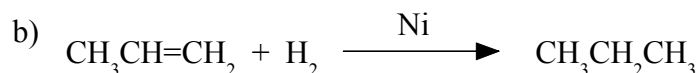


## Chemguide – answers

### ALKENES: HYDROGENATION

1. a) React with hydrogen in the presence of a finely divided nickel catalyst at about 150°.



2. a) A saturated fat is one that only has carbon-carbon single bonds in the hydrocarbon chains.

b) A monounsaturated fat or oil has only one carbon-carbon double bond in each of the hydrocarbon chains, whereas a polyunsaturated fat or oil has more than one double bond in each chain.

c) React with hydrogen in the presence of a nickel catalyst at a raised temperature. (It isn't possible to give an exact temperature, because it will vary.)

d) The more unsaturated a fat or oil is, the lower its melting point. By decreasing the amount of unsaturation, you increase the melting point so that you produce solids at room temperature which can be easier to use as spreads or in cooking.

d) The carbons in the C=C double bonds in the chains each have a hydrogen atom attached to them and another more complicated group. This allows geometric (cis-trans) isomerism. Most fats or oils have the groups arranged in the cis form. Heating the fat or oil can temporarily loosen the bond allowing the groups to rotate into the trans position. This is now a trans fat.

Trans fats can increase the amount of the “bad” form of cholesterol (the LDL form) which can increase the risk of heart disease.