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> Forthcoming book Organic Chemistry Brick by Brick: Using LEGO® to Teach Structure and Reactivity (ISBN: 978-1912636020)

www.ChemistryBrickByBrick.com/LegoChemistryPart2.pdf

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If we replace one hydrogen atom **H** in an ethane molecule  $C_2H_6$  with a methyl group,  $CH_3$ , we get the next compound from the homologous series of alkanes: propane,  $C_3H_8$ . We see that each carbon atom is still surrounded by an octet of electrons and has 4 covalent bonds.

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If we replace one hydrogen atom **H** in a propane molecule  $C_3H_8$  with a methyl group, we get the next homologue: butane,  $C_4H_{10}$ .



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The next homologue of pentane: hexane,  $C_6H_{14}$ . We can omit hydrogen atoms and assume implicit octet rule.



The next homologue of hexane: heptane,  $C_7H_{16}$ , in a simplified baseplate presentation.



In a propane molecule, we can choose a central carbon atom instead to replace a hydrogen atom attached to it with a methyl group,  $CH_3$ . We get isobutane molecule which has the same amount of carbon and hydrogen atoms as butane,  $C_4H_{10}$  but has a branching carbon skeleton. This called isomerism, and such compounds – isomers. We see that each carbon atom is still surrounded by an octet of electrons and has 4 covalent bonds.



If we decide to show hydrogen atoms, we can use double bricks for coinciding locations.

An isomer of pentane: isopentane.

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In a propane molecule, we can replace two hydrogen atoms attached to a central carbon atom with a methyl group, **CH**<sub>3</sub>. We get another isomer of pentane – neopentane. There are only 3 pentane isomers: n-pentane (straight, no branches), isopentane, and neopentane.



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Hexane has 5 isomers including n-hexane. Next slides show remaining isomers.

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JUJUJUJUJUJUJUJUJUJUJUJUJUJU ~~~~ FFULLULU This is an isomer of octane, C<sub>8</sub>H<sub>18</sub>.

