

Organic Chemistry



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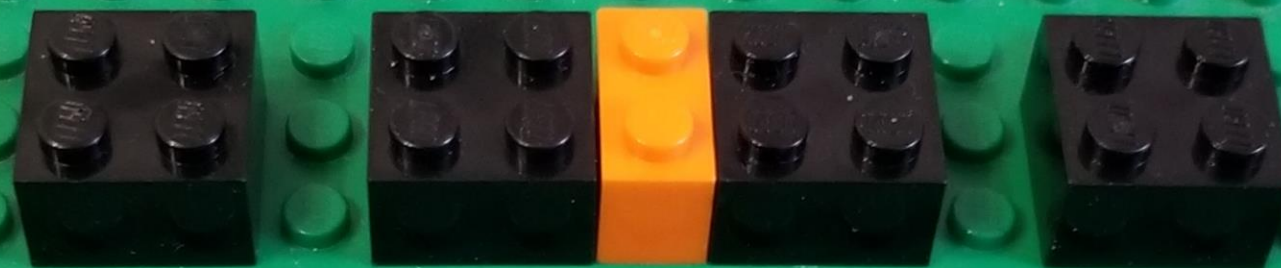
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Part 11

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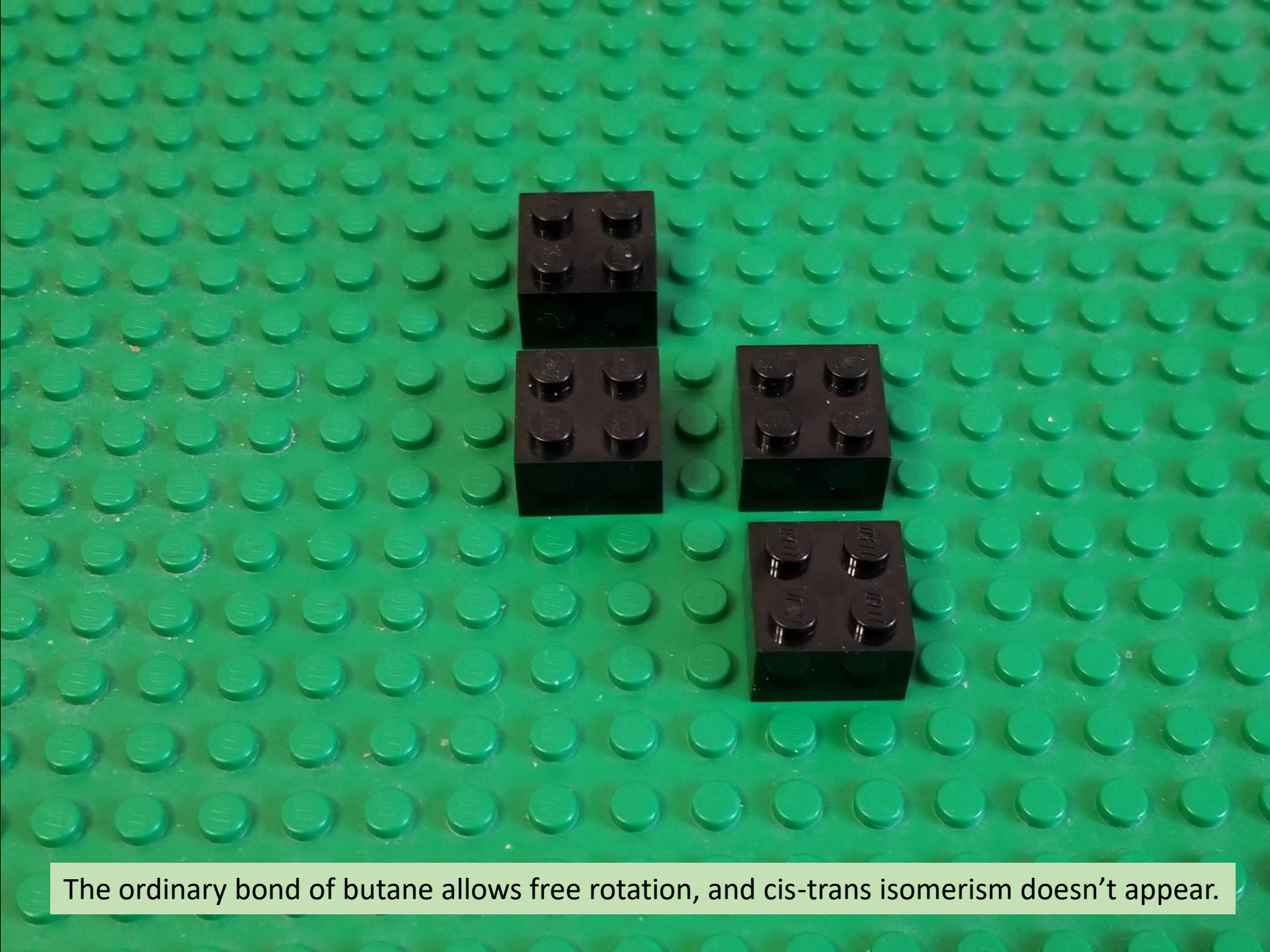
We now look at geometric isomerism. The double bond between carbon atoms is rigid and doesn't allow rotation.



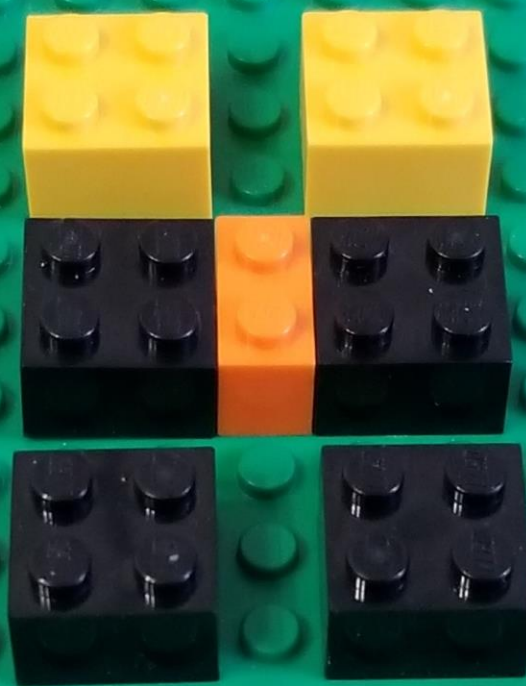
As a result, cis-isomer of 2-butene exists independently from ...

... the trans-isomer of 2-butene.





The ordinary bond of butane allows free rotation, and cis-trans isomerism doesn't appear.



This is a cis-2-butene molecule with shown hydrogen atoms.

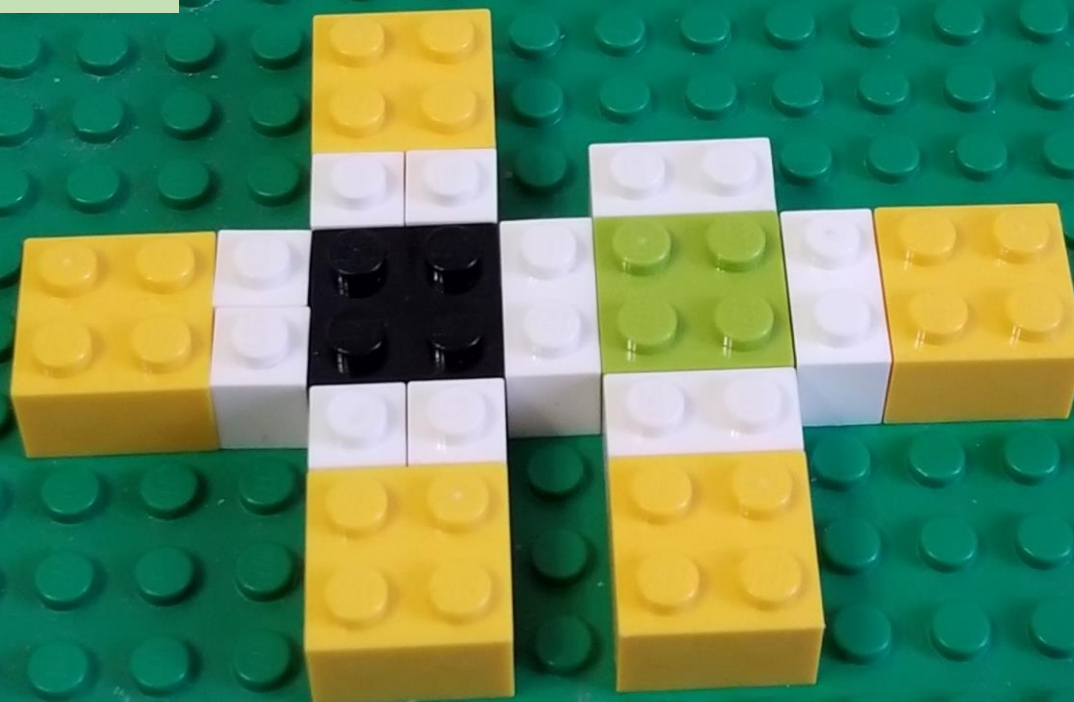
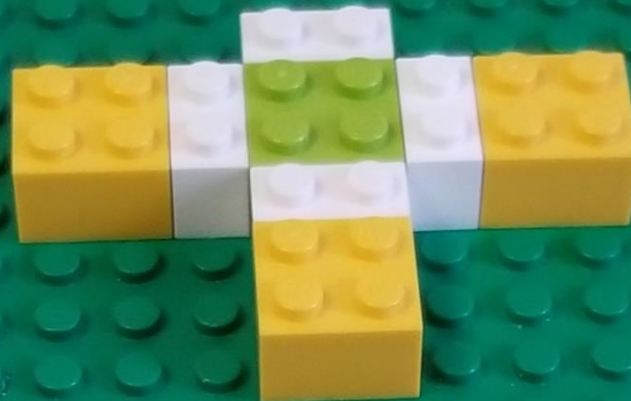


This is a trans-2-butene molecule with shown hydrogen atoms.



If we replace a hydrogen atom in hydrogen cyanide (H-CN) with a methyl group (CH_3), we get acetonitrile ($\text{CH}_3\text{-C}\equiv\text{N}$). Compounds having $\text{C}\equiv\text{N}$ group are called nitriles.

If we replace a hydrogen atom in ammonia (NH_3) with a methyl group (CH_3), we get methylamine ($\text{CH}_3\text{-NH}_2$). Compounds having NH_2 group are called amines.

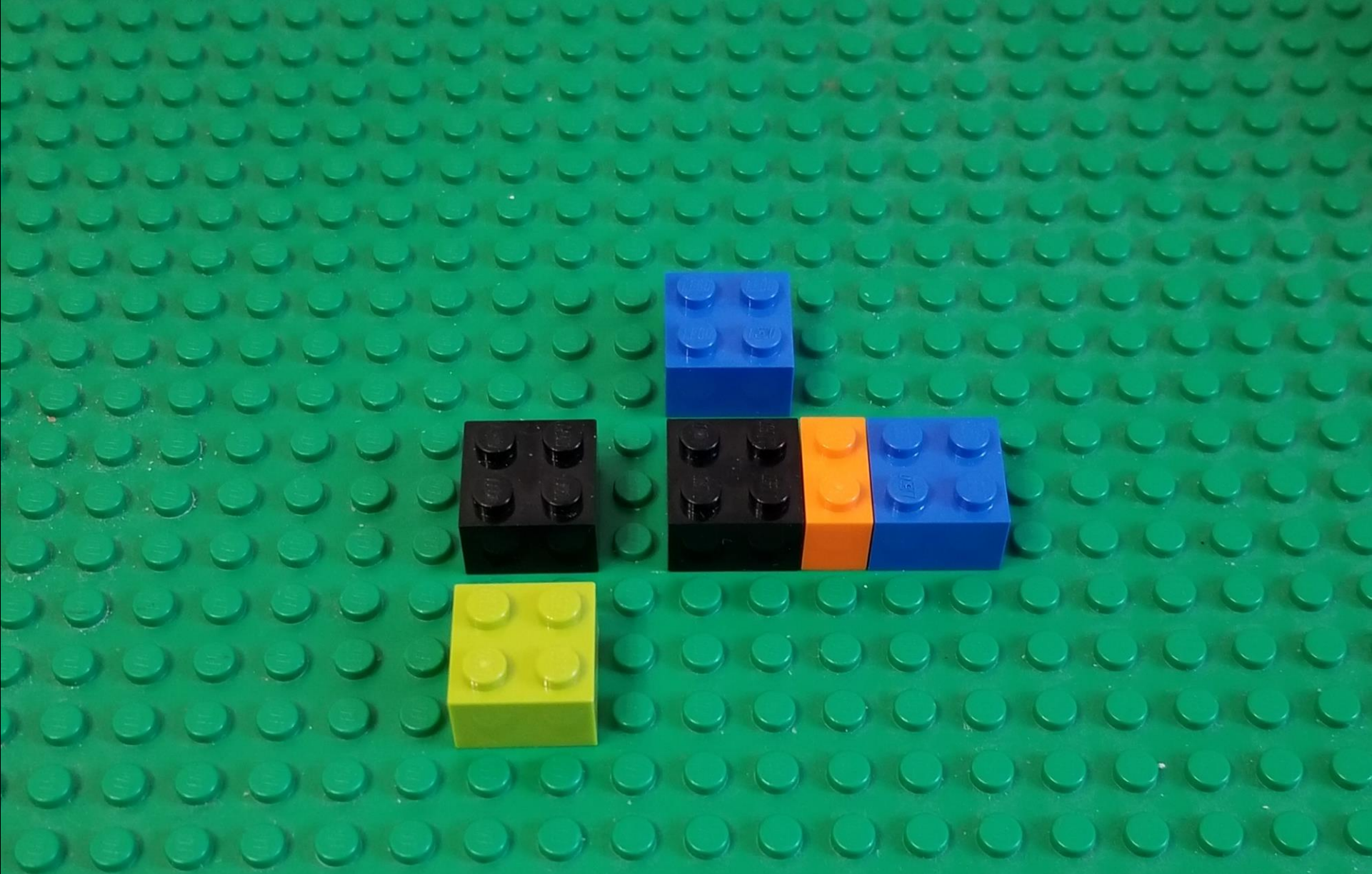




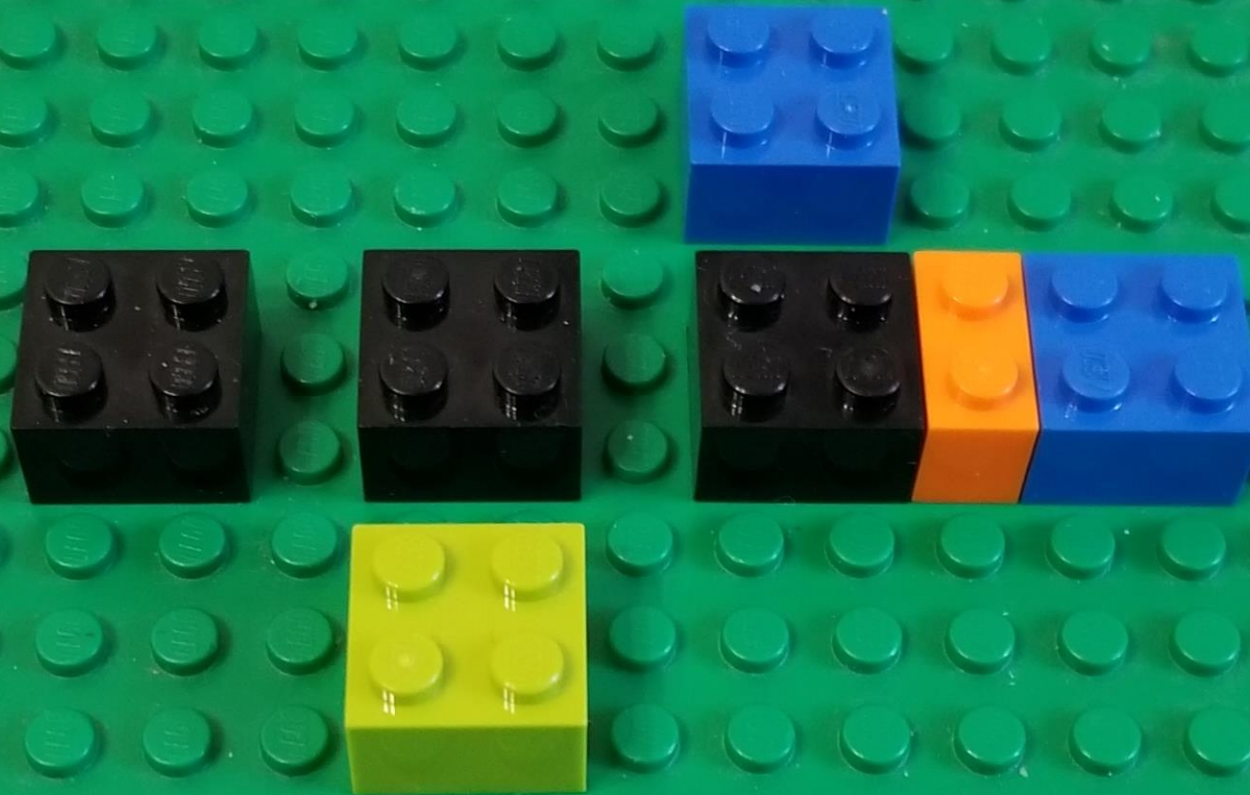
These are molecules of methylamine and ethylamine.



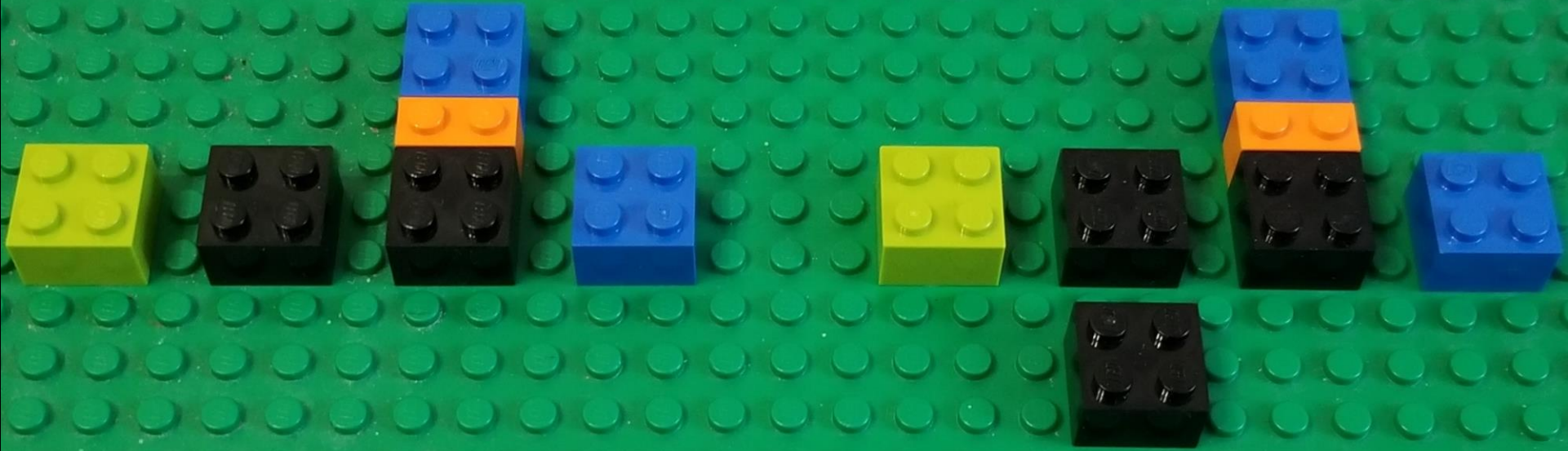
Now we show a few more complex molecules. This is one form of glucose which has 5 hydroxyl groups (**-OH**) and one aldehyde group (**-CH=O**).

A molecular model of glycine is shown on a green base with a grid of circular indentations. The model consists of several colored blocks: a yellow block at the bottom left, a black block to its right, a blue block above the black block, and a horizontal row of three blocks (black, orange, and blue) to the right of the yellow block. The orange block is positioned between the black block and the blue block, representing the carboxyl group. The blue block is positioned above the orange block, representing the amino group. The black block is positioned to the left of the orange block, representing the alpha-carbon. The yellow block is positioned below the black block, representing the hydrogen atom.

Molecules that contain amino (-NH_2) and carboxyl (-COOH) groups are called amino acids. This is the simplest amino acid – glycine (aminoacetic acid, 2-aminoethanoic acid).

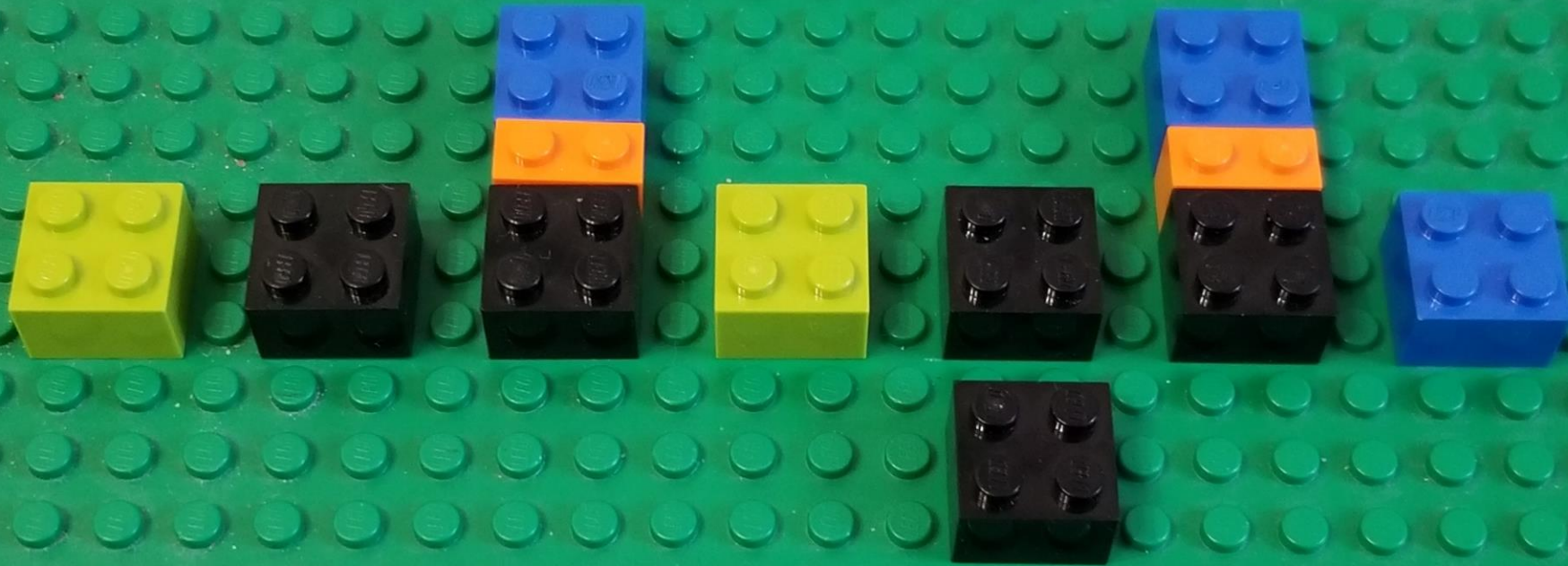


This is a molecule of alanine (2-aminopropanoic acid). Amino acids that have amino group adjacent to carboxyl group are called α -amino acids



α -amino acids may bond through hydroxyl (-OH) and amino group and ...

... form peptide bonds. Proteins (polypeptides) are compounds that consist of chains of α -amino acids connected by peptide bonds.



This is another complex molecule: monosodium glutamate, food enhancer, MSG, sodium 2-aminopentanedioate. We see Na^+ and 2 deprotonated carboxyl groups ($-\text{COO}^-$).





Continued with
Part 12