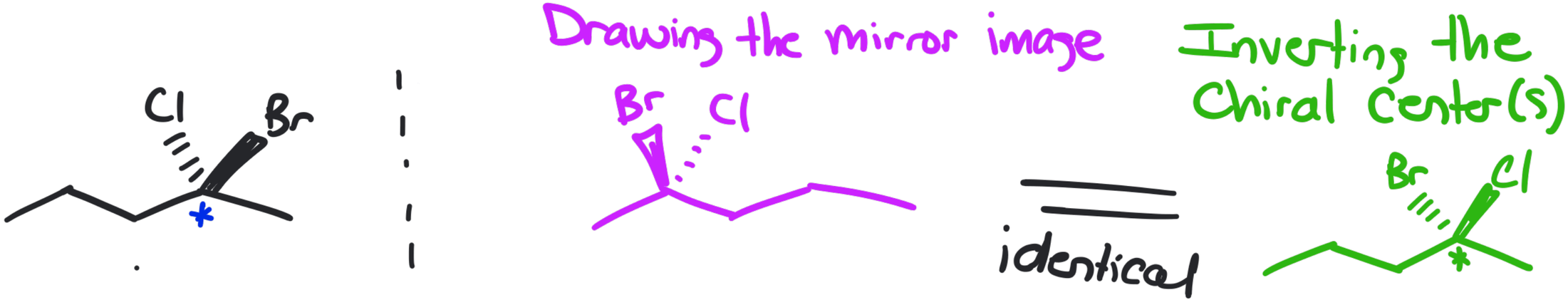
Review

- A chiral molecule is non-superimposable on its mirror image.

a pair of enantiomers

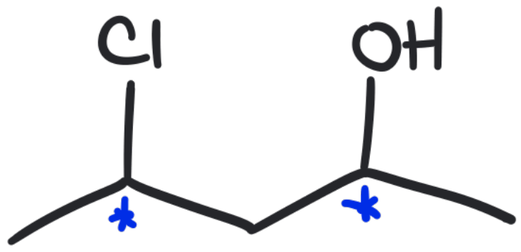
- A molecule with one chiral center is always chiral.
- You can draw an enantiomer by:



- An achiral molecule does not have an enantiomer

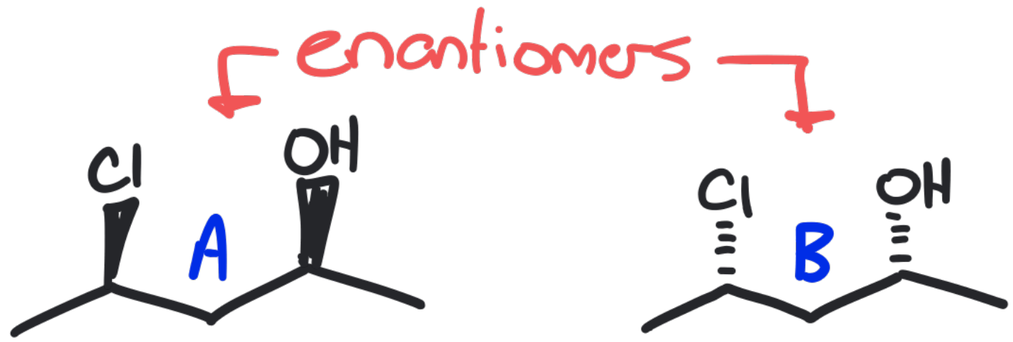
↳ it will be superimposable on its mirror image.
(identical to)

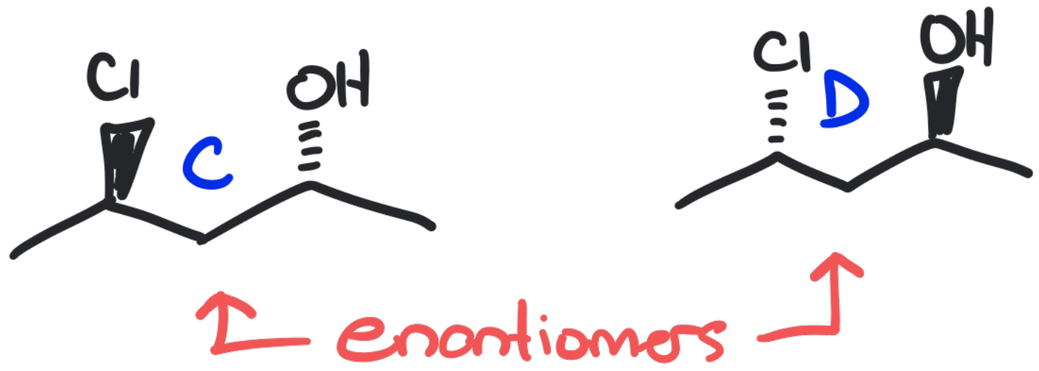
Compounds with 2 or More Chiral Centers



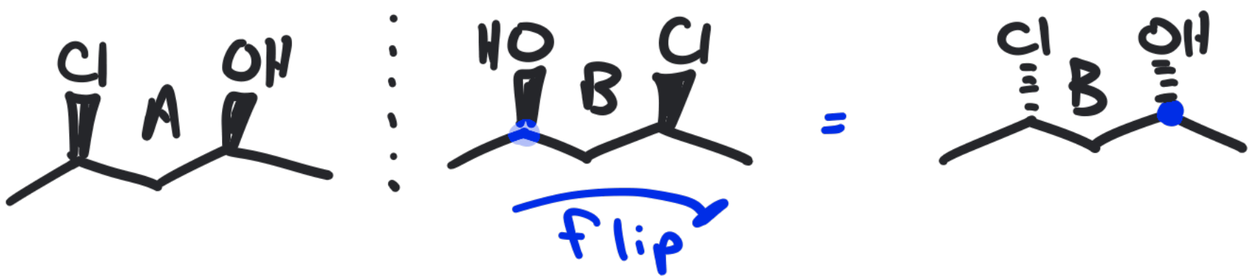
2^n (n = # of chiral centers)

$2^2 = 4$ (Max # Stereoisomers)





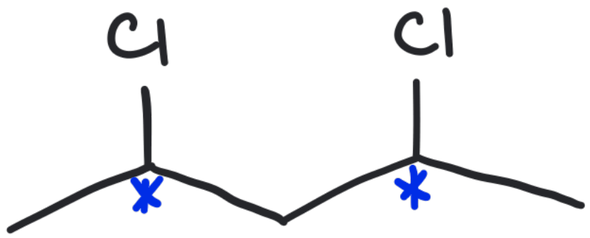
* Enantiomers - pair of non-superimposable mirror images.



A+C, A+D, B+C, B+D

pairs of non-superimposable, non mirror images = **diastereomers**

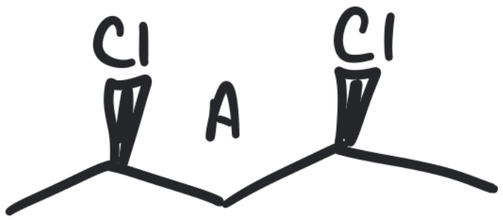
* One or more, but not all Chiral Centers are inverted



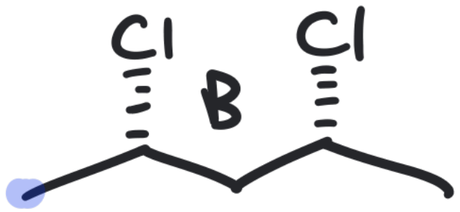
$2^2 = 4$ (max possible # of stereoisomers)

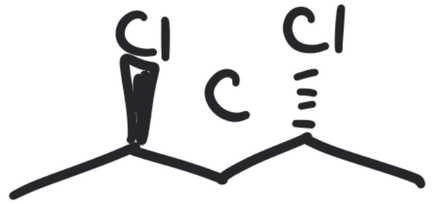
A = B

achiral

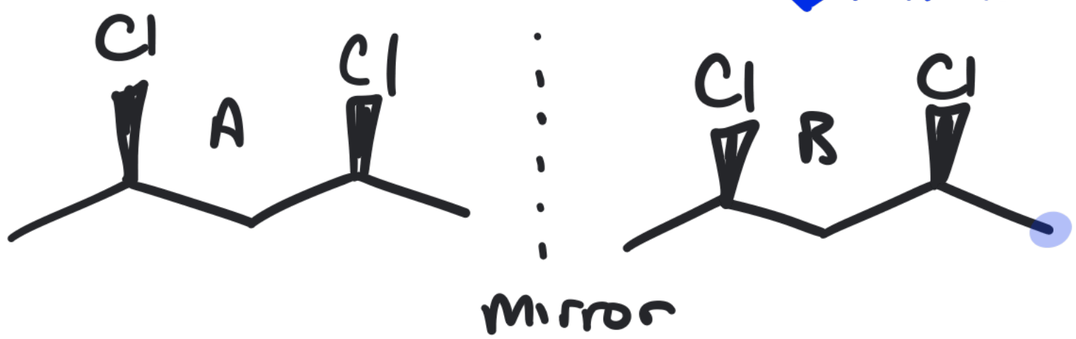


achiral





↓ flip horiz.

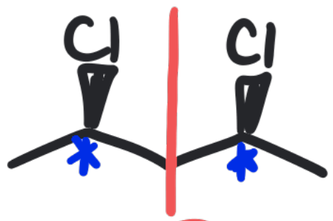


not enantiomers, but identical

A is superimposable on its mirror image B

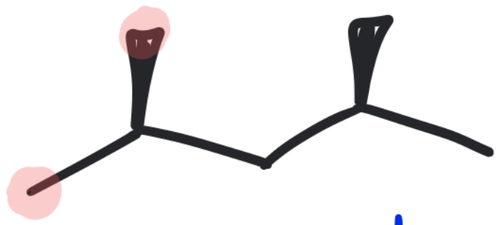
No enantiomer = achiral

A molecule with two or more Chiral centers can be achiral due to a plane of symmetry.

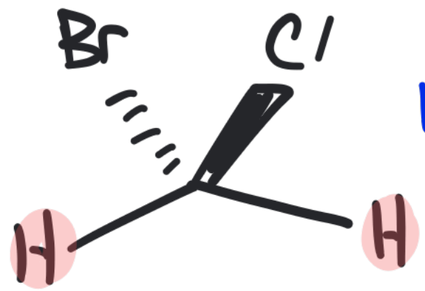


Meso Compound

no chiral centers

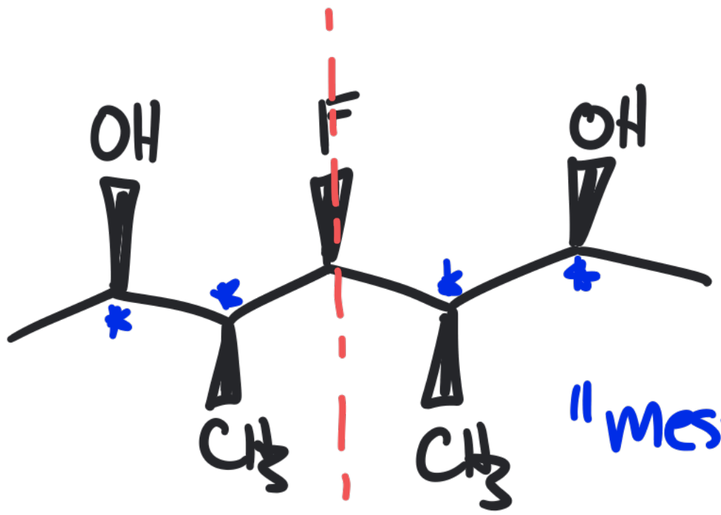


achiral



No Chiral Centers

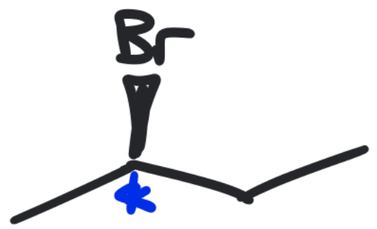
achiral



"meso achiral"

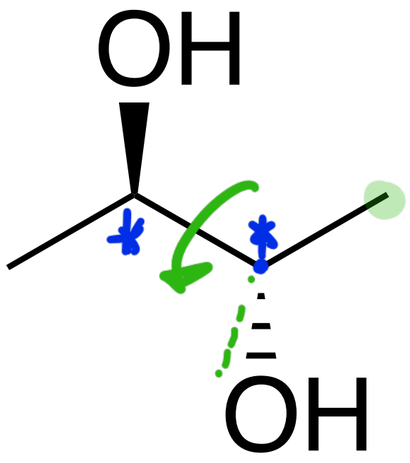
Symmetry

achiral → meso Compound



Chiral

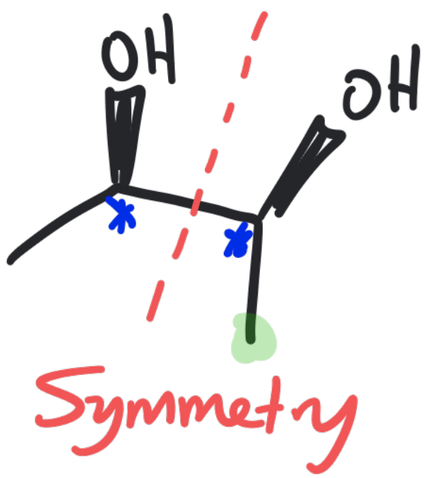
How would you best classify the molecule shown?

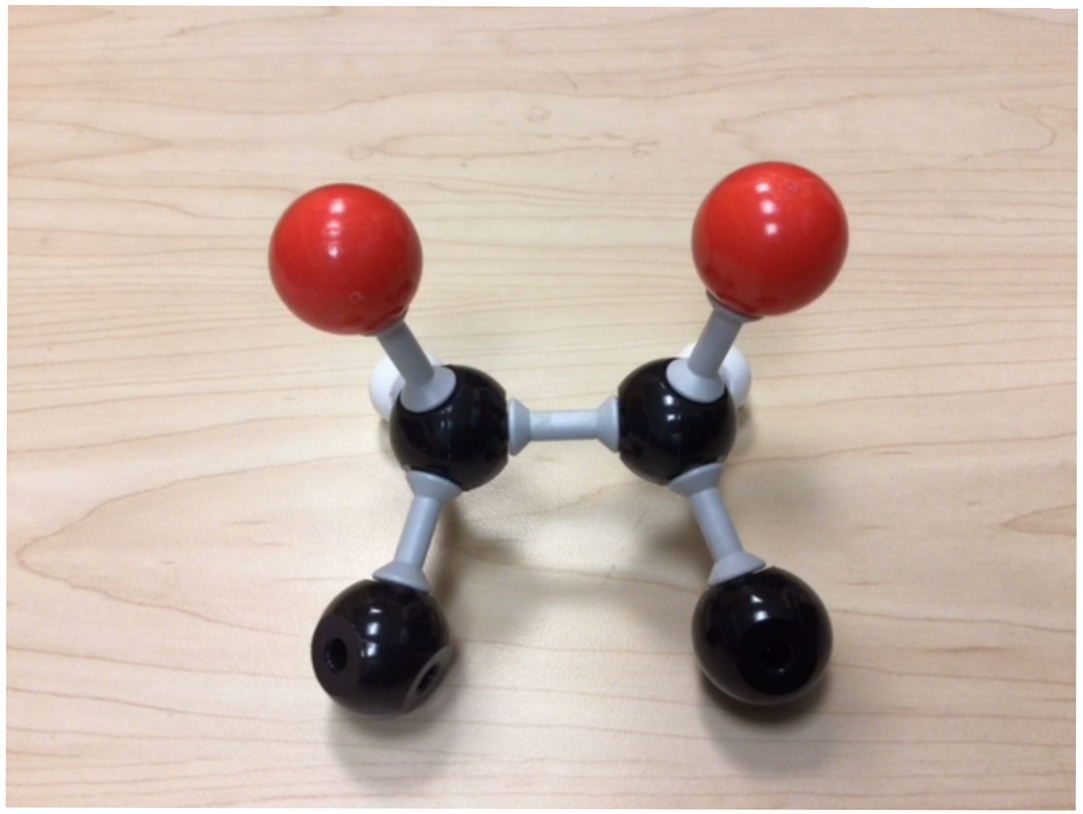


A. Chiral

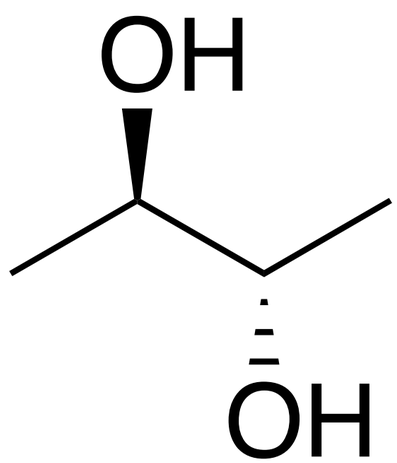
B. Achiral

C. Achiral (meso)





Does this molecule have an enantiomer?



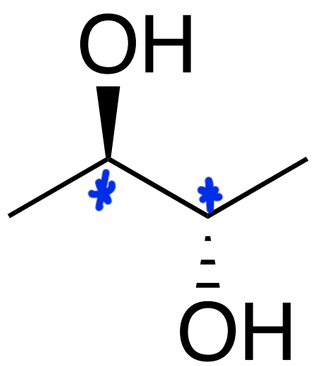
A. Yes

B. No

achiral (meso)

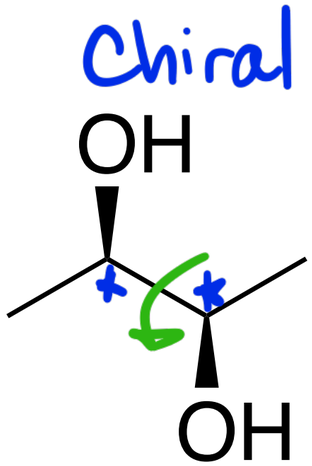
↳ do not have enantiomers

What is the relationship between the two compounds shown?



and

Chiral

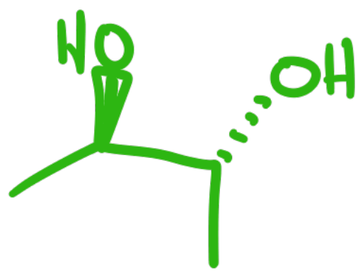


A. Identical

B. Enantiomers

C. Diastereomers

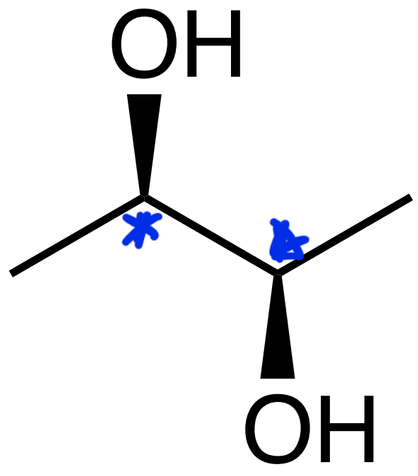
achiral (meso)



non superimposable

non mirror image

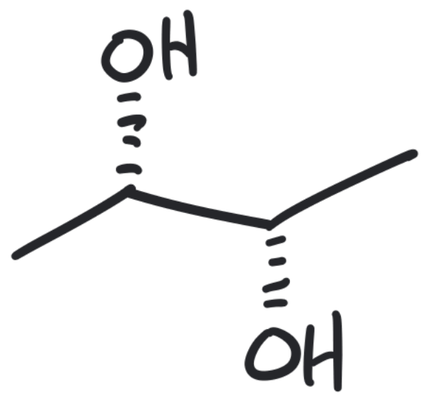
Does this molecule have an enantiomer?



A. Yes

B. No

Chiral

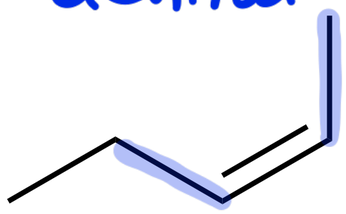


What is the relationship between the two molecules?

achiral

and

achiral



non-superimposable

non mirror images

A. Enantiomers

B. Diastereomers

C. Identical

D. Constitutional Isomers

don't necessarily have to have Chiral Centers