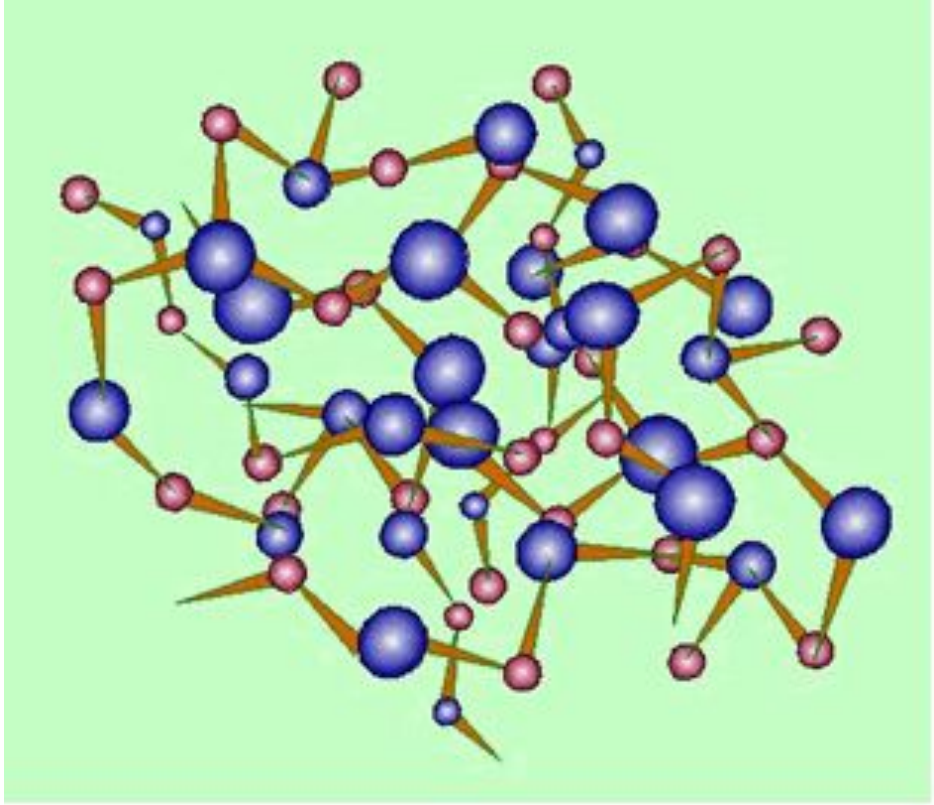
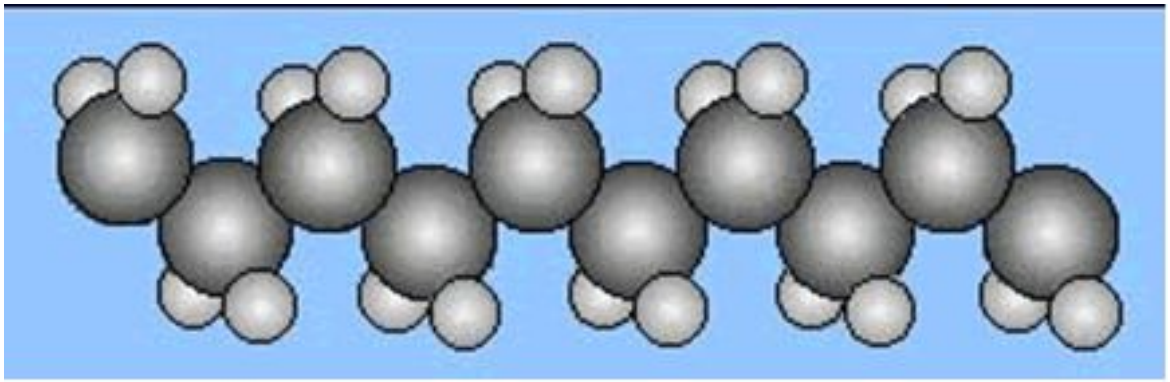


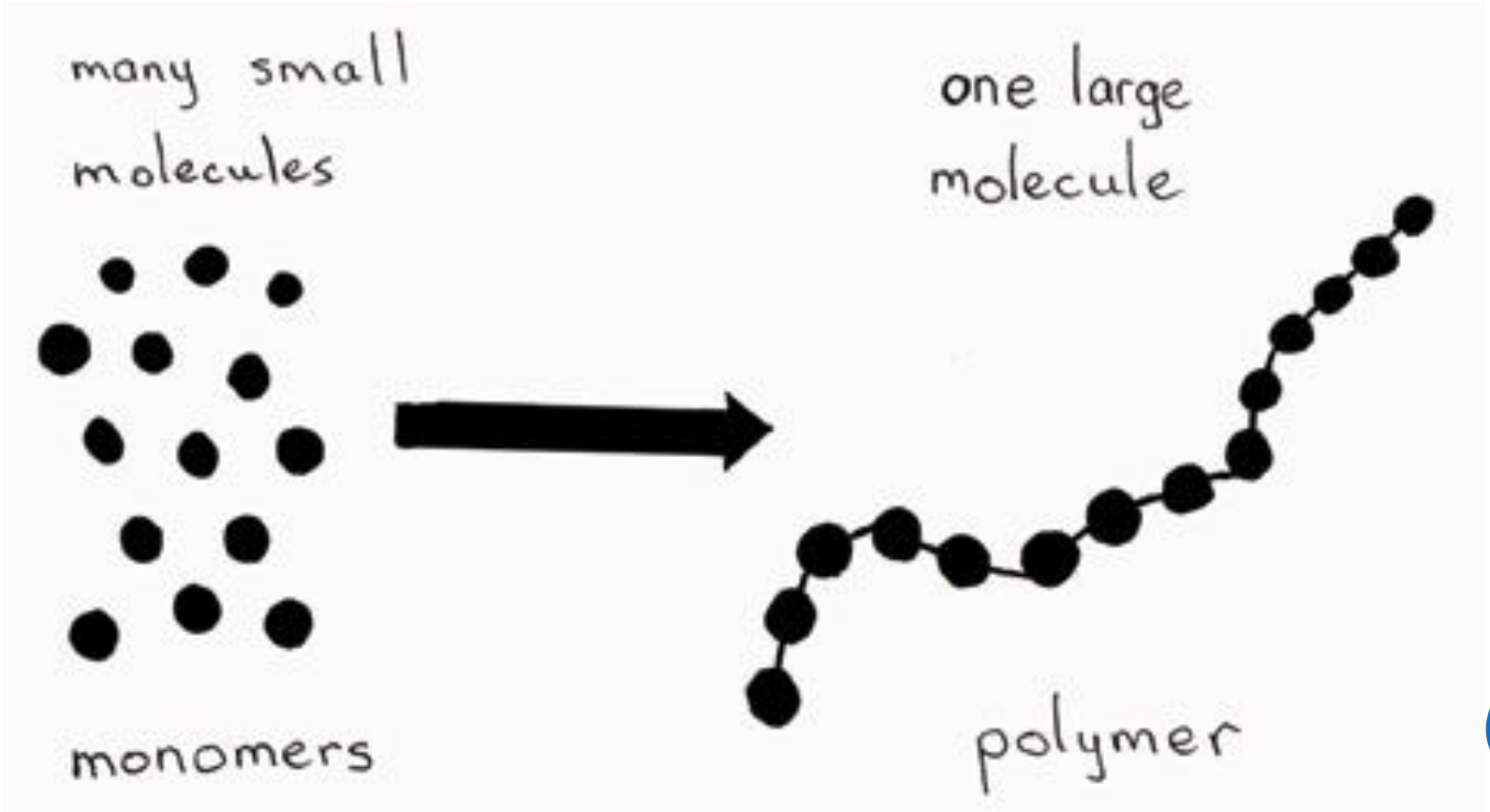
Polymers

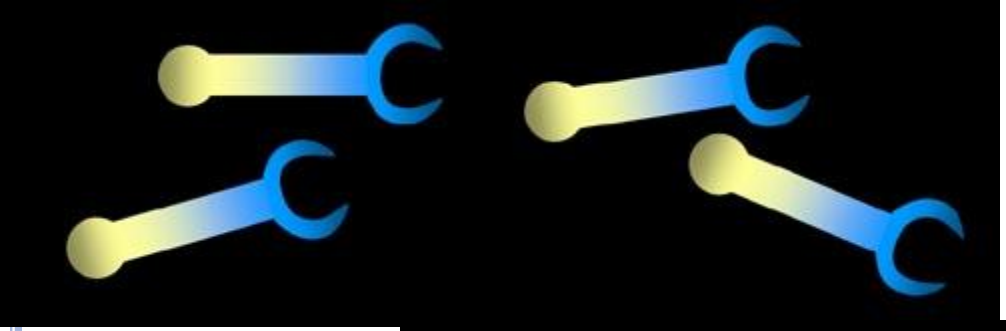


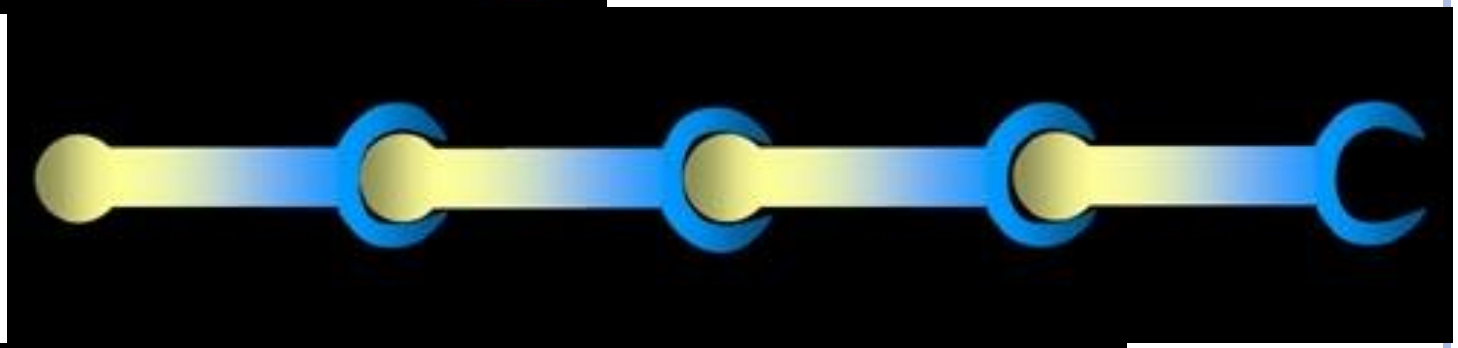
- "Poly" means "many" and "mer" means "parts."
- So "polymer" means "many parts."
- The parts are usually the same part used repeatedly in a chain-like manner.
- Polymers are also referred to as plastics because they are easily molded.

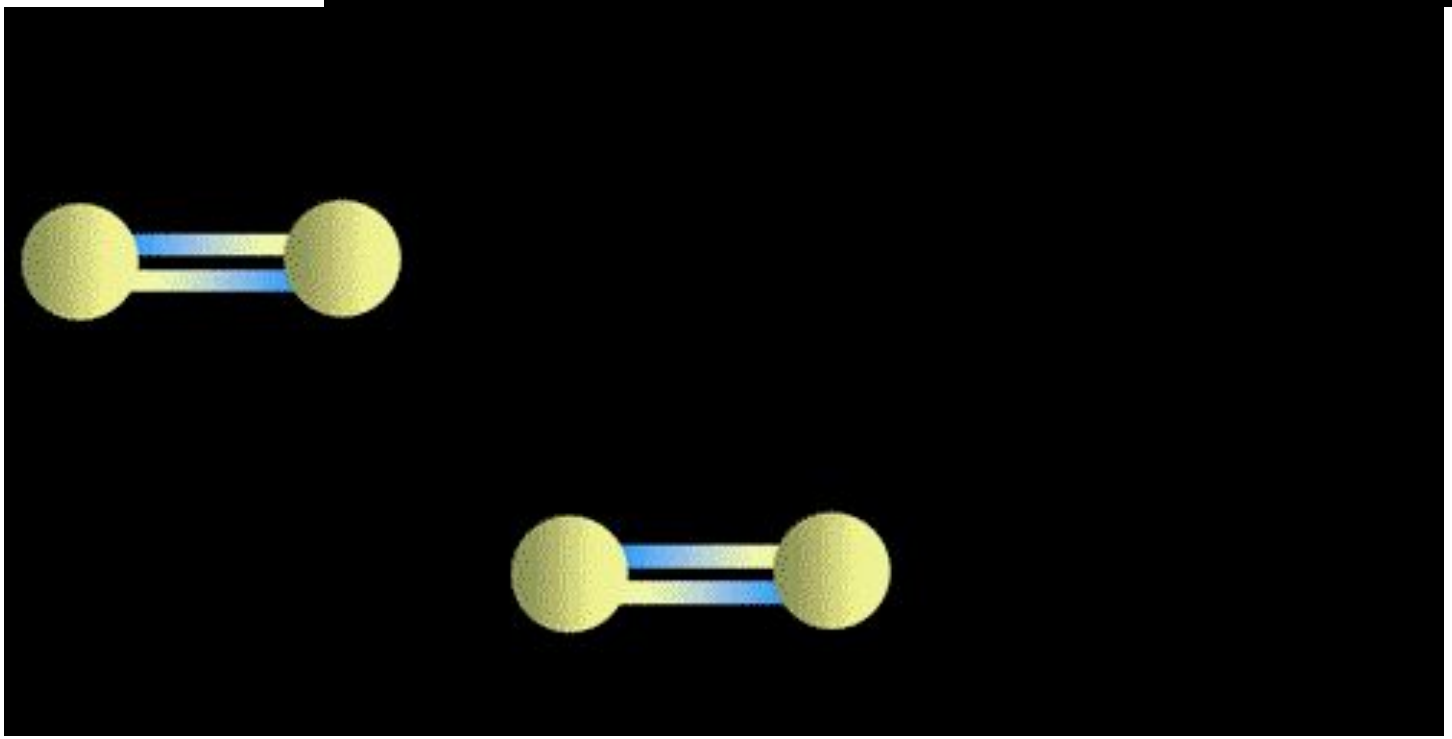
Polymers

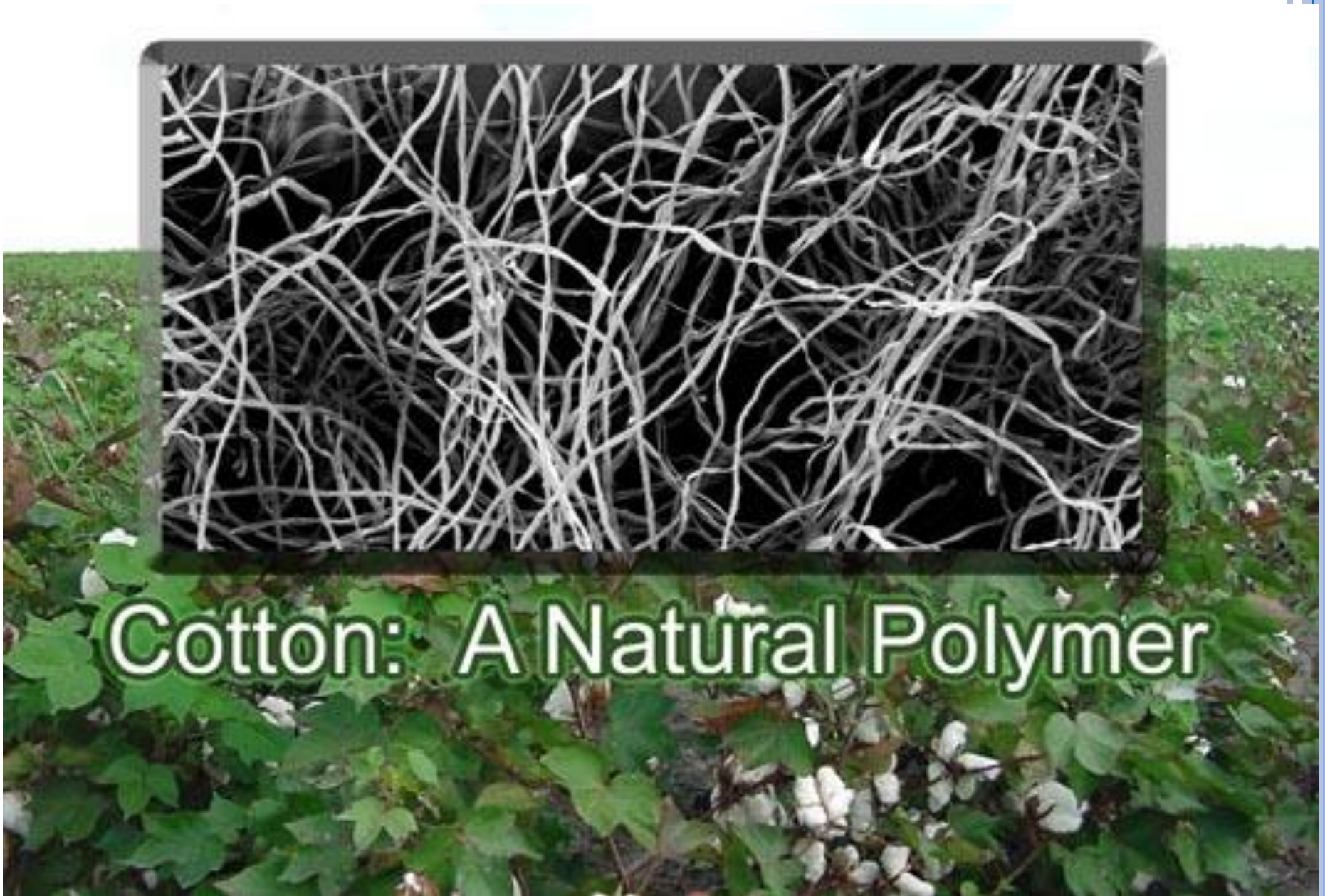
- Large molecule
  - formed by covalent bonds of repeating smaller molecules called <u>monomers</u>



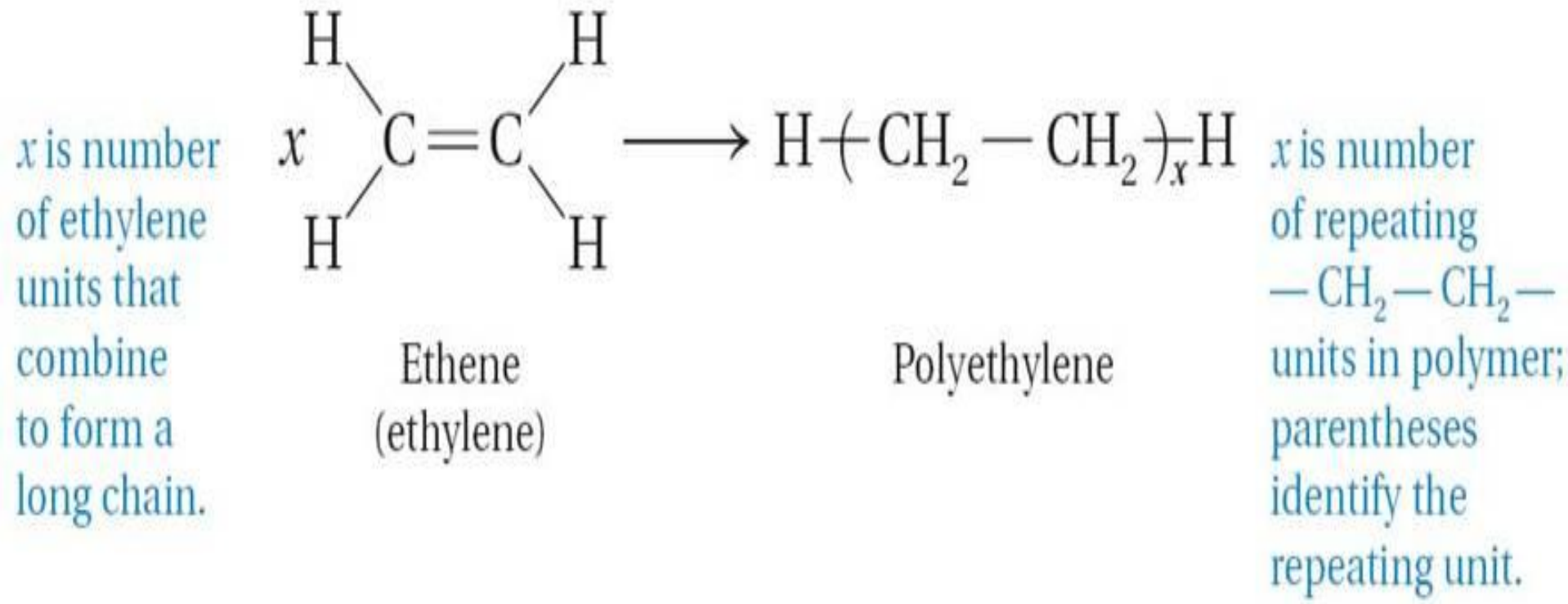

C
C
C
C

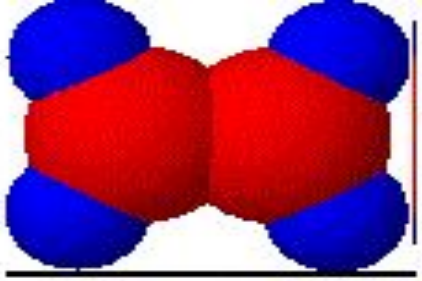

C



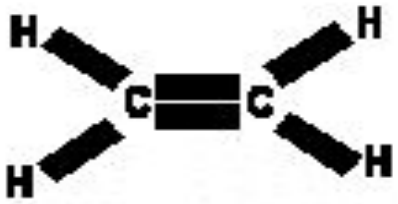

Cotton: A Natural Polymer

- Addition polymer: forms when unsaturated monomers react to form polymer



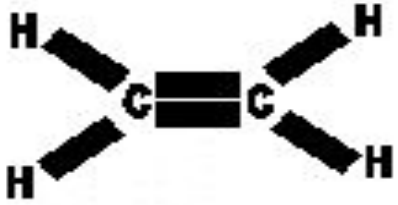


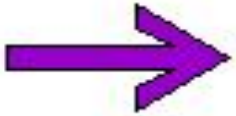
a monomer ethene

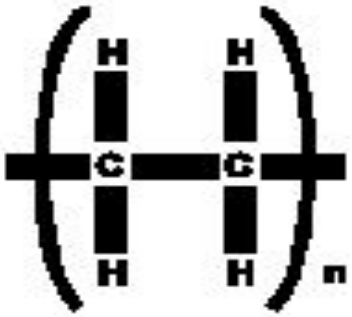


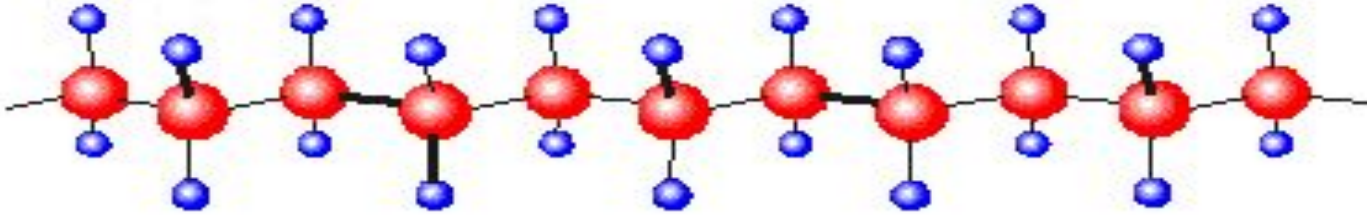
C_2H_4

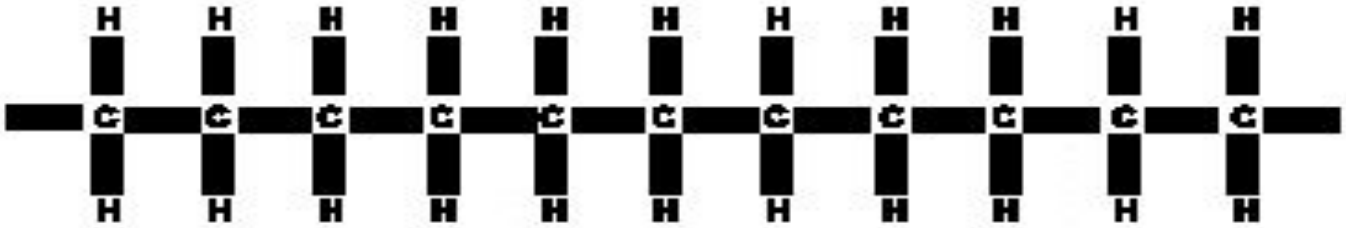
n





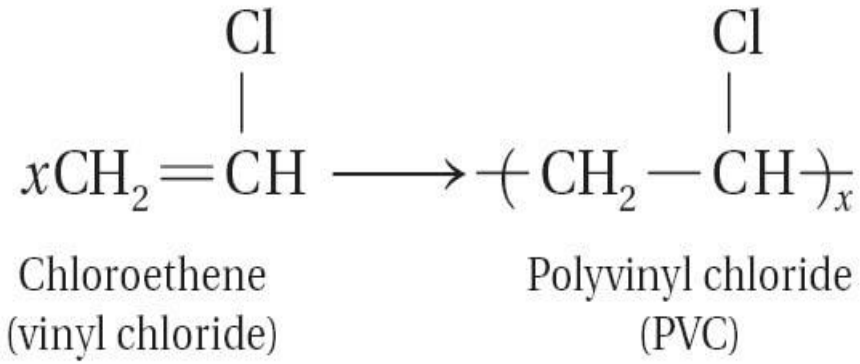


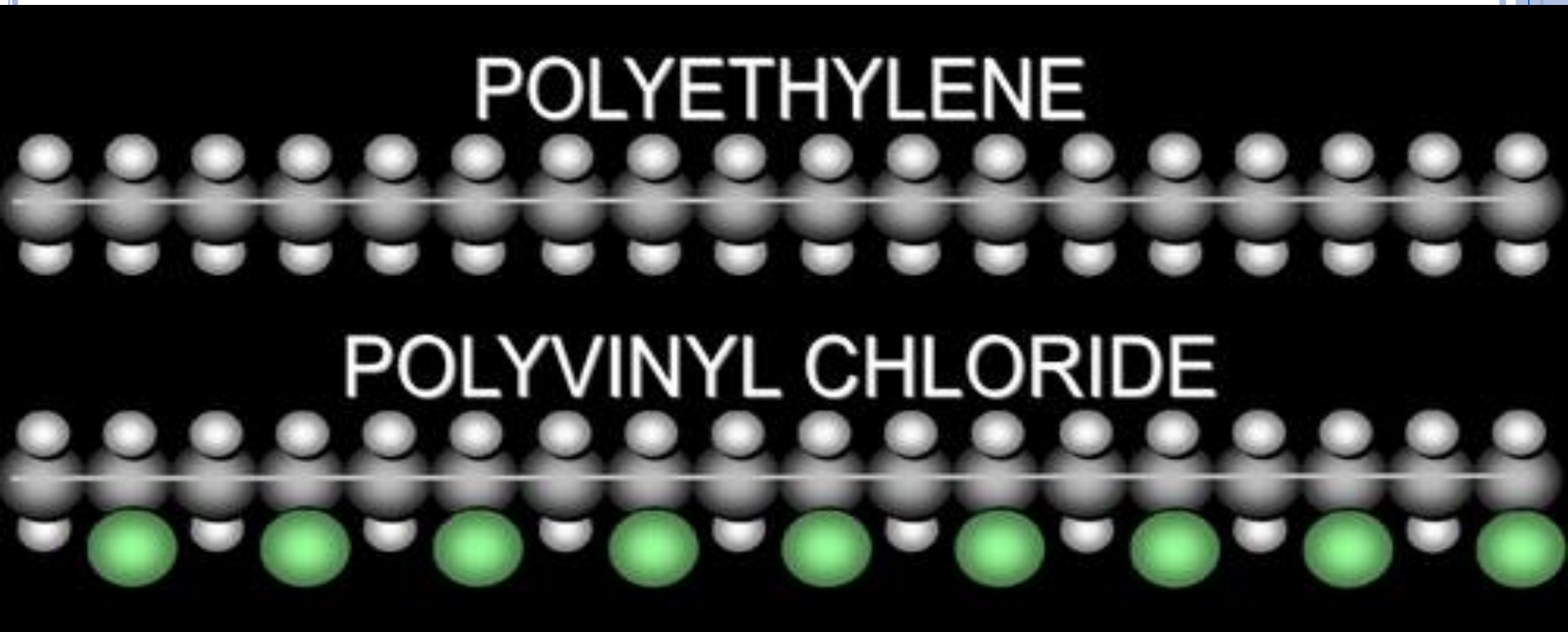




a polymer poly(ethene)

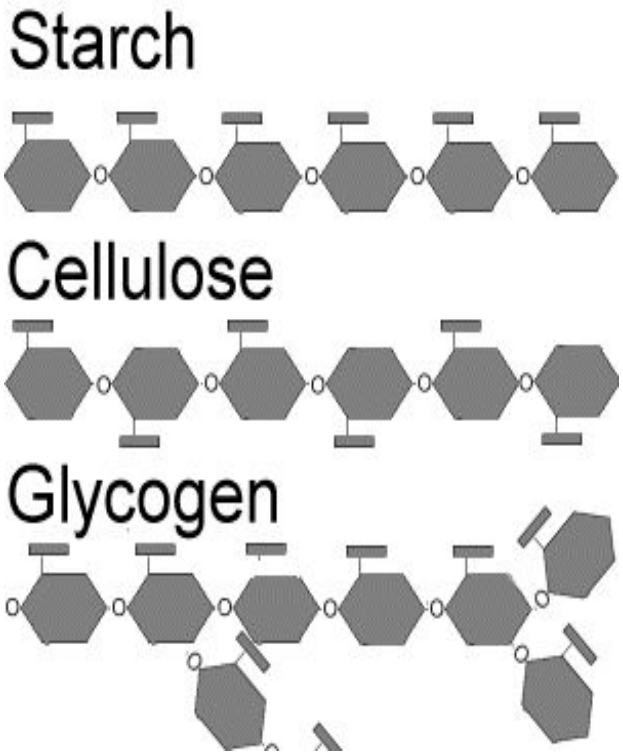
Polyvinyl chloride (PVC)





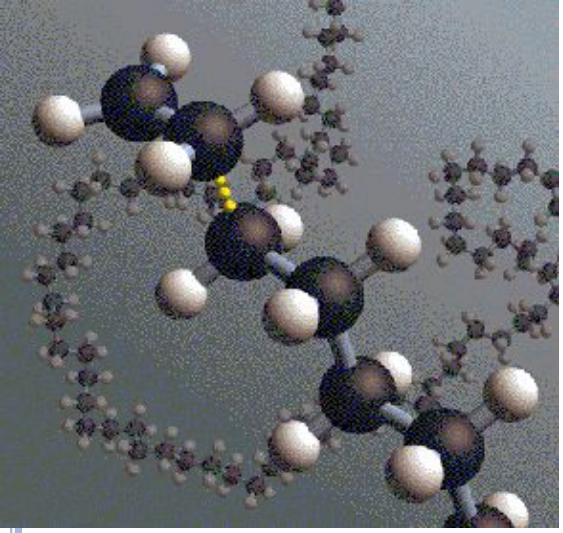
Polymers in your body

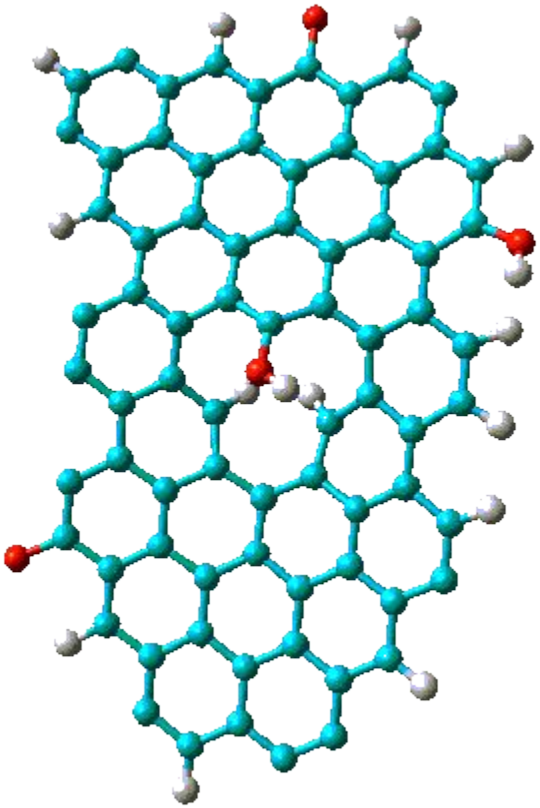
- Protein, starch & large biological molecules are polymers



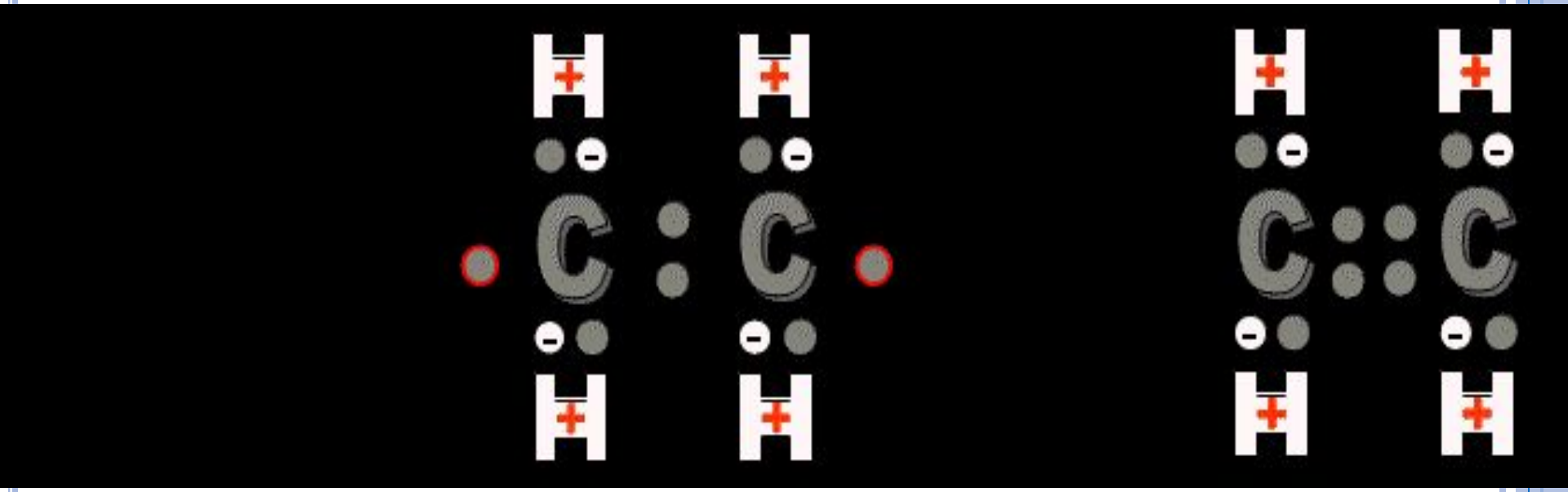
<u>Condensation reaction:</u> formed by the head to tail joining of monomers.

Example: Polysaccharides are formed from monosaccharides. Cellulose, starch and glycogen are all polysaccharides formed from glucose monomer units.






Polymers
PLASTICS



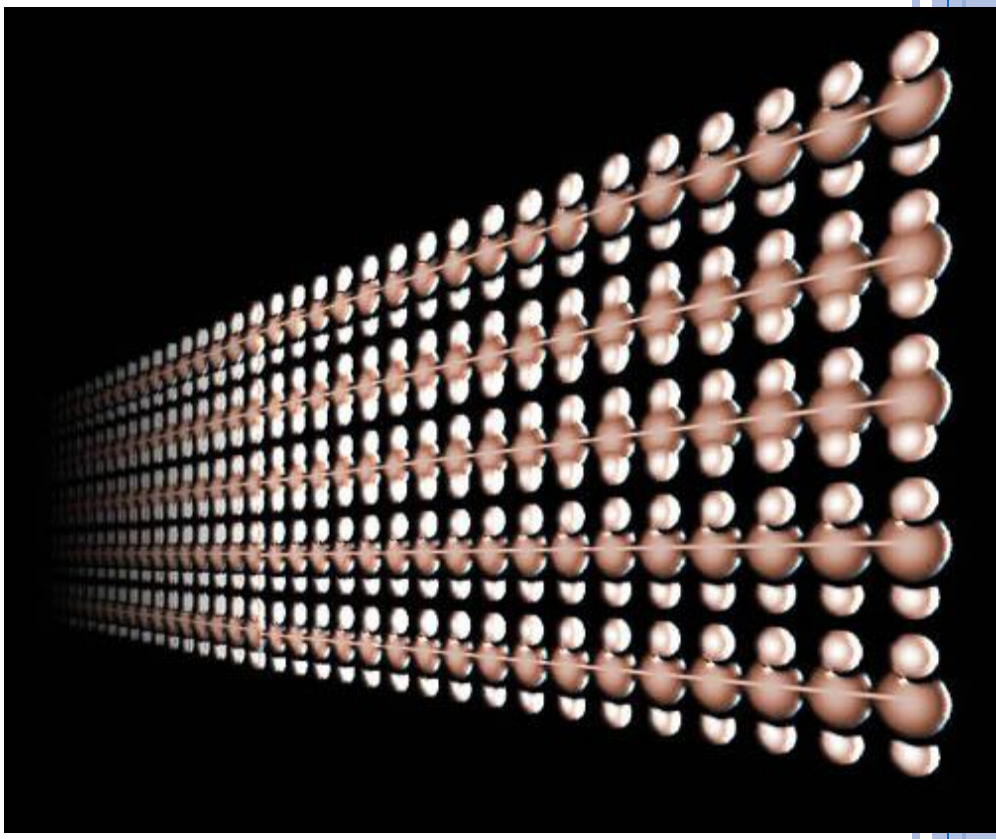
•Polyethylene is the most common of all polymers.

•One type of polyethylene is exists as long straight chains.

•The picture shows the chains of one carbon with two hydrogen atoms repeating.

•The chain can be 20,000 to 35,000 carbons.

•This is called high density polyethylene (HDPE). Sometimes made up to 500,000 carbons long.



Polyethylene is the most common plastic you see. High density polyethylene HDPE is used for bottles, buckets, jugs, containers, toys, even synthetic lumber, and many other things.

Low density polyethylene is used to make plastic bags, plastic wrap, and squeeze bottles, plus many other things.

500,000 carbons long. Here they are tough enough for synthetic ice, replacement joints and bullet-proof vests.

Think about it.
You start with ethylene gas molecules that can't stop a feather from passing through them. But after the double-bond of one ethylene molecule breaks, it causes a chain reaction that connects thousands to it.

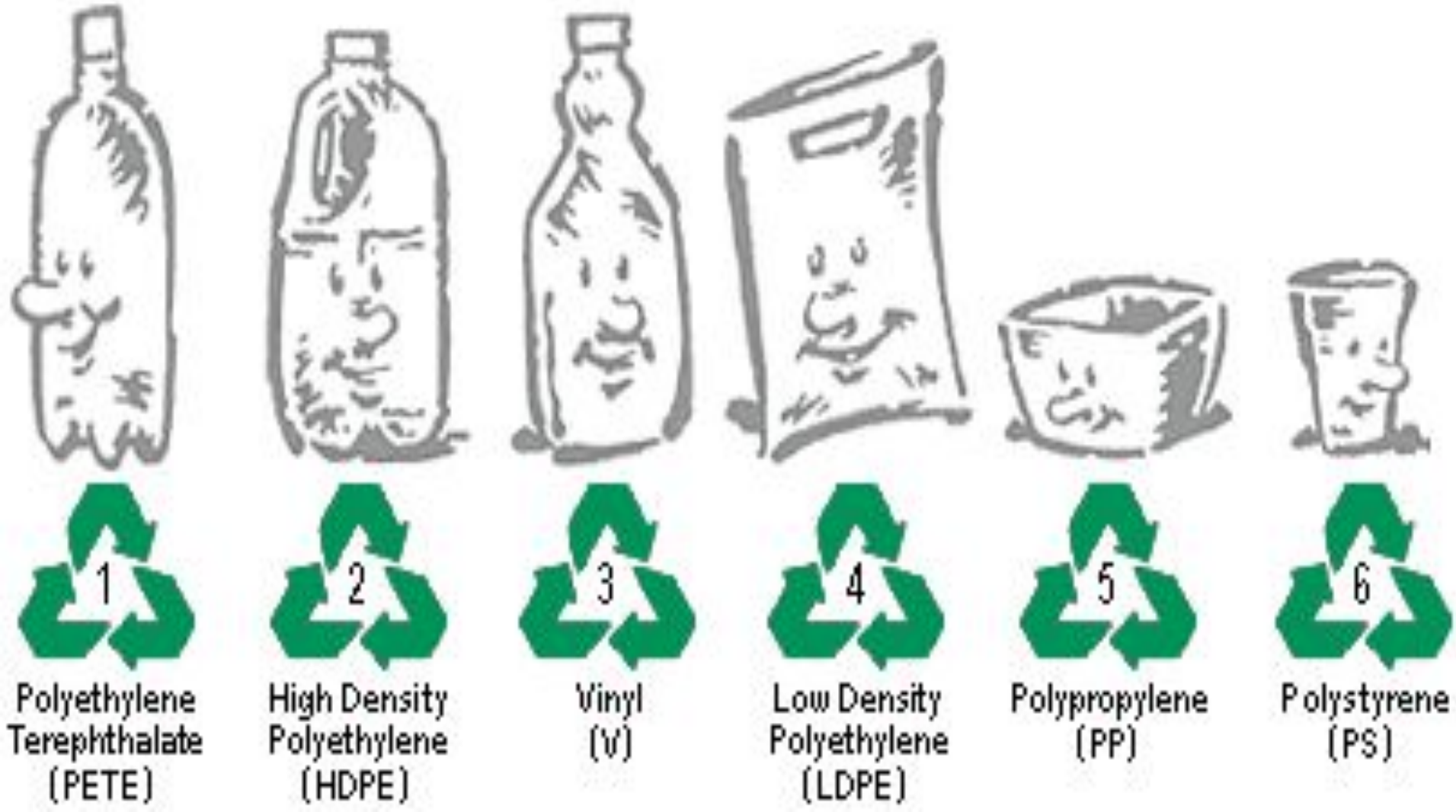
In less than a second, these long straight chains of carbon and hydrogen aligned next to each other are strong enough to stop a bullet or play ice hockey on.

Isn't chemistry wonderful?

The favorite properties of plastics are that they are inert and won't react with what is stored in them. They are durable and won't easily decay, dissolve, or break apart.

These are great qualities for things you keep, but when you throw them away, they won't decompose.

The answer is to recycle the plastics.
Here we see a bunch of CDs ready to be recycled.


1
Polyethylene Terephthalate (PETE)
2
High Density Polyethylene (HDPE)
3
Vinyl (V)
4
Low Density Polyethylene (LDPE)
5
Polypropylene (PP)
6
Polystyrene (PS)


1
PETE
2
HDPE
3
V
4
LDPE
5
PP
6
PS
7
OTHER


RECYCLING AT WORK, THE OLD FAITHFUL
BOARDWALK LUMBER IS MADE FROM 100%
RECYCLED PLASTIC, EQUIVALENT TO OVER
4,000,000 DETERGENT BOTTLES.
SPONSORS, UNILEVER
NATIONAL PARK FOUNDATION
U.S. PLASTIC LUMBER
NATIONAL PARK SERVICE.
TRAILS NOT
MAINTAINED
Ken Costello

So…

REUSE
REDUCE
RECYCLE