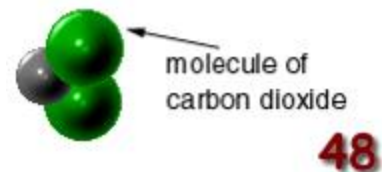
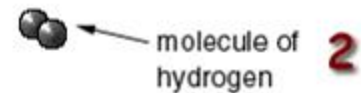
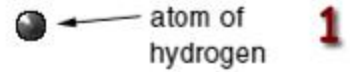


# MOLECULAR WEIGHT

## Molecular Weight



Changing the **length of the chains** in a thermoplastic material will change its final properties and how easily it can be shaped when melted.

The molecular weight is a way of measuring the length of the polymer chains in each material.

If a polymer has an average molecular weight of 60,000; and the repeating unit has a molecular weight of 60, and there are 1000 repeating units, the material molecular weight would be calculated as:

$$60 \times 1000 = 60,000.$$

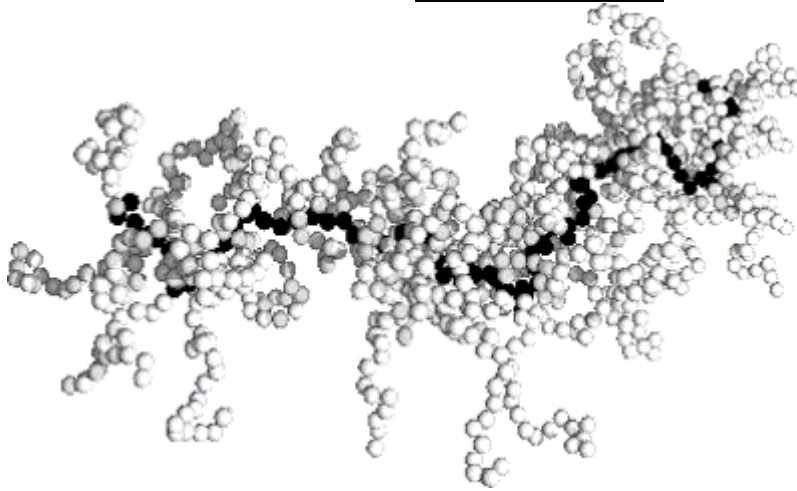
The molecular weight of most plastics is usually between 10,000 and 1,000,000.

It becomes **increasingly difficult** to form and/or mold plastics with the application of heat and pressure as the molecular weight of the material increases.

A molecular weight of about 200,000 is about the maximum for a polymer to still permit reasonable process ability.

UHMW (**ultra-high molecular weight**) Polyethylene has a molecular weight of between 3,500,000 to 6,000,000.

That means that this material is VERY DIFFICULT to manufacture and post-



manufacture with heat and pressure. Special processes are needed to process and shape it.

**Molecular weight is important because it determines how the material processes and performs.**