

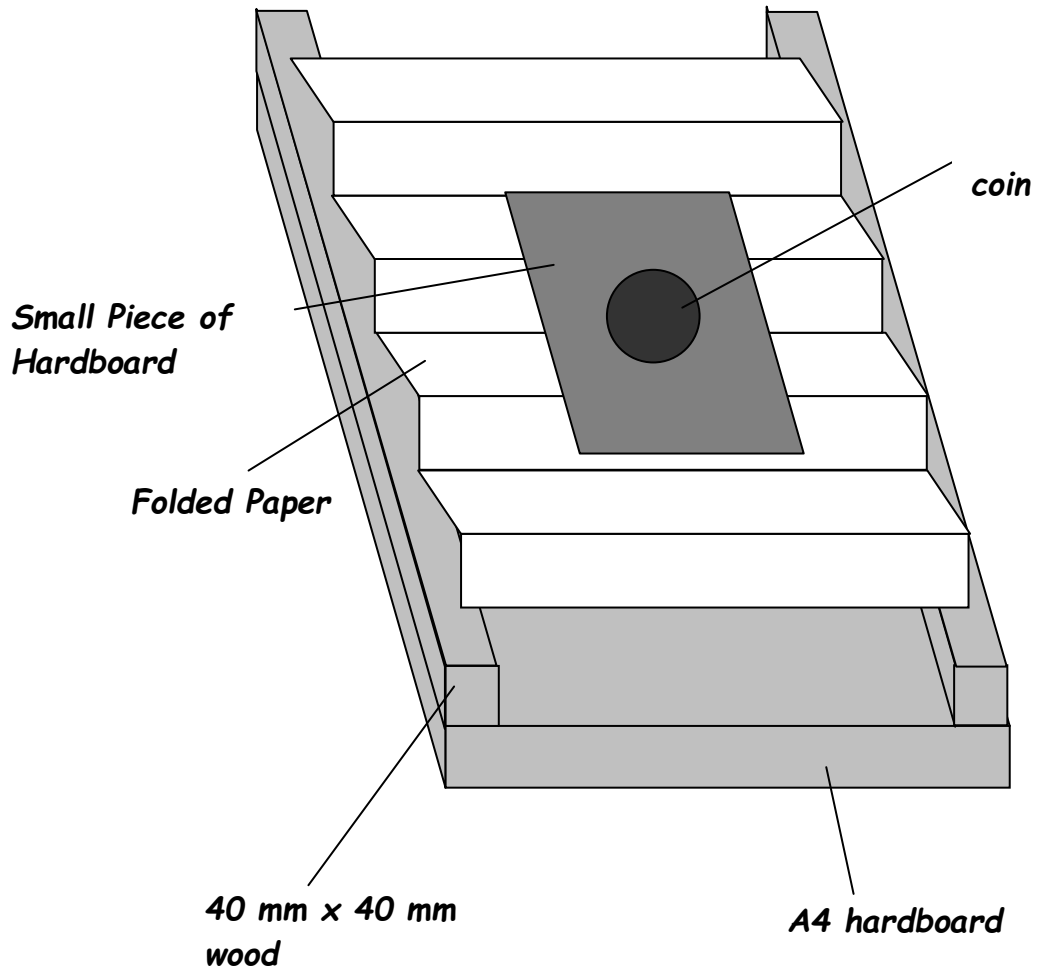
# CRENULATION

## *Purpose*

*To determine what effect crenulation has on the strength of shells.*

## *Instructions*

- 1. Choose three shells, one with a smooth shell, one with small crenulations and the last with larger crenulations. Sketch all three shells.*
- 2. Take a piece of uncreased paper and make a series of zigzag folds in it. The folds should go across the width of the paper. You will be told what spacing there should be between your folds. Fold the paper very carefully and accurately. Make five identical pieces of folded paper.*
- 3. Place a piece of the folded paper on top of the wooden gadget so that the edges rest equally on each side. Stretch the paper out so that there is a gap of about 1cm between the crests and place the small piece of wood on top in the centre. Record the wavelength and the amplitude.*
- 4. Add two pence pieces or weights in a symmetrical pattern, one at a time, on to the small board until the paper collapses. Record the final weight. 2p pieces weigh 7g.*
- 5. Now take a second piece of the folded paper but this time make the crests 1.5cm apart, place the wood on top and repeat instruction 4.*
- 6. With the third piece make the crests about 2cm apart and again place the weights on top until it collapses. Repeat so that you fill up one line of the table below.*



*Draw up a table like this and fill the other information from other pairs of students.*

	<i>Crest every 1cm</i>	<i>1.5cm</i>	<i>2cm</i>	<i>3cm</i>	<i>4cm</i>
<i>Folds every 1cm</i>					
<i>1.5cm</i>					
<i>2cm</i>					
<i>3cm</i>					
<i>4cm</i>					

*7. Draw your conclusions about what is the most effective fold pattern.*

## Teacher's Section

### Requirements

*Sheets of thin A4 paper,*

*A variety of smooth and crenulated shells such as Mytilus, Cardium, and Pecten.*

*Piece of hardboard 7.5cm by 10 cm*

*An A4 piece of hardboard with two pieces of wood 40mm by 40mm fixed to the long edges.*

*200 Two pence pieces or 100 10g weights*

### Notes

*The success of this depends on the paper being folded accurately. You can also try using paper of a different thickness. This works best if one pair of students folds 5 pieces of paper with 2cm between each fold and the next pair with 3cm and the next with 4cm etc. Each pair then varies the spacing of the crests. Results are shared.*

### Results

*Smaller tight folds are stronger but there is some evidence that folds with a 60° angle are strongest.*

### Time

*1 hour*



*crenulation*