

To complete this worksheet, see the instructions in the textbook (Chapter 10 Investigation).

Table 1. Identification of Features on the Ocean Floor

Different oceanic features are numbered (1 through 10) adjacent to the figure below. Write the name for each feature using the choices listed below. Note that the lettered spaces below do NOT correspond exactly to the numbered descriptions in the textbook.

Possible choices include: Abyssal plain, back-arc basin, fracture zone, linear island chain, island arc, mid-ocean ridge, oceanic plateau, oceanic trench, continental shelf, and submarine canyon and fan. Each choice is only used one time.

Feature A: _____

Feature B: _____

Feature C: _____

Feature D (refers to narrow sea between continent and islands): _____

Feature E: _____

Feature F: _____

Feature G: _____

Feature H: _____

Feature I: _____

Feature J: _____

Feature K: _____

Table 2. Interpretation of the Formation and Relationship of Features

For each of the numbered features on the previous figure, write the name of the feature in the table below and provide a brief interpretation of how the feature formed.

Feature Number	Name of Feature	Interpretation of How Feature Formed (circle the letter for the best answer)
A	(a) abyssal plain (b) island arc (c) mid-ocean ridge (d) continental shelf	(a) Movement of a plate over a hot spot results in a linear chain of volcanic islands and seamounts. (b) A broad area of continental crust that has been thinned and overlain by marine sediments. (c) Migration of an island arc and trench cause the crust to stretch and rift. (d) Cooling of lithosphere causes oceanic crust to subside and be covered by deep-water sediment.
B	(a) back-arc basin (b) fracture zone (c) oceanic trench (d) submarine canyon and fan	(a) Formed by bending down of a slab as it enters a subduction zone. (b) A broad area of continental crust that has been thinned and overlain by marine sediments. (c) Two oceanic plates diverge, allowing mantle magma to rise and form new oceanic crust. (d) Differences in the age of seafloor cause oceanic crust on one side of this feature to be higher in elevation than oceanic crust on the other side, but the feature is not a plate boundary.
C	(a) fracture zone (b) island arc (c) mid-ocean ridge (d) oceanic trench	(a) A rising plume of mantle melts and causes melting of adjacent lithosphere. (b) Formed where two oceanic plates converge, and melting of the subducted plate results in volcanoes on the overriding plate. (c) A broad area of continental crust that has been thinned and overlain by marine sediments. (d) Two oceanic plates diverge, allowing mantle magma to rise and form new oceanic crust.
D	(a) back-arc basin (b) oceanic trench (c) continental shelf (d) submarine canyon and fan	(a) Movement of a plate over a hot spot results in a linear chain of volcanic islands and seamounts. (b) Sediment is transported by turbidity currents from the edge of the continent into deeper water. (c) Migration of an island arc and trench cause the crust to stretch and rift, leading to spreading (d) Differences in the age of seafloor cause oceanic crust on one side of this feature to be higher in elevation than oceanic crust on the other side, but the feature is not a plate boundary.
E	(a) abyssal plain (b) mid-ocean ridge (c) oceanic plateau (d) continental shelf	(a) Formed where two oceanic plates converge, and melting of the subducted plate results in volcanoes on the overriding plate. (b) A rising plume of mantle melts and causes melting of adjacent asthenosphere and lithosphere. (c) Sediment is transported by turbidity currents from the edge of the continent into deeper water. (d) A broad area of continental crust that has been thinned and overlain by marine sediments.

Feature Number	Name of Feature	Interpretation of How Feature Formed (circle the letter for the best answer)
F	(a) fracture zone (b) linear island and seamount chain (c) mid-ocean ridge (d) continental shelf	(a) Formed where two oceanic plates converge, and melting of the subducted plate results in volcanoes on the overriding plate. (b) Movement of a plate over a hot spot results in a linear chain of volcanic islands and seamounts. (c) Migration of an island arc and trench cause the crust to stretch and rift. (d) Two oceanic plates diverge, allowing mantle magma to rise and form new oceanic crust.
G	(a) mid-ocean ridge (b) oceanic plateau (c) oceanic trench (d) submarine canyon and fan	(a) Formed by bending down of a slab as it enters a subduction zone. (b) Movement of a plate over a hot spot results in a linear chain of volcanic islands and seamounts. (c) Sediment is transported by turbidity currents from the edge of the continent into deeper water. (d) Migration of an island arc and trench cause the crust to stretch and rift.
H	(a) abyssal plain (b) mid-ocean ridge (c) oceanic plateau (d) continental shelf	(a) Formed where two oceanic plates converge, and melting of the subducted plate results in volcanoes on the overriding plate. (b) A rising plume of mantle melts and causes melting of adjacent lithosphere. (c) Movement of a plate over a hot spot results in a linear chain of volcanic islands and seamounts. (d) A broad area of continental crust that has been thinned and overlain by marine sediments.
I	(a) abyssal plain (b) mid-ocean ridge (c) oceanic plateau (d) continental shelf	(a) Formed by bending down of a slab as it enters a subduction zone. (b) A rising plume of mantle melts and causes melting of adjacent lithosphere. (c) Sediment is transported by turbidity currents from the edge of the continent into deeper water. (d) A broad area of continental crust that has been thinned and overlain by marine sediments.
J	(a) back-arc basin (b) mid-ocean ridge (c) oceanic plateau (d) oceanic trench	(a) Formed by bending down of a slab as it enters a subduction zone. (b) Two oceanic plates diverge, allowing mantle magma to rise and form new oceanic crust. (c) Movement of a plate over a hot spot results in a linear chain of volcanic islands and seamounts. (d) A broad area of continental crust that has been thinned and overlain by marine sediments.
K	(a) fracture zone (b) island arc (c) oceanic trench (d) submarine canyon and fan	(a) Formed by bending down of a slab as it enters a subduction zone. (b) Formed where two oceanic plates converge, and melting of the subducted plate results in volcanoes on the overriding plate. (c) Migration of an island arc and trench cause the crust to stretch and rift. (d) Differences in the age of seafloor cause oceanic crust on one side of this feature to be higher in elevation than oceanic crust on the other side, but the feature is not a plate boundary.

Table 3. Interpreted Relationship Between Adjacent Features

Related Features	Possible Interpretation of How the Features are Related (circle the letter for the best answer)
Features B and C	(a) Two oceanic plates diverge, forming a rift, and allowing magma to reach the surface. (b) Oceanic crust is subducted and releases water, and magma rises into the overriding plate. (c) A rising mantle plume causes widespread melting when it first encounters the lithosphere, and magmatism continues as the plate moves over the hot spot. (d) Spreading causes two plates to slip past one another on transform faults, and differences in elevation reflect differences in the age of the crust.
Features E and F	(a) Two oceanic plates diverge, forming a rift, and allowing magma to reach the surface. (b) Oceanic crust is subducted and releases water, and magma rises into the overriding plate. (c) A rising mantle plume causes widespread melting when it first encounters the lithosphere, and magmatism continues as the plate moves over the hot spot. (d) Two oceanic plates converge along an irregular boundary, which causes tears and wrinkles in the crust.
Feature J and K	(a) Oceanic crust is subducted and releases water, and magma rises into the overriding plate. (b) Turbidity currents scour deeply into oceanic crust in the middle of the ocean, causing grooves and ridges. (c) Spreading causes two plates to slip past one another on transform faults, and differences in elevation reflect differences in the age of the crust. (d) Two oceanic plates converge along an irregular boundary, which causes tears and wrinkles in the crust.

Table 4: Cross Section Along the Front of the Terrain

On the front of the terrain below, sketch your interpretation of the geometry of plates at depth, such as a subduction zone or mid-ocean ridge. Draw arrows to indicate which way the plates are moving relative to each other and show where melting is occurring at depth to form volcanoes on the surface. Use figures from the book as a guide for how to draw in the different types and thicknesses of crust and lithosphere.



Table 5. Interpretation of the Landscape in the Past or In the Future

For each question below, circle the appropriate answer about how the area is interpreted to have looked 20 million years ago or will look 20 million years into the future.

Question	Possible Answer
Where was the oceanic plateau relative to the hot spot 20 million years ago?	(a) farther away than today; (b) the same distance as today; (c) half the distance as today; (d) on top of the hot spot
What was the length of the linear chain of islands and seamounts 20 million years ago?	(a) longer than today; (b) same length as today; (c) half as long as today; (d) it did not yet exist
Which way is the plate on which the oceanic plateau rests moving relative to the hot spot at depth? Assume that on the main figure you are looking north.	(a) west; (b) northwest; (c) north; (d) northeast; (e) east southeast; (f) south; (g) southwest
How wide was the narrow sea between the western continent and adjacent volcanic islands 20 million years ago?	(a) wider than it is today; (b) same width as it is today; (c) a little narrower than it is today; (d) it was much narrower
How wide was the narrow ocean between the central and eastern continents 20 million years ago?	(a) wider than it is today; (b) same width as it is today; (c) a little narrower than it is today; (d) it was much narrower
How wide do you think the narrow ocean between the central and eastern continents will be 20 million years into the future?	(a) nearly twice as wide as it is today; (b) a little wider than today; (c) same width as today; (d) much narrower than today
What do you think might happen to the oceanic plateau 20 million years into the future?	(a) it may become much larger than it is today; (b) it may collide with and become part of the central continent; (c) it may subside and become part of the abyssal plain; (d) it may collide with the trench
Your instructor may have you draw on a separate sheet of paper a simple map of the area 20 million years ago showing the relative positions of the different features. Be sure to draw and label mid-ocean ridges, trenches, and other features.	
Your instructor may have you draw on a separate sheet of paper a simple map of the area 20 million years into the future showing the relative positions of the different features. Be sure to draw and label mid-ocean ridges, trenches, and other features.	