## Branched-chain alkanes can be named by following four steps:

**STEP 1: Name the main chain.** Find the longest continuous chain of carbons. This will be the parent name. (Watch out – the structure might "turn corners".)

$$\begin{array}{c|c} CH_3-CH_2 \end{array} & Wrong! \\ CH_3-CH-CH_2-CH_3 \end{array} & vs \\ \hline CH_3-CH-CH_2-CH_3 \end{array} & (CH_3-CH_2-CH_2-CH_3) \end{array}$$

Name as a substituted pentane, not as a substituted butane, because the longest chain hasfive carbons.

STEP 2: Number the carbon atoms in the main chain. Begin at the end nearer the first branch point:

	CH <sub>3</sub>	Righ	nt				CH <sub>3</sub>	W	rong!		The first (and only) branch occurs at
CH₃− 1	_сн 2	-CH₂- 3	CH₂ 4	−CH₃ 5	VS	СН <sub>3</sub> 5	—сн 4	-СН <sub>2</sub> З	CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>3</sub> 3 2 1	C2 if we start numbering from the left, but would occur at C4 if we started from the right by mistake.	

STEP 3: Identify the branching substituents, and number each according to its point of attachment to the main chain:

$$CH_3$$
  
 $CH_3$   
 $CH_3$   
 $CH_2$   
 $CH_2$   
 $CH_2$   
 $CH_2$   
 $CH_2$   
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 $CH_3$ 

If there are two substituents on the same carbon, assign the same number to both. There must always be as many numbers in the name as there are substituents.

$$\begin{array}{c} (CH_2-CH_3) \\ (CH_3-CH_2-C-CH_2-CH_2-CH_3) \\ 1 \\ (CH_3) \end{array}$$
The main chain is a hexane. There are two substituents:  
a -CH\_3 and a -CH\_2CH\_3, both connected to C3 of the chain.

**STEP 4:Write the name as a single word,** using hyphens to separate the numbers from the different prefixes and commas to separate numbers if necessary. If two or more different substituent groups are present, cite them in alphabetical order.

If two or more identical substituents are present, use one of the prefixes di-, tri-, tetra-, and so forth, but do not use these prefixes for alphabetizing purposes.

$$\begin{array}{c} \mathsf{CH}_{3}\\ \mathsf{CH}_{3}-\mathsf{CH}-\mathsf{CH}_{2}-\mathsf{CH}_{2}-\mathsf{CH}_{2}-\mathsf{CH}_{3}\\ \mathsf{CH}_{3}-\mathsf{CH}_{2}-\mathsf{C}-\mathsf{CH}_{2}-\mathsf{CH}_{2}-\mathsf{CH}_{3}\\ \mathsf{CH}_{3}-\mathsf{CH}_{2}-\mathsf{C}-\mathsf{CH}_{2}-\mathsf{CH}_{2}-\mathsf{CH}_{3}\\ \mathsf{CH}_{3}-\mathsf{C}-\mathsf{CH}_{2}\\ \mathsf{CH}_{3}-\mathsf{C}-\mathsf{CH}_{2}-\mathsf{CH}_{2}-\mathsf{CH}_{2}-\mathsf{CH}_{3}\\ \mathsf{CH}_{3}-\mathsf{C}-\mathsf{CH}_{2}-\mathsf{CH}_{2}-\mathsf{CH}_{3}\\ \mathsf{CH}_{3}-\mathsf{C}-\mathsf{CH}_{2}-\mathsf{CH}_{2}-\mathsf{CH}_{3}-\mathsf{CH}_{3}\\ \mathsf{CH}_{3}-\mathsf{C}-\mathsf{CH}_{2}-\mathsf{CH}_{3}-\mathsf{CH}_$$

2-methyl pentane (a five-carbon main chain with a methyl substituent on carbon 2)

3-ehtyl-3-methyl hexane (a six-carbon main chain with ethyl and methyl substituents attached to carbon 3. Notice the substituents are cited alphabetically.)

3,3-dimethyl hexane (a six-carbon main chain with two methyl substituents attached to carbon 3. Notice there has to be a number for each substituent -even if its the same.)