



Exploring the World of Science

2020

Dynamic planet test

By Kira Gottlieb

Team number _____

Name(s) _____

School _____

Total score- /125

Part 1- / 55

Part 2- / 15

Part 3- / 25

Part 4- /20

Part 5- /10

Part 1

Circle the correct answer.

1. Short wave radiation emits what wavelength on the electromagnetic spectrum?
 - a. Visible
 - b. Ultraviolet
 - c. Infrared
 - d. radio
2. Sea water contains about what percent of salts?
 - a. 10%
 - b. 1.5%
 - c. 2.5%
 - d. 7.5%
3. What are the 6 most abundant ions in seawater?
 - a. chloride, sodium, sulfate, carbon, calcium, and potassium
 - b. Boron, sodium, sulfate, magnesium, calcium, and potassium
 - c. chloride, sodium, sulfate, magnesium, calcium, and potassium
 - d. chloride, boron, sulfate, bromide, calcium, and carbon
4. Is the ocean crust older than the continental crust?
 - a. Yes
 - b. No
 - c. Around the same age
5. The gravitational force of what 2 things affect tides?
 - a. Earth, moon
 - b. Sun, moon
 - c. Stars, earth
 - d. Earth, sun
6. Are neap tides stronger, weaker, or around the same power as spring tides?
 - a. Stronger
 - b. Weaker
 - c. Around the same
7. Long wave radiation emits what wavelength on the electromagnetic spectrum?
 - a. Radio
 - b. Visible
 - c. Infrared

- d. ultraviolet
-
- 8. Which of the 4 types of tides is not created by astronomical forces?
 - a. Meteorological tides
 - b. Mixed tides
 - c. Diurnal tides
 - d. Semi diurnal tides
 - 9. What is an ebb current?
 - a. Offshore flows of water found at beaches where waves break across the surf zone
 - b. A flow of water going east to west usually found near rivers with waterfalls nearby
 - c. when the tide is advancing and the current is weakening
 - d. when the tide is receding and the current is directed back out to sea
 - 10. Which of the following are known to produce Volcanoes?
 - a. Barrier reef eruptions
 - b. Unstable mountains
 - c. mid-ocean ridges
 - d. Hydrothermal vents
 - 11. Which of the following answers has the highest tidal resonance?
 - a. Gulf of Mexico
 - b. Bay of Fundy
 - c. The Venetian Lagoon
 - d. The Mariana Trench
 - 12. How many different types of ocean currents are there?
 - a. 3
 - b. 7
 - c. 2
 - d. 4
 - 13. How are deep ocean currents caused?
 - a. by a large amount of sinking surface water
 - b. By upwelling
 - c. By oceanic crust disturbances
 - d. By the Coriolis effect
 - 14. What are rip currents?
 - a. Offshore flows of water found at beaches where waves break across the surf zone

- b. A flow of water going east to west usually found near rivers with waterfalls nearby
 - c. when the tide is advancing and the current is weakening
 - d. when the tide is receding and the current is directed back out to sea
15. What is a gyre?
- a. A whirlpool that forms near or in the surf zone
 - b. A circular pattern of currents in an ocean basin
 - c. A place where the river meets the ocean
 - d. The middle of an isthmus, where it is the thinnest
16. Which of the following is an example of the Coriolis effect?
- a. Coral slowly bleaching in the water over time
 - b. Waves breaking when they hit shore
 - c. Rocks being turned into sand overtime
 - d. hurricane winds turning left in the Northern hemisphere
17. How many major oceanic gyres are there?
- a. 31
 - b. 26
 - c. 5
 - d. 8
18. When does upwelling happen?
- a. when wind moves warm, nutrient-poor water, prompting it to be replaced by cooler, nutrient rich water
 - b. When water is displaced and due to disturbances and the ecosystem fails to thrive
 - c. When the water gets very polluted and the top water starts to sink and bring clean water up
 - d. When murky water meets fresh water and they mix
19. What growth does coastal upwelling directly support?
- a. Sharks
 - b. Seaweed and plankton
 - c. Coral
 - d. all of the above
20. What is the place where freshwater from rivers and streams mixes with salt water from the oceans called?
- a. Lagoon
 - b. doldrums

- c. Estuary
- d. Mixing zone

21. How many types of physical estuaries are there?
- a. 5
 - b. 4
 - c. 3
 - d. 6
22. What is the range of saltwater pH?
- a. 3.7-4.6
 - b. 9.2-10.1
 - c. 7.5-8.4
 - d. 6.5-7.5
23. When water evaporates the concentration of what in the water increases?
- a. Salt
 - b. Sand
 - c. Water
 - d. All of the above
24. An elevated landform rising from the bottom of the ocean that has a flat top is also known as what?
- a. Stack
 - b. Skerry
 - c. Guyot
 - d. tombolo
25. If you live in a place that has diurnal tides how many times a day is there high tide water?
- a. 4
 - b. 3
 - c. 2
 - d. 1
26. What is the difference between mixed and semidiurnal tides?
- a. They are the same thing
 - b. One of these tides occurs the ocean and the other one occurs in a sea
 - c. One has more high tides in a day than the other
 - d. One of these tides rises and falls at the same levels but the other one rises and falls at unequal levels
27. Deep water currents make up what percent of the ocean currents in volume?
- a. 75%

- b. 10%
 - c. 90%
 - d. 25%
28. What does it mean to be isopycnal?
- a. A place where there is equal salinity
 - b. A place where there is equal density
 - c. A place where the density changes quickly
 - d. A place where the salinity changes quickly
29. Around how much do branching coral grow a year?
- a. 2 cm
 - b. 100 cm
 - c. 50 cm
 - d. 10 cm
30. Which of the following influence the chemical composition of seawater?
- a. Rivers
 - b. Organisms
 - c. Hydrothermal solutions
 - d. All of the above
31. What was formed when glaciers deepened and widened existing river valleys so that they become U-shaped in cross-sections?
- a. Fjord
 - b. Valley
 - c. Delta
 - d. Arch
32. Which type of estuary is commonly found in tropical and subtropical locations?
- a. Coastal plain
 - b. Bar-built
 - c. Salt wedge
 - d. Drowned river valleys
33. What type of estuary is also known as coastal plain estuary?
- a. tectonic
 - b. Bar-built
 - c. Salt wedge
 - d. Drowned river valleys
34. How many types of plate boundaries are there?
- a. 7
 - b. 4

c. 3

d. 5

35. Ocean-ocean convergence can cause what?

a. The formation of coral reefs

b. Earthquakes and tsunamis to form

c. Rip currents to form

d. All of the above

36. Is oceanic or coastal crust denser?

a. Oceanic

b. Coastal

c. Around the same

37. What is the "Ring of Fire?"

a. Subduction zones that occur all around the edge of the Pacific Ocean

b. Subduction zones that occur all around the edge of the Atlantic Ocean

c. Subduction zones that occur all around the edge of the Indian ocean

d. Subduction zones that occur all around the edge of the arctic ocean

38. When 2 of the same crusts collide, like continent-continent convergence, there is a possibility that they will not subduct but they will what?

a. Explode

b. Do nothing

c. upheave

d. All of the above

39. How are waves created?

a. By the energy Passing through the water

b. By the wind wind blowing the water

c. By something disturbing the stillness

d. All of the above

40. A series of long waves that are created far from shore in deeper water is also known as what?

a. Wave chain

b. Long wave group

c. Storm surge

d. Storming wave cluster

41. How is wave speed determined?

a. Dividing the wave period by the wavelength

- b. Dividing the wave period by wave crest
 - c. Dividing wave crest by wavelength
 - d. Dividing wavelength by the wave period
42. What is the opposite of a wave crest?
- a. Wave trough
 - b. Wavelength
 - c. Wave height
 - d. Wave period
43. How many types of surf breaks are there?
- a. 5
 - b. 4
 - c. 7
 - d. 3
44. A region where waves break is called a...
- a. Break zone
 - b. Surf zone
 - c. Crash region
 - d. Crash zone
45. The steep, vertical section of a breaking wave is called a...
- a. Face
 - b. Lift
 - c. Ramp
 - d. cliff
46. Which of the following is the smallest wave?
- a. Chop
 - b. standing wave
 - c. Capillary waves
 - d. swell
47. Which of the following causes tsunamis?
- a. Submarine landslides
 - b. Big whales jumping
 - c. Whirlpools
 - d. None of the above
48. Who developed the reef classification system?
- a. Isaac Newton
 - b. John Reefington

- c. Robert Ballard
- d. Charles Darwin

49. What are the 2 main types of patch reefs?

- a. Lagoon and estuary
- b. Irregular and standard
- c. Circular and rhomboid
- d. Deep water and surface

50. How many types of reefs are there?

- a. 2
- b. 5
- c. 3
- d. 4

51. What is a scientific term that describes the fluctuations in temperature between the ocean and atmosphere in the east-central Equatorial Pacific?

- a. ENSO cycle
- b. ECEP thermo
- c. Niña/Niño monitor
- d. thermoflux

52. La Niña is caused by...

- a. A build-up of warmer-than-normal waters in the tropical Pacific
- b. A build-up of cooler-than-normal waters in the tropical Atlantic
- c. A build-up of cooler-than-normal waters in the tropical Pacific
- d. A build-up of cooler-than-normal waters in the tropical atlantic

53. Ocean currents in the northern hemisphere tend to go which way?

- a. clockwise
- b. counterclockwise
- c. It is completely random
- d. Towards the equator

54. The ocean is divided into three horizontal depth zones, which one is in the middle?

- a. Mixed layer
- b. Pycnocline
- c. Deep layer

55. Which type of estuary is semi isolated from ocean waters?

- a. Salt wedge

- b. Drowned river valley
- c. Tectonic
- d. Bar-built

Part 2

Match definition to word. Put the number of the definition near the matching word.

1. The underwater equivalent of topography; the measurement of the depth of water large, non-flowing bodies of water
2. The part of the underwater continental margin farthest from the shore
3. When a source of wave energy is in motion, the waves get scrunched up in the direction that the source is moving and more spread out in the direction opposite of the direction that the source is moving.
4. This is a powerful current in the Atlantic Ocean. It starts in the Gulf of Mexico and flows into the Atlantic at the tip of Florida, crashing into (and therefore accelerating along) the eastern coastlines of the United States and Newfoundland and delivering warm water to Northwestern Europe.
5. A temporary disturbance or oscillation in the water level of a lake or partially enclosed body of water, especially one caused by changes in atmospheric pressure. A seiche is a standing wave in an enclosed or partially enclosed body of water. Seiches and seiche-related phenomena have been observed on lakes, reservoirs, swimming pools, bays, harbours and seas.
6. Where one tectonic plate slides beneath another, in a process called subduction
7. this is a deposition landform in which an island is attached to the mainland by a narrow piece of land such as a spit or bar.
8. A naturally occurring material that is broken down by processes of weathering and erosion, and is subsequently transported by the action of wind, water, or ice or by the force of gravity acting on the particles. This is solid material that is moved and deposited in a new location. This can consist of rocks and minerals, as well as the remains of plants and animals.
9. Produced below waves when waves erode headland
10. This area of a beach extends from the limit of high water foam lines to dunes or extreme inland limit of the beach. It is only affected by waves during exceptional

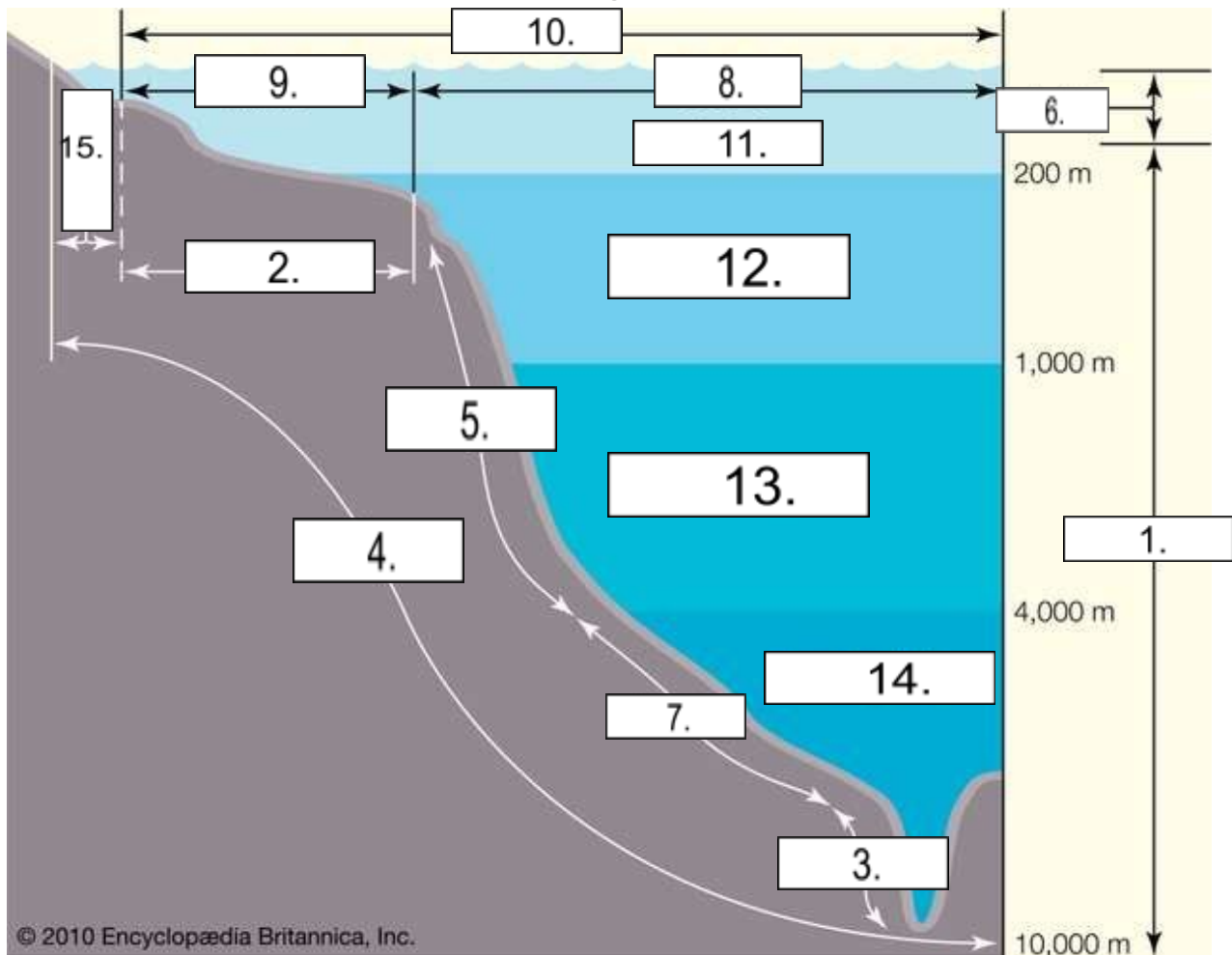
high tides or severe storms. Sediments in this area are well-sorted and well-rounded.

11. Occurring on continental slopes. They are incised into all continental margins and act as conduits for the transfer of sediment from the continents to the deep sea.
12. This is a geological landform consisting of a steep and often vertical column or columns of rock in the sea near a coast, formed by wave erosion. These are formed over time by wind and water, processes of coastal geomorphology.
13. A small rocky island, usually too small for human habitation. It may simply be a rocky reef. A skerry can also be called a low sea stack. This place may have vegetative life such as moss and small, hardy grasses.
14. Sedimentary deposit at the foot of a submarine canyon caused by direct conduction of terrigenous (land) sediment to the seafloor. May be made of loose sediment or sedimentary rock.
15. A feature that is formed through deposition of material at coastlines. The process of longshore drift occurs and this moves material along the coastline.

1. Sediment___8
2. Submarine canyon___11
3. Tombolo___7
4. Doppler effect___3
5. Spit___15
6. Seiche___5
7. Gulf stream___4
8. Ocean trench___6
9. Deep sea fan___14
10. Bathymetry___1
11. Stack___12
12. Wave cut bench___9
13. Skerry___13
14. Continental rise___2
15. backshore___10

Part 3

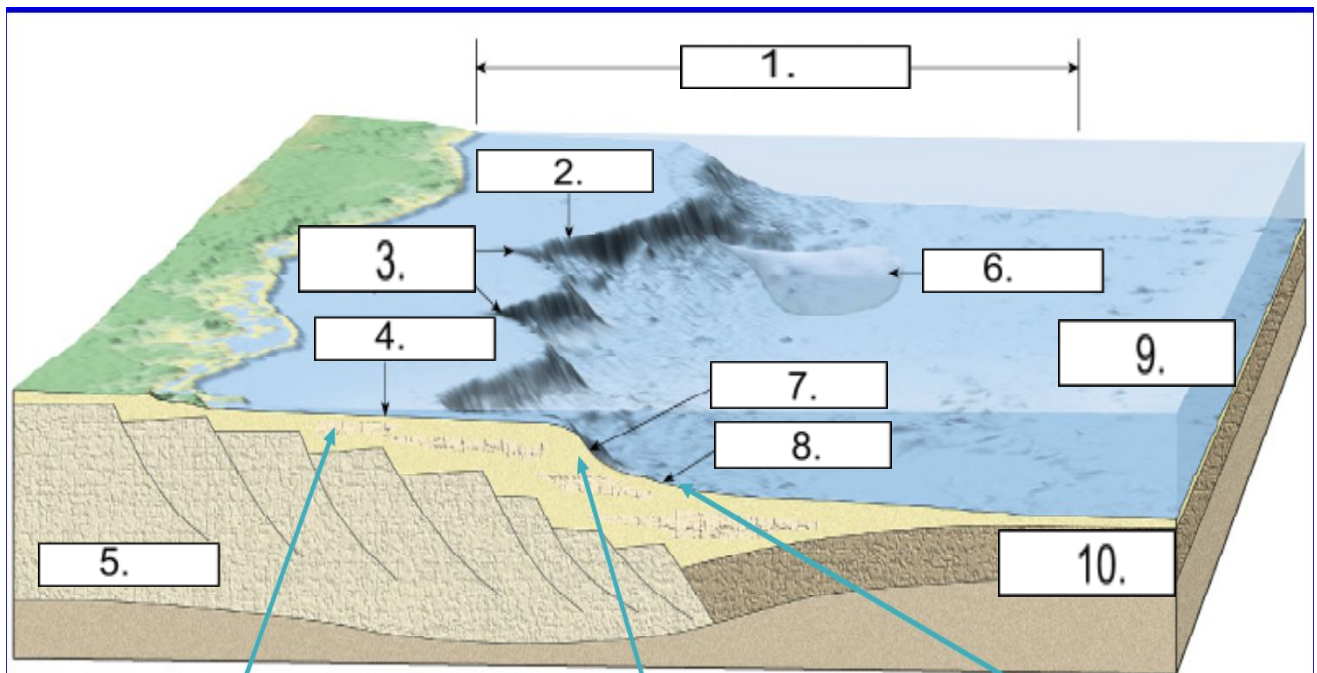
Label the diagrams below.



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- 1. aphotic
- 2. Sublittoral
- 3. hadal
- 4. Benthic
- 5. Bathyal

- 6. Photic
- 7. Abyssal
- 8. Oceanic
- 9. Neritic
- 10. Pelagic
- 11. Epipelagic
- 12. Mesopelagic
- 13. Bathypelagic
- 14. Abyssal pelagic
- 15. Littoral



- 1. Continental margin
- 2. Shelf break
- 3. Submarine canyons
- 4. Continental shelf
- 5. Continental crust
- 6. Deep sea fan

7. Continental slope

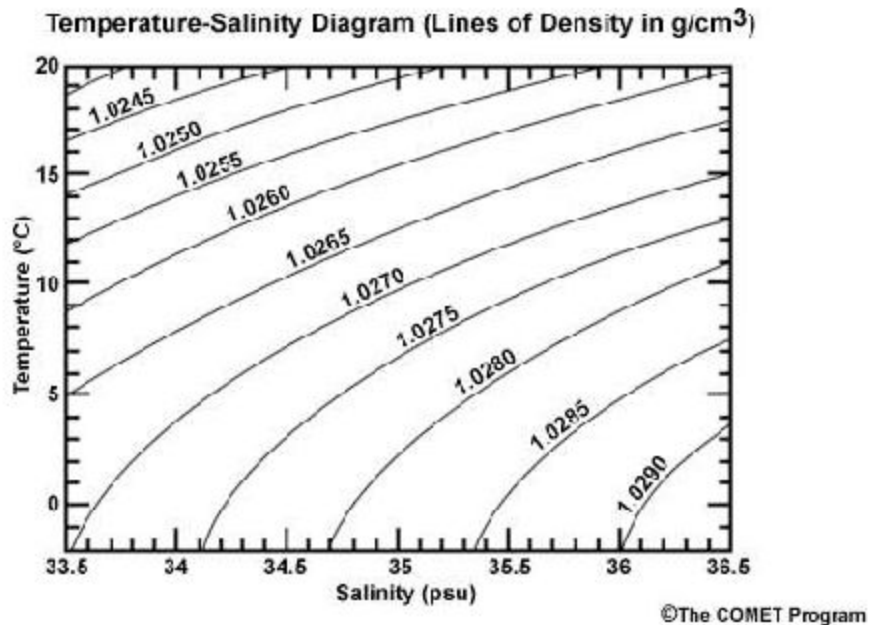
8. Continental rise

9. Abyssal plain

10. Oceanic crust

Part 4

Fill in the blanks to make the below statements true. Use the chart below to help answer these questions.



1. The temperature is 15 and the salinity is 35 so the density is 1.0260
2. The temperature is 0 and the salinity is 36.1 so the density is 1.0290
3. The temperature is 5 and the salinity is 33.5 so the density is 1.0265
4. The temperature is 5 and the salinity is 36 so the density is 1.0285
5. The temperature is 20 and the salinity is 34.5 so the density is 1.0245
6. The temperature is 15 and the salinity is 36.5 so the density is 1.0270
7. The temperature is 12 and the salinity is 36 so the density is 1.0275
8. The temperature is 3 and the salinity is 36.4 so the density is 1.0290
9. The temperature is 17 and the salinity is 35.6 so the density is 1.0260
10. The temperature is 14 and the salinity is 33.5 so the density is 1.0250

Part 5

Answer the following math questions with number answers.

1. Tim is trying to calculate wave frequency. He knows that the wave period is 67 and that the wave height is 13. Identify the frequency of the wave.

1/67

2. Lila is trying to crack the code to the safe. In order to open the safe she needs to find the velocity of the wave. She was given one hint for the code of the safe. The hint was that the wave has a wavelength of 350, a wave height of 35, and a wave period of 50. What is the code to the safe?

7

3. What is the wave steepness of a wave with a wave height of 37, wavelength of 22, and a wave frequency of 74?

37:22 or 37/22 or 37to22

4. What is the wave frequency of a wave with a wave height of 48 and a wave period of 21?

1/21

5. What is the wave speed of a wave with a wave height of 71, a wavelength of 36, and a wave period of 93?

36/93

