

Teaching and learning

MolDraw Docs · LabCanvas · 5 pages · moldraw.com/docs/

Educational layout and Teaching menu

Short answer: Click the graduation cap button in the top bar to open the Teaching menu. It switches the Educational layout, Show errors, Error tooltips, Lewis structure, Free sketch mode and the next atom preview. The same switches are in Settings, General.

MolDraw has two screen layouts. **Scientific** shows every button. **Educational** shows two compact rows and one tool column with the rings in it. Menus hold everything else. The Teaching menu puts the classroom switches one click away.

- 1 Click the **Teaching** button (a graduation cap) in the top bar, next to the theme and grid buttons.
- 2 Click a row to switch it on or off. The switch on the right shows the state.
- 3 Click **All teaching settings...** to open **Settings** at the **General** page.
- 4 Press **Esc** or click outside the menu to close it.

Every switch in the Teaching menu

Row	What it does	Default
Educational	Switches the layout between Educational (on) and Scientific (off)	Off (Scientific)
Show errors	Marks atoms with too many bonds and unclear stereo	On
Error tooltips	Explains a marked atom when you hover or tap it. Shows only while Show errors is on.	On
Lewis structure	Shows every atom, every hydrogen and the lone pairs	Off (Skeletal formula)
Free sketch mode	Relaxes the chemistry rules so you can draw anything	Off

Row	What it does	Default
Preview the next atom	Shows a faint bond and atom where the next click adds an atom	On in Scientific, off in Educational

Each switch has its own page: Show errors, Lewis structure and Free sketch mode.

Defaults per layout

The layout changes only one teaching default. **Preview the next atom** is on in Scientific and off in Educational, so beginners see a clean canvas. If you switch it yourself, your choice stays in both layouts. All other switches keep the same value when you change layout.

What the Educational layout changes

- The header shows two compact rows instead of the full Scientific chrome.
- The tools sit in one column on the left, and the rings join that column.
- The menu at the left of the tools row holds **My designs**, **Copy SMILES**, **Paste SMILES** and file actions.
- Undo, redo, clean up, 3D, zoom and download stay on screen.

Your drawing does not change. You can switch layout at any time, even in the middle of a drawing. For themes and a side by side look at both layouts, see Themes and layouts.

In Settings

Open **Settings**, then **General**:

- **Appearance** has **Layout** with Scientific and Educational pictures.
- **Teaching** has **Structure display**, **Free sketch mode** and its five rules, **Show errors**, **Error tooltips** and **Preview the next atom**.

The free sketch rules are only in Settings, not in the Teaching menu. Settings are saved in this browser.

Tips for a class

- Turn on **Educational** and **Show errors** before a lesson. Students see fewer buttons and get hints on mistakes.

- Switch on **Lewis structure** to check a drawing, then switch it off to see the skeletal formula again.
- Use inductive arrows and partial charges for polarity lessons.

Common problems

Problem	Fix
No graduation cap in the top bar	On a phone or small window the button is hidden. Open Settings , then General , and use the Teaching group.
The layout does not change on a phone	The Educational layout applies on larger screens. Phones always use the mobile layout. See phone and tablet use.
The settings are back to default	Settings are saved per browser. A private window or cleared site data resets them.

Questions and answers

How do I switch MolDraw to the Educational layout?

Click the graduation cap button in the top bar and switch on Educational. Or open Settings, General and pick Educational under Layout.

What is the difference between Scientific and Educational layout?

Scientific shows every button. Educational shows two compact rows and one tool column, and moves the rest into menus. Your drawing stays the same.

Where are the teaching settings in MolDraw?

Open Settings, then General, and find the Teaching group. The Teaching button in the top bar has the most used switches.

Do teaching settings apply for my students too?

Settings are saved in each browser. Each student turns them on in their own browser.

Source: <https://www.moldraw.com/docs/teaching/educational-layout-and-teaching-menu/>

Show errors and error tooltips

Short answer: Show errors is on by default. An amber dot marks atoms with too many bonds, or lone pairs that do not fit the charge. An amber ring marks unclear wedge or dash stereo. Hover or tap a marked atom to read the error. Turn it off in the Teaching menu.

MolDraw never stops you from drawing. When a structure breaks a rule, it marks the atom instead. This helps students find their own mistakes.

Where to find it

- 1 Click the **Teaching** button (graduation cap) in the top bar.
- 2 Switch **Show errors** on or off.
- 3 With Show errors on, switch **Error tooltips** on or off.

Both switches are also in **Settings, General, Teaching**. Both are on by default.

What is flagged

Mark	Problem	Example tooltip
Amber dot at the upper right of the atom	Too many bonds for the element and its charge	Too many bonds: C has 5 bonds, at most 4 expected
Amber dot	Lone pairs and formal charge do not agree	Charge does not match the lone pairs: O with 3 lone pairs here needs a – charge
Amber dot	More than eight electrons on B, C, N, O or F, or more than two on H	Too many electrons: N has 10 around it (3 bonds and 2 lone pairs), at most 8
Amber dot	The lone pairs give a different formal charge than the one drawn	Lone pairs do not add up

Mark	Problem	Example tooltip
Amber ring around the atom	Wedge and dash bonds that do not give one clear 3D arrangement	Stereo issue: the wedge and dash bonds here do not give one clear 3D arrangement

The lone pair and charge checks run only on atoms where you drew lone pairs. Implicit hydrogens count as bonds. Atoms with a text label like Ph are not checked for lone pairs.

Error tooltips

Hover over a marked atom or its dot to see the message. On a touch screen, tap the atom. The tooltip appears next to the atom in plain words. Turn **Error tooltips** off if you want students to find the problem without a hint.

The red flash while drawing

When a new bond overfills an atom, the atom flashes red. The bond is still drawn, and the amber dot stays after the flash. This flash is not part of Show errors. To stop it, use **Allow any number of bonds** in Free sketch mode.

What the marks do not do

- They never appear in downloads, copied images or print. Your exported figure stays clean.
- They do not change the structure. Fix the drawing, and the mark goes away.

Fix a flagged atom

Error	Fix
Too many bonds	Remove a bond, lower a bond order, or add a formal charge if the chemistry needs one.
Charge does not match	Add or remove a charge with the plus and minus tools, or change the number of lone pairs. See Lone pairs, radicals and charges.
Stereo issue	Click the wedge or dash to change it, or remove extra stereo bonds. See Stereochemistry.

For a full check of the whole structure, use **Check structure** from the command palette. See [Check a structure for valence errors](#). For the theory of formal charge, read the [formal charge guide](#).

Questions and answers

What does the amber dot on an atom mean in MolDraw?

The atom breaks a valence rule. It has too many bonds, too many electrons, or lone pairs that do not match its charge. Hover or tap the atom to read why.

How do I turn off error marks in MolDraw?

Click the graduation cap Teaching button and switch off Show errors. Or open Settings, General, Teaching.

Will the error dots show in my exported image?

No. The marks are editor hints only. They never appear in PNG, SVG, PDF, copied images or print.

Why does an atom flash red when I add a bond?

The new bond gives the atom more bonds than its valence allows. MolDraw still draws the bond and leaves an amber dot. Turn on Free sketch mode with Allow any number of bonds to stop the flash.

Source: <https://www.moldraw.com/docs/teaching/how-to-show-chemistry-errors-and-error-tooltips/>

Lewis structure view

Short answer: Click the graduation cap Teaching button and switch on Lewis structure. MolDraw shows every atom symbol, every hydrogen and the lone pairs as dots. Only the view changes. Your drawing stays the same, and you switch back the same way.

The Lewis structure view turns any skeletal drawing into a full Lewis structure. It is a display option. You draw in the normal way, and MolDraw adds the parts a Lewis structure needs.

- 1 Draw your structure, or paste a SMILES.
- 2 Click the **Teaching** button (graduation cap) in the top bar.
- 3 Switch on **Lewis structure**.
- 4 Switch it off to go back to the skeletal formula.

In **Settings, General, Teaching**, the same option is **Structure display**, with **Skeletal formula** and **Lewis structure**. The default is Skeletal formula.

What it shows

Part	In the Lewis view
Carbon atoms	Every atom shows its symbol, C included
Hydrogens	Each hydrogen is drawn as an H with its own bond
Lone pairs	Non bonding pairs show as dots on B, C, N, O, F, Si, P, S, Cl, Br and I
Your own lone pairs	Pairs you placed by hand stay as you drew them
Aromatic rings	Drawn with alternating double bonds instead of a circle
Labels like Ph or COOH	Stay as labels

The extra hydrogens and dots are not real atoms in your file. You can still select, move and edit the structure as usual. Undo works the same.

Exports

Downloads and copied images use the view on screen. Turn on Lewis structure before you download a PNG or SVG to get a Lewis figure. Turn it off to export the skeletal formula. File formats like SMILES and MOL do not change. See Download and file formats.

With other teaching options

- **Show errors:** a drawn lone pair that does not fit the charge gets an amber dot. See Show errors.
- **Free sketch mode:** with **No automatic hydrogens** on, the Lewis view shows only the atoms and pairs you drew. Students then add every H and pair themselves. See Free sketch mode.
- **Ball and stick:** the Lewis view does not apply to the ball and stick look.

Tips

- Draw a skeletal structure, then switch views to show students how the two forms match.
- Use **Clean up** first if the hydrogens crowd each other.
- For single dots, charges and the line style for pairs, see Lone pairs, radicals and charges.

Common problems

Problem	Fix
No lone pairs on an atom	Dots appear only on main group atoms with a known electron count. Metals and labels get none.
A charge looks wrong in the view	The view follows the charge you drew. Fix the charge with the plus and minus tools.
The view did not change	Check that the structure is not in the ball and stick look.

The Lewis structure generator is a separate free tool that builds Lewis structures from a formula.

Questions and answers

How do I show lone pairs on all atoms in MolDraw?

Switch on Lewis structure in the graduation cap Teaching menu. MolDraw draws the lone pairs as dots on every main group atom.

Does the Lewis view change my structure?

No. It is display only. The extra hydrogens and dots are not saved as atoms, and SMILES or MOL output stays the same.

Can I export a Lewis structure image?

Yes. Switch on Lewis structure, then download a PNG, SVG or PDF. The image shows the Lewis view.

How do I show all hydrogens in a structure?

Switch on Lewis structure in the Teaching menu. Every hydrogen is drawn with its own bond.

Source: <https://www.moldraw.com/docs/teaching/how-to-show-lewis-structures/>

Free sketch mode

Short answer: Click the graduation cap Teaching button and switch on Free sketch mode. MolDraw stops adding hydrogens and stops correcting valence, so you can draw any structure, even a wrong one. Pick which rules to relax in Settings, General, Teaching.

By default, MolDraw keeps your drawing chemically sensible. It adds implicit hydrogens, limits charges and trims lone pairs that do not fit. That helps most users. In a class you may want to draw a wrong structure on purpose, or let students place every electron themselves. Free sketch mode turns those rules off.

- 1 Click the **Teaching** button (graduation cap) in the top bar.
- 2 Switch on **Free sketch mode**.
- 3 To choose the rules, click **All teaching settings....**
- 4 In the **Teaching** group, switch each rule on or off.

The five rules appear in Settings only while Free sketch mode is on. All five are on by default when you start the mode.

The five rules

Setting	What it does	Default in the mode
No automatic hydrogens	Labels show only the element, O and not OH. Hydrogens appear only where you draw them. The formula counts drawn atoms only.	On
No valence correction	Edits never remove lone pairs or change bonds to fix valence	On
Allow any charge	Any atom can take a charge up to ± 9	On
Allow any number of lone pairs	Up to four lone pairs on any atom	On

Setting	What it does	Default in the mode
Allow any number of bonds	Extra bonds are drawn without the red warning flash	On

Turn a rule off to keep that part of the normal behaviour. For example, keep automatic hydrogens but allow any charge.

Normal limits it replaces

- **Charges:** without the mode, charge tools stop at a limit per element. H and the halogens stop at ± 1 . C, N and O stop at ± 2 .
- **Lone pairs:** without the mode, you can place only as many pairs as the electron count allows.
- **Bonds:** without the mode, overfilled atoms flash red while you draw.

What still works

- Show errors still marks atoms that break the rules. Leave it on so students see their mistakes. Turn it off for a clean sketch.
- The Lewis structure view follows the mode. With **No automatic hydrogens**, it shows only drawn atoms and pairs.
- With **No automatic hydrogens** on, the formula counts only the atoms you drew. A wrong sketch gives a wrong formula.

Ideas for a class

- Draw a carbon with five bonds and ask students to find the error.
- Draw a bare skeleton with no hydrogens. Ask students to add every H and lone pair, then switch on Lewis structure to compare.
- Draw an unusual ion with a large charge for a discussion of stability.

Common problems

Problem	Fix
OH labels turned into O	No automatic hydrogens is on. Switch it off, or draw the H atoms.
The formula looks wrong	With automatic hydrogens off, the formula counts only drawn atoms.
Lone pairs disappear when I edit	Switch on No valence correction .

Questions and answers

How do I draw a carbon with five bonds in MolDraw?

Turn on Free sketch mode in the Teaching menu. Allow any number of bonds is on by default, so the extra bond is drawn without a warning flash.

How do I stop MolDraw adding hydrogens to labels?

Turn on Free sketch mode and keep No automatic hydrogens on. An O label then stays O, and hydrogens appear only where you draw them.

What is the largest charge I can put on an atom?

In normal mode each element has a limit, such as ± 2 for carbon. In Free sketch mode with Allow any charge on, any atom can reach ± 9 .

Does free sketch mode change saved files?

No. It changes how the editor behaves while you draw. Your structure saves as drawn.

Source: <https://www.moldraw.com/docs/teaching/free-sketch-mode-for-teaching/>

Inductive arrows and partial charges

Short answer: Open the bond menu in the left rail and pick Inductive. Click a single bond to put an arrow on it that points at the atom that pulls harder. For partial charges, open the charge menu, pick $\delta+$ or $\delta-$ and click an atom. Click again for $\delta\delta+$ and $\delta\delta\delta+$.

Inductive arrows and partial charges show bond polarity. The **Inductive** tool puts an arrowhead on a σ bond. The **$\delta+$** and **$\delta-$** tools put partial charge labels on atoms. Both are display only. They do not change the formula, the charge or the SMILES.

Inductive arrows

- 1 Open the bond menu in the left tool rail. Its name is **Bond type**.
- 2 Under **Query / stereo**, pick **Inductive**.
- 3 Click a bond. The arrow points at the atom that pulls the electrons harder.
- 4 Click the same bond again to reverse the arrow.
- 5 Click a third time to remove it.

You can also draw new bonds with the tool. Click an atom to add a bond with an arrow, or drag from atom to atom. You can pick the tool from the command palette too: press **Ctrl** + **K** and type **Inductive**.

Which way the arrow points

MolDraw compares the Pauling electronegativity of the two atoms. On C-Cl the arrow points at Cl. On a bond between two atoms of the same element, like C-C, it looks at the neighbours. The carbon that carries Cl, O or another electronegative group pulls harder. If both sides pull the same, the second click removes the arrow.

When you draw a new inductive bond, arrows on nearby C-C bonds can turn around. MolDraw checks them again because the new bond changes the balance. Draw a chain like Cl-C-C-C with the tool, and the arrows point toward Cl.

Rules

- Inductive arrows sit only on single bonds. Clicking a double bond with the tool makes it a single bond with an arrow.
- To clear an arrow, click the bond until the arrow goes, or click it with the **Single** bond tool.

Partial charges: $\delta+$ and $\delta-$

NOTE

The δ tools live in the charge menu of the left rail, **Charge and symbol tools**, in the **Charge** group.

1. Open the charge menu and pick $\delta+$ or $\delta-$.
2. Click an atom. It shows $\delta+$ or $\delta-$.
3. Click it again for $\delta\delta+$, then $\delta\delta\delta+$. The next click clears it.
4. To place the label, press on the atom and drag. The label follows the pointer.

Use $\delta\delta+$ and $\delta\delta\delta+$ to show the effect fading along a chain. A $\delta+$ click on an atom with $\delta-$ replaces it with $\delta+$.

Partial charges are separate from formal charges. The plus and minus tools set real charges. See Lone pairs, radicals and charges.

Tips

- Draw the arrows first, then add δ labels at each end of the polar bond.
- Use Clean up to tidy the structure before a polarity figure.
- Arrows and labels show in PNG, SVG and PDF downloads.

Common problems

Problem	Fix
The arrow points the wrong way	Click the bond again to reverse it.
The arrow disappeared	You clicked a third time, or both atoms pull equally. Click once more.
The δ label sits on a bond	Press on the atom and drag the label to a free spot.
A $\delta+$ became $\delta\delta+$	Each click steps up. Keep clicking to clear it, then click once.

For the theory, read the bond polarity and dipole guide. To check a bond quickly, try the bond polarity checker.

Questions and answers

How do I draw an inductive effect arrow in MolDraw?

Open the Bond type menu in the left rail and pick Inductive under Query / stereo. Click a single bond and the arrow points at the more electronegative side.

How do I add delta plus and delta minus to atoms?

Open the charge menu in the left rail, pick $\delta+$ or $\delta-$, and click the atom. Press and drag on the atom to move the label.

How do I draw $\delta\delta+$ in MolDraw?

Pick the $\delta+$ tool and click the same atom twice. A third click gives $\delta\delta\delta+$ and a fourth click clears it.

Do partial charges change the molecular formula or charge?

No. $\delta+$ and $\delta-$ labels and inductive arrows are display only. The formula, net charge and SMILES stay the same.

Source: <https://www.moldraw.com/docs/teaching/how-to-draw-inductive-effect-arrows-and-partial-charges/>