Class 9-____ Name _____

The big new idea – Worksheet.

Match the numbers to the words in the boxes to complete the sentences.

Page 144

The discovery of Polythene

The first polymer made by **(1)**_____ was created by accident. Fawcett and Gibson worked for a chemical company, investigating the way gases react at high pressure. They squashed ethene gas in a container at 2000 times its normal pressure, but accidentally let some air in. A couple of days later they were surprised to find a white, waxy solid inside the container. They thought that the gas had reacted with itself to produce a solid. The small molecules of ethene had polymerised to make bigger molecules.

Page 145

The new molecules were like repeating chains, made of repeating links of ethene molecules. The oxygen in the air that leaked into the container had acted as a **(2)**_____. It speeded up the reaction to join the ethene molecules together, which is usually very slow.

What are polymers?

All polymers are long chains of repeating links of smaller molecules. The small molecules that make each link are called monomers.

Each monomer connects to the next one to form a chain. This is true for synthetic polymers (polythene, nylon) and **(3)**_____ polymers (cotton, silk, wool).

The common name for the polymer of ethene is polythene. This is short for Poly(Ethene), poly is from ancient Greek and means “many”, as the polythene molecule is made of many ethene molecules.

Polymer by design

Not all polymers were accidents, people **(4)**_____ nylon as an alternative to silk as silk was expensive.

1-4

Catalyst ( )	Man ( )	Designed ( )
Reactant ( )	Natural ( )	Nature ( )

Page 146

Long and short molecules

The length of a polymer's molecules **(5)**_____ its properties. Even though their molecules are similar, wax is weaker than polythene because wax molecules are shorter than polythene molecules. Wax molecules contain a few atoms but polythene molecules contain thousands of atoms.

Two different bonds

The bonds between atoms in molecules are strong. It is difficult to **(6)**_____ these bonds. The bonds don't break when a material is physically **(7)**_____. However, the forces between molecules are weak, making it easy to separate one molecule from another. The molecules can sometimes slide past each other.

Breaking and melting wax and polythene

Separating small molecules is easy, so you can crack wax by stretching or bending it.

It is more difficult to **(6)**_____ a lump of polythene because it has longer molecules which are tangled and jumbled, so they don't slide past each other easily.

Polythene has a **(8)**_____ melting point than wax because forces between long molecules are stronger than forces between short molecules. More energy is needed to separate longer molecules, so polythene melts at a hotter temperature than wax.

5-8

Determines ( )	Higher ( )	Pulled Apart ( )
Stronger ( )	Makes ( )	Break ( )