- **Co-polymerisation** copolymerising side chains which limits how closely chains can pack together, meaning fewer intermolecular bonds are formed the polymer is more flexible
- Plasticisers small molecules which lie between polymer chains, pushing them apart to reduce intermolecular bonding so chains can more easily slide past one another – increases flexibility

Н

N

R

N

R

(1°) Primary amine

(3°) Tertiary amine

Replace

Replace

2 H ato

Replace

3 H atom

- N

Ammonia

one H aton

Recognise members of the homologous series amines and amides

Amines resemble ammonia, yet have at least one alkyl group in place of an H.

- A primary amine has one alkyl group and 2 hydrogen atoms
- A secondary amine has two alkyl groups and 1 hydrogen atom
- A tertiary amine has 3 alkyl groups and no hydrogen atom

To name simple primary and tertiary amines with methyl and ethyl groups, we use the alkyl as the prefix and amine as the suffix e.g. the primary amine above is methylamine.

However when moving into propyl groups, the prefix becomes alw a with suffix the $\begin{bmatrix} H & | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & | \\ | & |$

Molecules with an amino on either or or multiple amines are diamines e.g. the molecules used to create plot

An **amp** is formed in the reaction between a carboxylic acid and amine – this is key in the development of nylon.



Explain the difference between addition and condensation polymerisation

Addition polymerisation occurs where two monomers react to form a polymer. These usually contain a double bond which is broken.

Condensation polymerisation occurs where two molecules react to form a polymer and give off a small stable molecule. Each molecule must have two appropriate functional groups to form a bond on either side.