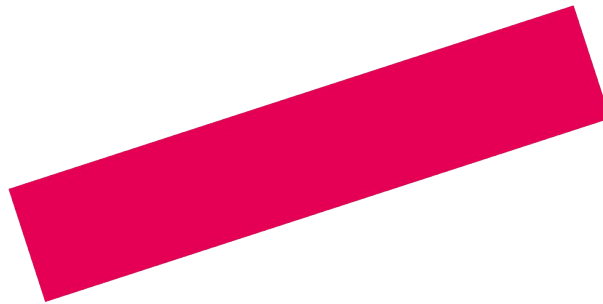


Academie toegepaste biowetenschappen en chemie

Chemie Course 3



Week 4: H12

Vandaag

Eigenschappen van organische moleculen

Functionele groepen

Structuren van alkanen

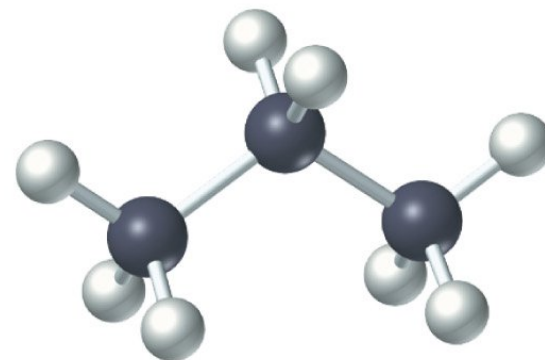
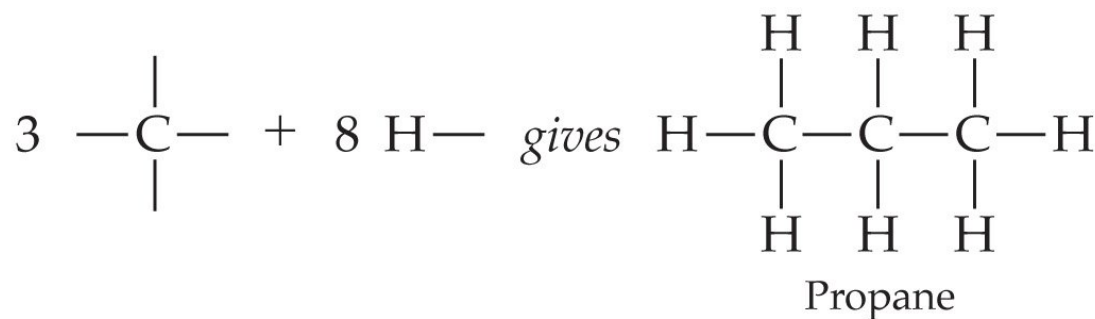
Tekenen van structuren

Vormen van organische moleculen

Benoemen van alkanen

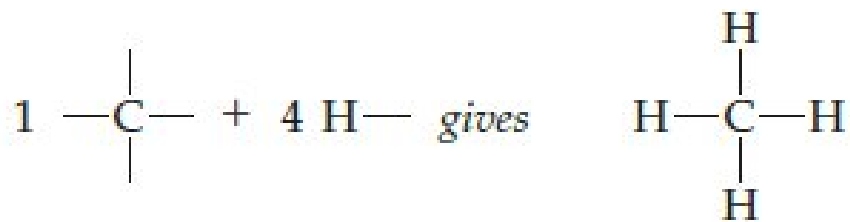
12.3 Structuur en isomerie

C₃H₈: 1 isomeer

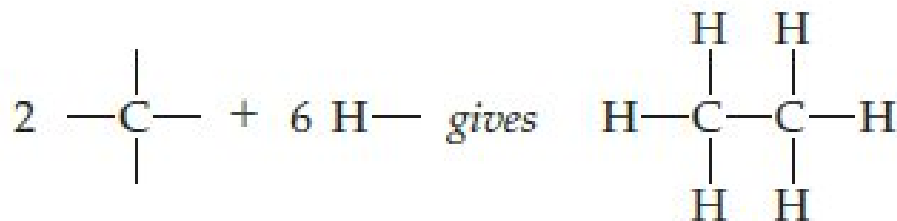


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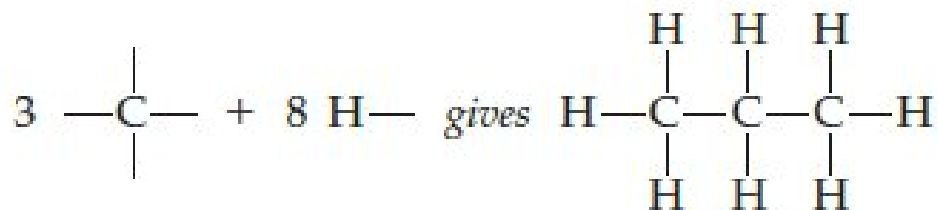
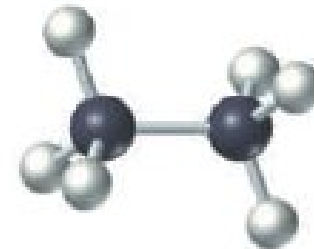
12.3 Structuur en isomerie



Methane



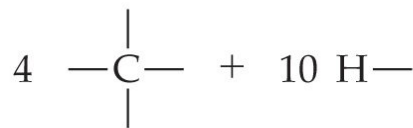
Ethane



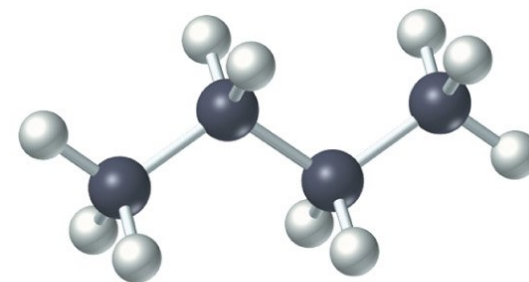
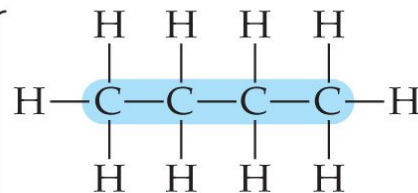
Propane



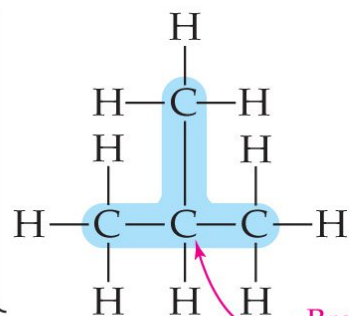
C_4H_{10} : 2 isomeren



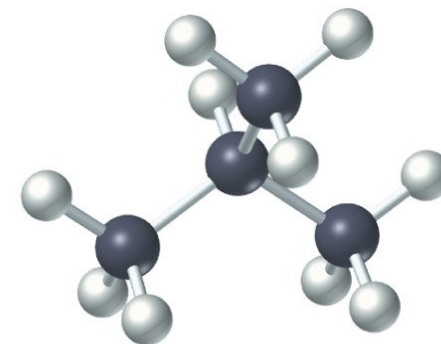
gives



Straight chain



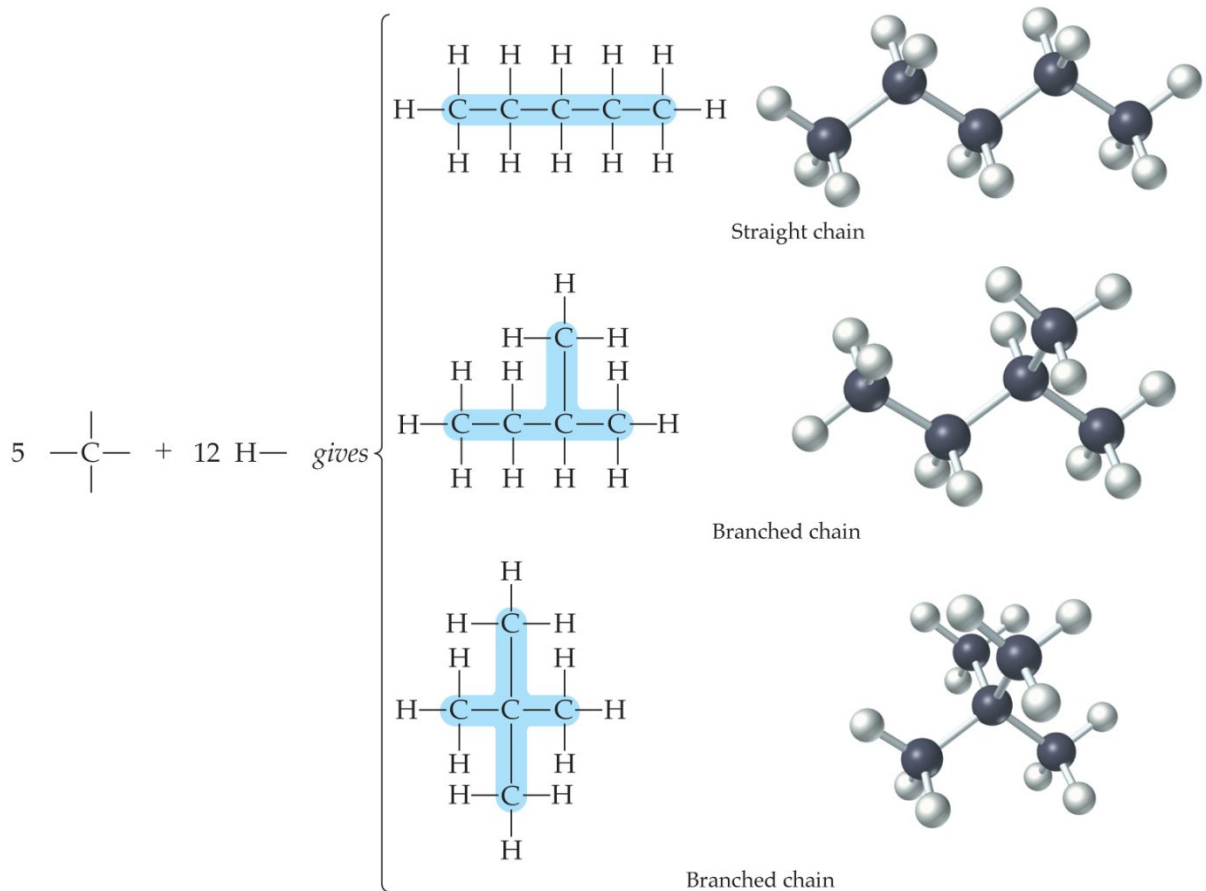
Branch point



Branched chain

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C₅H₁₂: 3 isomeren

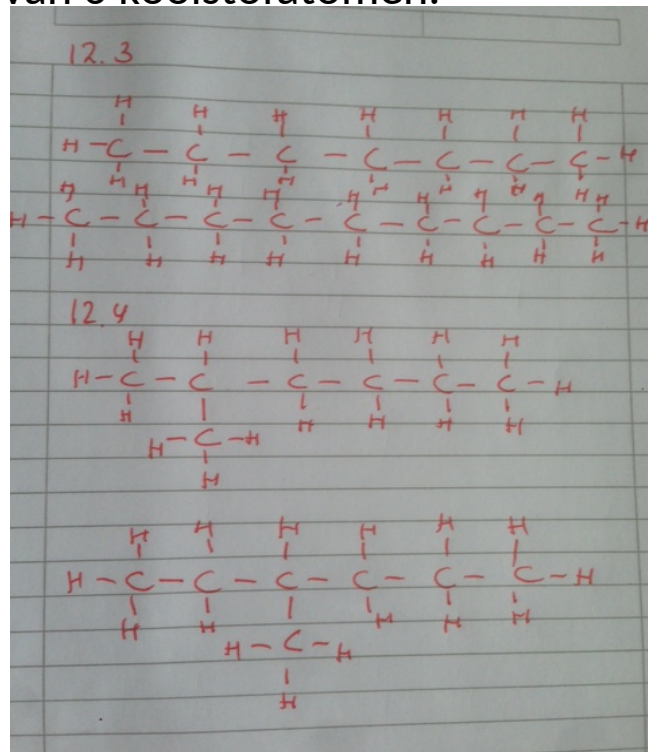


C_6H_{14} : 5 isomeren
 C_7H_{16} : 9 isomeren
 C_8H_{18} : 18 isomeren
 C_9H_{20} : 35 isomeren
 $C_{12}H_{26}$: 355 isomeren
 $C_{32}H_{66}$: 27.711.253.769 isomeren

12.3

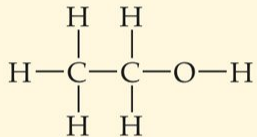
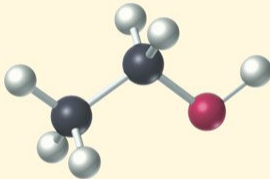
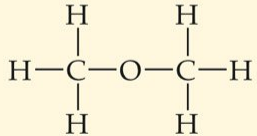
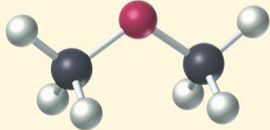
Teken moleculen van C_7H_{16} en C_9H_{20} met een rechte keten.

12.4 Teken de 2 vertakte isomeren van C_7H_{16} met een langste keten van 6 koolstofatomen.



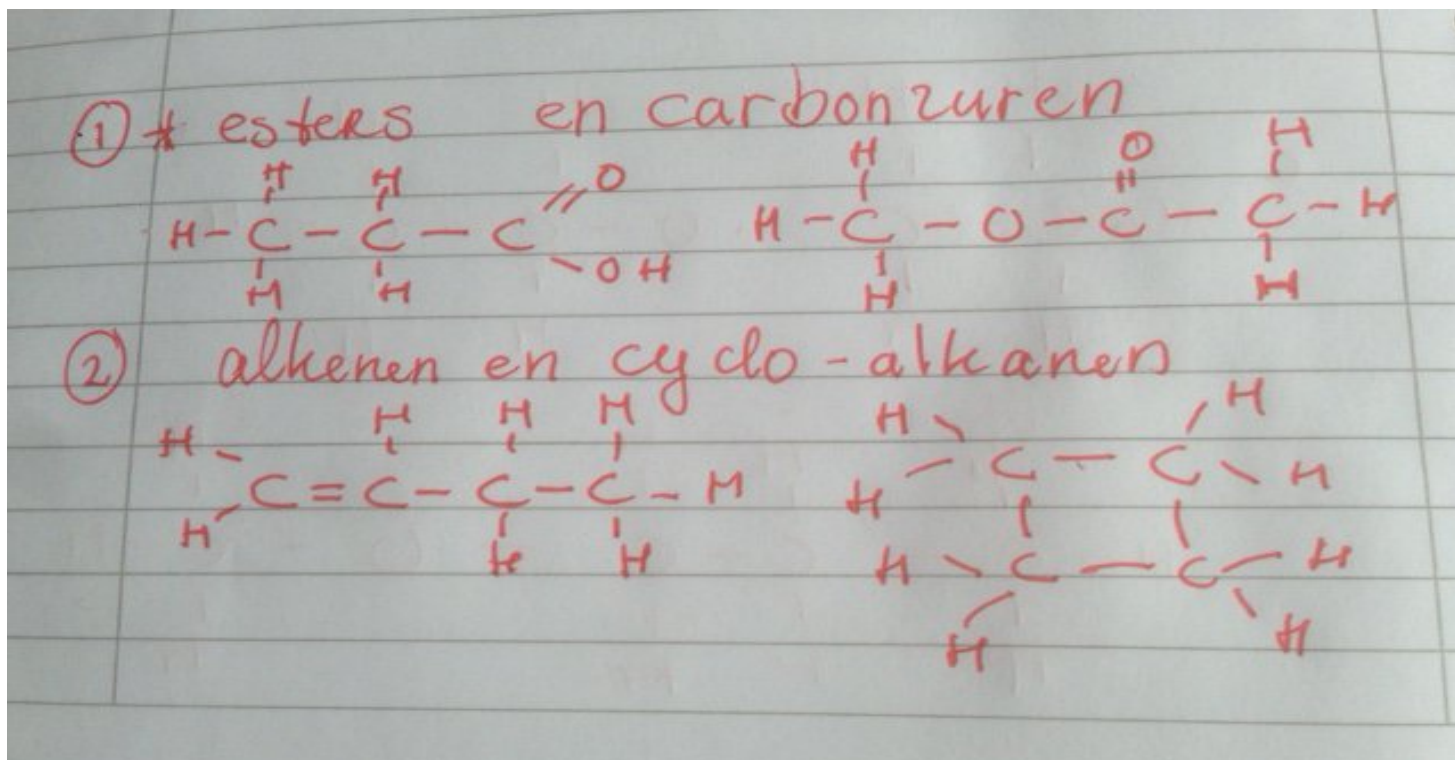
Type-isomerie

TABLE 12.2 Some Properties of Ethyl Alcohol and Dimethyl Ether

NAME AND MOLECULAR FORMULA	STRUCTURE	BOILING POINT	MELTING POINT	PHYSIOLOGICAL ACTIVITY
Ethyl alcohol C_2H_6O	 	78.5 °C	- 117.3 °C	Central-nervous-system depressant
Dimethyl ether C_2H_6O	 	- 23 °C	- 138.5 °C	Nontoxic; anesthetic at high concentration

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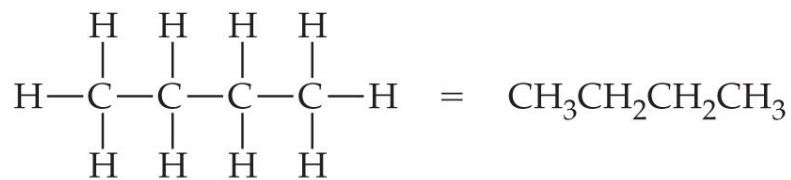
Bedenk nog 2 groepen type-isomeren en teken van elke afzonderlijke groep een structuur...



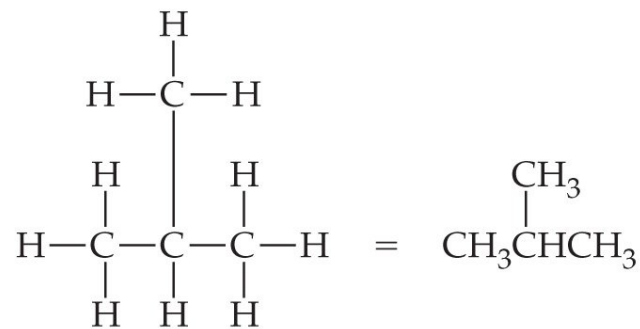
12.4 Structuren tekenen

Structureel

Gecondenseerd



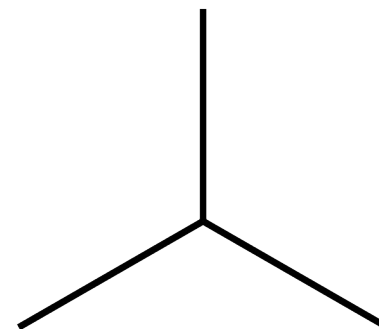
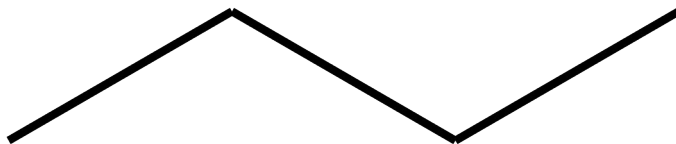
Butane



2-Methylpropane

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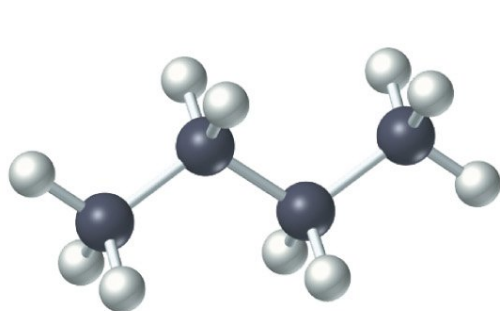
lijn structuur



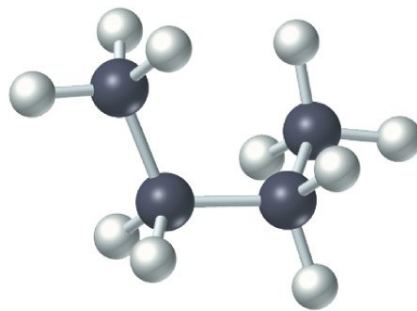
12.5 De vorm van moleculen

Conformatie = de driedimensionale rangschikking van atomen in een molecuul

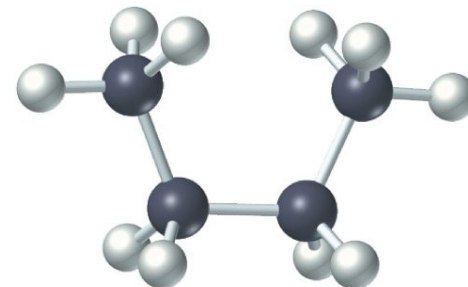
- Hieronder 3 conformaties van butaan
- Butaan heeft oneindig veel conformaties



(a)

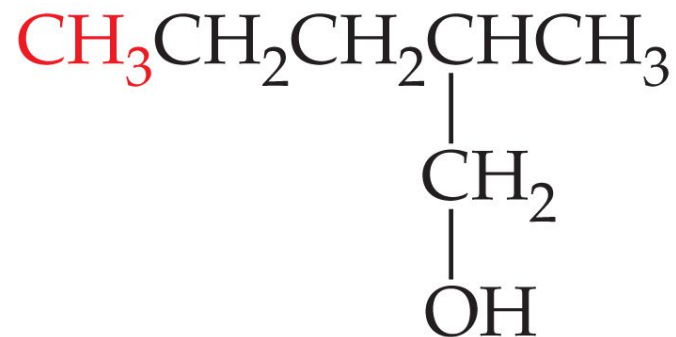
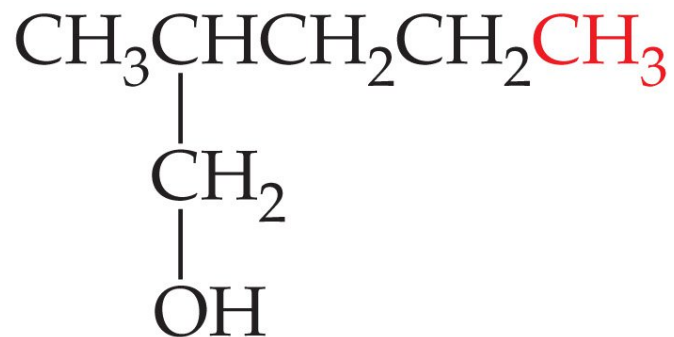


(b)



(c)

Onderstaande stoffen zijn identiek!!!



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12.5 De vorm van moleculen

Conformers

Isomeren

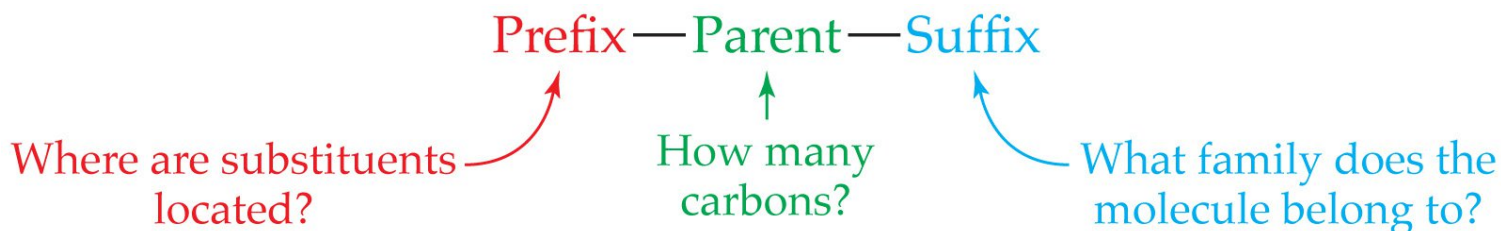
Ongerelateerd

12.6 Nomenclatuur alkanen

Naamgeving in regels vastgelegd

IUPAC

[International Union of Pure and Applied Chemistry](#)



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Stappen

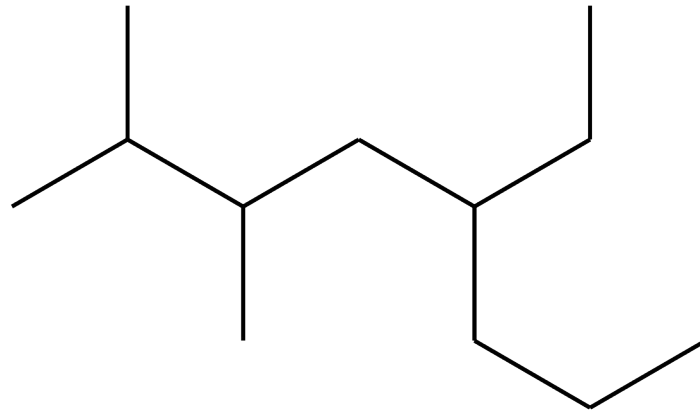
Zoek langste keten

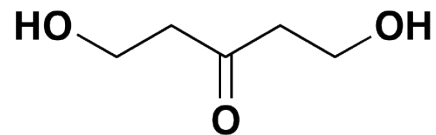
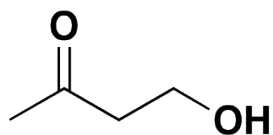
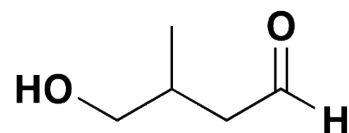
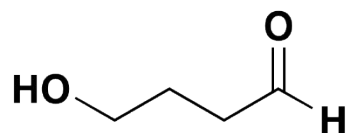
Geef C-atomen een nummer

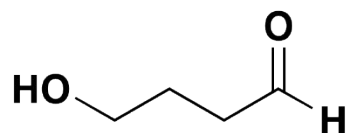
Welke zijketens zijn aanwezig

Alfabetische volgorde

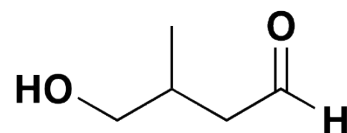
Schrijf naam als één woord



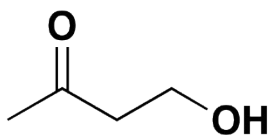




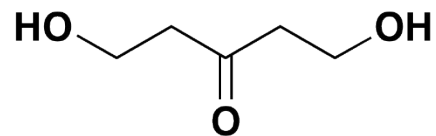
4-hydroxybutanal



4-hydroxy-3-methylbutanal



4-hydroxy-2-butanone



1,5-dihydroxy-3-pentanone

Table 2.1 Nomenclature and Physical Properties of Straight-Chain Alkanes

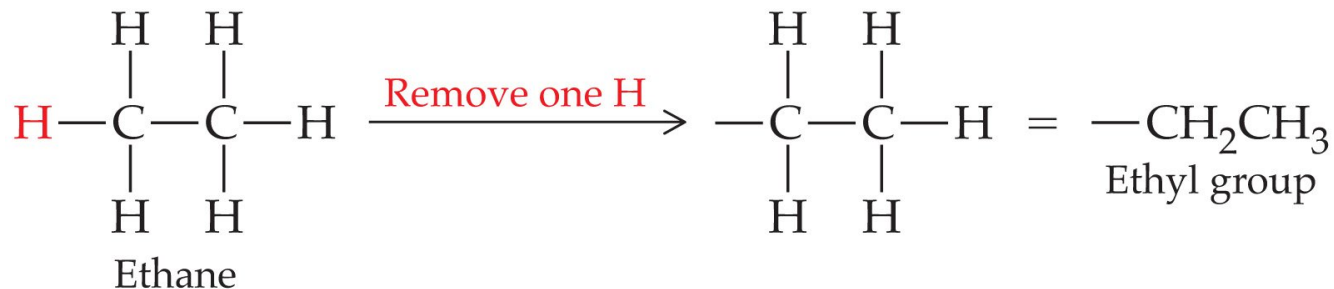
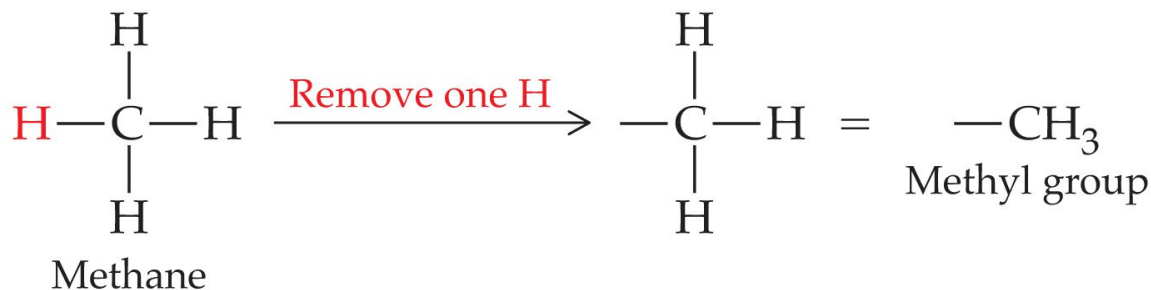
Number of carbons	Molecular formula	Name	Condensed structure	Boiling point (°C)	Melting point (°C)	Density ^a (g/mL)
1	CH ₄	methane	CH ₄	-167.7	-182.5	
2	C ₂ H ₆	ethane	CH ₃ CH ₃	-88.6	-183.3	
3	C ₃ H ₈	propane	CH ₃ CH ₂ CH ₃	-42.1	-187.7	
4	C ₄ H ₁₀	butane	CH ₃ CH ₂ CH ₂ CH ₃	-0.5	-138.3	
5	C ₅ H ₁₂	pentane	CH ₃ (CH ₂) ₃ CH ₃	36.1	-129.8	0.5572
6	C ₆ H ₁₄	hexane	CH ₃ (CH ₂) ₄ CH ₃	68.7	-95.3	0.6603
7	C ₇ H ₁₆	heptane	CH ₃ (CH ₂) ₅ CH ₃	98.4	-90.6	0.6837
8	C ₈ H ₁₈	octane	CH ₃ (CH ₂) ₆ CH ₃	125.7	-56.8	0.7026
9	C ₉ H ₂₀	nonane	CH ₃ (CH ₂) ₇ CH ₃	150.8	-53.5	0.7177
10	C ₁₀ H ₂₂	decane	CH ₃ (CH ₂) ₈ CH ₃	174.0	-29.7	0.7299
11	C ₁₁ H ₂₄	undecane	CH ₃ (CH ₂) ₉ CH ₃	195.8	-25.6	0.7402
12	C ₁₂ H ₂₆	dodecane	CH ₃ (CH ₂) ₁₀ CH ₃	216.3	-9.6	0.7487
13	C ₁₃ H ₂₈	tridecane	CH ₃ (CH ₂) ₁₁ CH ₃	235.4	-5.5	0.7546
⋮	⋮	⋮	⋮	⋮	⋮	⋮
20	C ₂₀ H ₄₂	eicosane	CH ₃ (CH ₂) ₁₈ CH ₃	343.0	36.8	0.7886
21	C ₂₁ H ₄₄	heneicosane	CH ₃ (CH ₂) ₁₉ CH ₃	356.5	40.5	0.7917
⋮	⋮	⋮	⋮	⋮	⋮	⋮
30	C ₃₀ H ₆₂	triacontane	CH ₃ (CH ₂) ₂₈ CH ₃	449.7	65.8	0.8097

^aDensity is temperature dependent. The densities given are those determined at 20 °C (d^{20°).

Alkylgroepen

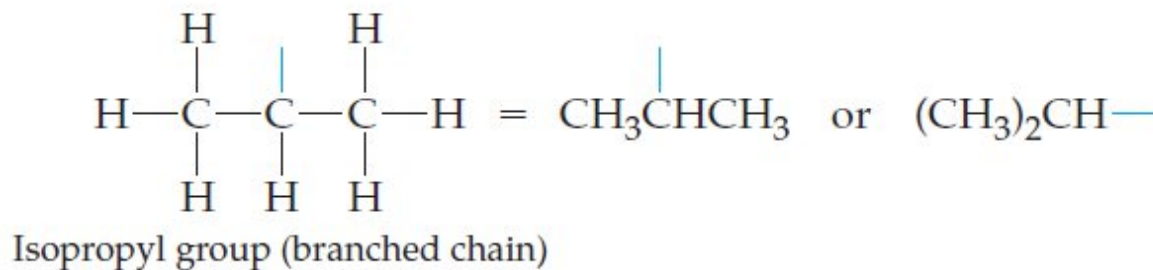
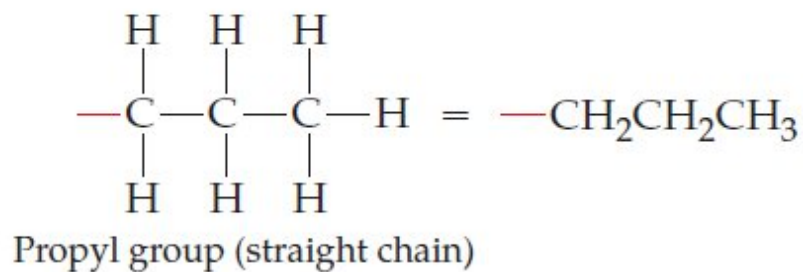
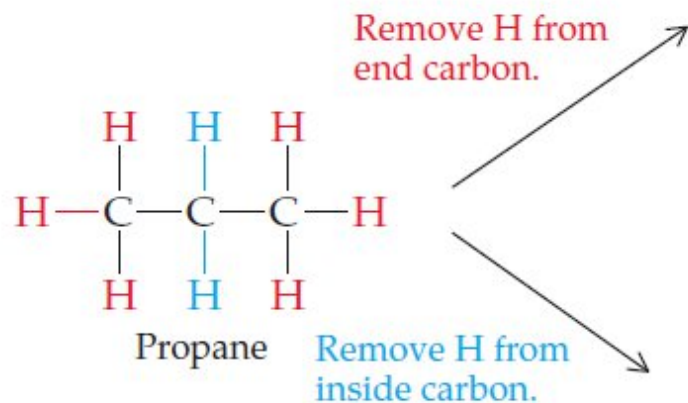
Vertakkingen van de zijketen

Alkyl groups are derived from a parent alkane.



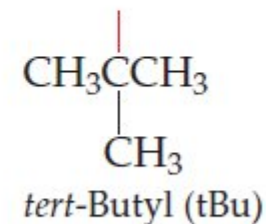
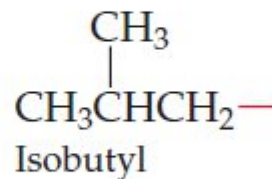
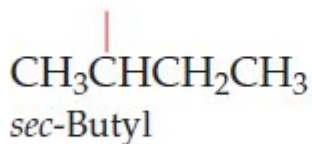
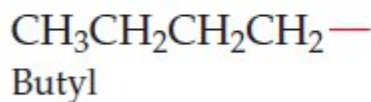
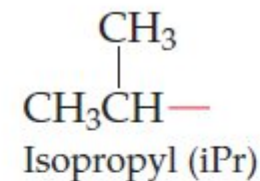
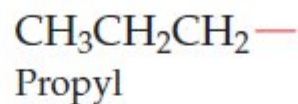
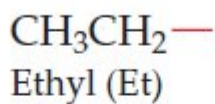
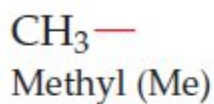
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Alkylgroepen



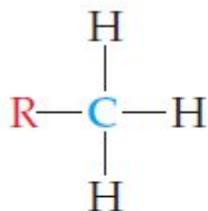
Wat veelgebruikte alkylgroepen

Some Common Alkyl Groups (and their abbreviations)*

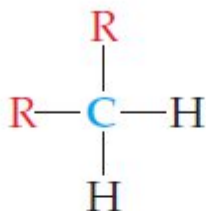


*The red bond shows the connection to the rest of the molecule.

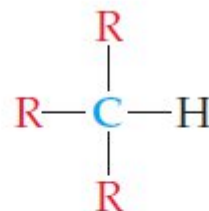
primair, secundair, tertiair en quaternair



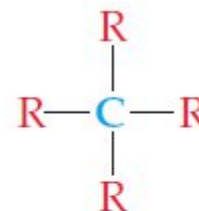
Primary carbon
(1°) has one other
carbon attached.



Secondary carbon
(2°) has two other
carbons attached.



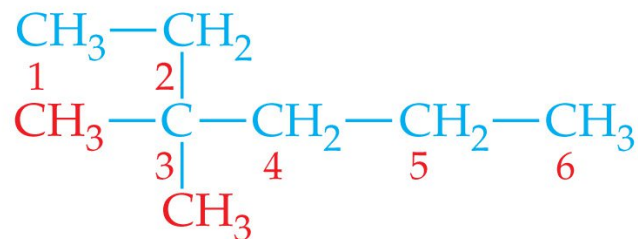
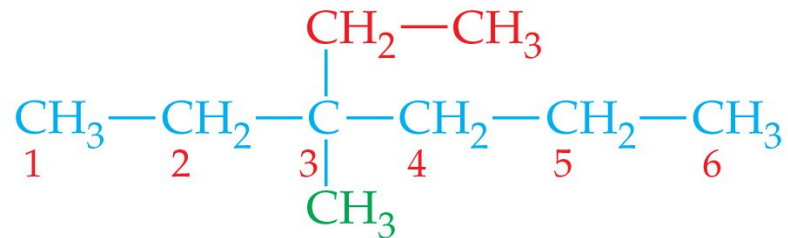
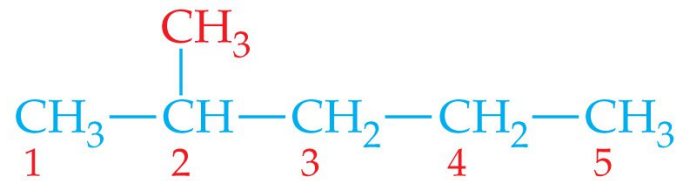
Tertiary carbon
(3°) has three other
carbons attached.



Quaternary carbon
(4°) has four other
carbons attached.

R represents a linkage to another C.

Benoemen



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Nu

Maken t/m 12.15

Bronnen

Afbeeldingen afkomstig van:

- McMurry - Fundamentals of general, organic, and biological chemistry. 7th edition, uitgever: Pearson.
 - Veplicht boek boekenlijst opleiding