

Supporting Information A for

Development and Use of a Flowchart as a Scaffolding Tool for Isomeric Relationships in Organic Chemistry

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Flowchart for Isomerism (FCI)

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Content and Limitations of FCI






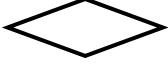


In this part, the content of the FCI are presented below:

- FCI determines the isomeric relationship between pairs of compounds. In addition, FCI can provide information about the stereochemical properties of each of the compounds.
- Flowchart for Isomerism (FCI) is presented in two parts:
 - Flowchart Part 1 for Non-Isomers, Constitutional Isomers and Conformers (FCI-1, see page 5) and
 - Flowchart Part 2 for Configurational Isomers (FCI-2, see page 6).
- In FCI-1;
 - Non-isomers, different compounds and same compounds can be identified.
 - Constitutional isomers are detailed as skeletal, tautomeric, functional group or positional isomers.
 - Conformers are divided into ring and rotational isomers. Some conformational properties of the ring conformers (chair, half-chair, twist-boat, boat, planar, butterfly, and envelope) and the rotational isomers (anti, gauche, eclipsed, and staggered) are provided.
- In FCI-2;
 - Configurational Isomers are divided into enantiomers and diastereomers.
 - R and S or dextrorotatory and levorotatory properties of an enantiomer can be accessed.
 - Diastereomers are classified as epimers, cis-trans isomers and E-Z isomers. Information about the cis, trans, E and Z configuration of a compound is also available.

In this part, the limitations of the FCI are listed below.

- With FCI-1, two different decisions (functional group isomers and skeletal isomers) are reached for a compound pair with different functional groups and carbon skeletons. FCI-1 can be used for pairs of compounds that differ in either functional group or carbon skeleton.
- FCI-1 is suitable for the determination of 3-6 membered ring conformers under the concept of "Ring conformers".
- FCI-1 is suitable for the determination of rotational isomers for 0-2 substituted systems under the concept of "Rotational isomers".
- FCI-2 is suitable for determining the cis-trans and E-Z isomerism relationships of alkenes containing one double bond.

Shapes in FCI

Shape	Name	Function
 and 	Start/End	Oval shapes with continuous lines indicate the start of the FCI and the isomeric relationship decision (end) between the pair of compounds. Oval shapes with dashed lines indicate a stereochemical property (end) associated with each compound in the pair of compounds.
	Connector	An arrow connects the shapes.
 and 	Process	Rectangular shapes contain commands and indicate that the process is ongoing.
 and 	Decision	Diamond shapes contain question statements and enable decision-making.
	Output	Parallelogram shapes represent output which means an intermediate decision.

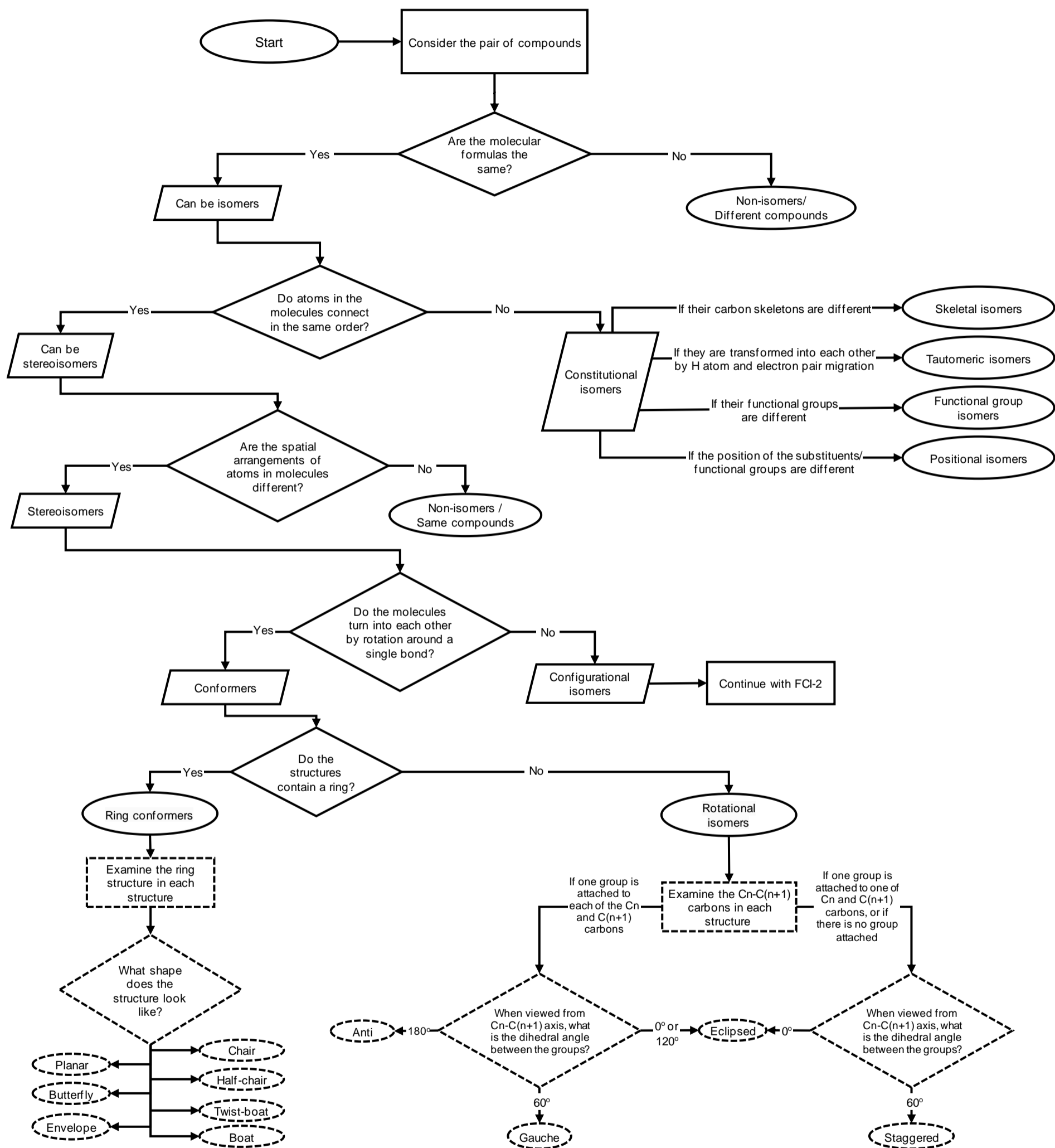
Alternative Use of FCI

In this part, alternative usage of FCIs are listed below.

- Instructors can use the FCIs in the editable format given below, in line with their curriculum, by revising some parts.
- Instructors can print FCIs with a page size of A3 on A4-sized paper, and for low vision students they can be printed on A3 or larger-sized paper. (The steps to be followed in Microsoft Word for printing on papers of different page sizes are as follows: Choose File - Print, then the bottom drop-down, defaults to one page per sheet, click that and you should see the Scale option.)
- Since FCIs are prepared in black and white, they are also suitable for students who are color blind.

Flowchart Part 1 for Non-isomers,
Constitutional Isomers and Conformers

FCI-1



Flowchart Part 2 for Configurational Isomers

FCI-2

