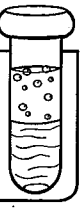
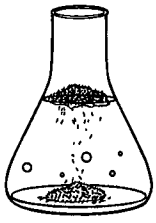
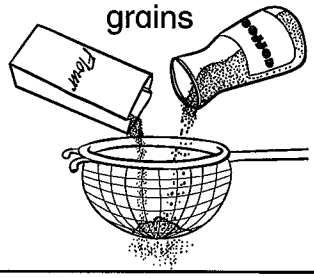
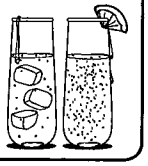
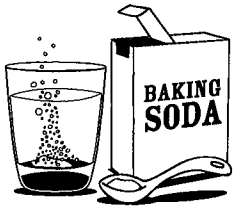
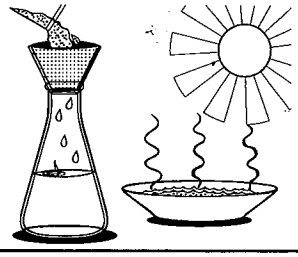
What happens when materials are mixed? – I

When different materials are mixed together a number of things may happen.

Liquid–liquid mix	Liquid–solid mix	Solid–solid mix
Example 1: The liquids do not mix. They are *immiscible*. The more dense liquid sinks to the bottom and the less dense rises to the top. They do not react with each other. The two liquids can be separated by *siphoning*. **Examples:** olive oil and water 	**Example 1:** The solid does not dissolve. It is *insoluble* in the liquid. There is no chemical reaction between the two. The solid can be separated by *filtration*. **Examples:** vinegar and sawdust 	**Example 1:** If the solids have different-sized *particles*, they can be separated by *sieving*. **Examples:** flour and instant coffee grains 
Example 2: The liquids do mix because they have equal density. They are *miscible*. They do not react with each other. This is a *reversible* change. They can be separated by *distillation*. The liquids are heated until the lower boiling point of the two liquids is reached. This vapour is then collected in a condenser, where it returns to its liquid phase. **Examples:** water and fruit juice 	**Example 2:** The solid dissolves. It is *soluble* in the liquid. There is a chemical reaction between the two, resulting in a new substance being formed. The change is irreversible. The solid can not be separated from the liquid. **Examples:** vinegar and baking soda 	**Example 2:** The solids have same-sized particles and one dissolves in a liquid but the other does not. They can be separated by adding the liquid, filtering the insoluble solid and separating the soluble solid by evaporation. **Examples:** sand and sugar using water 
Example 3: The liquids do mix because they have equal density. They are *miscible*. The liquids react with each other to form another substance. This is an *irreversible* change because the liquids can not be separated. **Examples:** - acid and alcohol 	**Example 3:** The solid dissolves. It is *soluble* in the liquid. There is no chemical reaction between the two. The change is reversible. The solid can be separated by *evaporation*. **Examples:** water and salt 	**Example 3:** The solids have same-sized particles and both dissolve in all liquids. They can not be separated easily. **Examples:** salt and caster sugar