C$_3$H$_5$NO
$C_3H_5NO$
$^1H$ NMR spectrum of 1,1-dichloroethane
$^1$H NMR spectrum of 1,1,2,3,3-pentachloropropane

Coupling constant, $J$: the distance separating individual legs of a multiplet, measured in hertz.

Here, $J = 5.4$ Hz. Note that coupling constants are always identical for coupled hydrogens.
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\[
\text{multiplicity of a resonance} = N + 1
\]

where \( N \) is the number of chemically nonequivalent nearest neighbor Hs *three \( \sigma \) bonds apart*
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  - when the ring bears an EWG or a EDG
  - if there are multiple substituents of any kind on the ring
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\textit{long range coupling} through 4 or 5 \( \sigma \) bonds also is possible: usually seen when the bonds are arranged in “W” or zig-patterns
What would the $^1$H NMR spectrum of ethanol, $C_2H_6O$, look like?

\[ \text{H}_a, \text{H}_b, \text{H}_c \]

- **downfield** $\delta$: $H_b$, q, 2H
- **upfield**: $H_a$, t, 3H
- **anywhere**: $H_c$, s, 1H
$^1$H NMR spectrum of ethanol

H NMR spectrum of ethanol
$^{1}H$ NMR spectrum of ethanol + D$_2$O
$^1$H NMR spectrum of ethyl acetate
$^1$H NMR spectrum $C_6H_{10}O$
$^1$H NMR spectrum
$^1\text{H}$ NMR spectrum $\text{C}_3\text{H}_7\text{NO}_2$
$^1$H NMR spectrum $C_3H_7NO_2$

\[
\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{NO}_2
\]