Organic chemistry is all about carbon and the compounds it forms. Many of these compounds involve just carbon and hydrogen and are collectively known as “hydrocarbons.”

Recall that carbon has four valence electrons, and therefore has four bonding sites:

And hydrogen has just one valence electron, and therefore has just one bonding site:

The simplest hydrocarbon would just involve one carbon and four hydrogens:

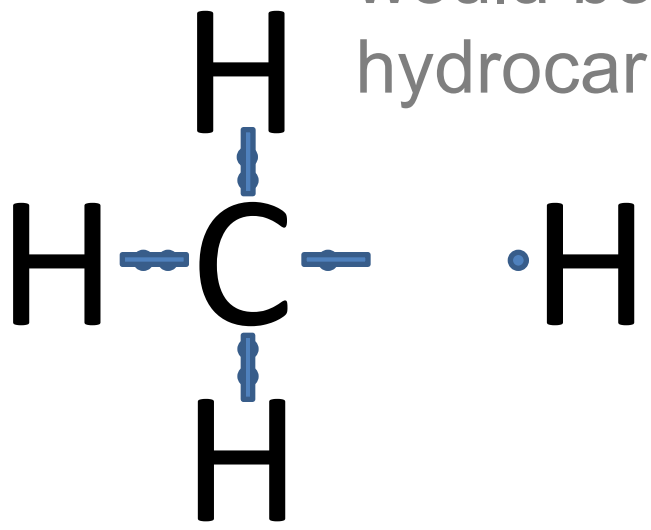
This is CH_4, and it is commonly known as "methane."

By the way, recall that these molecules are not really flat the way they look here. Do you remember how four atoms would arrange themselves around a central atom so they are all as far away from one another as possible?

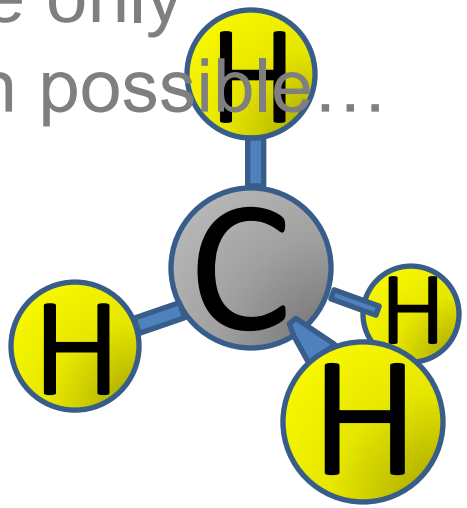
Like this: And do you recall the name of this shape? Tetrahedral!

No matter… in this tutorial, we are only concerned with the flat structural formulas

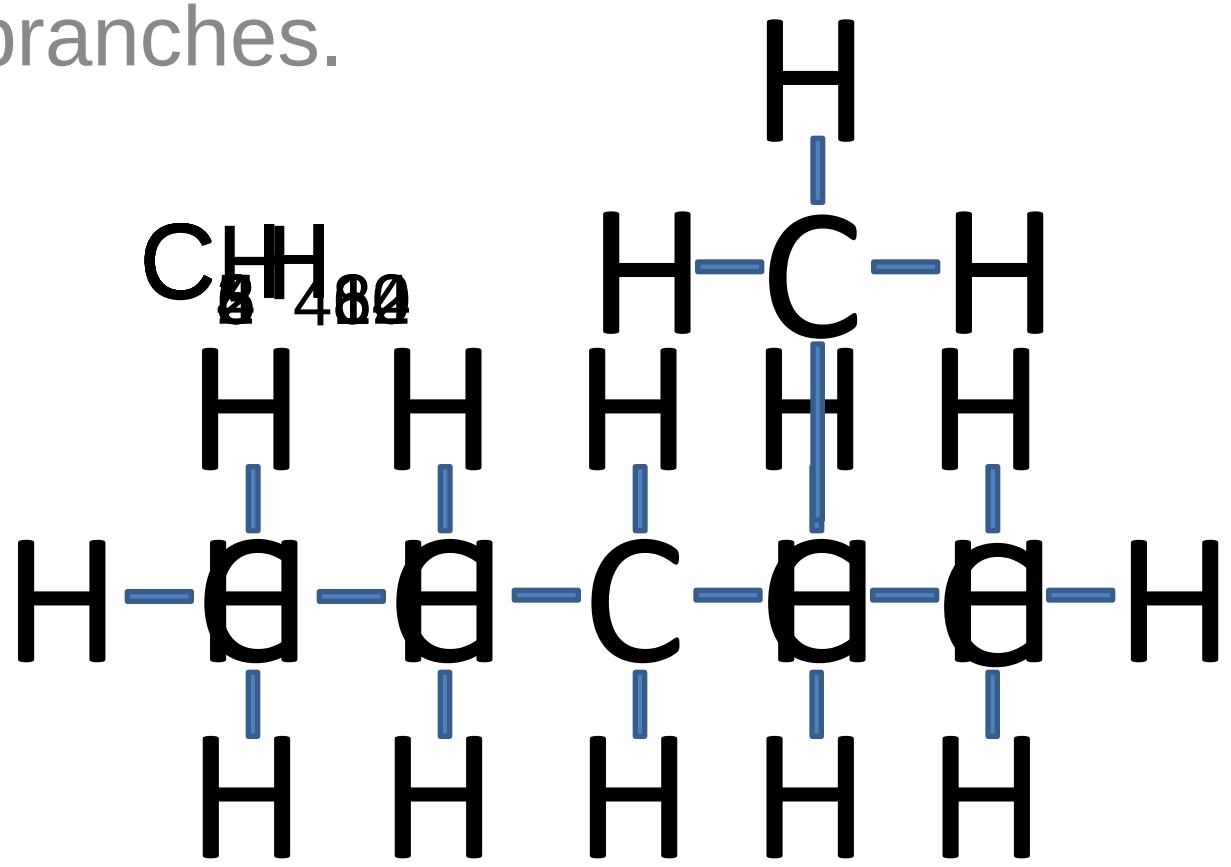
CH_4



You might think that CH_4 would be the only hydrocarbon possible…



…But carbon atoms have a strong tendency to bond to other carbon atoms… over… and over… and over…and over… forming a nearly infinite variety of molecules with different chain lengths and branches.

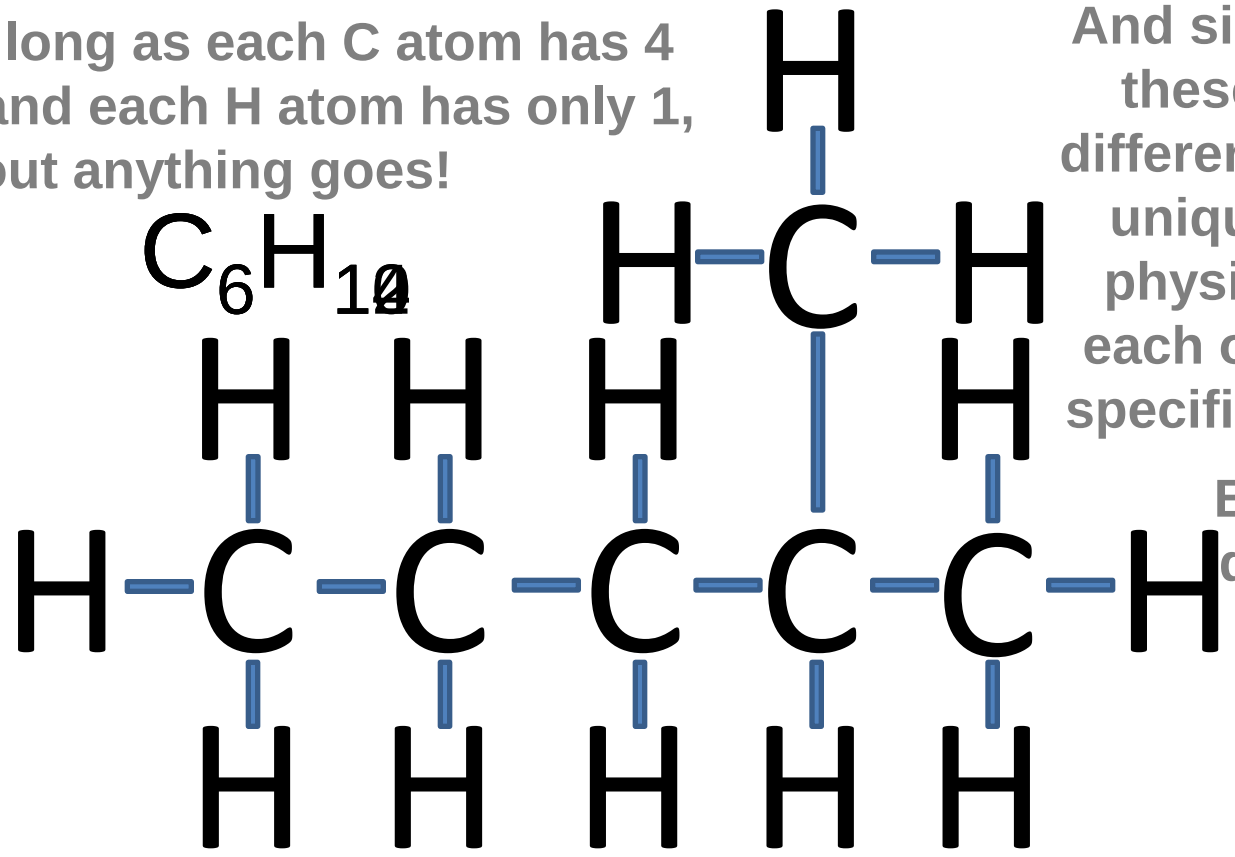


And sometimes, when the molecule is forming and there are not enough H atoms to go around, the C atoms form a double bond between them…

Or even a triple bond.

This give rise to even more possibilities.

Just so long as each C atom has 4 bonds and each H atom has only 1, just about anything goes!



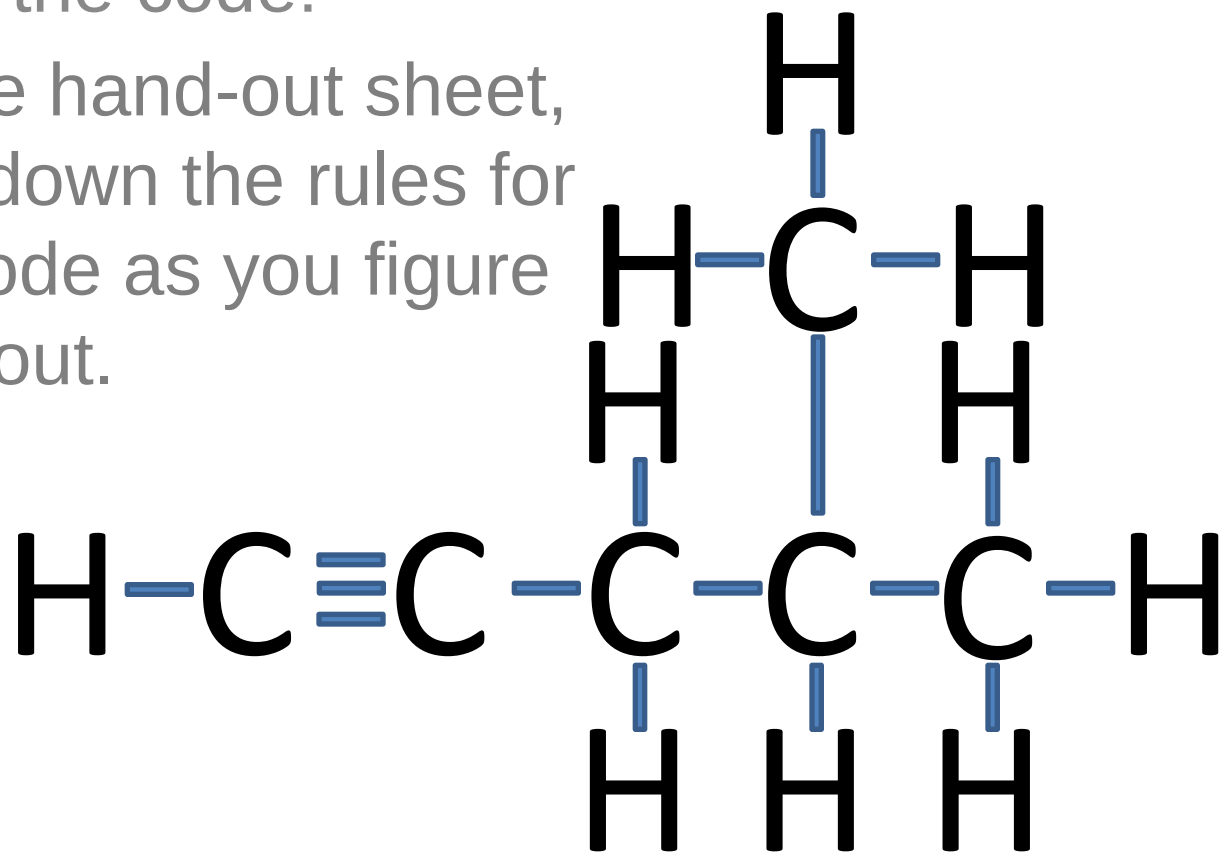
And since each one of these compounds is different – with its own unique chemical and physical properties – each one must have a specific, unique name.

But what system do chemists use for naming these compounds?

The compound below is named “4-methyl-1-pentyne.” But where in the world does that come from???

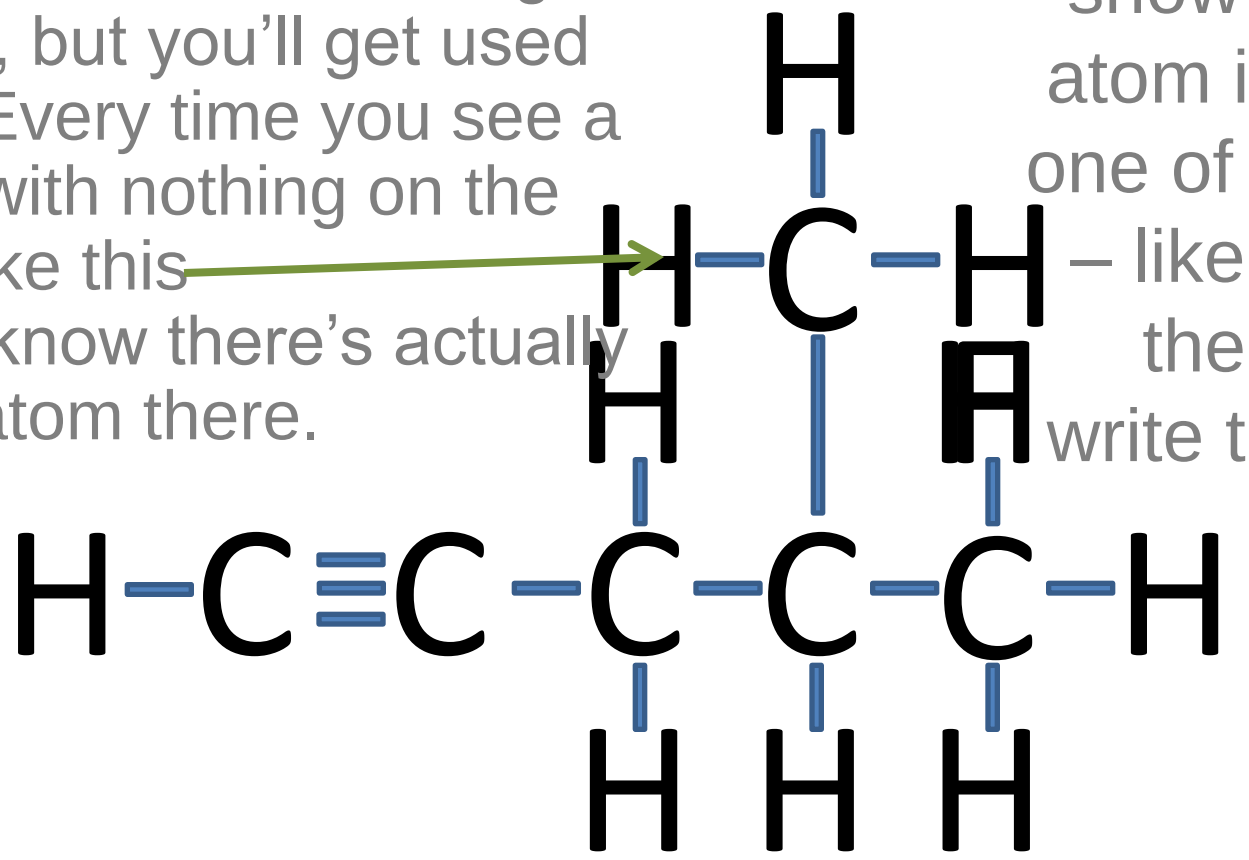
The following pages will show dozens of organic compounds along with their names. Your job is to break the code!

On the hand-out sheet, write down the rules for this code as you figure them out.



Oh yeah, something else you need to know… Since H atoms are all over the place, and drawing them all in can get to be a real pain in the neck, they are usually left off like this:

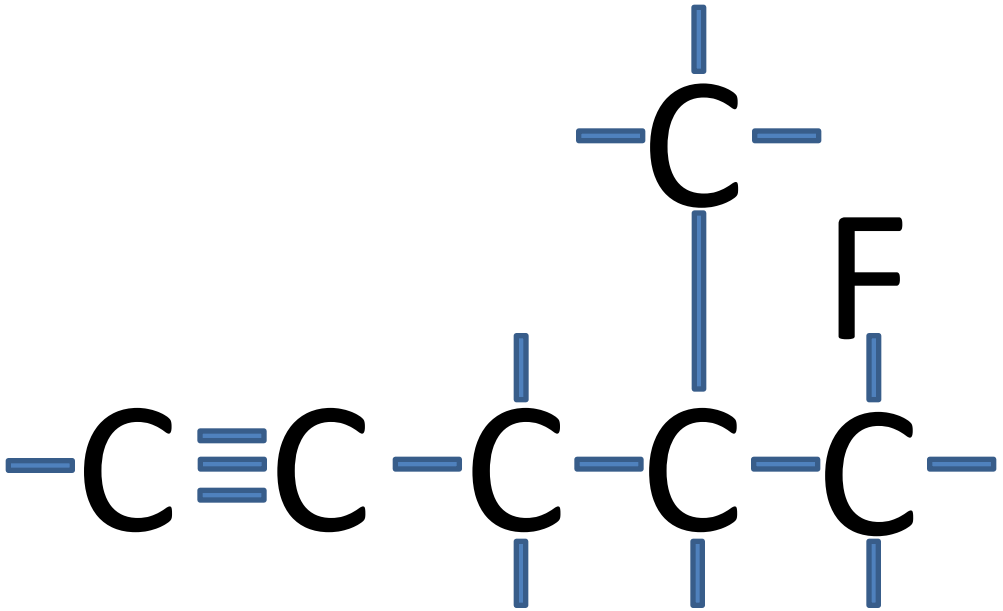
It may look a little strange at first, but you'll get used to it. Every time you see a bond with nothing on the end, like this → You'll know there's actually an H atom there.



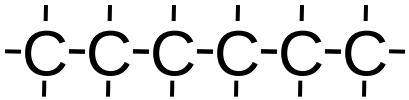
And if we want to show some other atom is bonded in one of these spots – like a fluorine – then we simply write that atom in, like this:

Oh… And one more thing… Don't get frustrated, or give up. Like most secret codes, none of these names or formulas will make any sense to you at first, but if you stick with it, you will start to see patterns.

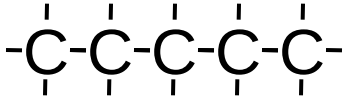
As you see patterns, write them down on the hand-out sheet.



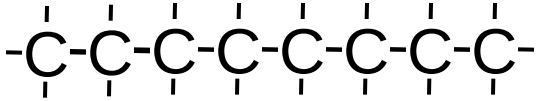
alkanes



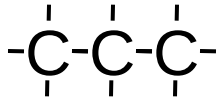
hexane



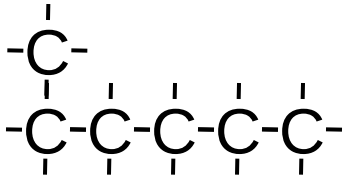
pentane



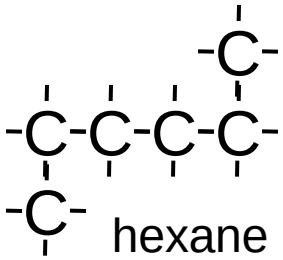
octane



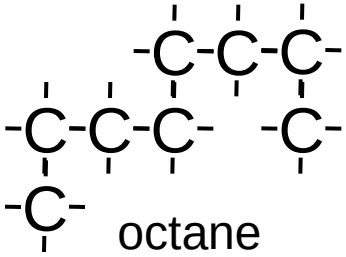
propane



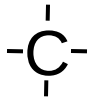
hexane



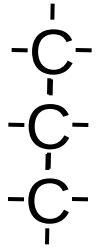
hexane



octane

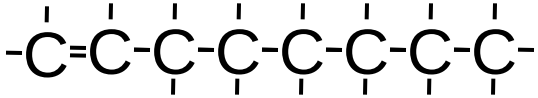


methane

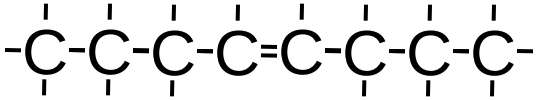


propane

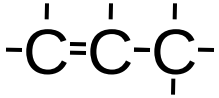
alkenes



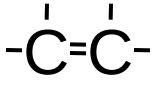
1-octene



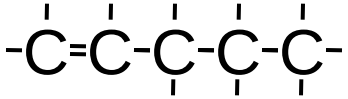
4-octene



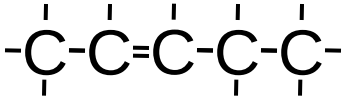
1-propene



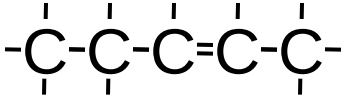
1-ethene
(or just: ethene)



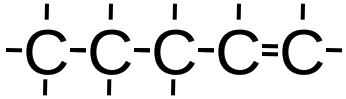
1-pentene



2-pentene

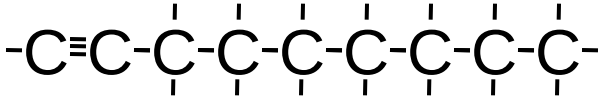


2-pentene

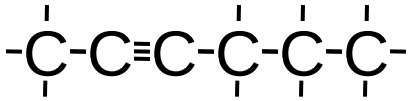


1-pentene

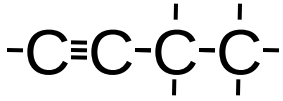
alkynes



1-nonyne

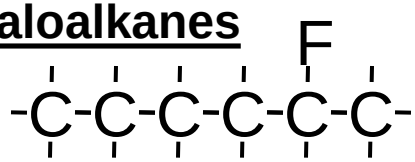


2-hexyne

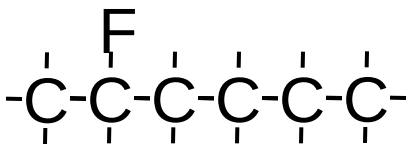


1-butyne

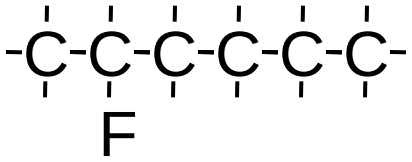
haloalkanes



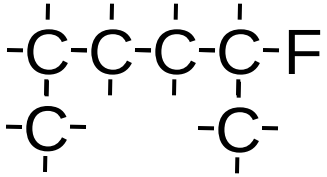
2-fluorohexane



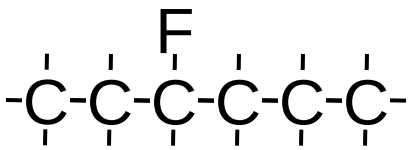
2-fluorohexane



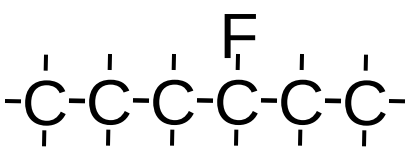
2-fluorohexane



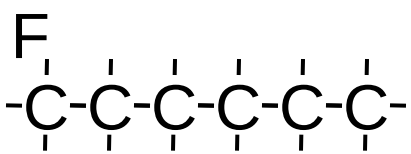
2-fluorohexane



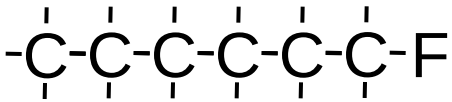
3-fluorohexane



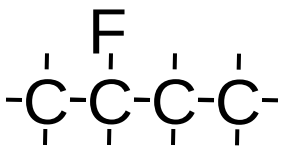
3-fluorohexane



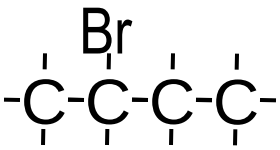
1-fluorohexane



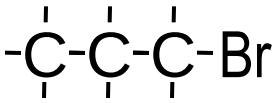
1-fluorohexane



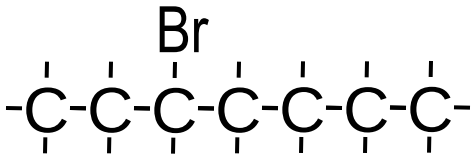
2-fluorobutane



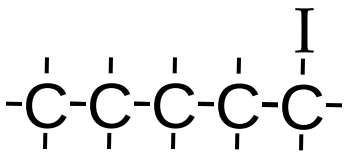
2-bromobutane



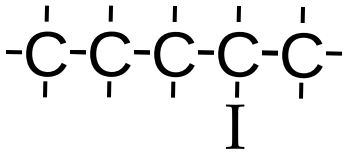
1-bromopropane



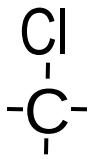
3-bromoheptane



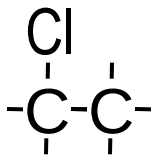
1-iodopentane



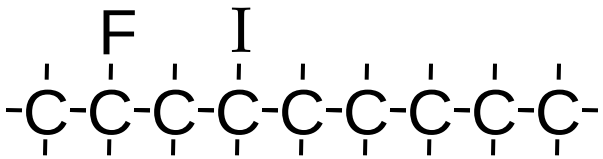
2-iodopentane



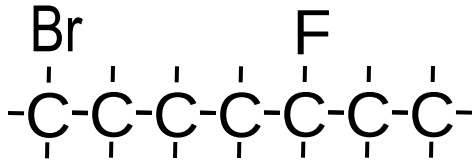
1-chloromethane
(or just: chloromethane)



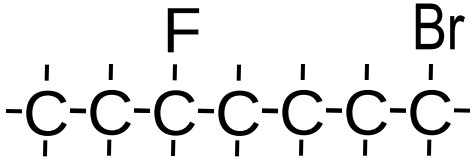
1-chloroethane
(or just: chloroethane)



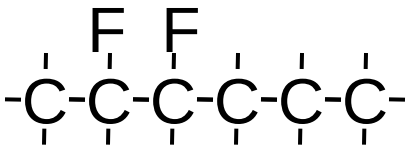
2-fluoro-4-iodononane



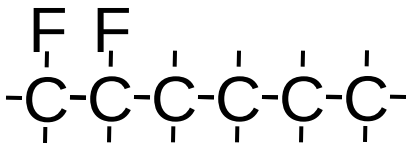
1-bromo-5-fluoroheptane



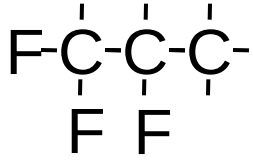
1-bromo-5-fluoroheptane



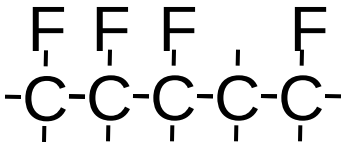
2,3-difluorohexane



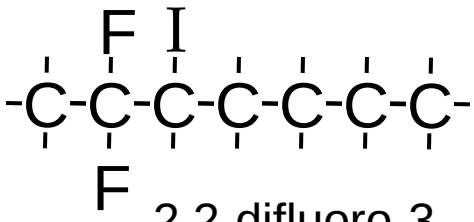
1,2-difluorohexane



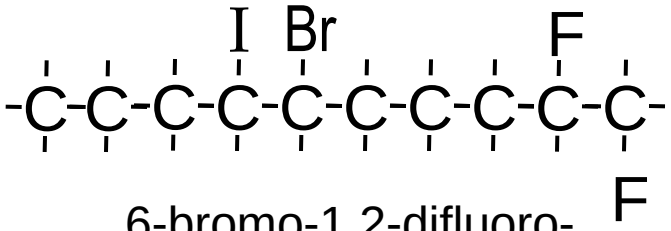
1,1,2-trifluoropropane



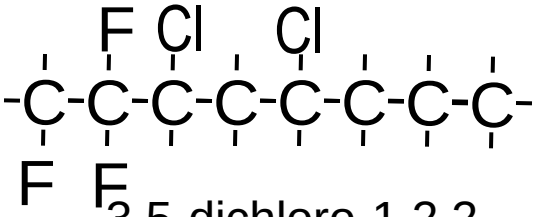
1,2,3,5-tetrafluoropentane



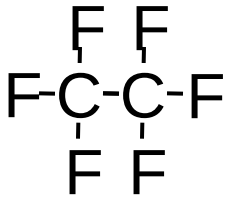
2,2-difluoro-3-iodoheptane



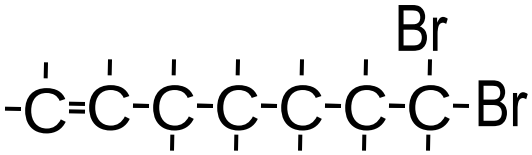
6-bromo-1,2-difluoro-7-iododecane



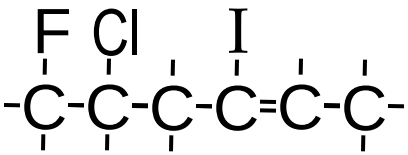
3,5-dichloro-1,2,2-trifluorooctane



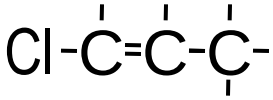
hexafluoroethane



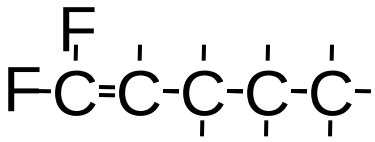
7,7-dibromo-1-heptene



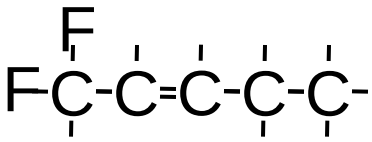
5-chloro-6-fluoro-3-iodo-2-hexene



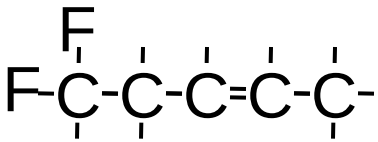
1-chloro-1-propene



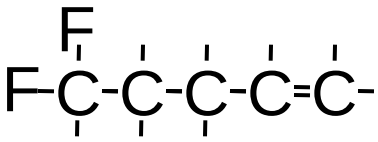
1,1-difluoro-1-pentene



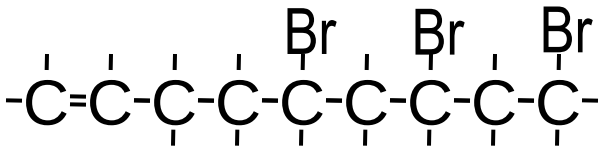
1,1-difluoro-2-pentene



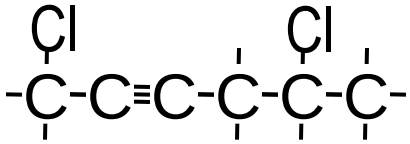
5,5-difluoro-2-pentene



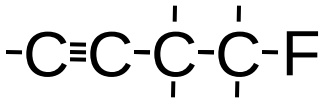
5,5-difluoro-1-pentene



5,7,9-tribromo-1-nonene

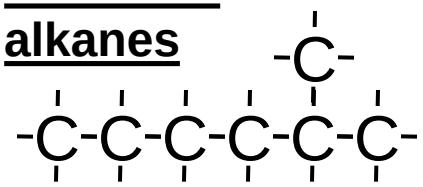


1,5-dichloro-2-hexyne

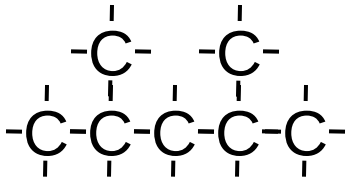


4-fluoro-1-butyne

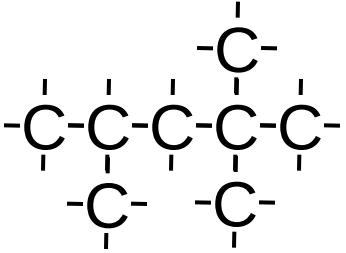
branched alkanes



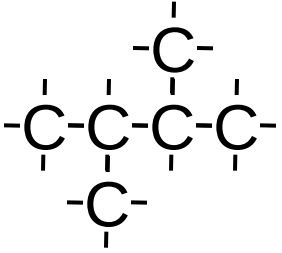
2-methylhexane



2,4-dimethylpentane

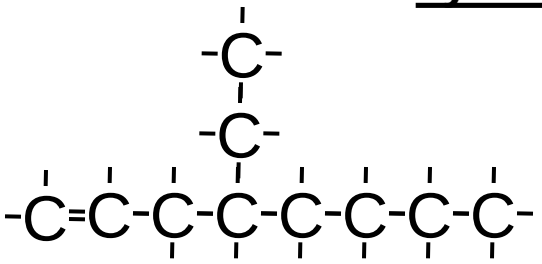


2,2,4-trimethylpentane

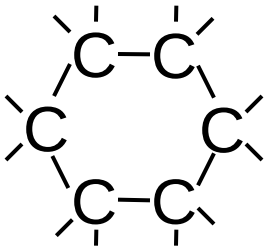


2,3-dimethylbutane

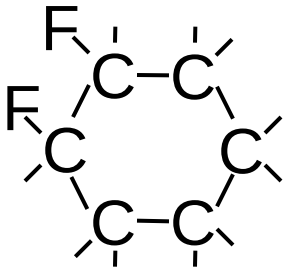
cyclocompounds



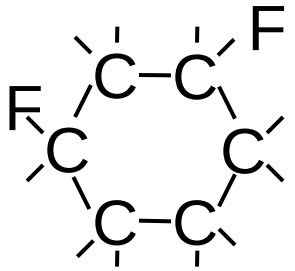
4-ethyl-1-octene



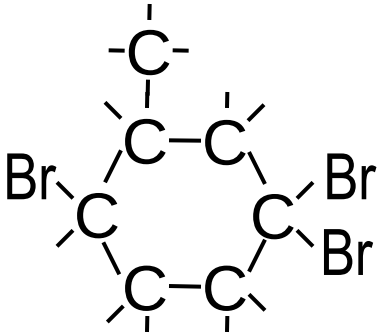
cyclohexane



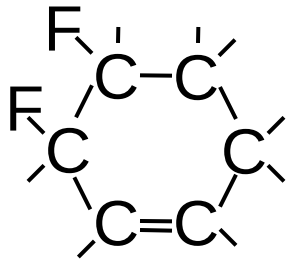
1,2-difluoro-cyclohexane



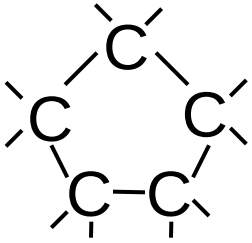
1,3-difluoro-cyclohexane



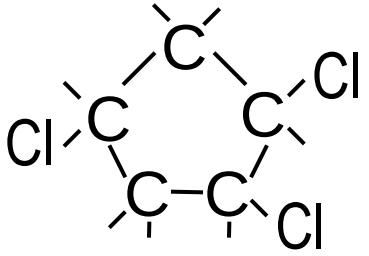
1,1,4-tribromo-3-methylcyclohexane



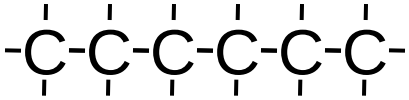
3,4-difluoro-cyclohexene



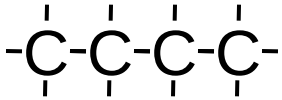
cyclopentane



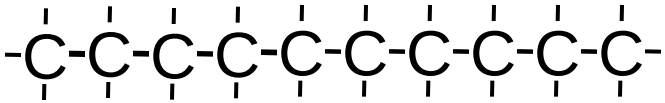
1,2,4-trichloro-cyclopentane



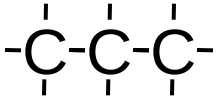
hexane



butane



decane



propane

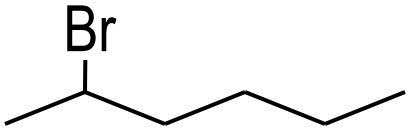
line structures

hexane

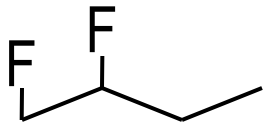
butane

decane

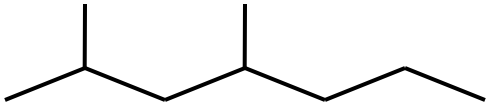
propane



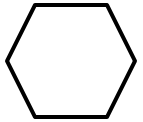
2-bromohexane



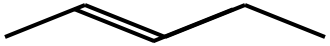
1,2-difluorobutane



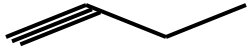
2,4-dimethylheptane



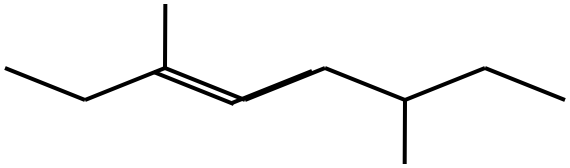
cyclohexane



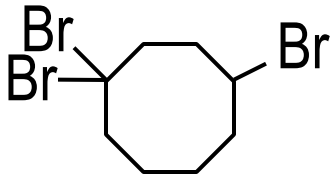
2-pentene



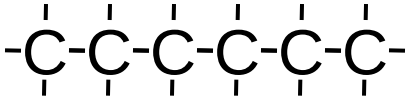
1-butyne



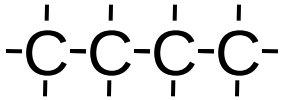
3,6-dimethyl-3-octene



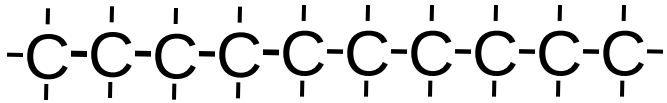
1,1,4-tribromo-
cyclooctane



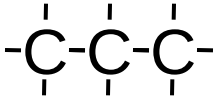
hexane



butane



decane



propane

condensed structural formulas

$CH_3CH_2CH_2CH_2CH_2CH_3$ [or $CH_3(CH_2)_4CH_3$]

hexane

$CH_3CH_2CH_2CH_3$

butane

$CH_3CH_2CH_2CH_2CH_2CH_2CH_2CH_2CH_2CH_3$ [or $CH_3(CH_2)_8CH_3$]

decane

$CH_3CH_2CH_3$

propane

$CH_3CHBrCH_2CH_2CH_3$

2-bromopentane

$CH_3CH{=}CHCH_2CH_2CH_3$

2-hexene

$CH_3CH(CH_3)CH_2CH_3$

2-methylbutane

$\boxed{CH_2CH_2CH_2CH_2}$

cyclobutane

$CHF_2CH_2CHF(CH_2)_5CH_3$

1,1,3-trifluorononane

$CH{\equiv}CCH_2CH_3$

1-butyne

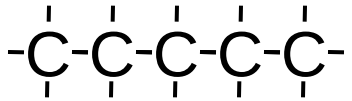
$CH_3CH{=}C(C_2H_5)CH_2CH_2CH_3$

3-ethyl-2-hexene

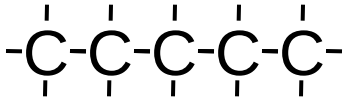
$\boxed{CH(CH_3)CH(CH_3)CH_2CH_2CH_2}$

1,2-dimethyl-cyclopentane

OK, let's see how well you've figured out the code:
For the next forty slides, you will be given the chance to test your skills at naming and formula writing.
Write your answer directly in the box on the screen
In the lower left-hand corner of the screen is a pen icon:
[It only shows up when you bring your cursor over to it.]
Click on it to change the stylus into a pen (your choice of colors), then into an eraser or back to an arrow.
Just so it's clear, below are examples of what you will asked to write:

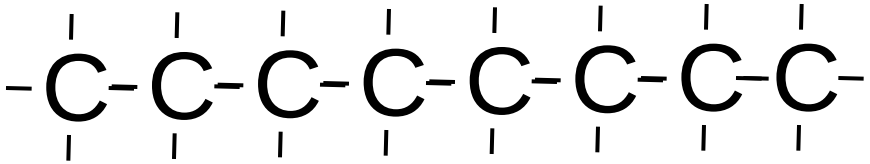
structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

You're welcome to use the notes you took… or you might try doing without them just to see…

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

1)

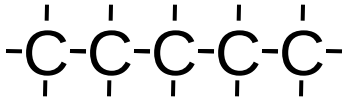
structural formula



name:

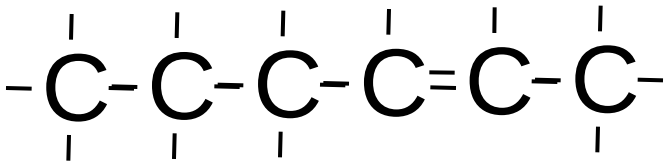
answer: octane

Always start by counting how long the carbon chain is. 8 = “oct-.”

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

2)

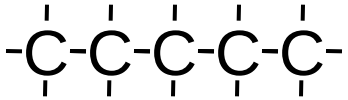
structural formula



name:

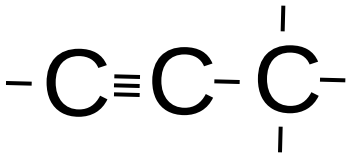
answer: 2-hexene

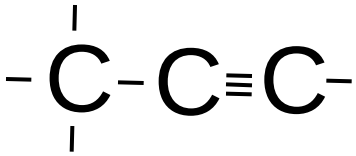
"-ene" means double bond. "2" tells you where the double bond starts. In numbering the carbon chain, left to right or right to left doesn't really matter. **What matters is that the numbers be as low as possible**.

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

3)

structural formula





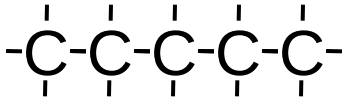
Can you see that this is the exact same molecule, just flipped over?

name:

answer:

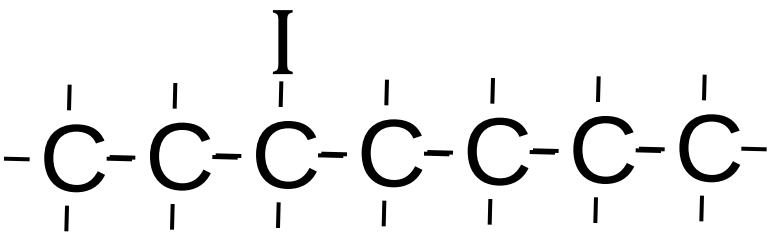
1-propyne

"-yne" means triple bond. "1" tells you where the triple bond starts. Actually, this could be called just "propyne" because there really isn't any other place the triple bond could have been:

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

4)

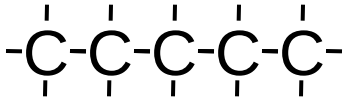
structural formula



name:

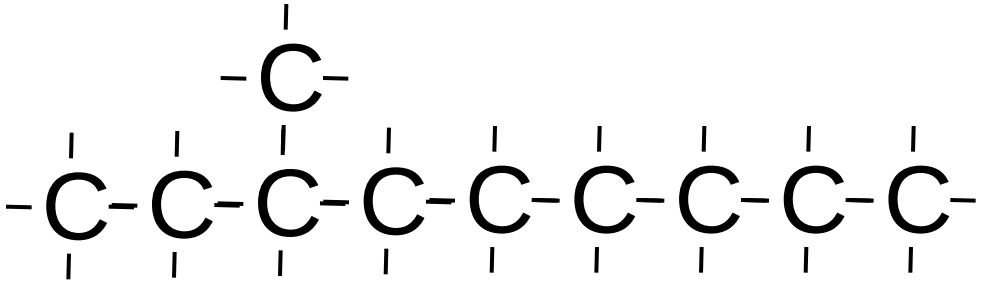
answer: 3-iodoheptane

"iodo" means iodine atom. "3" tells you where the iodine is attached.

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

5)

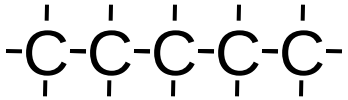
structural formula



name:

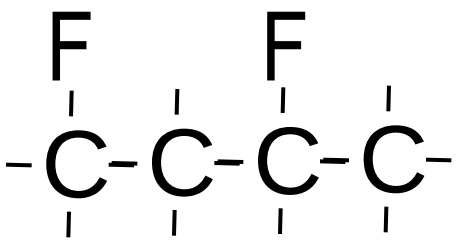
answer: 3-methylnonane

"methyl" means a $–CH_3$ branch. This is called a "side chain," and the "3" tells you where the side chain is attached.

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

6)

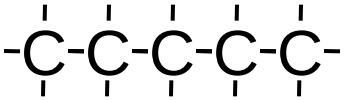
structural formula



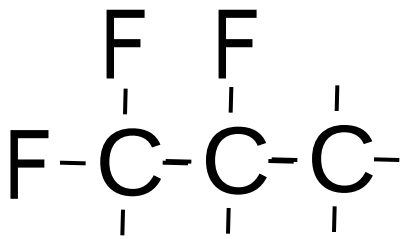
name:

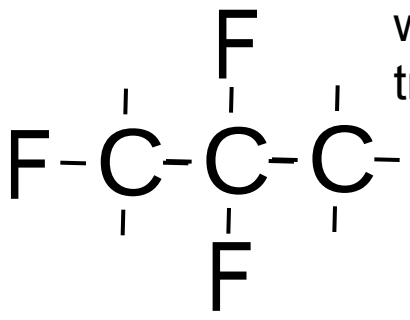
answer: 1,3-difluorobutane

"difluoro" because there are two fluorines. "1,3" tells you where these two F's are attached. If you called it "1,2" then you thought you could change the numbering direction in the middle of the name. You can't.

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

7) structural formula





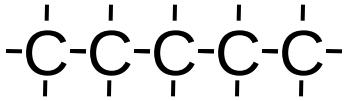
This molecule would be “1,2,2-trifluoropropane”

name:

answer:

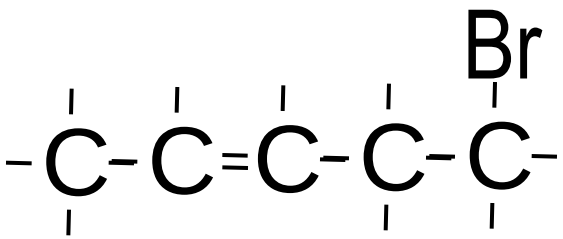
1,1,2-trifluoropropane

“trifluoro” says there are three fluorines. “1,1,2” tells you precisely where each F is attached. If you just called it “1,2-trifluoropropane” then someone reading that might think you meant this molecule instead:

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

8)

structural formula

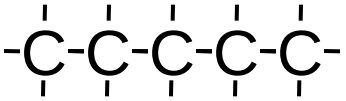


name:

answer:

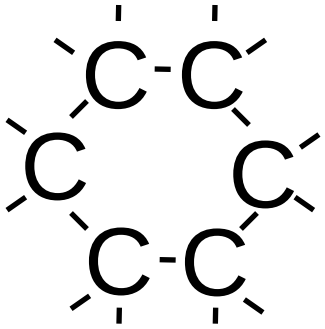
5-bromo-2-pentene

"-ene" means double bond. "2" tells you where the double bond starts. Giving the double bond the lowest number is more important than giving the bromo the lowest number.

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

9)

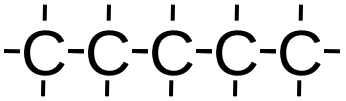
structural formula



name:

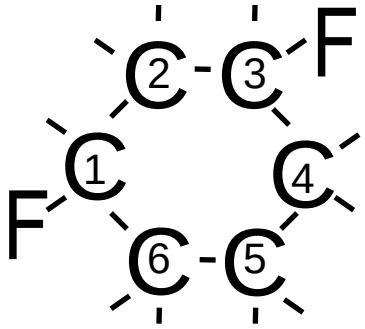
answer: cyclohexane

"cyclo-" means ring structure. Notice how each C is identical – with bonds to two H atoms and bonds to two other C atoms in the ring.

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

10)

structural formula

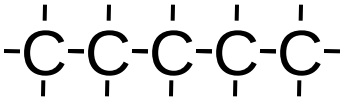


name:

answer:

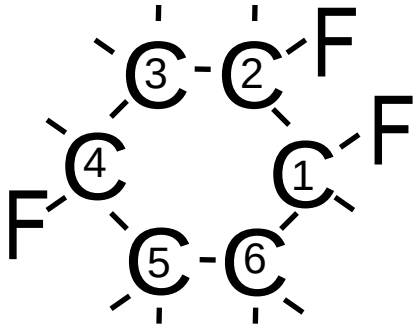
1,3-difluorocyclohexane

In a ring structure, start numbering the carbons in whatever way gives the lowest numbers:

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

11)

structural formula

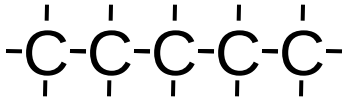


name:

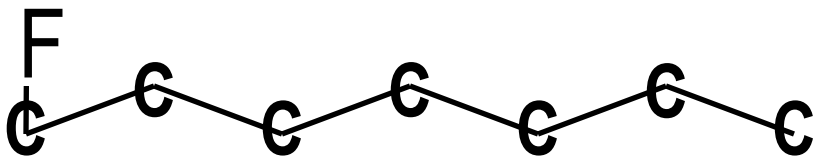
answer:

1,2,4-trifluorocyclohexane

In this case, there is only one correct way to number the carbons that gives the lowest set of numbers:

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

12)

line formula 

name:

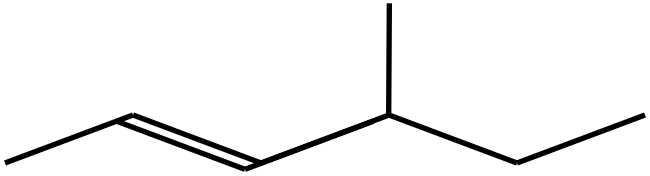
answer: 1-fluoroheptane

Each line segment represents a bond with a C on each end.

structural formula	name	line formula	condensed structural formula	molecular formula
-C-C-C-C-C-	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

13)

line formula



name:

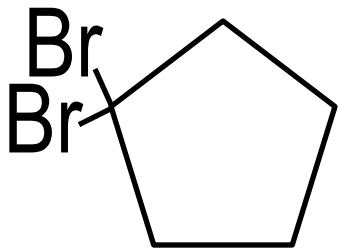
answer: 4-methyl-2-hexene

Remember to give the double bond the lowest number.

structural formula	name	line formula	condensed structural formula	molecular formula
-C-C-C-C-C-	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

14)

line formula



name:

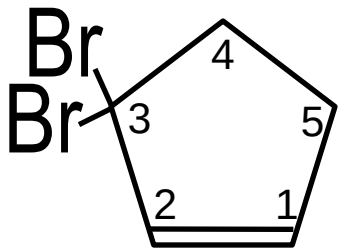
answer: 1,1-dibromocyclopentane

Since a ring has no beginning or end, you can designate any C as the #1 C. Also, remember: it's not enough just to say 1-dibromocyclopentane. You have to specify where both bromos are.

structural formula	name	line formula	condensed structural formula	molecular formula
-C-C-C-C-C-	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

15)

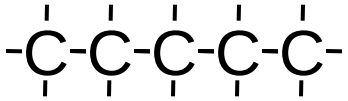
line formula



name:

answer: 3,3-dibromocyclopentene

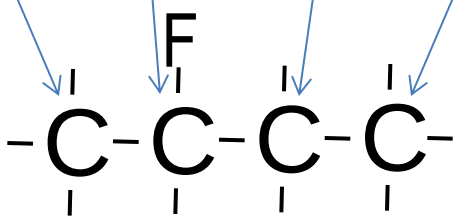
In a ring structure with a double bond, always start numbering so that the double bond is between the 1 and 2 carbons:

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

16)

Condensed structural formula

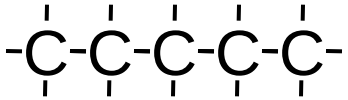
$CH_3CHFCH_2CH_3$



name:

answer: 2-fluorobutane

The condensed structural formula just spells out what's on each carbon as you move down the chain:

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

17)

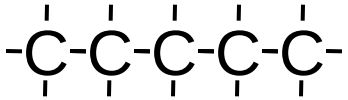
Condensed structural formula

$CH_3CH_2CH{=}CHCH_2CH_2CH_2CH_3$

name:

answer: 3-octene

This is how double bonds are shown in this format.

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

18)

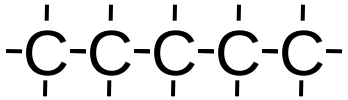
Condensed structural formula

$CH_3CH_2CHCH_3CH_2CH_2CH_3$

name:

answer: 3-methylhexane

This is how carbon side chains (like methyl) are shown in this format.

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

19)

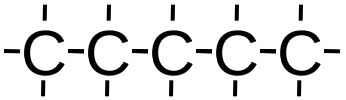
Condensed structural formula

$\mathbf{CH_3(CH_2)_6CF_2CH_2CH_3}$

name:

answer: 3,3-difluorodecane

Instead of writing $-CH_2CH_2CH_2CH_2CH_2CH_2-$ which gets really long, you can jut write $–(CH_2)_6–$ which is much faster!

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

20)

Condensed structural formula

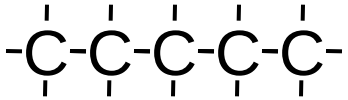
$$\left[CH_2CH_2CH_2CH_2CH_2CH_2CH_2\right]$$

This wrap-around line represents a bond connecting the last carbon back to the first

name:

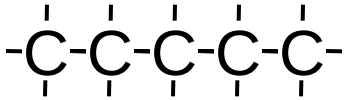
answer: cycloheptane

The wrap around line is one way to show a cyclo-compound in this format.

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

So far all the problems have required you to write the name of the compound given a structural, line or condensed structural formula. Now let's see if you can go the other way. For these next 15 questions, you will be given the name of a compound, and you will be required to write the structural formula, line formula or condensed molecular formula.

Since the orientation of the molecule doesn't really matter, for many of the questions, more than one answer is correct.

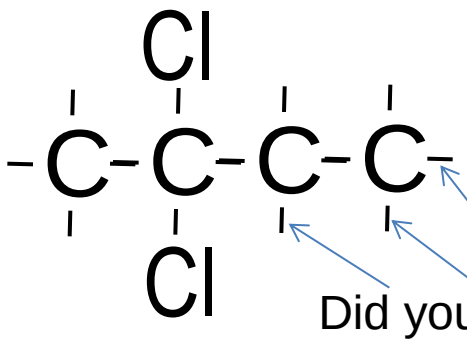
structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

21)

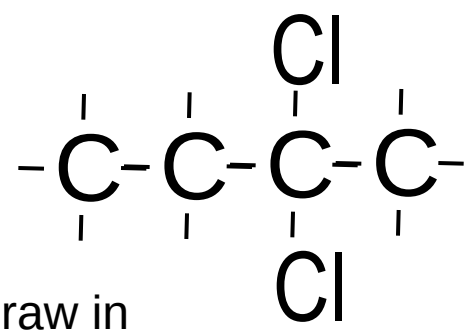
name: 2,2-dichlorobutane

structural formula:

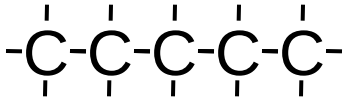
answer:



or:



Did you remember to draw in all the dashes (implied H's)?

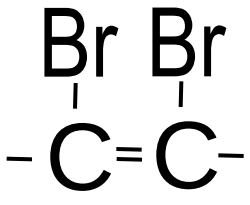
structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

22)

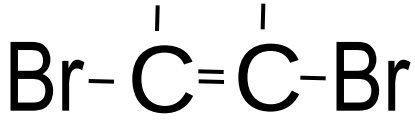
name: 1,2-dibromo-1-ethene

structural formula:

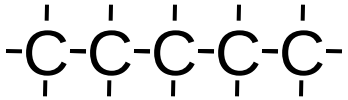
answer:



or:



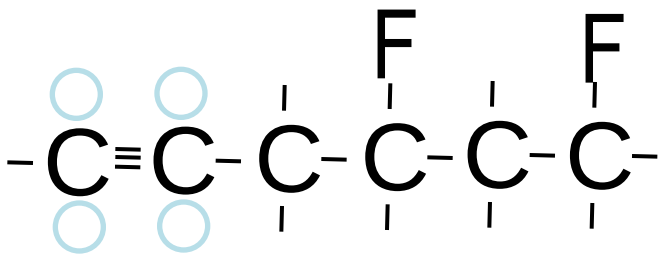
Did you remember to leave off these two dashes to show the two H atoms that had to be taken off to allow for the double bond?

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

23)

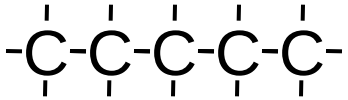
name: 4,6-difluoro-1-hexyne

structural formula:

answer: 

or the same thing flipped over horizontally or vertically

Did you remember to leave off these <u>four</u> dashes to show the four H atoms that had to be taken off to allow for the triple bond?

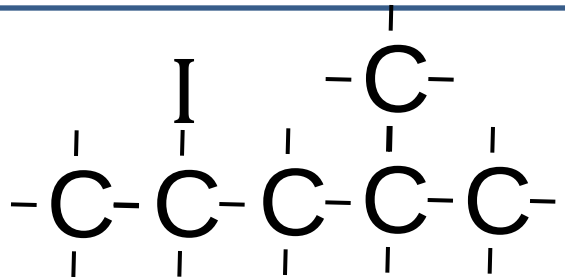
structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

24)

name: 2-iodo-4-methylpentane

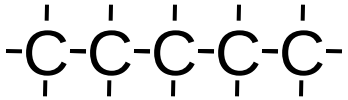
structural formula:

answer:



or the same thing flipped over horizontally or vertically

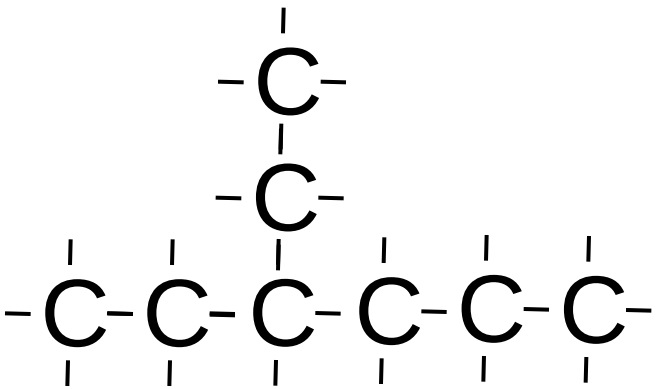
Remember that methyl means a 1-carbon side chain, complete with three H's ($-CH_3$).

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

25)

name: 3-ethylhexane

structural formula:

answer: 

or the same thing flipped over horizontally or vertically

Just as methyl means a 1-carbon side chain, ethyl means a 2-carbon side chain ($-C_2H_5$)

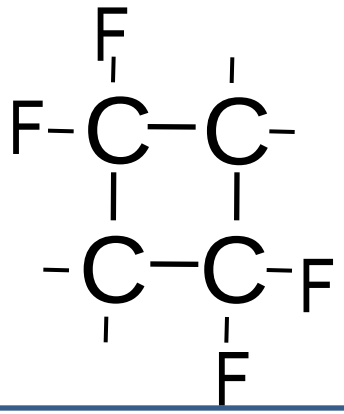
structural formula	name	line formula	condensed structural formula	molecular formula
-C-C-C-C-C-	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

26)

name: 1,1,3,3-tetrafluorocyclobutane

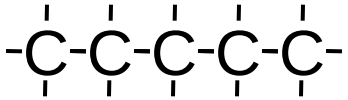
structural formula:

answer:

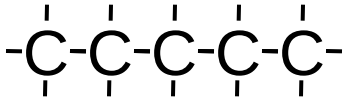


or the same thing flipped over horizontally or vertically

Did you remember that cyclo means a ring structure and that “tetra-” means four?

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

Now try drawing some line formulas:

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

27)

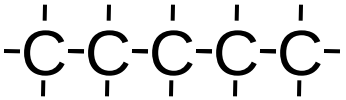
name: 4-chloro-2-nonyne

line formula:

answer:

…or the same thing flipped over horizontally or vertically

Did you remember that “non-” means nine carbons and that “-yne” means triple bond?

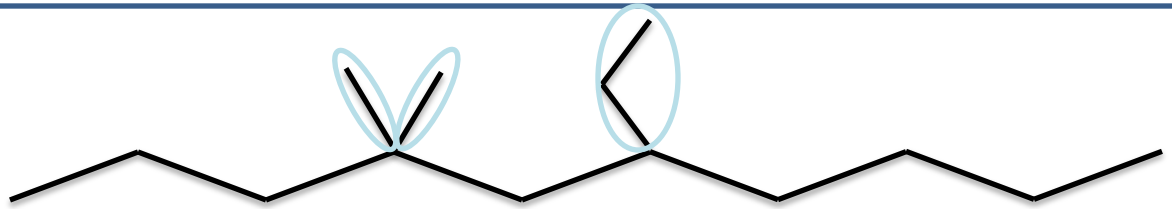
structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

28)

name: 4,4-dimethyl-6-ethyldecane

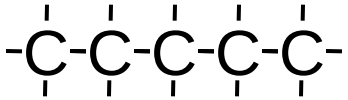
line formula:

answer:



…or the same thing flipped over horizontally or vertically

Notice how “dimethyl” means two 1-carbon side chains and “ethyl” means one 2-carbon side chain.

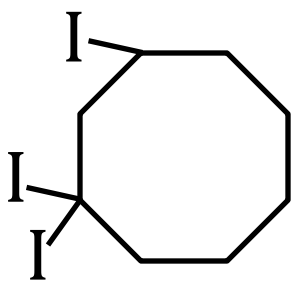
structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

29)

name: 1,1,3-triiodocyclooctane

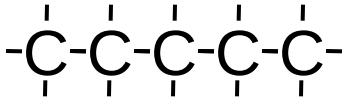
line formula:

answer:



…or the same thing flipped over or rotated

Did you remember to make a ring structure?

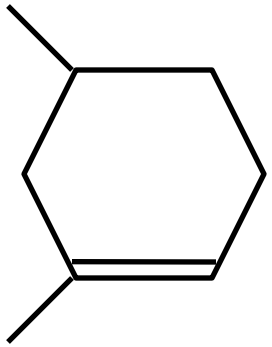
structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

30)

name: 2,4-dimethylcyclohexene

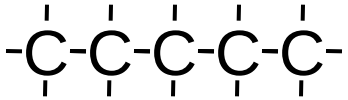
line formula:

answer:

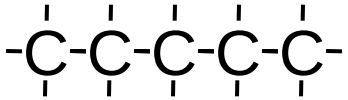


…or the same thing flipped over horizontally or vertically

Did you remember that the double bond determines the number 1 & 2 carbons?

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

Now try writing some condensed structural formulas:

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

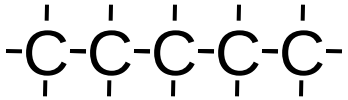
31)

name: 3,4,4-tribromo-2-iodoheptane

condensed structural formula:

answer: $CH_3CHICHBrCBr_2CH_2CH_2CH_3$

How close did you get?

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

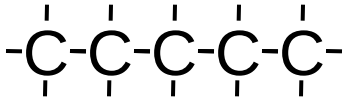
32)

name: 4-methyl-2-hexyne

condensed structural formula:

answer: $CH_3C{\equiv}CCH(CH_3)\ CH_2CH_3$

Did you put the triple bond in the right place?
And did you remember to take the H's off those two carbons?

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

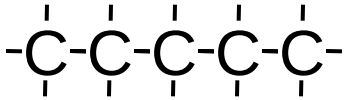
33)

name: 1-bromo-3-fluoro-3-iodocyclopentane

condensed structural formula:

answer: $CHBrCH_2CFICH_2CH_2$

Did you remember it was a ring structure?

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

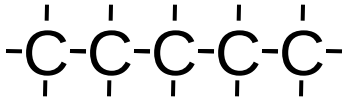
34)

name: hectane (hect = 100 C's)

condensed structural formula:

answer: $CH_3(CH_2)_{98}CH_3$

Hopefully you used this short-cut & didn't try writing out all those CH_2's!
And do you understand why the 98?

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

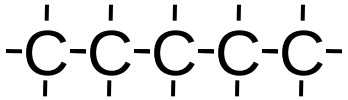
35)

name: 27-fluorohectane

condensed structural formula:

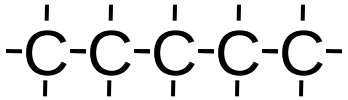
answer: $CH_3(CH_2)_{25}CHF(CH_2)_{72}CH_3$

Once again, the parentheses short-cut proves quite helpful!
And do you understand the 25 and the 72?

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

Finally, for these last five problems, try writing the molecular formulas:

Molecular formulas contain the least information – they don't tell you how the molecule looks or what goes where; all they tell you how many atoms there are all together of each element present in the compound. Molecular formulas are not very useful for helping us draw structural formulas, but they are easier to deal with in some situations, such as balancing equations or converting from moles to grams.

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

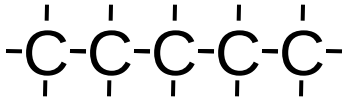
36)

name: 2-bromononane

molecular formula:

answer: $C_9H_{19}Br$

If it were just nonane (no bromo) it would be C_9H_{20}, but since the Br replaces one of the H's, it's $C_9H_{19}Br$

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

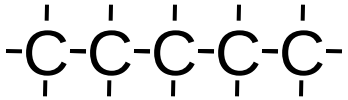
37)

name: 1,2,6-trichloro-3-decene

molecular formula:

answer: $C_{10}H_{17}Cl_3$

10 C's has room for 22 H's, but the double bond gets rid of two an then the three Cl's get rid of three more, so that leaves 17 H's.

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

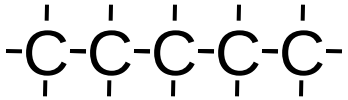
38)

name: 1,1-diiodocyclobutane

molecular formula:

answer: $C_4H_6I_2$

Butanes four C's should be able to hold 10 H's, but the cyclo gets rid of two H's, and then the two I's get rid of two more…so that's why we are down to just 6 H's.

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

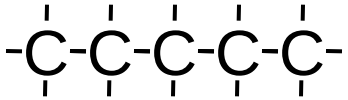
39)

name: 2,3-dimethyl hexane

molecular formula:

answer: C_8H_{18}

Hexane has six C's, but the two methyl side chains add two more to make it eight. With no double bonds, rings, or substitutions, there is the full load of 18 H's..

structural formula	name	line formula	condensed structural formula	molecular formula
	pentane		$CH_3CH_2CH_2CH_2CH_3$	C_5H_{12}

40)

name: 74-chloro-34-hectyne

molecular formula:

answer: $C_{100}H_{197}Cl$

100 C's could hold a maximum of 202 H's, but the triple bond knocks out four of the H's and the "chloro " knocks out one more.