How much will dissolve?

There is a limit to how much of a substance will dissolve in a liquid. This varies between substances, and also depends on how hot they are.

When you make a cup of instant coffee, you put coffee, and perhaps sugar, into hot water. Soon these ingredients have dissolved, or blended together, and made a cup of steaming hot coffee. But if someone had a sweet tooth, or wanted very strong coffee, could they keep putting sugar and coffee into the cup for ever?

Are all substances equally soluble?

Substances vary widely in how much they will dissolve. If a substance will not dissolve, it is called **INSOLUBLE** (Picture 1). If it will dissolve, it is **SOLUBLE**.

There is no easy way to guess whether something is soluble or insoluble. You simply have to try it to find out.

Comparing substances

It is easy to find out how much of a substance will dissolve in water. You need a glass or clear, plastic-sided jar so that you can see what is happening. Use the same amount of water for each test. You simply add whatever substance you are testing (for example, sugar, bath salts or table salt) to the water one spoonful at a time. After each new spoonful is added, you have to stir until everything dissolves (Picture 2). This may take a few minutes, especially when the solution contains almost as much of the substance as it will take.

Finally, a stage will be reached when you add a spoonful but it will not dissolve, and some solid remains in the bottom. This is the point when you have

▼ (Picture 1) Many substances will not dissolve in water. Vegetable oil is one liquid that will not dissolve in water. Sand is a solid that will not dissolve in water.

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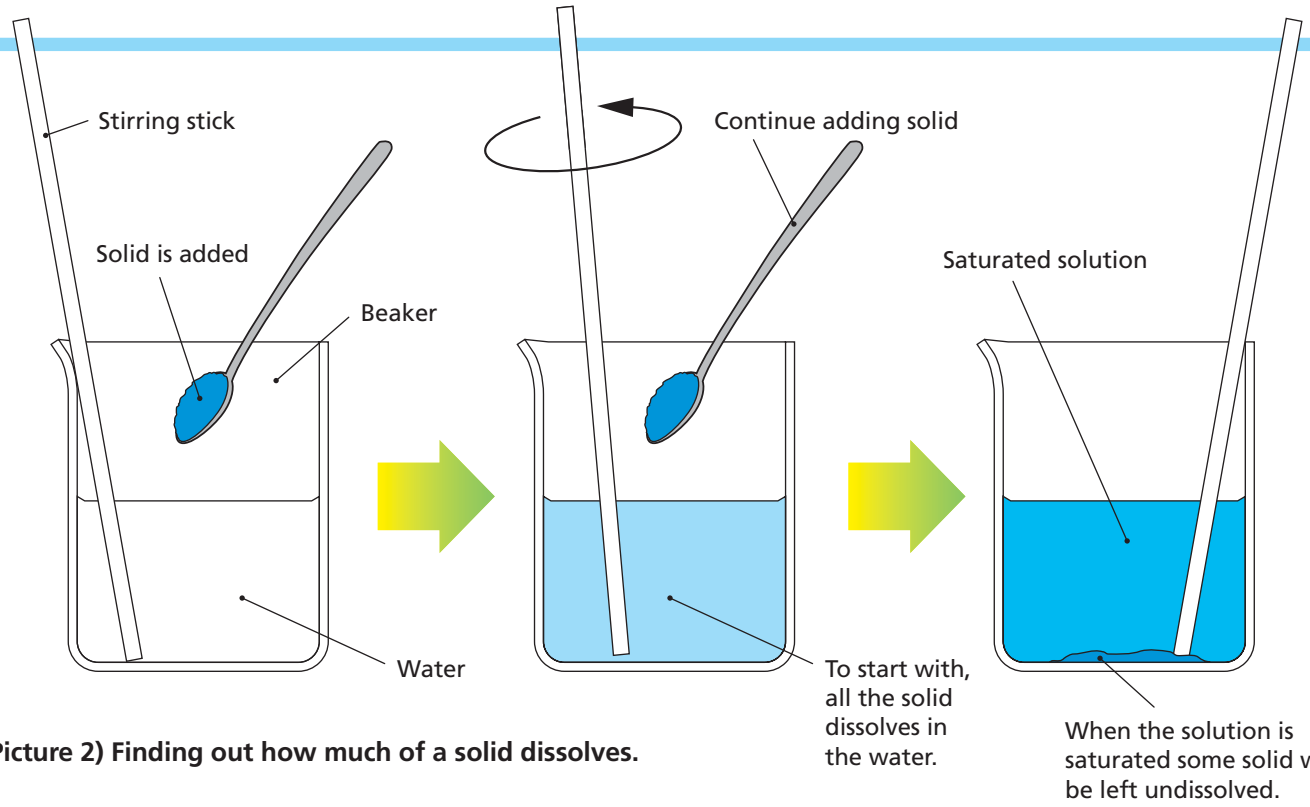


▲ **(Picture 2) Finding out how much of a solid dissolves.**

added as much of the substance as will dissolve in that amount of water. We say the solution is saturated.

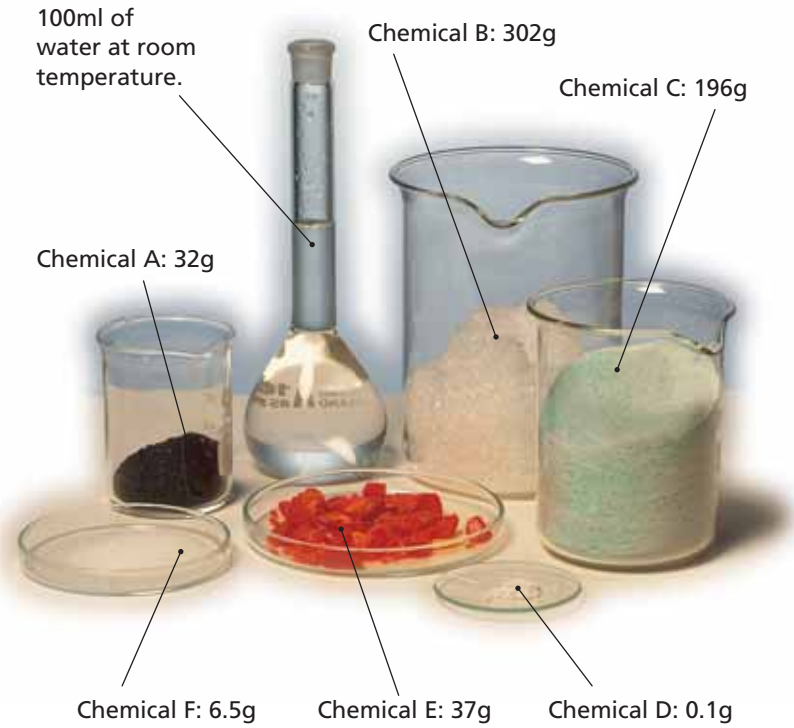
If you find out, for example, that you can dissolve more spoonfuls of bath salts than spoonfuls of sugar, then we say that the bath salts are more soluble than the sugar.

You can compare all kinds of substances in the same way (Picture 3), but it is important to always use water at the same temperature, for example, always use water at room temperature. You will find out why this is so important on the next page.

Summary

- **Not all substances dissolve in water.**
- **Different substances dissolve in water by different amounts.**
- **There is a limit to how much of a substance can be dissolved.**

▼ **(Picture 3) It may seem surprising, but the same amount of water will dissolve different amounts of chemical. The ones below are from a chemist's laboratory. Each chemical will dissolve in 100ml of water at room temperature. As you can see, some substances are far more soluble than others.**



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