

A Wire with a Memory

Of course you can bend a wire, but have you seen a wire bend itself?

WHAT TO DO

Hold a piece of special metal wire under icy cold water then gently bend it. Now remove it from the cold water, warm it with your breath or hot water and watch it magically straighten out or bend itself into a completely different shape!

WHAT'S HAPPENING?

This wire is made from a special alloy or mixture of two common metals, nickel and titanium, called Nitinol. Often when metals are combined with other elements, the alloy has very different properties than the original metal. Steel is a common alloy made by adding carbon to iron, making it much stronger. In this case, Nitinol has a very strange property- it can exist in two different solid phases depending on its temperature. At low temperatures the solid phase is called martensite, but when warmed above a critical temperature it almost instantly changes into a new solid phase called austenite, and its molecules actually rearrange themselves back into the shape they were originally given when it was first made (at a very high temperature). The critical temperature for our wire is just above room temperature, so even your warm breath can cause it to change shape!