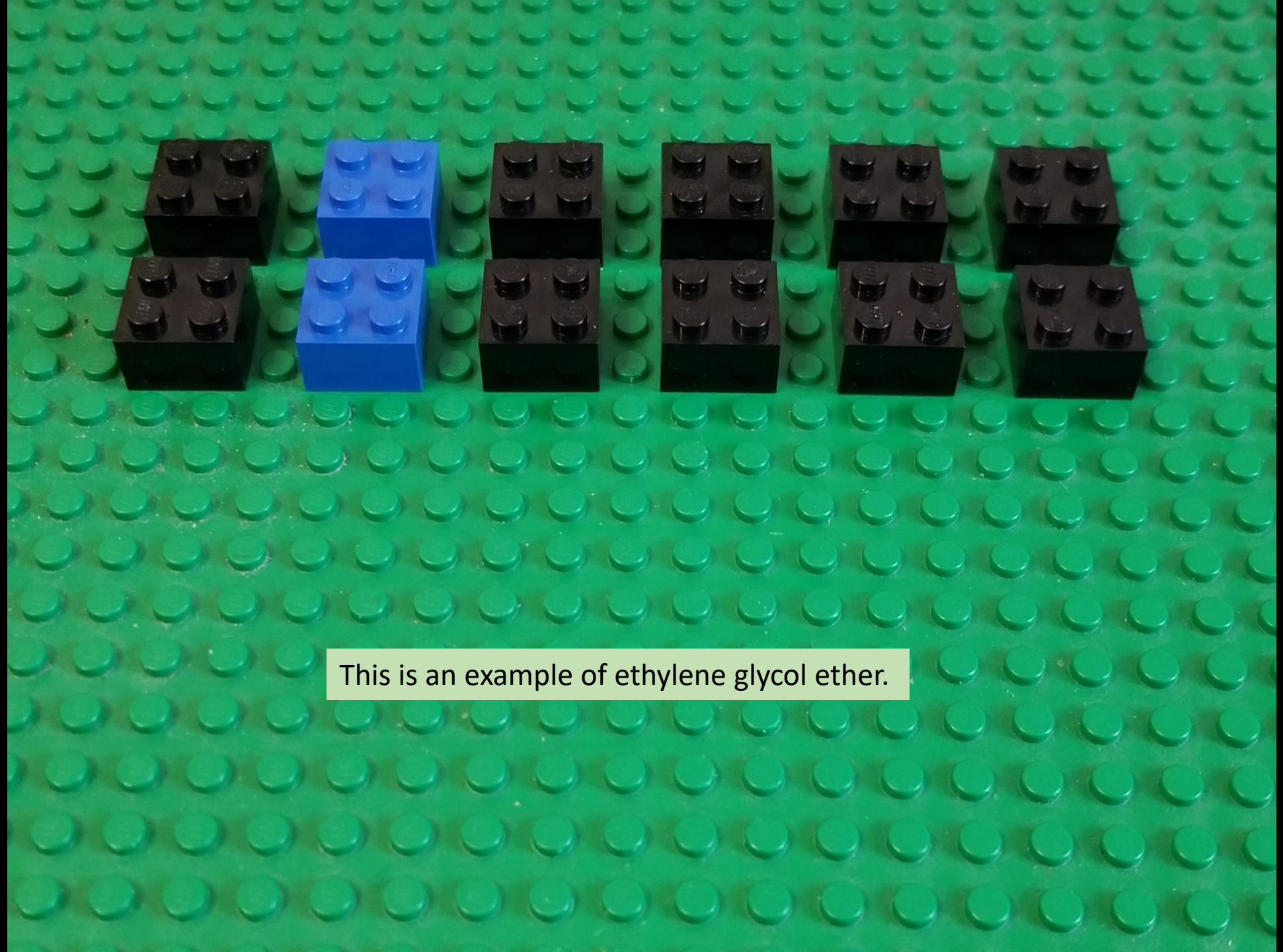


This is a glycerol (glycerine) molecule, a simple polyol compound.

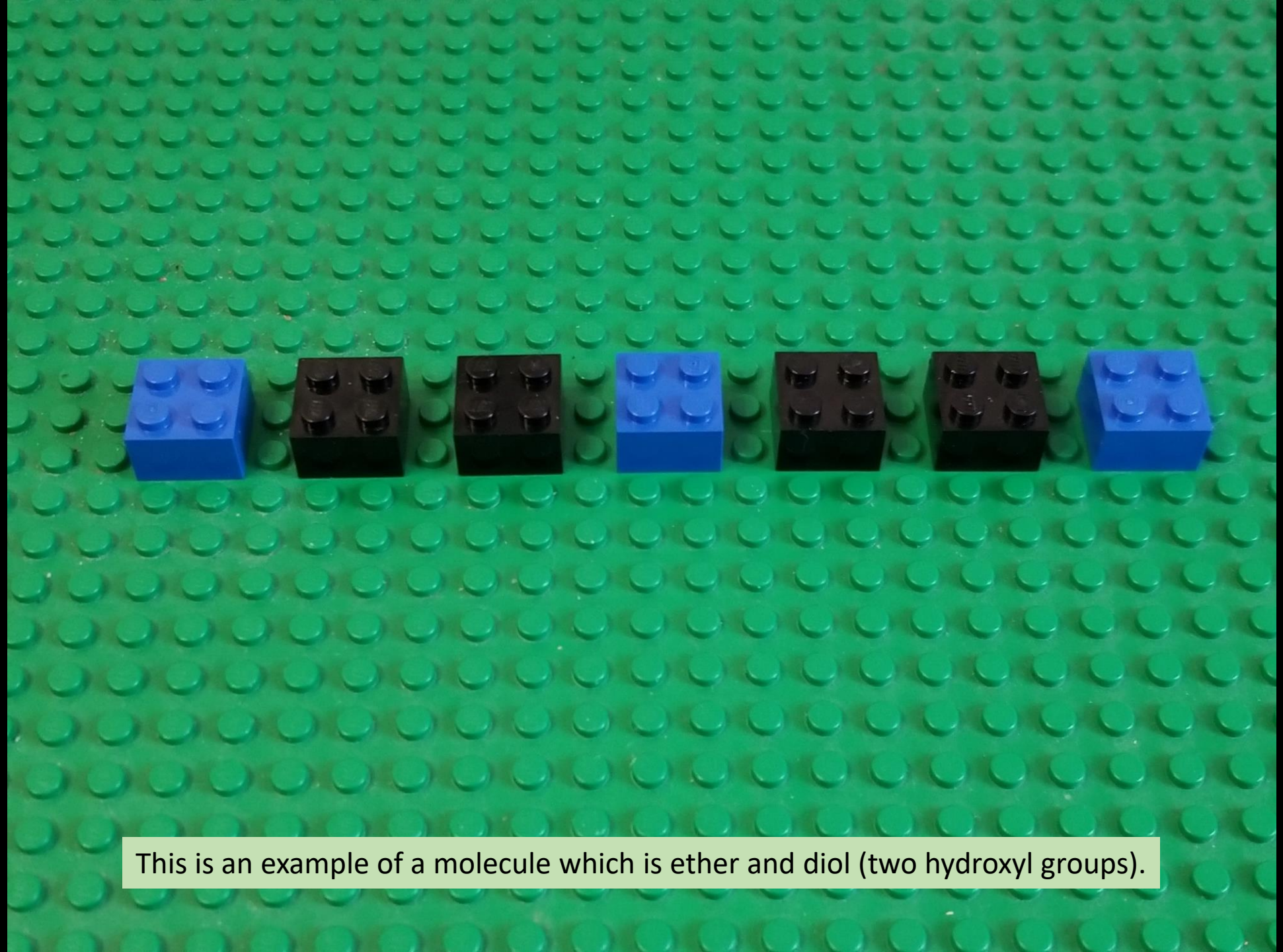


This is a glycerol ether (an example of alkyl ethers).

This is another example of glycerol ethers.



This is an example of ethylene glycol ether.



This is an example of a molecule which is ether and diol (two hydroxyl groups).

Continued with Part 11