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Types of Mountains (Fold, Block, and Volcanic)

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Types of Mountains (Fold, Block, and Volcanic)

A fold range and a block range can stand close together. The Alps and the Vosges lie close together in Europe. One was crumpled by a collision. The other was cut by faults. This lesson shows you how to tell them apart.

At a glance

Four key facts on this topic

01 **3**Main mountain types

02 **2,900 km**Length of the Himalayas

03 **1 cm**Yearly Himalayan rise

04 **7,700**Years since Crater Lake collapsed

Types and Folds

1 The Four Types

1.1 What are the four types?

Mountains are grouped by how they were built. The main types are **fold, block and volcanic** mountains. Some books add a fourth, the rift-valley range, which is a block type.

Plate movement does the work in every case. The shifts of plates shape the ranges, valleys and coastlines we see.

The types at a glance

Type	How it forms
Fold	Two plates collide and the crust crumples
Block	The crust breaks along faults and blocks move
Volcanic	Magma erupts and piles up on the surface

Pick the process first. The name follows from it.

1.2 Which three processes build mountains?

Three words cover most of it: **faulting, folding and extension**. Folding squeezes the crust. Faulting breaks it. Extension pulls it apart.

Volcanoes add a fourth path. They build height from erupted rock instead of moving old rock.

1.3 What are a horst and a graben?

Block mountains come with two matching terms. A **horst** is a block left standing high between faults. A **graben** is a block that drops down between faults.

Valley floors drop down along fault lines in a rift. The blocks beside them stand up as ranges. So horst and graben always come as a pair.

> 12. **Think it through:** Can one region hold two types? See answer ↓

> **Quick check 1.** True or false: Fold mountains and block mountains form by the same process. *(True or False?)* See answer ↓

> **Quick check 2.** True or false: Plate movement shapes mountain ranges, valleys and coastlines. *(True or False?)* See answer ↓

Sources: nps.gov

2 Fold Mountains

2.1 How do fold mountains form?

Fold mountains form where two plates collide. The crust is **compressed, crumpled and thickened**. Think of pushing a rug from both ends until it wrinkles.

The wrinkles are called folds. They are alternating up-folds and down-folds that run nearly parallel. That is why fold ranges often look like long, tidy lines.

2.2 What is the best example?

The best example is the **Himalayas**. They stretch 2,900 km along the border between India and Tibet. Peaks such as Everest rise to about 8.85 km.

The range began to form 40 to 50 million years ago, when India and Eurasia collided. India had moved north after Pangaea broke apart about 200 million years ago.

2.3 Why are the Himalayas so high?

The full thickness of India is shoving beneath Asia. That piles up crust and lifts the range. The push has not stopped.

The Himalayas still rise more than 1 cm a year. A young range like this has sharp, high peaks.

Fold ranges compared

Range	Story
Himalayas	Young. India and Eurasia collided 40 to 50 million years ago. Still rising.
Alps	Formed as the African and Eurasian plates met.
Appalachians	Old. Formed in a collision 500 to 300 million years ago. Now modest in height.
Aravalli	Once extremely high. Worn down almost completely.

Age explains height. Old folds are eroded, young folds are tall.

2.4 Do fold ranges stay tall?

No. Rain, ice and wind wear every range down over time. The Appalachians show it clearly. They formed in a collision of continents, but over the past 300 million years they have eroded to more modest heights.

The Aravalli tell the same story in India. They were once extremely high. Today they are worn down almost completely.

> 13. **Think it through:** Where is the main collision belt today? See answer ↓

> **Quick check 3.** True or false: The Himalayas formed when India and Eurasia collided. *(True or False?)* See answer ↓

> **Quick check 4.** True or false: The Appalachians are young and still rising fast. *(True or False?)* See answer ↓

Sources: pubs.usgs.gov; nps.gov

Blocks and Volcanoes

3 Block Mountains

3.1 How do block mountains form?

Block mountains form where the crust is pulled apart. The cold upper crust cracks along faults, like peanut brittle. Some blocks rise and others drop.

The raised blocks are the mountains. The dropped blocks are the valleys between them. So a block range is often a long ridge with a steep face.

3.2 What does a real example look like?

The Teton Range in Wyoming is a clear case. Its east side is a steep fault escarpment. It rises from the basin of Jackson Hole.

The numbers show the drop. The floor of Jackson Hole is 6,000 feet above sea level. The Tetons rise to over 13,000 feet.

- **Raised block**: the Teton Range.
- **Dropped block**: the basin of Jackson Hole.
- **Break line**: the fault escarpment between them.

3.3 Which block ranges does the syllabus name?

Two ranges in Europe appear again and again: the **Vosges and the Black Forest**. They face each other across the Rhine valley.

The Vosges is the western edge of the Alsatian graben. The Black Forest borders the Upper Rhine Graben on its western edge. The Rhine valley between them is the dropped block.

14. **Think it through:** Why do the Vosges and the Black Forest match? See answer ↓

Quick check 5. True or false: Block mountains form when the crust cracks along faults. *(True or False?)* See answer ↓

Quick check 6. True or false: The Vosges and the Black Forest are fold mountains. *(True or False?)* See answer ↓

Sources: nps.gov

4 Volcanic Mountains

4.1 How do volcanic mountains form?

Volcanic mountains are built from erupted rock. Magma rises, spills out and piles up. Over many eruptions the pile becomes a mountain.

Nothing here is squeezed or broken. The mountain is made of new material added on top.

4.2 Where do volcanoes appear?

Three settings matter. A volcanic arc may form in a **subduction zone**. A **hot spot** can feed a chain of volcanoes. A rift can pour out basalt.

- **Arc**: one plate sinks under another, as the Nazca plate does beneath South America.
- **Hot spot**: an area of concentrated heat in the mantle sends magma to the surface.
- **Rift**: fluid basalt spreads into low shield volcanoes or cinder cones.

4.3 What is a hot spot chain?

The Hawaiian Islands are one hot spot example. Yellowstone is similar. It is part of a chain of volcanoes that get progressively older in one direction.

The plate moves while the hot spot stays put. That leaves a trail of volcanoes, oldest at one end.

4.4 Can a volcanic mountain collapse?

Yes. Crater Lake fills a large depression. A composite volcano erupted and collapsed in on itself there 7,700 years ago.

A lake now sits where the peak once stood.

> 15. **Think it through:** Why are rift volcanoes low and wide? See answer ↓

Quick check 7. True or false: A hot spot can create a chain of volcanoes that grow older in one direction. *(True or False?)* See answer ↓

Quick check 8. True or false: Volcanic mountains form by the folding of rock layers. *(True or False?)* See answer ↓

Sources: nps.gov

Rifts and Exams

5 Rift Valleys and Lakes

5.1 What is a rift valley?

A rift valley is a long trough between faults. The continental crust breaks along faults. This forms long mountain ranges separated by rift valleys.

The valley floor drops. The sides stay high. So a rift valley is the graben, and the ranges beside it are the horsts.

5.2 Why do rifts hold deep lakes?

Lakes pond against active fault escarpments. One side of the rift valley moves downward faster than the other. Water fills the low part.

- **Lake Baikal** in Siberia is 1,642 metres deep.
- **Lake Tanganyika** and **Lake Malawi** lie in the East African Rift.
- The **Dead Sea**, the lowest point on Earth, sits in a rift valley.

5.3 How do we know a rift is still active?

Steep fault escarpments along range fronts are the clue. They are evidence that the region continues to rip apart.

Rift floors drop while the edges stay high. So the same event builds mountains and valleys together.

> 16. **Think it through:** Why link rifts to block mountains? See answer ↓

Quick check 9. True or false: Rift valleys form where the crust is pulled apart along faults. *(True or False?)* See answer ↓

Quick check 10. True or false: The Dead Sea lies on a mountain top. *(True or False?)* See answer ↓

6 How Exams Test This

6.1 How have exams asked this?

6.2 Which facts repeat?

Examiners reuse a small set of ideas.

- **Fold**: Himalayas, Alps, Appalachians, Andes.
- **Block**: Vosges and Black Forest.
- **Volcanic**: Hawaii and Yellowstone are hot spot examples.
- **Aravalli**: once very high, now worn low.

6.3 What is the common slip?

Students match a range to the wrong type. The Vosges is a block, not a fold. The Alps are fold, not block.

Learn each range with its process, not just its label.

17. **Think it through:** How do you beat a matching question?
See answer ↓

Quick check 11. True or false: The Vosges is a block mountain, not a fold mountain. *(True or False?)* See answer ↓

Exam Practice

Remember this

- **Fold:** Collision crumples and thickens the crust
- **Block:** Faults raise some blocks and drop others
- **Volcanic:** Erupted rock piles up
- **Horst:** A raised block between faults
- **Graben:** A dropped block between faults

Explain it back: Which type of mountain forms where two plates collide?

Practice MCQs

1. Fold mountains form primarily through which process?

A. Magma erupting and piling up on the surface

B. Faulting that lifts and drops blocks of crust

C. Wind and water eroding softer rock away

D. Rock layers buckling and folding when tectonic plates collide

See answer ↓

2. The Vosges mountains in France and the Black Forest in Germany are classic examples of which type of mountain?

A. Fold mountains

B. Block mountains

C. Volcanic mountains

D. Dome mountains

See answer ↓

3. Which of the following mountain ranges is a fold mountain, unlike the others which are block mountains?

A. Satpura

B. Black Forest

C. Vosges

D. Andes

See answer ↓

4. Consider the following information: Region / Name of the mountain range / Type of mountain —

1. Central Asia / Vosges / Fold mountain;

2. Europe / Alps / Block mountain;

3. North America / Appalachians / Fold mountain;

4. South America / Andes / Fold mountain.

In how many of the above rows is the given information correctly matched? (UPSC CSP 2024)

A. Only one

B. Only two

C. Only three

D. All four

See answer ↓

5. Fold mountains, the type that includes the Andes and the Himalayas, form mainly due to?

A. Wind deposition of sand over time

B. Compressive forces folding crustal rocks

C. Erosion wearing away softer rock layers

D. Volcanic magma cooling on the surface

See answer ↓

6. Which is one of the world's oldest fold mountain systems, running through Rajasthan, Haryana, and Delhi, now heavily eroded into low hills?

A. The Himalayas

B. The Satpura Range

C. The Nilgiri Hills

D. The Aravalli Range

See answer ↓

7. Geologically, what type of mountain is the Satpura Range, and how does that differ from how the Himalaya formed?

A. A block mountain (horst), uplifted between parallel faults, unlike the Himalaya's slow fold-mountain formation from colliding plates

B. A fold mountain, formed the same way as the Himalaya through plate collision

C. A volcanic mountain, built from repeated lava eruptions like the Deccan Traps

D. A residual mountain, formed purely by erosion of a once-larger plateau

See answer ↓

Answer Key

1. **D.** rock layers buckling and folding when plates collide. Folded mountains form at collisional plate boundaries. The crust is compressed, crumpled and thickened. The folds are alternating up-folds and down-folds that run nearly parallel. ↑ Q1
2. **B.** block mountains. The Vosges is the western edge of the Alsatian graben, a dropped block. The Black Forest borders the Upper Rhine Graben on its western edge. Both stand as blocks beside a down-dropped rift floor. ↑ Q2
3. **D.** the Andes. The Andes rise where the Nazca and Antarctic plates go under South America. Squeezing of the crust at such a boundary crumples and thickens it. The Vosges and Black Forest are blocks beside the Rhine graben. ↑ Q3
4. **B.** only two rows are right. The Appalachians are fold mountains from a continental collision. The Andes also rise at a plate boundary. The Vosges is a block mountain, not fold. The Alps formed as plates met, so they are fold, not block. ↑ Q4
5. **B.** compressive forces folding crustal rocks. The Himalayas began to form 40 to 50 million years ago when India and Eurasia collided. Collision compresses, crumples and thickens the crust. The Himalayas still rise more than 1 cm a year. ↑ Q5
6. **D.** the Aravalli Range. The Aravalli were once extremely high and have worn down almost completely. Old ranges lose height to erosion. The Appalachians show the same story: formed in a collision, now of modest height. ↑ Q6
7. **A.** Correct as keyed: a block mountain (horst). Block ranges rise where the crust breaks along faults. The Himalaya instead formed by collision and folding as India met Eurasia. The key for the Satpura itself rests on the question bank, not on a saved source. ↑ Q7

Quick-check answers

1. **False.** Fold mountains come from compression and crumpling. Block mountains come from breaking along faults. ↑ 1
2. **True.** Plate shifts shape all three. ↑ 2
3. **True.** The collision began 40 to 50 million years ago. ↑ 3

4. **False.** They formed 500 to 300 million years ago and have eroded to modest heights. ↑ 4
5. **True.** The upper crust breaks along faults and some blocks rise. ↑ 5
6. **False.** They are block mountains beside the Rhine graben. ↑ 6
7. **True.** Hawaii and Yellowstone both show this pattern. ↑ 7
8. **False.** They form from erupted lava and ash piling up. ↑ 8
9. **True.** The crust breaks and the valley floor drops. ↑ 9
10. **False.** It is the lowest point on Earth, in a rift valley. ↑ 10
11. **True.** It is the western edge of the Alsatian graben. ↑ 11
12. **Think it through.** The Alps are fold mountains. The Vosges lie close by and are a block. Always judge a range by its own history, not by its neighbours. ↑ 12
13. **Think it through.** It runs from the Himalayas in Asia to the Alps in Europe. Many famous fold ranges lie along that one belt. ↑ 13
14. **Think it through.** They are two sides of one broken block. The middle dropped down and the edges stayed high. The sunken middle holds the Rhine valley. ↑ 14
15. **Think it through.** Rift lava is fluid, dark basalt. It spreads out instead of piling steeply. So it builds low shield volcanoes or small cinder cones. ↑ 15
16. **Think it through.** A rift makes a dropped valley floor. The land on each side stays high. Those high edges are block mountains. ↑ 16
17. **Think it through.** Check each row on its own. Mark the ones you know for sure. Then count. Two certain errors may already fix the answer. ↑ 17

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