Preventing the spread of coronavirus

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The structure of a soap molecule is similar to the lipids in the membrane layer of coronavirus. The soap molecules can surround the virus and remove it from the skin. It is also thought that soap molecules can disrupt the lipids in the membrane and 'disintegrate' the virus. Sodium laurate is a common soap molecule. It has the formula $CH_3(CH_2)_{10}CO_2^-Na^+$.

Alcohol hand sanitisers generally contain a mixture of ethanol, propan-1-ol and propan-2-ol. To be effective against the virus there needs to be an alcohol content of >60%.

Ethanol is less polar than water and so can interact better with the components of the virus. It can interact with and disrupt the lipid membrane layer of the virus. It may also cause some of the proteins in the virus to denature. Alcohol hand sanitisers are considered to be less effective than soap, partly because they do not remove any 'dirty' substance from the hand.

Anti-bacterial soaps generally contain normal soap molecules which are effective against the virus. The extra anti-bacterial components added to the formulation such as the compound triclosan have no effect against the virus. It is better to use ordinary soap.

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1. Sodium laurate can be produced from coconut oil. What is the reactant needed for this reaction?
2. Explain why sodium laurate has both polar and non-polar parts.
3. Explain how soap molecules can remove grease and viruses from the skin.
4. Draw displayed structures of the alcohols present in hand sanitisers.
5. Explain why using alcohol-based sanitisers on dirty hands is not effective.

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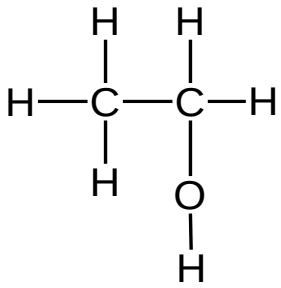
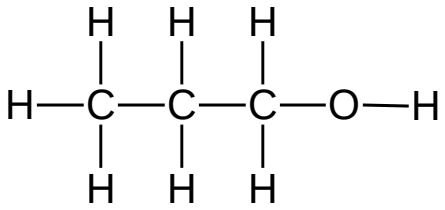
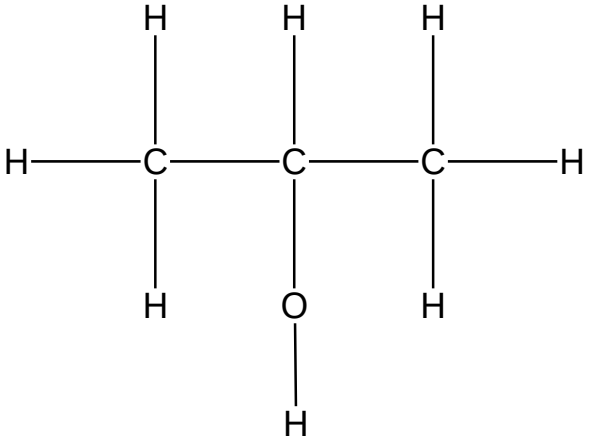
4. Displayed structures of the alcohols present in hand sanitisers



Ethanol



Propan-1-ol



Propan-2-ol