

Foldo – a game of chance for structural geologists

This game activity on folds was originally produced by Chris King (King, 1981). The activity was designed to help Advanced level students to learn the fold nomenclature appropriate to the A level syllabus at that time. (A solution to the activities is provided) This game activity may be used with students in Y12 and Y13 classes following specialist Earth science course to help develop their knowledge and understanding of folds.

Instructions

The instructions are given to the students as a 'rules of play' sheet as shown in the box below. The instructions are accompanied by the 'fold card' sheet (Figure 1), printed on thin card, or backed by thin card, and cut into 21 rectangular cards. The class should be divided into groups and one person, possibly the teacher, needs to act as the caller. [Notes: If students are playing Foldo for the first time, it may be useful to provide copies of (Figure 2). Answers are given in Table 1.]

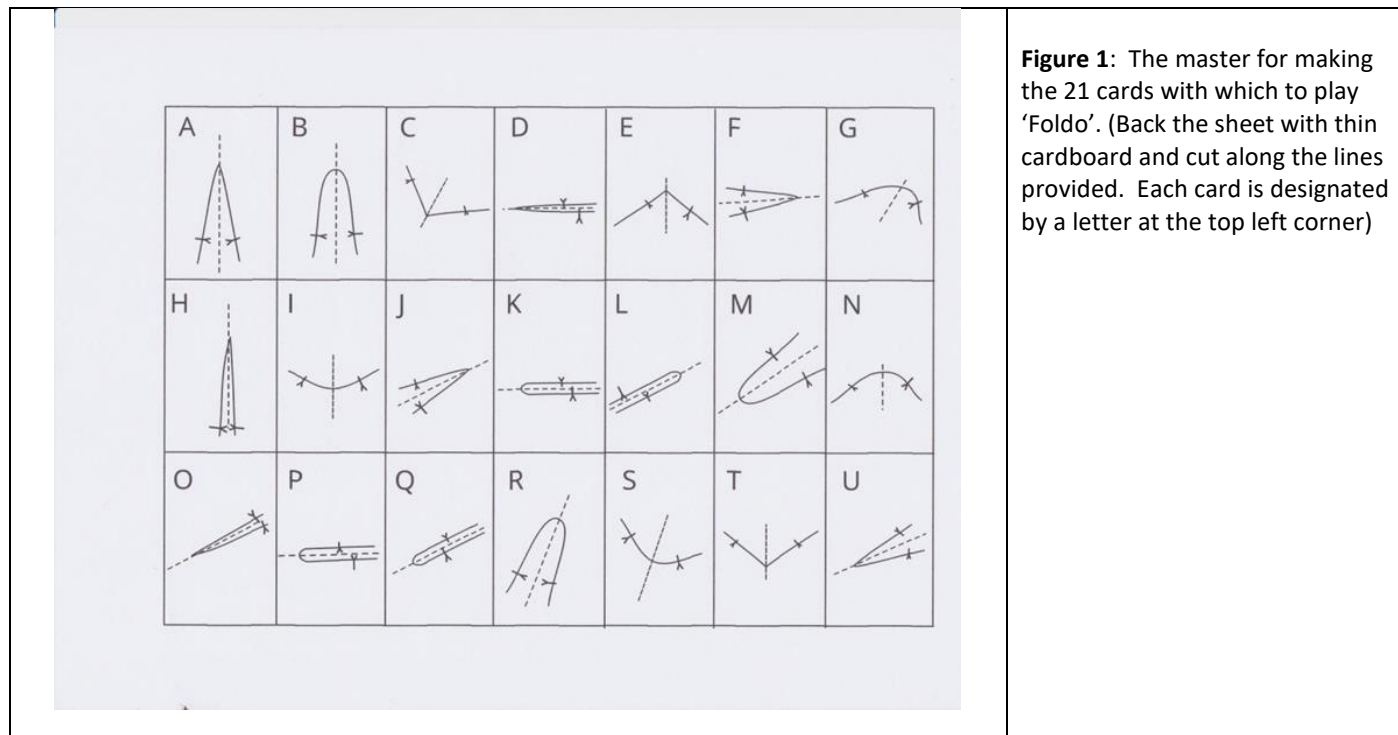


Figure 1: The master for making the 21 cards with which to play 'Foldo'. (Back the sheet with thin cardboard and cut along the lines provided. Each card is designated by a letter at the top left corner)

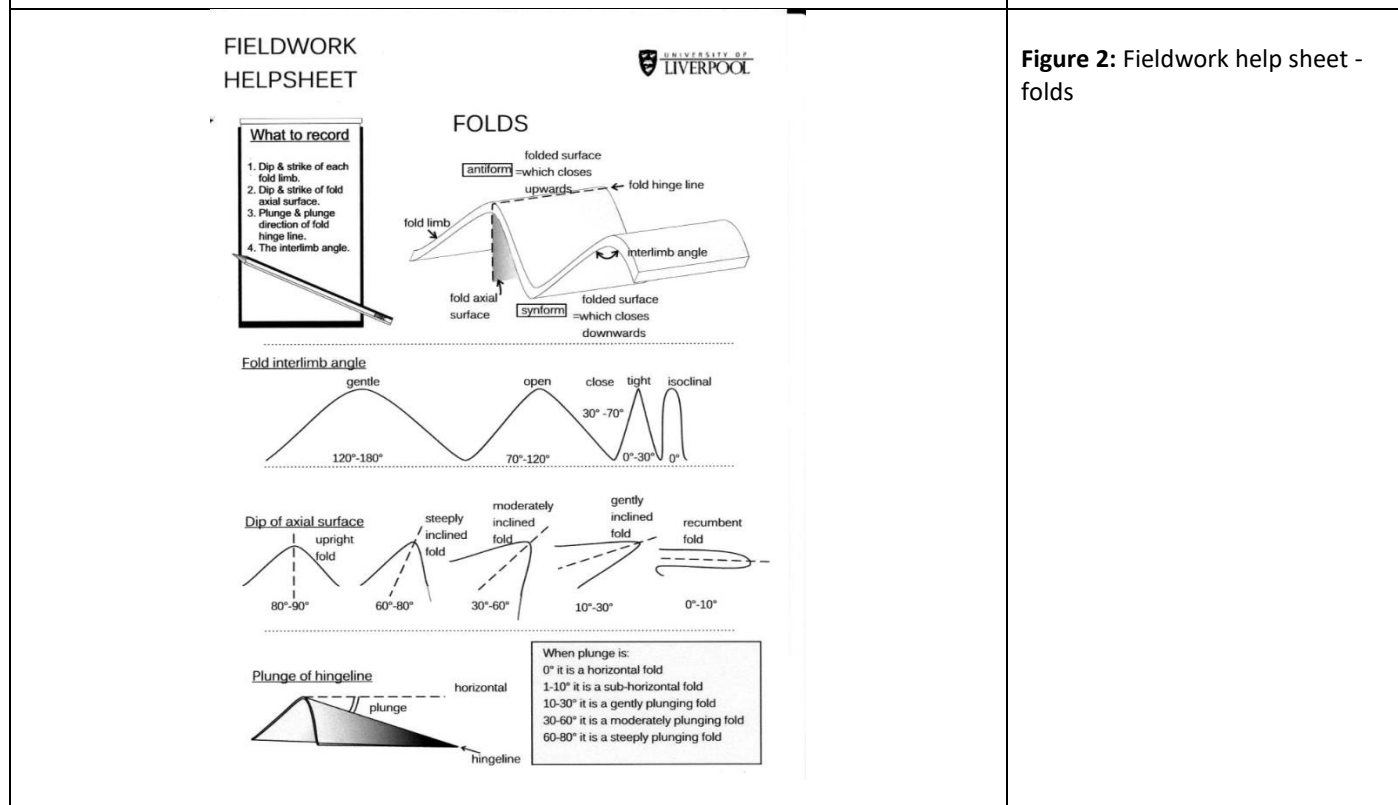


Figure 2: Fieldwork help sheet - folds

| Foldo - Rules of play | List a | Lists b, c, d, e |
|--|---|--|
| <p>(i) Complete the descriptions in list a by adding the missing terms from lists b-e. These descriptions, if completed correctly, will show you how the fold on your fold card should be described.</p> <p>(ii) Take a 'fold card' at random from the pack in front of you. Cards show the axial plane as a dotted line and symbols indicate younging direction (Note: All 'fold cards' should be held so that the letter code is in the top left-hand corner.)</p> <p>(iii) Describe the fold on your 'fold card' in terms of its axial plane attitude, its interlimb angle, fold 'type' (based on the type of fold closure & younging direction on the fold limbs) and the change in dip around the fold hinge.</p> <p>(iv) The 'caller' will throw two dice simultaneously and using the number indicated call out the description of the fold from list a (but not the 'missing term' or the number). For example, if the caller throws $5 + 2 = 7$, the call should be 'folds with an interlimb angle between and 0° and 30°'.</p> <p>(v) As the descriptions of list a are called, tick off those relating to the terms in your fold description.</p> <p>(vi) The first person to complete a full list of fold descriptions should shout 'Foldo' and wins the game providing that the caller checks that terms are correctly used in the descriptions.</p> <p>(vii) If a person shuts 'foldo' and has not related the terms correctly (i.e. the wrong numbers have been thrown) he/she is disqualified for the rest of the game.</p> | <p>No.</p> <ol style="list-style-type: none"> 1 Folds in which the core of the fold contains the oldest rock are called _____. 2 Folds in which there is a sudden change in dip around the fold hinge are called _____. 3 Folds in which the axial planes are vertical are called _____. 4 Folds in which the axial planes are inclined and the strata on one limb are inverted are called _____. 5 Folds with an interlimb angle between 70° and 120° are called _____. 6 Folds with parallel limbs are called _____. 7 Folds with an interlimb angle between and 0° and 30° are called _____. 8 Folds in which axial planes are inclined, but strata are not inverted are called _____. 9 Folds in which the axial planes are near horizontal are called _____. 10 Folds in which there is a gradual change in dip around the hinge are called _____. 11 Folds in which the core of the fold contains the youngest rocks are called _____. | <p>Some of the missing terms to use in your fold descriptions.</p> <p>List b</p> <p>Open folds Fight folds Isoclinal folds</p> <p>List c</p> <p>Rounded hinge folds Angular hinge folds</p> <p>List d</p> <p>Upright folds Inclined folds Overtured folds Recumbent folds</p> <p>List e</p> <p>Anticlines Synclines</p> |

| Answers to question (i). (Missing words) | Answer(s) to question (iii). [Correct fold descriptions for the folds A – U on the fold card (Figure 1)] |
|---|--|
| 1. Anticlines | A. Upright, tight anticline with an angular fold hinge |
| 2. Folds with angular fold hinges | B. Upright, tight anticline with a rounded fold hinge |
| 3. Upright folds | C. Inclined, open syncline with an angular fold hinge |
| 4. Overturned folds | D. Recumbent, isoclinal syncline with an angular fold hinge |
| 5. Open folds | E. Upright, open anticline with an angular fold hinge |
| 6. Isoclinal folds | F. Recumbent, tight anticline with an angular fold hinge |
| 7. Tight folds | G. Inclined, open anticline with a rounded fold hinge |
| 8. Inclined folds | H. Upright, isoclinal anticline with an angular fold hinge |
| 9. Recumbent folds | I. Upright, open syncline with a rounded fold hinge |
| 10. Folds with rounded fold hinges | J. Overturned, tight anticline with an angular fold hinge |
| 11. Synclines | K. Recumbent, isoclinal syncline with a rounded fold hinge |
| | L. Overturned, isoclinal anticline with a rounded fold hinge |
| | M. Overturned, tight syncline with a rounded fold hinge |
| | N. Upright, open anticline with a rounded fold hinge |
| | O. Overturned, isoclinal syncline with an angular fold hinge |
| | P. Recumbent, isoclinal anticline with a rounded fold hinge |
| | Q. Overturned, isoclinal syncline with a rounded fold hinge |
| | R. Inclined, tight anticline with a rounded fold hinge |
| | S. Inclined, open syncline with a rounded fold hinge |
| | T. Upright, open syncline with an angular fold hinge |
| | U. Overturned, tight syncline with an angular fold hinge |

Table 1: Answers to questions (i) and (iii)

References

King, C. (1981) Foldo – a game of chance for structural geologists. *Geology Teaching* **12** (4), pp. 132-134.