

FOLDING & FAULTING

5TH YEAR GEOGRAPHY

LEARNING OUTCOME

Examine how sedimentary rocks are affected by folding

Review the three periods of fold mountain building

Understand structures of deformation;

- Folding
- Doming
- Faulting

**ROCKS CAN
CHANGE
SHAPE DUE
TO STRESS**

KEY TERM

Orogeny

The forces and events leading to the structural deformation of the Earth's Crust due to plate movement. Orogeny results in mountain building.

FOLDING

**Rock layers bend due
to stress**

**Most rocks are laid
down horizontally**



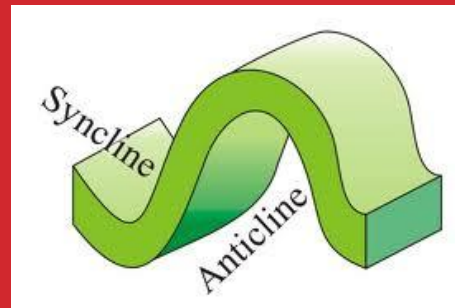
Compression

Rock buckled

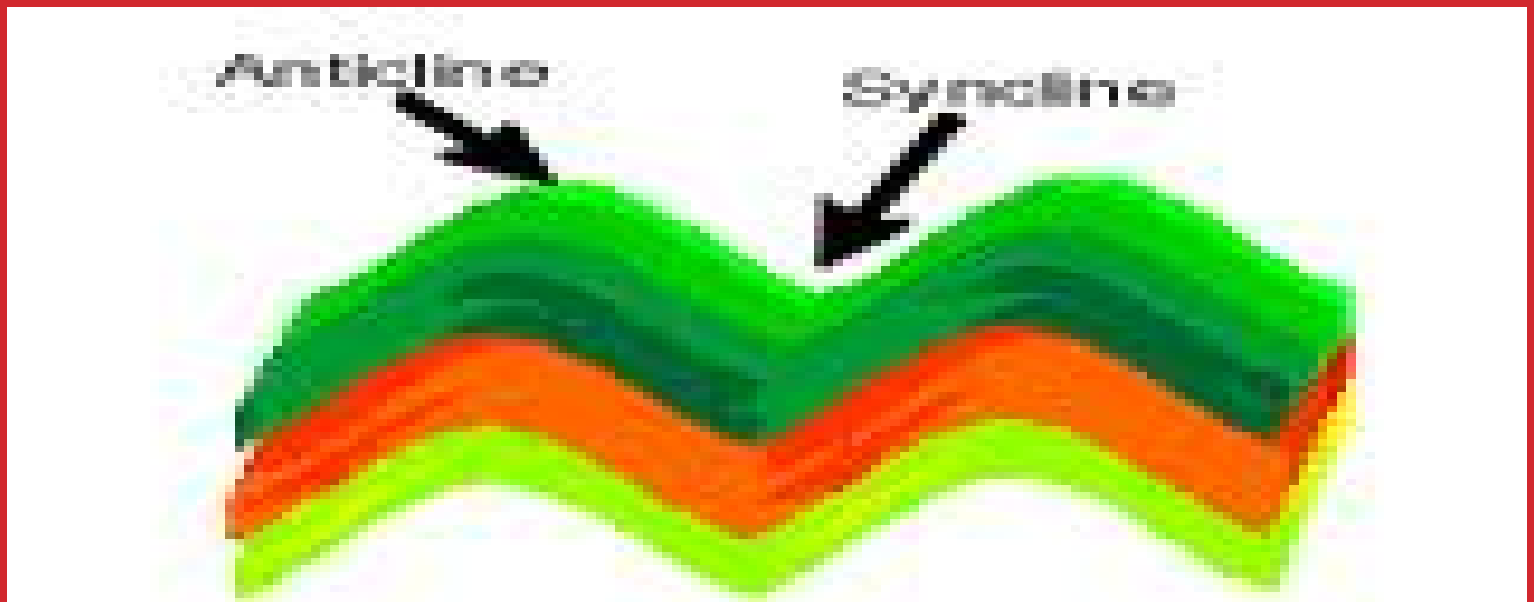
Appears as folds on the landscape

Layers of sedimentary rock pushed upwards- Anticlines

Layers pushed downwards- Synclines



ANTICLINES & SYNCLINES



SYNCLINE



FOLDING

Associated with the closing of oceans

Continental plates collide with each other

Compresses the sedimentary rocks that are on the seabed

4 TYPES OF FOLD

- Simple
- Asymmetrical
- Overfold
- Overthrust

THREE PERIODS OF FOLD MOUNTAIN BUILDING

Caledonian

Armorican

Alpine

CALEDONIAN FOLDING

- **400 million years ago**
- **American & Eurasian plates collided / converged**
- **Closed the Iapetus Sea**
- **Formation of Fold Mountains**
 - **Eg; West Ireland- Nephin Beg Mountains**
 - **Dublin & Wiclow Mountains**
 - **Scottish Highlands**
- **Igneous and Metamorphic rock also formed**
- **Magma moved up through faults**

ARMORICAN FOLDING

- **250 million years ago**
- **Eurasian & African plates collided / converged**
- **Munster Ridge & Valley landscape formed**
- **Formation of Fold Mountains**
 - Eg; Macgillicuddy Reeks
 - Comeragh Mountains
 - Pyrenees, France

ALPINE FOLDING

- **60 million years ago**
- **Did not affect Ireland**
- **Eurasian & African plates collided / converged**
- **Formation of Fold Mountains**
 - Eg; Alps
 - Appennines, Southern Italy

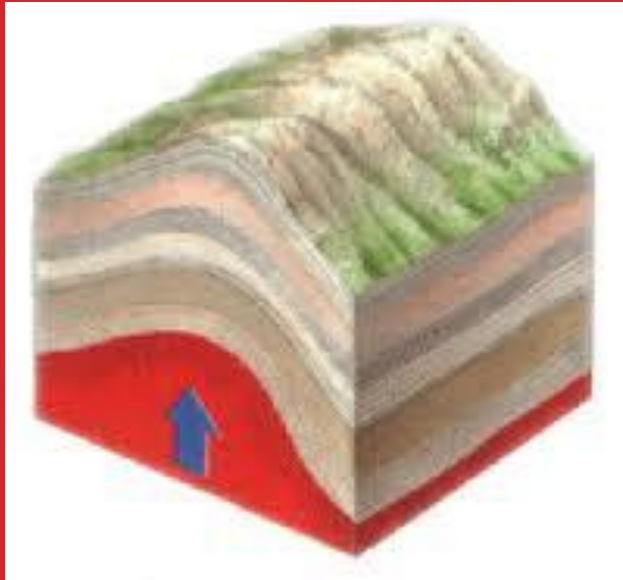


© QT Luong / terragalleria.com

EXAM QUESTION

Explain how the study of plate tectonics has helped us to understand the global distribution of Fold Mountains.

DOMING



DOMING

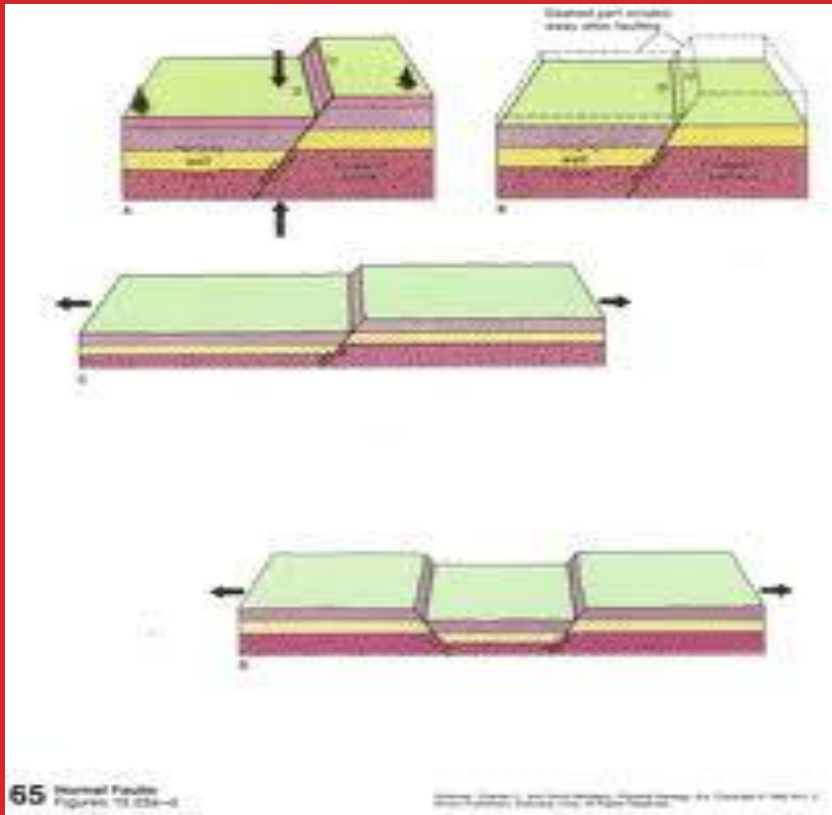
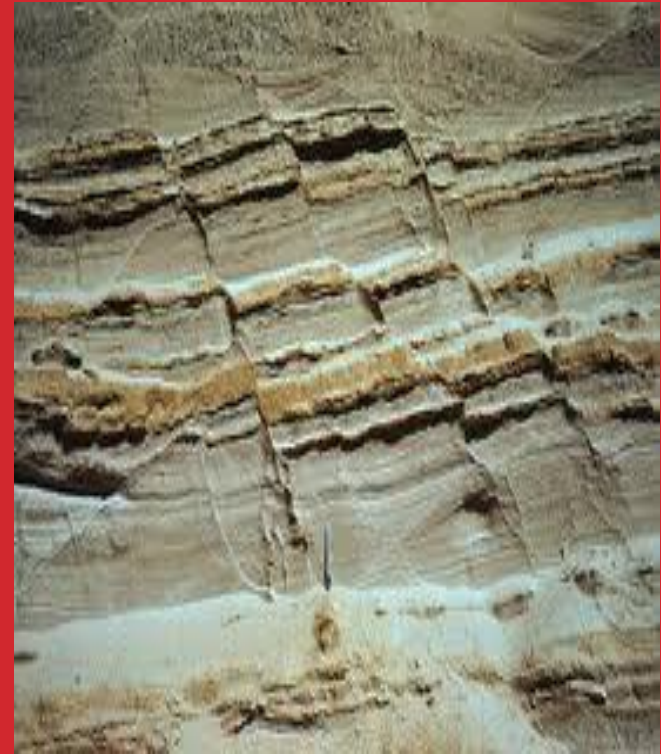
2 Types;

- When rising magma raises rock upwards
- The result of compression

Eg; Slieve Bloom Mountains, Laois/Offaly



FAULTING



65 Normal Faults
Figures 10.23a-d

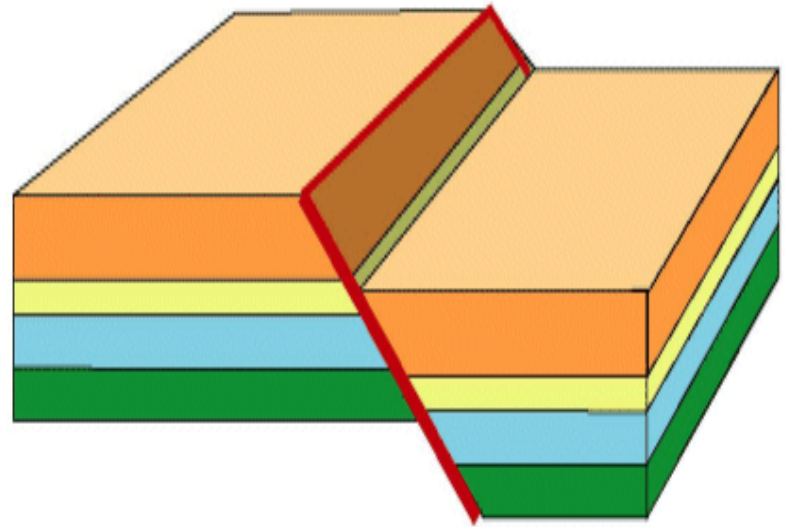
© 2004 Brooks/Cole, a division of Thomson Learning, Inc. All rights reserved.

Faulting

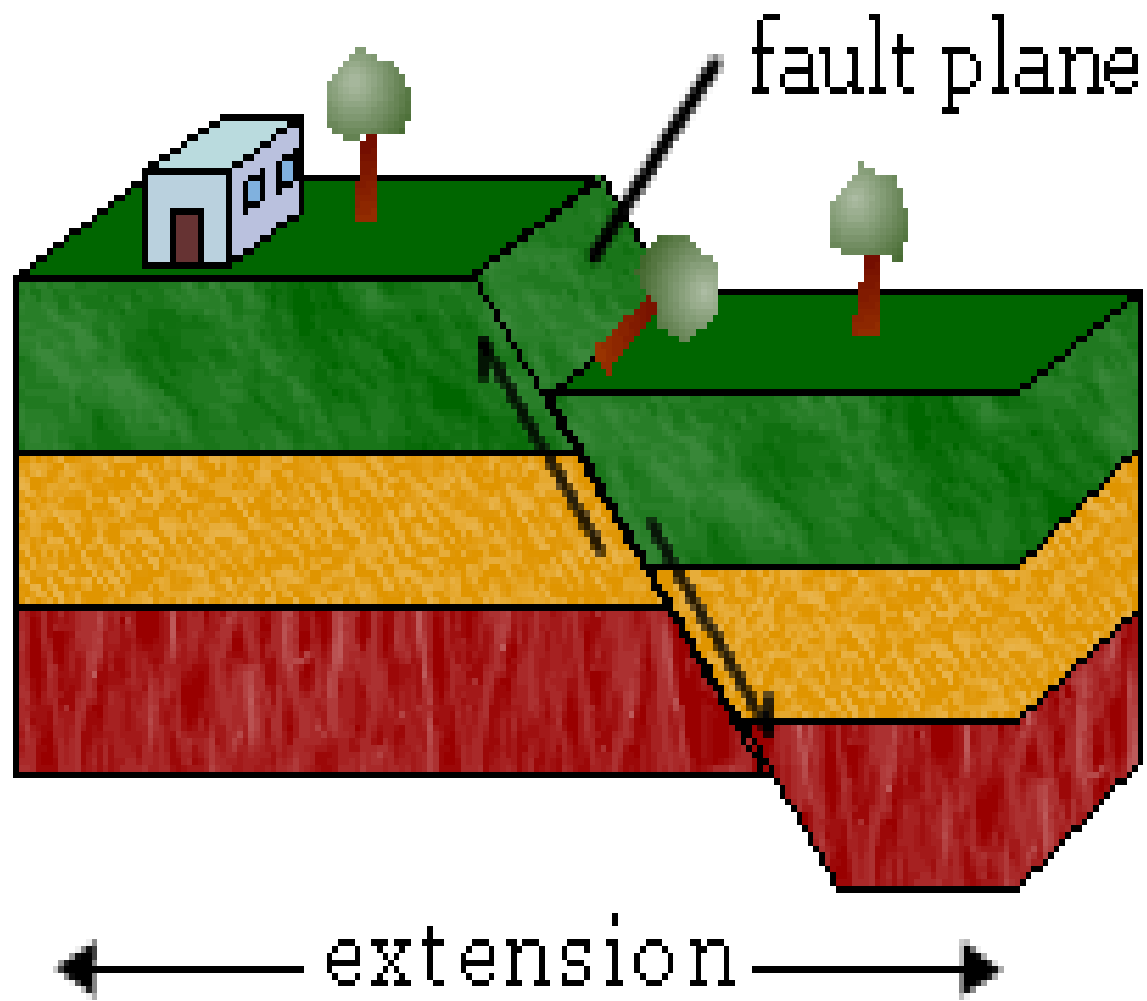
- Faults are caused by plate movement
- The movement may be vertical, horizontal or both
- It causes the rocks within the earth's crust to experience stress
- A fracture occurs along a line of weakness in the rock

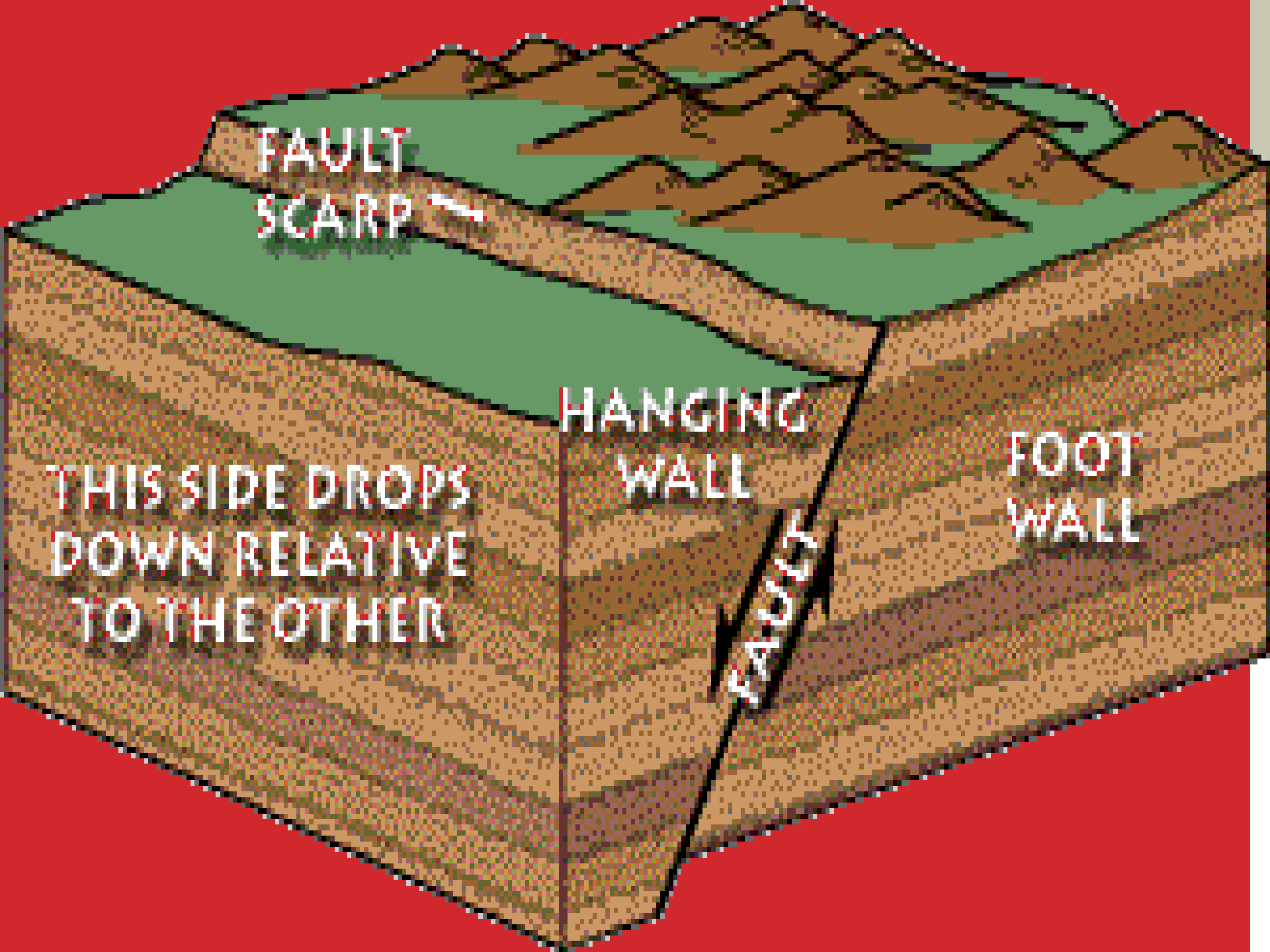
NORMAL FAULTS

- Constructive plate boundaries
- Tension, crust stretches
- Rocks fracture along fault line
- Downward movement of land



Normal faults





FAULT SCARP

HANGING WALL

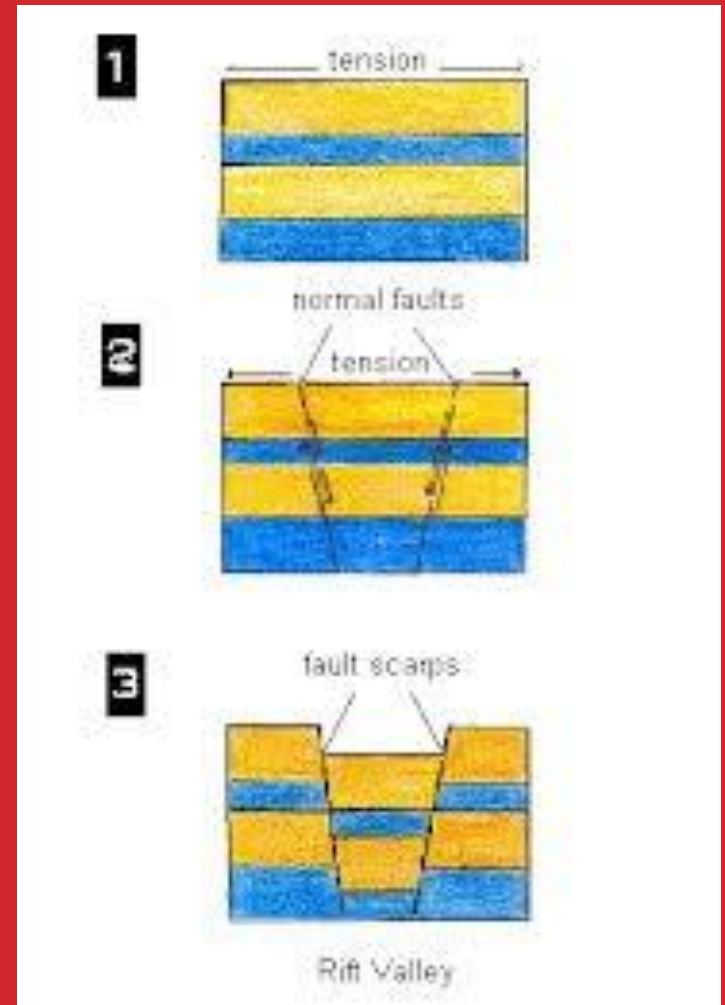
FOOT WALL

FAULT

THIS SIDE DROPS DOWN RELATIVE TO THE OTHER

NORMAL FAULTS

- Two or more parallel faults
- Block of land moves down
- Rift Valley / Graben

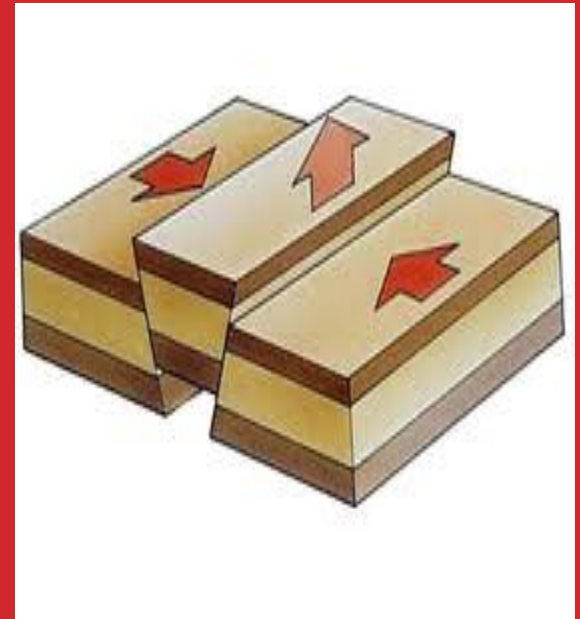


EAST AFRICAN RIFT VALLEY



NORMAL FAULTS

- **Compression** can cause land between two parallel faults to be pushed upwards
- **Block Mountain**

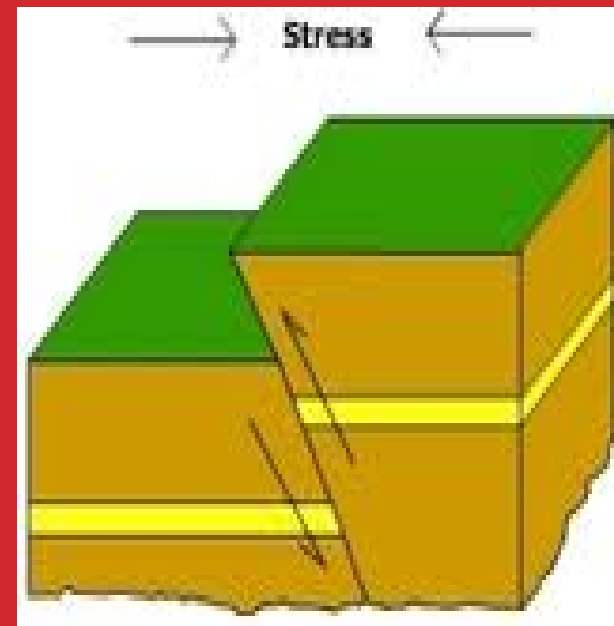
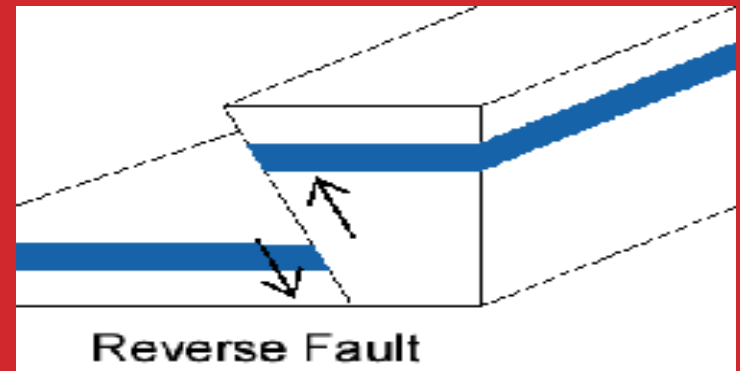


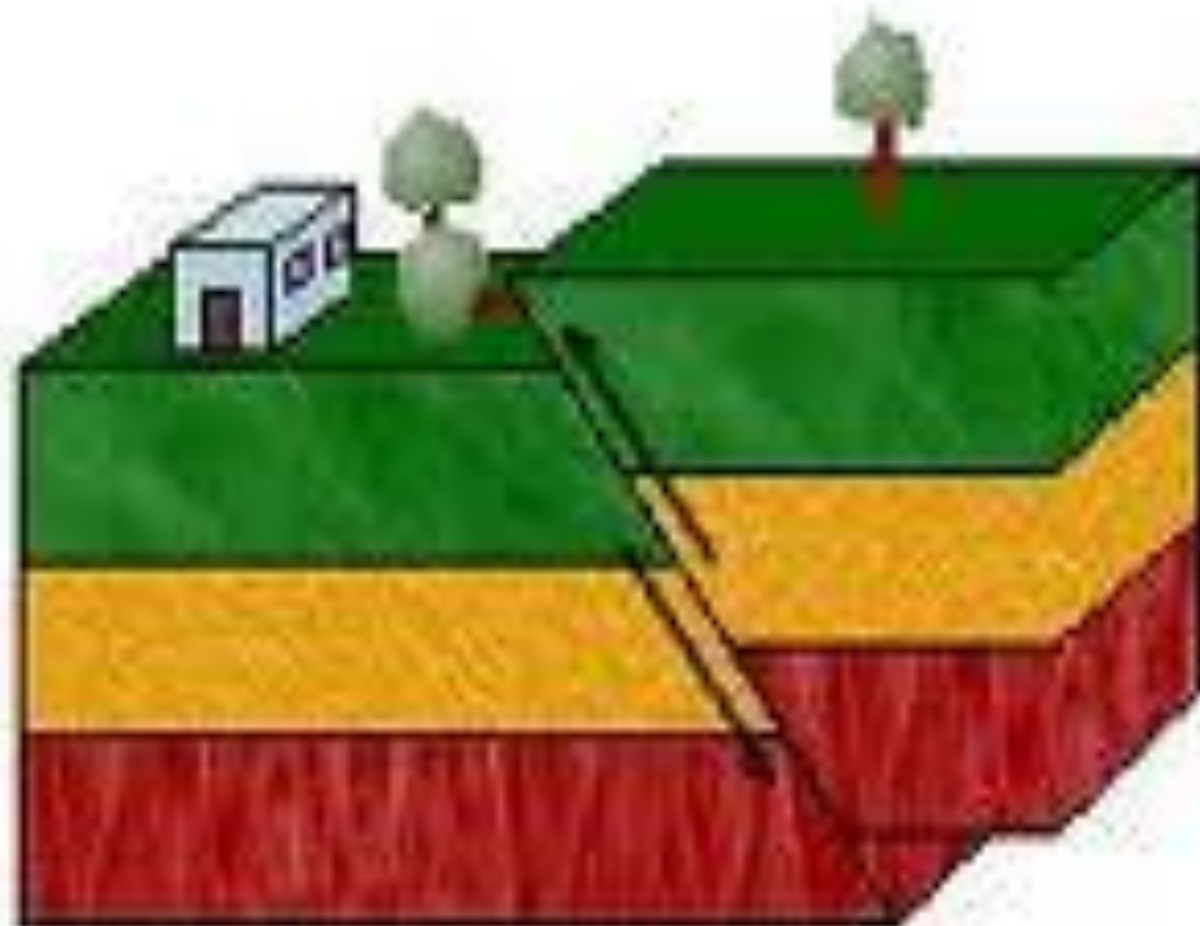
OX MOUNTAINS, SLIGO



REVERSE FAULTS

- Destructive plate boundaries
- Compression within the crust
- Rocks fold upwards
- Crust fractures
- Land moves upwards

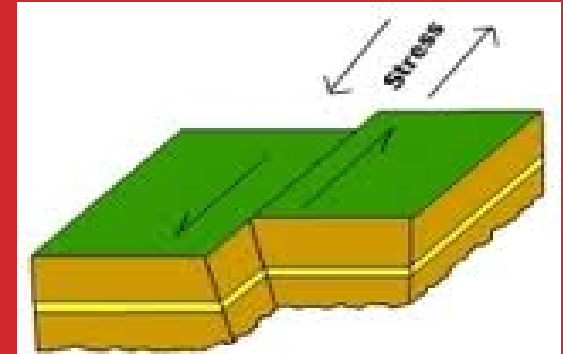




→ shortening ←

TEAR / TRANSFORM FAULTS

- Plates slide past each other
- Crust is neither created or destroyed
- Stress builds up in the two plates
- Shearing can occur
- The crust is fractured along a fault line



SAN ANDREAS FAULT

- **Tear /
Transform Fault**
- **1300 km long**
- **North
American &
Pacific Plates**
- **California**



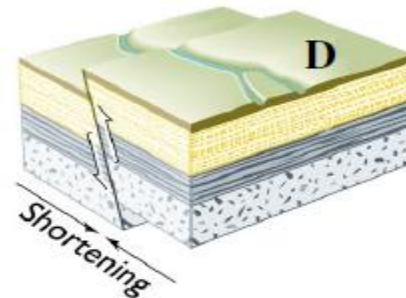
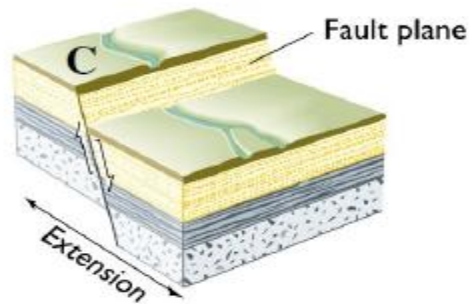
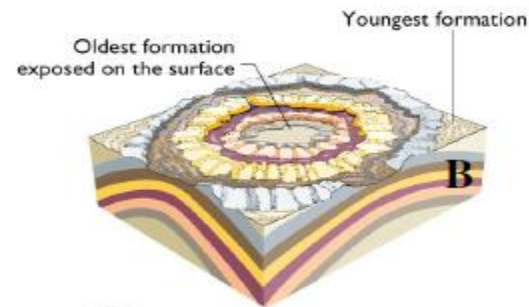
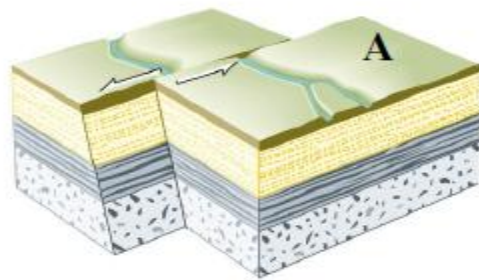
PAIR-WORK

REVISION QUESTIONS

- 1. Where is folding most likely to occur?**
- 2. What is Orogeny?**
- 3. Give an example of mountains formed during the Caledonian period.**
- 4. Explain the two ways domes can form.**
- 5. Name a dome structure found in Ireland.**
- 6. What causes faulting?**
- 7. List the three types of fault.**
- 8. Explain how a rift valley occurs.**

EXAM QUESTION

The following diagrams show structures of deformation.



In your answer-book, match each of the structures below with the correct label A to D in the diagrams above:

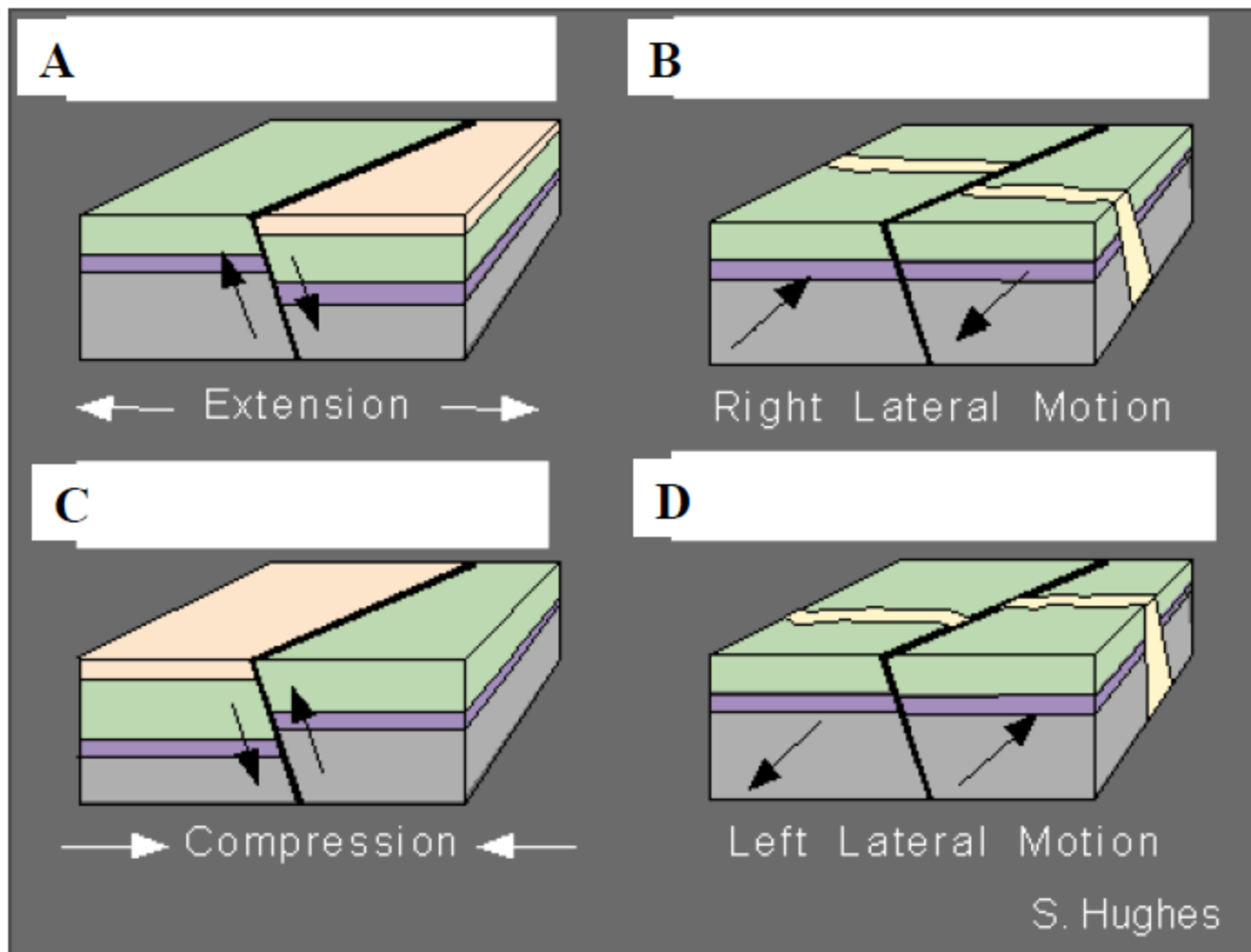
- Normal fault
- Reverse or thrust fault
- Doming
- Transverse or tear fault

EXAM QUESTIONS

Examine the impact of **folding and faulting** on the landscape.
In your answer refer to **one** landform in **each** case.

[30m]

Explain how the study of plate tectonics has helped us to understand the global distribution of Fold Mountains.



Examine these diagrams showing four types of fault. In the space provided, write **each** of these labels in its appropriate place:

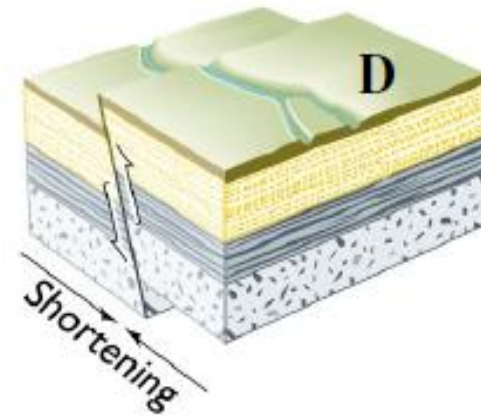
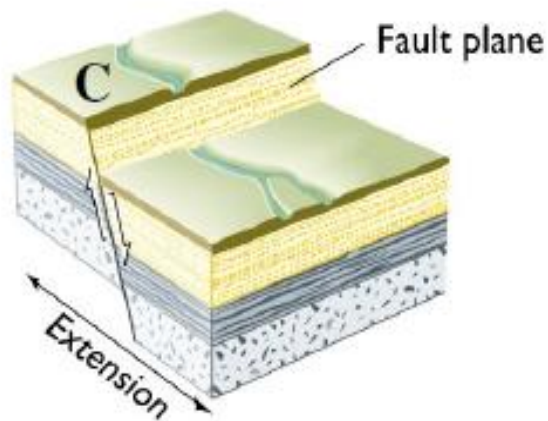
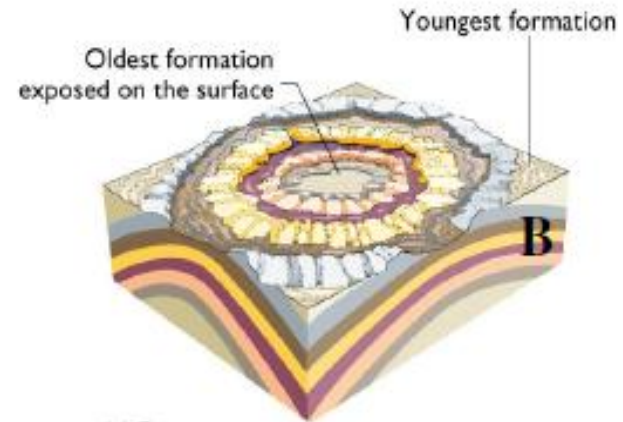
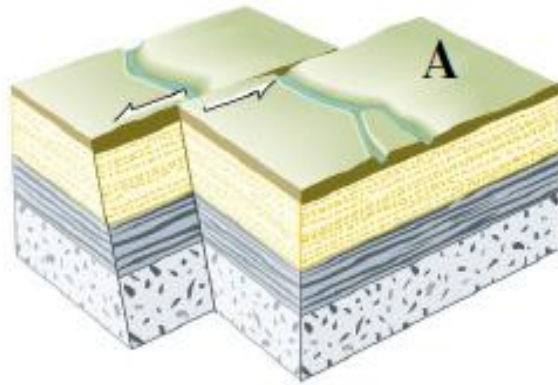
Transform [twice],

Reverse,

Normal

[NB: the label "Transform" needs to be inserted in two spaces].

The following diagrams show structures of deformation.



In your answer-book, match **each** of the structures below with the correct label A to D in the diagrams above:

- Normal fault
- Reverse or thrust fault
- Doming
- Transverse or tear fault

Match **each** of the surface processes in Column A with the correct example in Column B.

Column A	
<i>Erosional</i>	<i>A</i>
<i>Structural</i>	<i>B</i>
<i>Mass Movement</i>	<i>C</i>
<i>Depositional</i>	<i>D</i>

Column B	
<i>Soil Creep</i>	<i>1</i>
<i>Fold Mountain</i>	<i>2</i>
<i>Pothole</i>	<i>3</i>
<i>Esker</i>	<i>4</i>

Letter	Number
<i>A</i>	
<i>B</i>	
<i>C</i>	
<i>D</i>	