

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) What are the basic differences between the disciplines of physical and historical geology? 1) _____
A) Physical geology involves the study of rock strata, fossils, and deposition in relation to plate movements in the geologic past; historical geology charts how and where the plates were moving in the past.
B) Physical geology is the study of fossils and sequences of rock strata; historical geology is the study of how rocks and minerals were used in the past.
C) Historical geology involves the study of rock strata, fossils, and geologic events, utilizing the geologic time scale as a reference; physical geology includes the study of how rocks form and of how erosion shapes the land surface.
D) None of the above-physical geology and historical geology are essentially the same.
- 2) The study of Earth's atmosphere is known as _____. 2) _____
A) oceanography B) meteorology C) cosmology D) astronomy
- 3) Which discipline is not used within the Earth sciences? 3) _____
A) Biology
B) Physics
C) Chemistry
D) Mathematics
E) None of the above; Earth Science makes use of all of these sciences.
- 4) Oceanography is the study of the oceans and geology is the study of Earth, so what is meteorology? 4) _____
A) the study of the Sun's impact on the upper atmosphere
B) the study of how to be a TV newscaster
C) the study of meteors
D) the study of the atmosphere
- 5) Sedimentary rocks with marine fossils are exposed at the top of Mt. Everest. Which scientists would make most use of this observation in their study? 5) _____
A) geologists, because their elevation is related to physical geology and fossils are related to Earth history
B) meteorologists, because they could use the fossils as a guide to ancient climates
C) astronomers, because they can study how life came from outer space to Earth
D) oceanographers, because the fossils can tell us about periods when Earth was covered with water to the height of Mt. Everest
- 6) Hurricanes and tornados are natural disasters. What branch of the Earth sciences studies the origin of these phenomena? 6) _____
A) meteorology B) geology C) oceanography D) astronomy
- 7) Earthquakes are natural disasters. Which branch of the Earth sciences studies the impact of this phenomenon on coastal environments? 7) _____
A) meteorology B) geology C) oceanography D) astronomy

- 8) Haley's Comet visits Earth's atmosphere once every 76 years. What branch of the Earth sciences is the main group that studies these phenomena? 8) _____
A) meteorology B) geology C) oceanography D) astronomy
- 9) If you want to buy a house in an area and you are worried there may be an earthquake hazard, who would be the best person to ask for advice on this hazard? 9) _____
A) a physicist B) an astrologer C) a geologist D) a civil engineer
- 10) Earth is estimated to be approximately 4.6 billion years old. Life appeared early in the history of Earth, but metazoans (multicelled organisms) did not appear until about 600 million years ago. If the history of Earth were compressed into a single year, about when would metazoans appear? 10) _____
A) late November B) late January C) late September D) mid-December
- 11) Which of the following would not typically be considered an Earth Science study? 11) _____
A) studies of impact craters on the moon
B) studies of volcanic eruptions
C) studies of acid mine waters and the bacteria that live in those waters
D) chemical refining of petroleum
- 12) Climate change is a well-known human created problem but there remains resistance to addressing the issue despite widespread scientific agreement on the issue. Although most scientists are familiar with the issues, if you were a congressman and wanted an informed analysis of the problem, which of the following would be most likely to give you the most complete analysis? 12) _____
A) a meteorologist with knowledge of oceanography
B) a geologist with knowledge of astronomy
C) a physicist
D) an astronomer
- 13) Geologists primarily would study which phenomenon? 13) _____
A) clouds and precipitation B) rocks and minerals
C) marine life and ocean currents D) stars and galaxies
- 14) Oceanography includes a study of _____. 14) _____
A) ocean animals
B) the effect of oceans on climate
C) chemistry of sea water
D) the ocean floor
E) all of the above
- 15) A _____ is a well-tested and widely accepted view that best explains certain scientific observations. 15) _____
A) law B) hypothesis C) generalization D) theory
- 16) The primary goal of Earth Science is _____. 16) _____
A) to locate resources
B) to protect the environment
C) to identify the patterns in nature and use that information to predict the future
D) to develop things that will benefit mankind

- 24) Light elements like hydrogen and helium form a large percentage of the outer planets and Sun is made up primarily of hydrogen. Why are these elements nearly absent from the inner planets? 24) _____
 A) It is a mystery that has never been solved by science.
 B) The Sun captured all of the hydrogen during its formation.
 C) Hydrogen and helium have all been bound up by chemical reactions on the inner planets and are held in rock.
 D) These light elements are blown away from the inner planets by the solar wind.
- 25) Comets are made up primarily of _____. 25) _____
 A) frozen hydrogen
 B) iron-nickel alloys
 C) frozen water, carbon dioxide, and methane
 D) silicate minerals, like rocks on Earth
- 26) The Oort cloud is _____. 26) _____
 A) another name for the inner solar system, just before the Sun became hot enough for nuclear fusion
 B) an unusual type of cloud formed when meteorites strike Earth
 C) the outer solar system where planetesimals, rocky debris and comets orbit outside beyond the outer planets but cross into the inner solar system at times
 D) the asteroid belt
- 27) The circumference of Earth is about _____ km. 27) _____
 A) 10,000 B) 30,000 C) 20,000 D) 40,000
- 28) The _____ refers to the sum total of all life on Earth. 28) _____
 A) geosphere B) biosphere C) atmosphere D) hydrosphere
- 29) The _____ refers to the water-dominated parts of Earth. 29) _____
 A) atmosphere B) biosphere C) geosphere D) hydrosphere
- 30) The largest of Earth's spheres is the _____. 30) _____
 A) biosphere B) hydrosphere C) geosphere D) atmosphere
- 31) Soil belongs to the _____. 31) _____
 A) hydrosphere
 B) geosphere
 C) biosphere
 D) atmosphere
 E) All of the above
- 32) The exchange of energy between the surface of Earth, the atmosphere, and space causes _____. 32) _____
 A) topography B) glaciers C) weather D) temperature
- 33) Ocean surf wearing away rocks is an example of the interaction of which two of Earth's spheres? 33) _____
 A) biosphere and geosphere B) atmosphere and hydrosphere
 C) hydrosphere and geosphere D) biosphere and atmosphere

- 34) In correct order from the center outward, Earth includes which units? 34) _____
 A) inner core, outer core, mantle, crust B) core, crust, mantle, hydrosphere
 C) inner core, crust, mantle, hydrosphere D) core, inner mantle, outer mantle, crust
- 35) The composition of Earth's inner core is thought to be _____. 35) _____
 A) granite B) peridotite
 C) solid iron-nickel alloy D) basalt
- 36) The asthenosphere is part of the _____ of Earth. 36) _____
 A) inner core B) outer core C) mantle D) crust
- 37) The _____ is thought to be a liquid, metallic region in Earth's interior. 37) _____
 A) lithosphere B) outer core C) mantle D) inner core
- 38) The _____ is the thinnest layer of Earth. 38) _____
 A) outer core B) inner core C) crust D) mantle
- 39) The _____ forms the relatively cool, brittle tectonic plates. 39) _____
 A) eosphere B) astrosphere C) lithosphere D) asthenosphere
- 40) Which of the following energy sources is thought to drive the lateral motions of Earth's lithospheric plates? 40) _____
 A) swirling movements of the molten iron particles in the outer core
 B) electrical and magnetic fields localized in the inner core
 C) gravitational attractive forces of the Sun and Moon
 D) heat transfer between Earth's interior and the surface of Earth
- 41) Convergent plate boundaries are _____. 41) _____
 A) sites of supervolcanoes like Yellowstone
 B) sites where heat from Earth's interior is vented to the surface as volcanoes
 C) areas where two plates slide laterally past one another, generating earthquakes, like the San Andreas fault
 D) sites where oceanic plates descend beneath continental plates
- 42) Oceanic crust is generated at _____. 42) _____
 A) convergent plate margins B) hot spots on the sea floor, like Iceland
 C) spreading ridges D) transform plate margins
- 43) Continental shields and platforms represent _____. 43) _____
 A) sedimentary basins with inland seas shaped like a shield, like Hudson's bay
 B) sites where continents collide, analogous to warriors clashing shields
 C) areas in the interior of continents that have not experienced mountain building for billions of years
 D) names given to Paleozoic mountain belts
- 44) Which of the following layers in Earth has the highest density? 44) _____
 A) outer Core B) lower mantle C) lithosphere D) asthenosphere

- 45) The Andes Mountains in South America are formed as a result of _____. 45) _____
 A) subduction B) back-arc contraction
 C) continental collision D) sea floor spreading
- 46) The Himalayan Mountains and adjacent Tibet are a mountain system formed by _____. 46) _____
 A) subduction B) back-arc contraction
 C) continental collision D) sea floor spreading
- 47) Which of the following is a reasonable approximation of the rate that plates move? 47) _____
 A) the rate of growth of human hair or fingernails
 B) the speed of a mountain glacier
 C) the speed a turtle walks
 D) the speed of deep ocean currents
- 48) What two chemical elements are most abundant in the deep interior of Earth? 48) _____
 A) hydrogen and helium B) iron and magnesium
 C) silicon and oxygen D) magnesium and oxygen
- 49) A major cause of the differences in elevation between ocean basins and continents is _____. 49) _____
 A) mass B) temperature C) viscosity D) density
- 50) Ocean floor averages about _____ km depth below sea level. 50) _____
 A) 4 B) 8 C) 6 D) 2
- 51) Ocean crust is denser than continental crust because ocean crust is _____. 51) _____
 A) thicker than continental crust B) composed primarily of basalt
 C) composed primarily of granite D) thinner than continental crust
- 52) Flat, stable areas of continental crust tend to be located _____. 52) _____
 A) along coastlines
 B) near desert regions
 C) in areas that receive large amounts of rainfall
 D) in the interior of continents
- 53) Major mountain belts on Earth are _____. 53) _____
 A) made of granite because it is low density and allows for maximum growth
 B) older than smaller mountain belts because they have had enough time to grow large
 C) over 10 km high
 D) located around the Pacific Ocean
- 54) Shield areas in continental interiors are characterized by _____. 54) _____
 A) flat river valleys that cut through older mountain ranges
 B) ancient coastal regions that have become abandoned and eroded
 C) linear chains of mountains less than 100 million years old
 D) flat areas that include rocks older than 1 billion years old
- 55) Which of the following is not considered to be part of a typical ocean basin? 55) _____
 A) deep canyons B) a linear chain of volcanoes
 C) granitic intrusions D) large expanses of flat plains

- 56) Deep ocean trenches typically are not located adjacent to _____. 56) _____
A) transform plate boundaries B) young continental mountains
C) volcanic island arc chains D) abyssal plains
- 57) Long oceanic mountain chains typically are characterized by _____. 57) _____
A) rocks older than 1 billion years old B) highly deformed sedimentary rocks
C) layers of igneous rocks D) granitic plutons and batholiths
- 58) Active mountain belts are most likely to be found _____. 58) _____
A) along only the eastern margins of continents
B) scattered throughout continents
C) along the margins of continents
D) in the interior regions of continents
- 59) The continental shelf is located _____. 59) _____
A) between the continental slope and continental rise
B) landward of the continental slope
C) between the continental rise and the abyssal plains
D) seaward of the continental slope
- 60) The most prominent features on the ocean floor are the _____. 60) _____
A) seamounts B) oceanic ridges
C) deep-ocean trenches D) lava plateaus

61) Below is a picture of Mt. St. Helens volcano

61) _____



What is the usual cause for such events?

- A) interaction of the hydrosphere and the atmosphere
- B) location in earth's interior
- C) location near a plate boundary
- D) earthquakes

62) Below is a picture of an Appalachian mountain ridge and Himalayan mountain peaks (left and right, respectively). Why are the Appalachians so much smoother and lower than the Himalayan Mountains?

62) _____



- A) The Appalachian Mountains are younger and younger mountains tend to be more weathered.
- B) The Appalachian Mountains are older and thus have softer rocks.
- C) The Appalachian Mountains are younger and have not yet built up to being jagged.
- D) The Appalachian Mountains are older and thus have become more worn down.

63) A(n) _____ system is one in which energy moves freely in and out, but no matter enters or leaves the system.

63) _____

- A) closed
- B) equilibrated
- C) open
- D) feedback

64) Mechanisms that enhance or drive change are known as _____.

64) _____

- A) open feedback mechanisms
- B) closed feedback mechanisms
- C) negative feedback mechanisms
- D) positive feedback mechanisms

65) What is the source of the energy that powers the Earth system?

65) _____

- A) heat from Earth's interior
- B) the Sun
- C) both A and B
- D) none of the above

66) Which of the following is not a system?

66) _____

- A) soil, plants, rock, soil organisms, and animals
- B) the Pacific Ocean and the west coast of North America
- C) the study of minerals
- D) the biosphere

67) A mineralogist studies minerals and their origins. A mineralogist studying the Earth system would _____.

67) _____

- A) study how minerals influence organisms living on them, how they react with water to produce soil forming minerals, or study how wind transports minerals as dust and influences climate
- B) study how minerals form rocks
- C) do the same thing, studying minerals and their origins, as any other mineralogist
- D) Minerals can never be used to study the Earth system.

- 68) Examine the words and/or phrases below and determine the relationship among the majority of words/phrases. Choose the option that does not fit the pattern. 68) _____
 A) theory B) hypothesis C) fact D) observation
- 69) Examine the words and/or phrases below and determine the relationship among the majority of words/phrases. Choose the option that does not fit the pattern. 69) _____
 A) meteorites B) comets
 C) Oort cloud D) planetesimals
- 70) Examine the words and/or phrases below and determine the relationship among the majority of words/phrases. Choose the option that does not fit the pattern. 70) _____
 A) solid Earth B) atmosphere C) hydrosphere D) biosphere
- 71) Examine the words and/or phrases below and determine the relationship among the majority of words/phrases. Choose the option that does not fit the pattern. 71) _____
 A) mantle B) crust C) lithosphere D) core
- 72) Examine the words and/or phrases below and determine the relationship among the majority of words/phrases. Choose the option that does not fit the pattern. 72) _____
 A) shield B) mountain belt
 C) continental interior D) stable platform
- 73) Examine the words and/or phrases below and determine the relationship among the majority of words/phrases. Choose the option that does not fit the pattern. 73) _____
 A) seamount B) abyssal plain
 C) oceanic ridge D) continental crust
- 74) Examine the words and/or phrases below and determine the relationship among the majority of words/phrases. Choose the option that does not fit the pattern. 74) _____
 A) psychology
 B) astronomy
 C) geology
 D) oceanography
 E) meteorology
- 75) The vast majority of Earth scientists are involved in _____. 75) _____
 A) lobbying for alternative energy for profit
 B) focusing on only one earth science discipline with few connections to other Earth science disciplines.
 C) either extraction of mineral resources or energy
 D) exploring the features and process of Earth
- 76) Earth Science uses _____. 76) _____
 A) chemistry B) mathematics C) biology D) All of the above
- 77) Environmental science primarily focuses on any of the following except _____. 77) _____
 A) sustainable development B) water use
 C) air pollution D) mineral classification

- 78) Science is based on the assumption that nature behaves in a _____ and _____ manner. 78) _____
 A) consistent; predictable B) consistent; unpredictable
 C) inconsistent; unpredictable D) inconsistent; predictable
- 79) A scientific _____ is a tentative or untested explanation that is proposed to explain scientific observations. 79) _____
 A) law B) theory C) observation D) hypothesis
- 80) A scientific theory is the _____ step in developing an idea. It is _____ well tested. 80) _____
 A) first; very B) last; very C) first; not very D) last; not very
- 81) The "Big Bang" is an example of a _____. 81) _____
 A) law B) hypothesis C) theory D) observation
- 82) The formation of the solar system from a huge cloud of gases and dispersed particles is known as the _____. 82) _____
 A) Big Bang theory B) solar galactic hypothesis
 C) origin of species D) harmony of the heavens
- 83) According to the nebular theory, all of the bodies in the universe evolved from a rotating cloud of gases and dust about _____ billion years ago. 83) _____
 A) 2 B) 5 C) 12 D) 3
- 84) There are places on the deepest parts of the ocean where no _____ penetrates that support colonies of life. 84) _____
 A) sound B) energy C) water D) light
- 85) Oceans cover about _____ of Earth's surface. 85) _____
 A) 30 B) 97 C) 70 D) 90
- 86) The lithosphere and asthenosphere are layers of Earth defined by their _____. 86) _____
 A) strength B) heat C) composition D) biology
- 87) The earth is sometimes called "The Blue Planet" because the _____ appear(s) blue in sunlight. 87) _____
 A) overall surface of earth from space B) rivers
 C) atmosphere D) lakes
- 88) Internally, Earth consists of _____ shells with different compositions and densities. 88) _____
 A) circular B) rectangular C) hollow D) square
- 89) The asthenosphere is the _____ layer in the upper mantle that the plates move on. 89) _____
 A) all solid B) partially melted
 C) all liquid D) gaseous
- 90) Subduction zones are where _____ are descending. 90) _____
 A) magmas B) oceanic plates
 C) transform faults D) collisional mountain chairs

- 91) Earth's core is largely molten _____ and _____ and convection of this molten mass generates Earth's magnetic field. 91) _____
 A) nickel, iron B) oxygen, iron C) silicon, iron D) nickel, silicon
- 92) Subduction zones are regions of convergence and the overlying plate is made of _____ lithosphere. 92) _____
 A) liquid B) sedimentary C) oceanic D) continental
- 93) During the history of Earth there have been periods when all the continents were together in a supercontinent known as _____. 93) _____
 A) Gaia B) Tethys C) Pangaea D) Laurentia
- 94) The asthenosphere is a relatively _____ and rigid shell that _____ the lithosphere. 94) _____
 A) warm; underlies B) cool; underlies
 C) warm; overlies D) cool; overlies

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

- 95) Continents are, on average, about 2 km higher than sea level. 95) _____

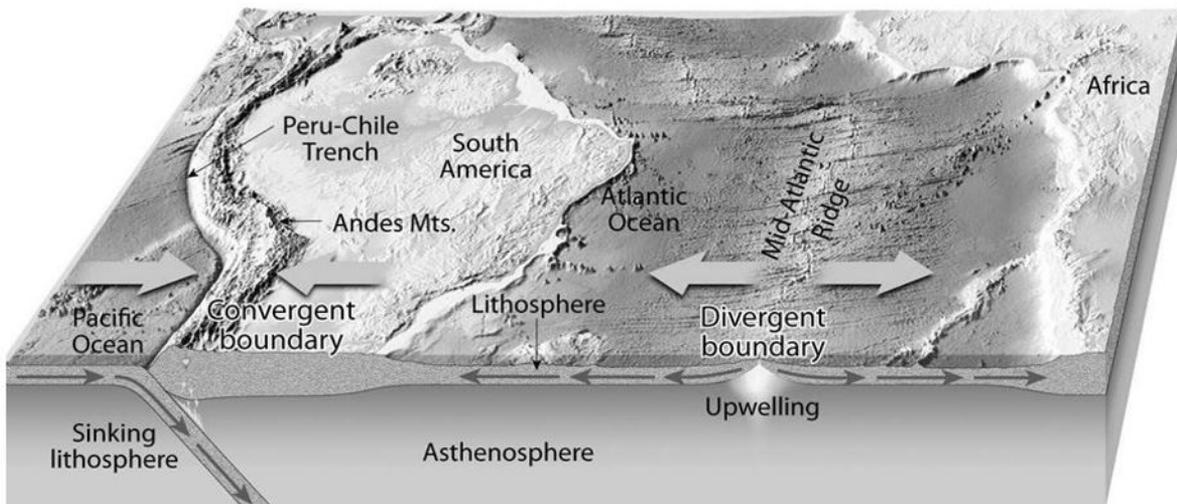
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 96) The waterline where the ocean meets the land is the boundary between _____. 96) _____
 A) continental crust and oceanic crust B) mid-ocean ridge and subduction zone
 C) dry land and submerged land D) all of the above
- 97) Shields and stable platforms are typically found in the _____ regions of a continent. 97) _____
 A) subsurface B) interior C) exterior D) atmospheric
- 98) Humans are _____ the Earth System _____ Earth's environment in a major way. 98) _____
 A) part of; and affect B) part of; but do not affect
 C) not part of; but affect D) not part of; and do not affect
- 99) In an open system energy and matter flow _____ of the system. 99) _____
 A) not into but out B) into and out
 C) not into and not out D) into but not out
- 100) The two broad, traditional subject areas of geologic study are _____. 100) _____
 A) physical and historical geology B) structural geology and sedimentology
 C) mineralogy and igneous petrology D) None of the above
- 101) The thin, outer layer of Earth, from 7 to 40 km in thickness, is called the _____. 101) _____
 A) core B) crust C) lithosphere D) mantle
- 102) The _____ is the relatively rigid zone above the asthenosphere that includes the crust and upper mantle. 102) _____
 A) core B) crust C) lithosphere D) mantle
- 103) The _____ is the solid, rocky shell between the crust and outer core. 103) _____
 A) core B) crust C) lithosphere D) mantle

- 104) The convective flow of liquid, metallic iron in the _____ is thought to generate Earth's magnetic field. 104) _____
 A) inner core B) asthenosphere C) outer core D) lithosphere
- 105) Moving from the shoreline towards the deep-ocean basin, the first part of the continental margin you would encounter would be the continental _____. 105) _____
 A) trench B) shelf C) slope D) rise
- 106) The _____ are the most prominent feature on the ocean floor. 106) _____
 A) seamounts B) sediment cores
 C) abyssal mounds D) mid-ocean ridges

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

- 107) Earth's physical environment is traditionally divided in the hydrosphere, atmosphere, and the solid Earth. Remembering the scientific method, why do you think that scientists tend to categorize and classify various features, phenomena, and characteristics of the natural world into groups or subdivisions? Also, are there potential pitfalls or problems if we only consider the natural world as individual groups or categories rather than as a whole?
- 108) What is the relationship of the dense oceanic crust that is produced at a divergent plate boundary to the convergence or collision of an oceanic plate and a continental plate, such as the western margin of South America in the diagram below?



109) Below is a picture of water striking rocks at a coastline.



Describe which of Earth's "spheres" are interacting here, and some of the effects that may be caused by this intera

Answer Key

Testname: UNTITLED1

- 1) C
- 2) B
- 3) E
- 4) D
- 5) A
- 6) A
- 7) B
- 8) D
- 9) C
- 10) A
- 11) D
- 12) A
- 13) B
- 14) E
- 15) D
- 16) C
- 17) A
- 18) A
- 19) C
- 20) C
- 21) D
- 22) B
- 23) B
- 24) D
- 25) C
- 26) C
- 27) D
- 28) B
- 29) D
- 30) C
- 31) E
- 32) C
- 33) C
- 34) A
- 35) C
- 36) C
- 37) B
- 38) C
- 39) C
- 40) D
- 41) D
- 42) C
- 43) C
- 44) A
- 45) A
- 46) C
- 47) A
- 48) B
- 49) D
- 50) A

Answer Key

Testname: UNTITLED1

- 51) B
- 52) D
- 53) D
- 54) D
- 55) C
- 56) A
- 57) C
- 58) C
- 59) B
- 60) B
- 61) A
- 62) D
- 63) A
- 64) D
- 65) C
- 66) C
- 67) A
- 68) C
- 69) C
- 70) C
- 71) C
- 72) B
- 73) D
- 74) A
- 75) C
- 76) D
- 77) D
- 78) A
- 79) B
- 80) B
- 81) C
- 82) B
- 83) B
- 84) D
- 85) C
- 86) A
- 87) A
- 88) A
- 89) B
- 90) B
- 91) A
- 92) D
- 93) C
- 94) A
- 95) FALSE
- 96) C
- 97) B
- 98) A
- 99) B
- 100) A

Answer Key

Testname: UNTITLED1

101) B

102) C

103) D

104) C

105) B

106) D

107) Categorizing and classifying is a way of cataloging the differences and similarities between things. We put items that are mostly similar into the same broad groups and separate items that are mostly different. From this system, we can begin to study why things are similar and what is the significance of the differences and that helps us to get to the basic processes that are of scientific interest. The pitfalls or problems are that we may not recognize similarities in objects that have been classified as different and vice versa. Also, we are likely to miss the interactions between different groups and the processes that cause those interactions when we focus on classifying things.

108) The dense oceanic crust sinks underneath the more buoyant continental crust at this type of convergent plate boundary.

109) Student may say that the hydrosphere (surf) and geosphere (rocks) are interacting. They may also involve the atmosphere, as its energy is driving the force of the waves. Less commonly they may invoke the biosphere, noting that the rocks may be made from the shells of organisms. In terms of the effects, they could note that the surf energy will diminish when it hits the land, but erosion may occur as a result of the surf hitting land.