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Student Experiences on Chemical Reactions Chanbasha Basheer*

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Perspective

Children will have experienced many samples of chemical process without actually realizing it. They are conversant in burning, cooking, rusting and chemical processes that appear to involve dissolving. However at this level students don't see new materials being produced as results of chemical process, rather they see that existing materials have merely been modified in how. For example they see smoke as a part of the wood that's somehow released when the wood burns. Because students rarely understand the concept of 'a substance' they do not see substances being changed.

Students frequently believe that to urge something new, things just got to be mixed together. When a chemical reaction does take place, they believe that one or other of the reactants is simply modified; it hasn't really changed. Gas bubbles that are frequently produced when a tablet dissolves in water are often not seen by students as a new substance. Processes like cordial mixing with water, the utilization of coloring in food, freezing and boiling are seen as almost like chemical changes like those involved in cooking eggs.

Scientific view

All materials are made of chemicals. Chemical reactions involve interaction between chemicals such all reactants are become new materials. The properties of the new materials are different from those of the reactants. This is distinct from other changes like evaporation, melting, boiling, freezing and mixing where changes involve no new substances. While heat is usually necessary to start out reactions, this needn't be the case.

Chemical reactions involve breaking chemical bonds between reactant molecules (particles) and forming new bonds between atoms in product particles (molecules). The number of atoms before and after the chemical process is that the same but the amount of molecules will change.

Humans use chemical reactions to supply a good range of useful materials; the breakdown of waste materials also involves chemical reactions that occur naturally within the environment. For some human made wastes, there are not any such reactions and that they cause problems as a result.

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Critical teaching ideas

In teaching about chemical reactions at this level the emphasis should be on improving student understanding of the importance of chemical reactions in our lives in producing many of the things we deem granted also as improving their recognition and understanding of what's involved during a chemical process. It is not necessary at this stage to speak about particles like atoms or molecules or chemical bonds.

Chemical reactions involve the production of new materials which are quite different from the reacting substances. Any new materials come from the reacting substances. Changes that may accompany a chemical reaction include color, appearance and production of new materials, for example, a gas. Mixing alone might not cause a reaction to require place. While heat is usually necessary to initiate a reaction it's not always necessary. Chemical reactions are wont to produce most of our energy. Chemical reactions are used extensively to test, identify and analyses a wide range of materials (for example, pool testing kits and forensic tests from television shows such as 'CSI').

In learning about chemical reactions students will got to describe various substances, which at this level are going to be materials they're conversant in (the kitchen and changes involving cooking are very good starting points). They will got to be ready to identify changes in these substances with the aim of eventually recognizing when new chemicals are produced i.e. a chemical change has taken place. Environmental effects of chemical reactions also can be considered, for instance how we eliminate

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some chemicals once they're produced, in forms like plastic bags.

Open up discussion via a shared experience

Initial teaching activities should aim to bring out students' existing ideas. At this stage it's important that students are encouraged to place up their ideas and discuss them in small groups. All alternatives should be considered with no resolution at this stage.

Promote reflection on and clarification of existing ideas

Activities which give problems to be explored and challenge existing ideas are useful in encouraging students to hunt new explanations for things they observe. Students should investigate a number of changes and ask questions similar to those above. In all of those students should be encouraged to watch the changes that happen and to spot what products are formed. Discussion can also center on how these are different from the starting materials.

Some examples could include

Baking soda and vinegar during a corked glass bottle - why does the cork fly off? Add bicarbonate of soda to glass containing vinegar and six currants. Why do the currants move up and down? What are the bubbles? Where are the bubbles coming from? Making sherbet—mix four parts powdered sugar, two parts acid and one part bicarbonate of soda (these are all available from supermarkets). Students put little amount of the mixture on their tongue. What causes the fizz? Do any of the powders on their own produce a fizz? Half fill a jar with wire wool (without soap) and add enough vinegar to hide the wire wool.

Practice using and build the perceived usefulness of a scientific model or idea

Other activities can involve chocolate making. Students are often encouraged to seem for the differences between making chocolate where the chocolate melts and therefore the production of caramel/toffee where the sugar changes into something different.

There are many other similar chemical changes which will be investigated - further cooking activities can include: making a cake, melting and browning cheese, making honeycomb, baking bread, poaching eggs and making toast. Other changes can include the setting of two component glues like Araldite and mixing wire wool and an answer of copper sulphate (available from plant nurseries). Oxygen may be a vital reactant in many chemical reactions and students can investigate changes involving this component of air.