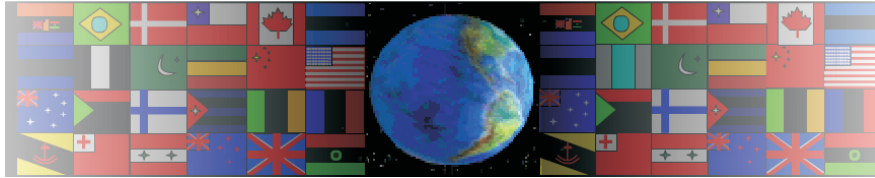


# MATERIALS

V.Ryan © 2000 - 2008

On behalf of The World Association of Technology Teachers

## W.A.T.T.



World Association of Technology Teachers

The 'Materials Exercise' can be printed and used by teachers and students. It is recommended that you view the website section 'Graphics' ([www.technologystudent.com](http://www.technologystudent.com)) before attempting the design sheet.

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# SMART MATERIALS - SHAPE MEMORY ALLOY (SMA)

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SMA wire is sometimes called '\_\_\_\_\_', as it is composed of \_\_\_\_\_ and \_\_\_\_\_. On first site this special wire looks like ordinary wire and even has many of the same properties. It can be \_\_\_\_\_ to form complex shapes quite easily and it \_\_\_\_\_ electricity. However, it is very expensive when compared to ordinary steel or even copper wire. However, it has properties that make it very special:

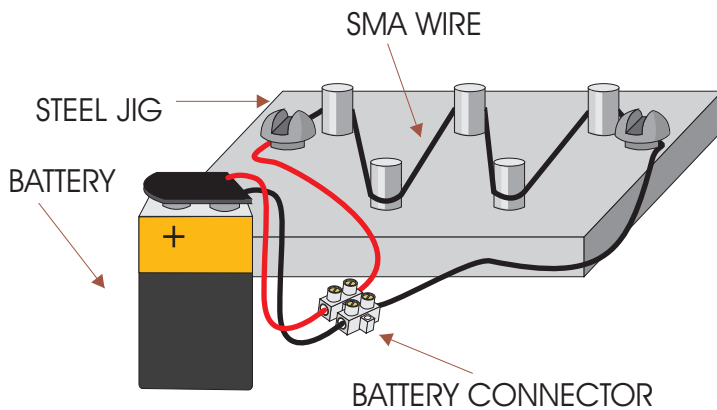
The wire has a \_\_\_\_\_ - for example, if it is folded to form a shape and then heated above \_\_\_\_\_ (centigrade) it returns to its \_\_\_\_\_ shape.

The material can also be '\_\_\_\_\_ ' to remember a shape. This can be achieved by folding the wire to a particular shape and clamping it in position. The wire is then heated for a approximately \_\_\_\_\_ at precisely 150 degrees or pass an electric current through the \_\_\_\_\_ wire. If the wire is now folded into another shape and then placed in hot water it returns to the original 'programmed' shape.

conducts	original	nickel	programmed	titanium	five minutes
memory	Nitinol	90 degrees	folded	SMA	

Below are diagrams that represent programming the shape of SMA wire and returning it to its original shape. Add notes to each diagram to help explain each stage.

1.




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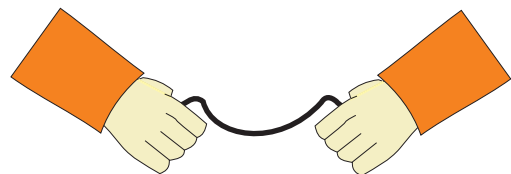


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2.




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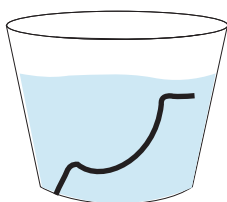


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3.




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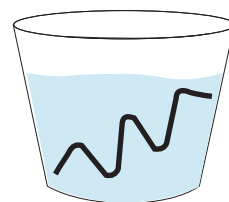


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4.




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