

What does a cosmetic scientist do?
As a cosmetic scientist you would be **involved in the research and development of cosmetics, hair care, perfume and toiletry products**, ensuring not only that they do what they are intended to but above all that they are safe to use for the consumer.

Cosmetics have different physical properties;

- Smell (fragrance)
- Colour
- Opacity
- Texture
- Viscosity (How thick it is)

Keyword	Definition
Formulation	A mixture which has been designed as a useful product.
Mixture	A mixture contains different substances that are not chemically joined to each other.



Cosmetic science

Trends in boiling, melting points & viscosity.(thickness)

Saturated hydrocarbons (Alkanes)

Name	Molecular Formula	Melting Point (°C)	Boiling Point (°C)	State at 25°C
methane	CH ₄	-183	-164	gas
ethane	C ₂ H ₆	-183	-89	gas
propane	C ₃ H ₈	-190	-42	gas
butane	C ₄ H ₁₀	-138	-0.5	gas
pentane	C ₅ H ₁₂	-130	36	liquid
hexane	C ₆ H ₁₄	-95	69	liquid
heptane	C ₇ H ₁₆	-91	98	liquid
octane	C ₈ H ₁₈	-57	125	liquid
nonane	C ₉ H ₂₀	-51	151	liquid
decane	C ₁₀ H ₂₂	-30	174	liquid
undecane	C ₁₁ H ₂₄	-25	196	liquid
dodecane	C ₁₂ H ₂₆	-10	216	liquid
eicosane	C ₂₀ H ₄₂	37	343	solid
triacontane	C ₃₀ H ₆₂	66	450	solid

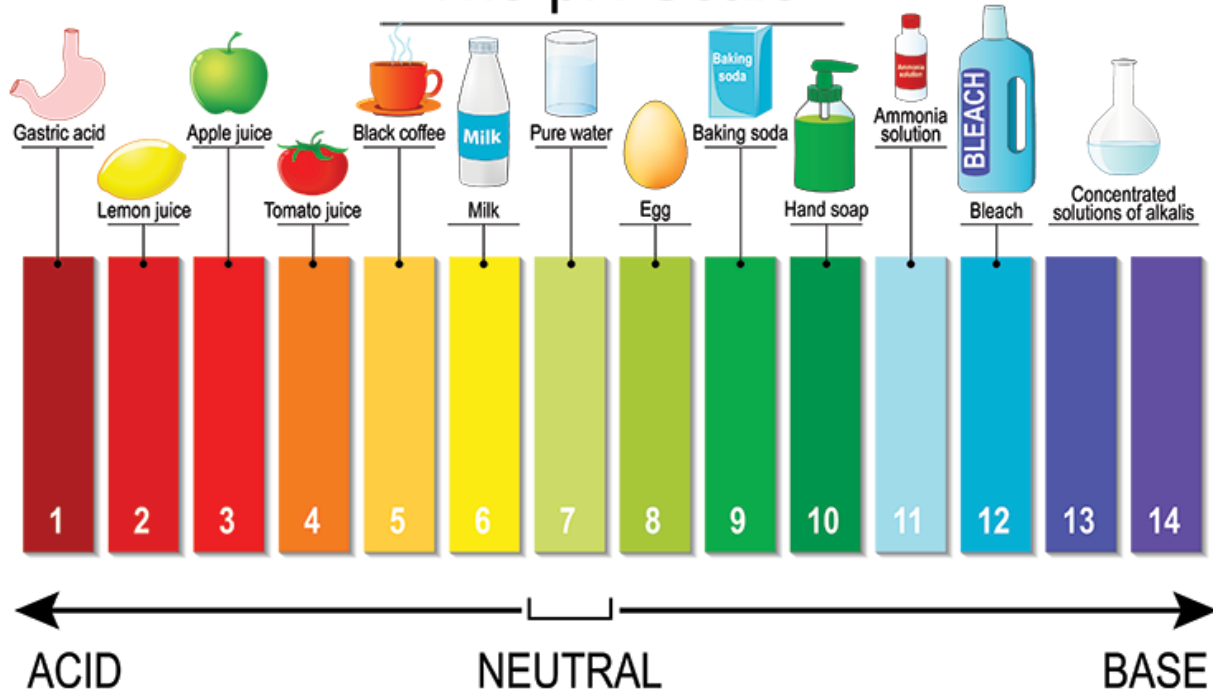
What do you notice about the size of the molecule and it's boiling/melting point?

The bigger the molecular chain the higher the melting & boiling point.

Longer the chain more viscous.

Civilisation	How they created cosmetics
10,000 BC	Used oil from plants/flowers to mask body odour and soften skin.
3000 BC	The Chinese stained fingernails with gum
3000 BC	Grecian women paint their faces with white lead and apply crushed mulberries as rouge.
100AD	Romans used sheep fat & blood as nail polish.
300-400 AD	Henna is used in India as both a hair dye and in mehndi.
1300AD	Elizabethan women of Society women wear egg whites over their faces to create the appearance of a paler complexion.

The pH Scale



We can test a substances pH by using an indicator.

An indicator is a substance which will change colour depending on the pH of the solution it is mixed with.

You will have used red cabbage indicator or universal indicator.

Types of tests on animals

1. Draize Test – Chemicals placed in a rabbits eye. They are restrained.
2. Skin Irritation Testing – Place a chemical on their skin and see if they have a reaction.
3. Carcinogenicity Tests – Places cosmetics on/in animals skin and identifies if it causes cancer.

Alternatives to testing on animals

1. Artificial Skin development – Artificial skin cells
2. The Bovine Corneal Opacity and Permeability Test (BCOPT) – Uses eyes from slaughtered animals from the meat industry
3. Research on human volunteers - Human volunteers can be microdosed, that is given a very small dose of a substance to test its effects.

Neutralisation reactions

A chemical reaction happens if you mix together an acid and a base. The reaction is called neutralisation. A neutral solution is made if you add just the right amount of acid and alkali(base) together.



Cosmetic science

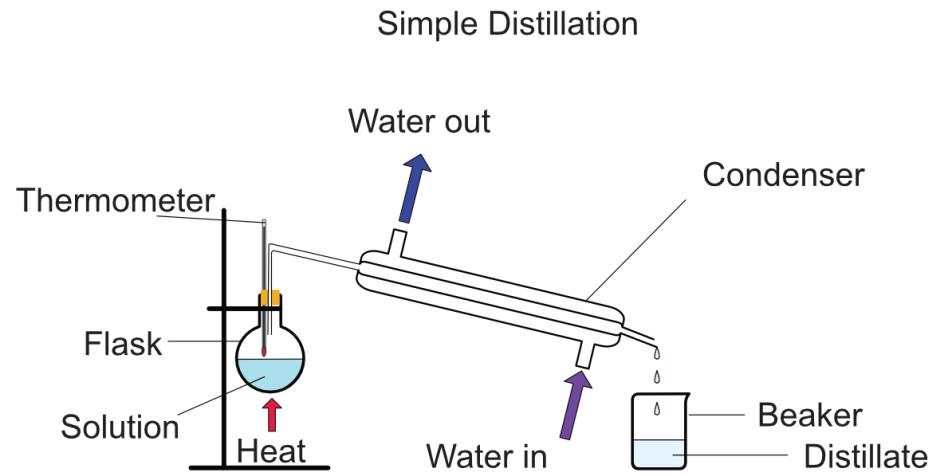


Cruelty free means when a cosmetic product or its ingredients are not tested on animals.



Distillation is a separation technique used to separate liquid (the solvent) from a mixture and keep the liquid part. Distillation involves boiling the solution and then condensing the vapour back into a liquid by cooling it down.

For example, dirty water can be distilled to produce pure water, which is safe to drink.



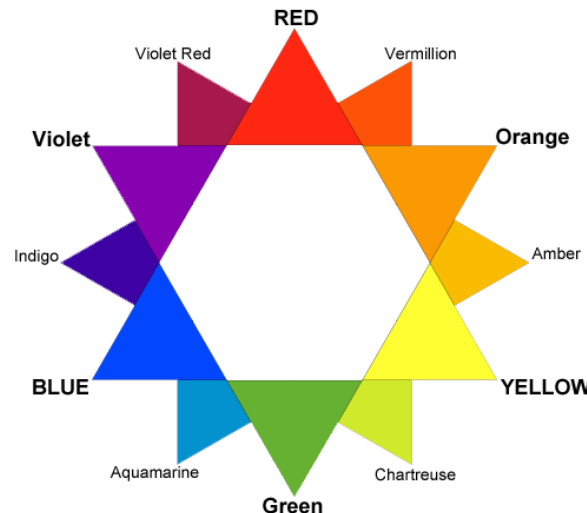
There are various colour theory models, but here are the three we come across every day:

- **Red Green Blue (RGB) model** – used in electronic systems that transmit light such as computers and televisions.
- **Red Yellow Blue (RYB) model** – the colour system traditionally used in art. It has been around for centuries and is the model taught in school.
- **Magenta Cyan Yellow model** – a more modern approach to painting and is the model used by printers. These colours mix a bright and clean spectrum.

Distilling a salt solution

A salt solution (salt water) can be distilled into pure water which we can drink.

1. The salt solution is placed into a flask and heated until it boils. (BOILING IS TAKING PLACE HERE LIQUID -> GAS)
2. The water turns into a gas but the salt stays behind in the flask.
3. The water vapor passes into the condenser. The condenser is a tube which is surrounded by a layer of cold water. This cools the gas, which turns it back into a liquid. (CONDENSING GAS -> LIQUID)
4. The distillate is pure water.



Primary colours in capitals
 Secondary colours in bold
 Tertiary colours in the smallest font.

Primary colours are the 3 base colours that make up everything else.

When equal amounts of **two primary colours are mixed**, it creates a secondary colour.

They are made by mixing one primary colour equally with one of its adjacent secondary colours.

For example, a 50:50 mix of red (primary colour) + orange (secondary colour and situated next to red on the colour wheel) = vermilion.