NO PREP

Continental Margins

Active vs. Passive Boundaries

Includes: Student reading, case study, differentiated questions, teacher key

Name: Period: Date:

Continental Margins: Active vs. Passive Boundaries

What Are Continental Margins?

The continental margin is the zone between the dry land of continents and the deep ocean basins. It includes three main parts: the continental shelf, the continental slope, and the continental rise. The shelf is a gently sloping, shallow extension of the continent, often rich in marine life and natural resources. Beyond the shelf, the slope drops steeply toward the ocean floor, and the rise forms a more gradual incline where sediments accumulate. Not all continental margins are the same. Scientists classify them into two main types: active margins and passive margins. The differences between them come from plate tectonics. Where continents meet plate boundaries, the margin is active, and where they do not, the margin is passive. This distinction

Name: Period: Date:

Continental Margins: Active vs. Passive Boundaries

What Are Continental Margins?

The continental margin is the zone between the dry land of continents and the deep ocean basins. It includes three main parts: the continental shelf, the continental slope, and the continental rise. The shelf is a gently sloping, shallow extension of the continent, often rich in marine life and natural resources. Beyond the shelf, the slope drops steeply toward the ocean floor, and the rise forms a more gradual incline where sediments accumulate. Not all continental margins are the same. Scientists classify them into two main types: active margins and passive margins. The differences between them come from plate tectonics. Where continents meet plate boundaries, the margin is active, and where they do not, the margin is passive. This distinction affects the geology, resources, and hazards of each region.

Active Continental Margins

An active margin occurs where a continent's edge meets an oceanic plate boundary, typically at a convergent boundary. These areas are geologically active, with frequent earthquakes, volcanic eruptions, and mountain building. The continental shelf in active margins is usually narrow because the crust is constantly being reshaped. Examples of active margins include the west coasts of North and South America. In places like Chile, the oceanic Nazca Plate is subducting beneath the South American Plate, creating the Andes Mountains and the Peru-Chile Trench. Similarly, off the coast of California, the San Andreas Fault marks the sliding boundary between the Pacific and North American Plates. These regions are prone to seismic hazards but also host valuable mineral deposits.

Passive Continental Margins

A passive margin occurs where a continent's edge does not coincide with a plate boundary. These margins are geologically quiet, with broad continental shelves, little volcanic activity, and fewer earthquakes. Instead of mountains and trenches, sediments erode from the land and build up thick layers on the continental rise. The U.S. East Coast is a passive margin. Here, the continental shelf extends for hundreds of kilometers, creating shallow seas that support fisheries and oil and gas exploration. Passive margins are often home to major economic resources because of their wide shelves and sedimentary basins. However, they are not completely hazard-free—hurricanes and rising sea levels also pose threats.

Key Information: Table: Comparing Active and Passive Margins

Characteristic	Active Margin	Passive Margin
Location	At plate boundaries	Away from plate boundaries
Geologic activity	High: earthquakes, volcanoes	Low: little seismic or volcanic activity
Continental shelf	Narrow and steep	Wide and shallow
Example	U.S. West Coast, Chile	U.S. East Coast, West Africa
Hazards	Earthquakes, tsunamis, volcanoes	Hurricanes, coastal flooding

Case Study: The U.S. West Coast

The U.S. West Coast is a classic example of an active continental margin. Along California, the Pacific Plate slides past the North American Plate along the San Andreas Fault, creating frequent earthquakes. Farther north, in Oregon and Washington, the Juan de Fuca Plate is subducting beneath the North American Plate, creating the Cascadia Subduction Zone. This area has the potential to generate massive earthquakes and tsunamis. Scientists study these regions closely to understand the risks and prepare communities. In contrast to the broad and calm continental shelf of the East Coast, the Pacific margin is narrow, rugged, and dangerous. Its geology demonstrates how active margins are shaped by ongoing plate interactions and highlight the hazards faced by millions of people living along them.

1. Why is the U.S. West Coast classified as an active margin?

_____

_____

2. What hazards are associated with the Cascadia Subduction Zone?

_____

_____

Multiple Choice

1. Which feature is usually broader at passive margins than at active margins?

    a) Continental shelf

    b) Ocean trench

    c) Continental slope

    d) Continental rise

2. What type of boundary is most associated with active continental margins?

a) Transform plate boundary

b) Divergent

c) Convergent

d) Passive

3. Which U.S. coast is considered a passive margin?

a) Gulf Coast

b) East Coast

c) Alaska

d) West Coast

Matching

Write the letter of the correct definition on the line next to each term.

Term	Definition
1. ___ Active margin	A) Geologically quiet with wide shelves
2. ___ Passive margin	B) Earthquake-prone transform boundary
3. ___ Cascadia Subduction	C) Gentle incline where sediments accumulate
4. ___ San Andreas Fault	D) Juan de Fuca Plate sinking beneath North America
5. ___ Continental rise	E) Found at convergent or transform boundaries

Fill-in-the-Blank

1. The _____ continental margin is located at plate boundaries and experiences frequent earthquakes.

2. The _____ continental shelf is wide and supports economic resources like oil and fisheries.

3. The Cascadia Subduction Zone poses a risk of massive _____ and tsunamis.

Short Answer

Answer each question in 2-4 complete sentences.

1. Why are active margins typically narrower than passive margins?

2. How do passive margins contribute to economic activity?

3. Compare the main hazards faced by communities on the U.S. East Coast versus the West Coast.