WAVELENGTH

Purpose

To work out the relationship between wavelength, amplitude, dip of limbs and crustal shortening

Instructions

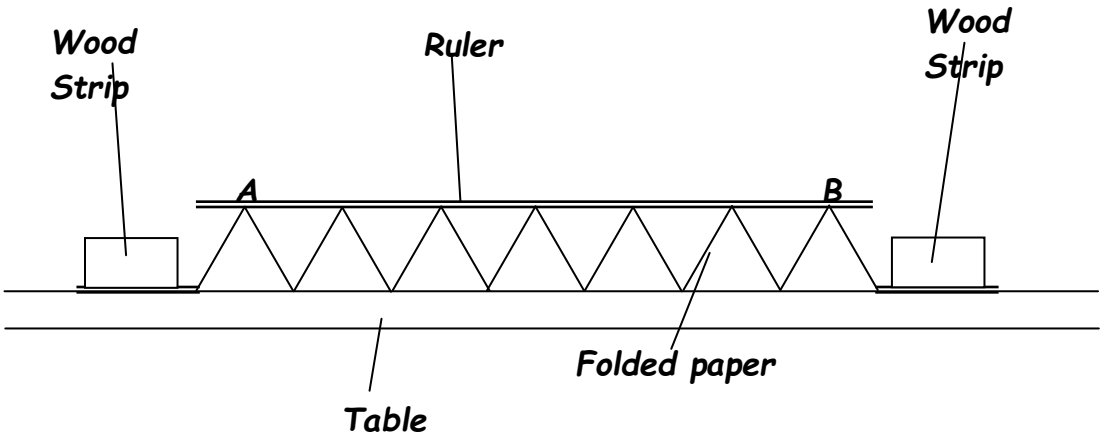
1 Set out a table with the following headings:

Limb length	*Original Length*	*No of synclines*	*New length*	*amplitude*	*Dip angle*	*Wave - length*	*Crustal shortening*

2 Stretch the piece of paper out flat and measure the length from A to B.

		A						*B*	
1.	*2.*	*3.*	*4.*	*5.*	*6.*	*7.*	*8.*	*9.*	*10.*

3 Stretch out the folded paper at the edge of the desk so that the wavelength is large. Place a piece of wood at each end and a ruler on top to make sure all crests are the same height and same spacing.



4 Count the number of synclines.

5 Measure the length from first crest to last crest and record it.

6 Measure the dip of the limbs

7 Measure the amplitude using the small ruler.

8 Repeat instructions 3 to 6 three more times with shorter lengths between crests.

9 Calculate the wavelengths.

10 Calculate the crustal shortening as a percentage:

$$\frac{\text{original length – new length x 100}}{\text{Original length}}$$

11 Plot wavelength and amplitude against crustal shortening.

12 Draw your conclusions.

13 Calculate the crustal shortening, wavelength and amplitude of the folds on the photo.

Teacher's Section

Requirements

A3 piece of paper cut lengthways into strips about 10cm wide. One strip folded very carefully every 2cm, one every 3cm and the last every 4cm. Alternatively get strips of sticky labels of different sizes, these fold very easily and actually work better. There should be an odd number of folds.

Two 30cm rulers, one which has no space between zero and the end (the end can be cut off with a fine toothed saw or use a metal ruler).

Small protractor or better a clinometer.

Two small weights to hold paper at set distances; anything will do but pieces of wood 10cm by 3cm by 2cm are ideal except for the 2cm limbs when coins or thinner wood are needed.

Photo of highly folded strata (e.g. British Geological Survey memoir 307 p43)

Notes

It is more difficult to get an even spread with steeper limbs and probably less likely to occur in nature. Students need only do one strip, different pairs of students could do different limb lengths and compare results

Results
Wavelength decreases and amplitude and dip increase with increasing crustal shortening

Time
60 minutes for all three strips