Is Matter Around Us Pure ?

SAMACHEER, CLASS XI, SCIENCE, LESSON - 3

The idea of pure substances and mixtures, although fundamental to chemistry, is abstract for students to comprehend. They have a poor understanding of particle ideas and find it difficult to imagine particles reacting with each other. To concretize the concept and help them visualize, a combination of activities and discussions were carried out for class IX students.

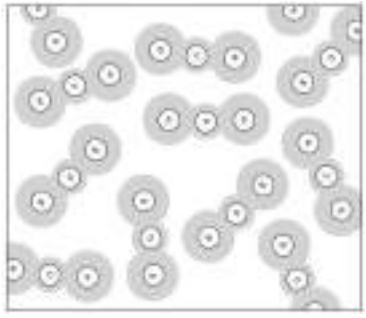
Card Sort Activity - A set of symbol cards were used for this activity. Students were asked to sort the cards into three groups and explain their rationale. Children grouped them differently according to their understanding. At the first level, some groups categorized them as atoms, molecules, and mixtures. It was interesting to note that students had perceived the different shapes as atoms. However, they had confusions with regard to mixtures and compounds. About half of the students considered any diagram that contained different symbols as atoms, whatever their placement, as a representation of a mixture.

After one round of sorting, it was explained that each shape represents a different kind of atom. Two three different atoms joined together could represent a compound. Based on this understanding, they were asked to regroup the cards. This time most children were able to group them into elements, compounds and mixtures.

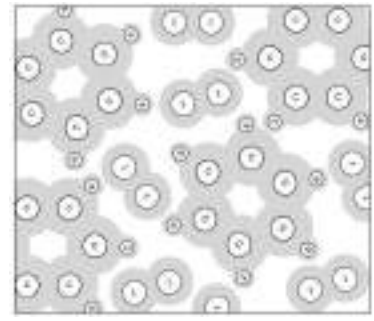
C*lassifying Common Substances* - Students were given a list of substances and were asked to identify it as an element, compound or mixture. Each group had to justify why they put a substance in either category. Two things came out in the discussion. Children's perception of objects were those that they come across in their lives. Since copper wires have insulation around it, they placed it as a mixture and not element. Silver, is not an element as the ornaments are mixed with other metals. It has to be clarified that these copper, silver etc. are elements but are mixed with other elements for different purposes.

The second point of confusion arose when they had to distinguish between mixtures and compounds based on separation of its components. When we say that components in a mixture can be easily separated, children understand it literally. They apply the methods that they are familiar with to

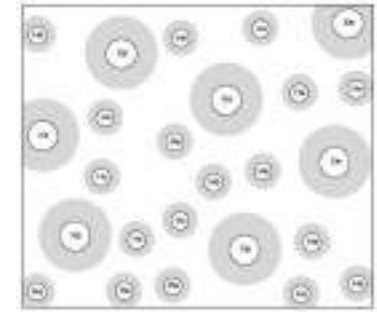
Elements



Compounds



Mixtures



Another version of the card game with the symbols of elements is being shown here

different substances. Substances that cannot be separated using hand picking, winnowing, sieving and magnetic separation etc. are placed in the category of compounds

Separating Mixtures - Different mixtures were given to students and they were asked observe and predict the best method to separate its components. Most groups tried the sieve first. If the sieve couldn't separate a particular mixture (iron fillings and graphite), they sought other methods. They kept tinkering until they arrived at the appropriate method for that particular mixture. They explored methods such as sublimation (salt and camphor), separating funnel (oil and water) and filtration (sand water). This activity highlighted that different separation methods are adopted according to the properties of the components in the mixture.

Through such discussions and activities, it is easier to spark their imagination, kindle curiosity and confront their misconceptions - molding them into real science practitioners

Students were able to guess that smoke is a mixture as it contains different gases. However, since they were not able to think how the different gases could be separated, they changed their answer to 'smoke is a compound'. It is therefore important to discuss physical properties and methods of separation in detail with students.

R. Hemalatha, TGT
IAGHSS Mutharayarpalayam