

Personnel: Reader
Person to Reset Buzzer
Score Keeper (As ticks: TTTT II)

IF POSSIBLE, USE A BUZZER SYSTEM SUCH AS THOSE USED ON THE TELEVISION GAME, JEOPARDY.

Rules of the game:

1. The class will be split into two teams. (Boys & Girls, Left & Right sides, etc.)
2. When you are able answer a question, push the buzzer or raise your hand.
3. Do not answer until you are recognized by the announcer.
4. No conferring or helping other team members until the other team has had a chance to answer.
5. In case of a wrong answer, or an answer given before recognition by the reader, the opposing team may have the whole question repeated for their benefit.
6. Penalties for misuse of the buzzers will increase with time.
7. 1 point for questions 1-30, 2 points each for 31-50.

Questions:

1. What was the original name for Plate Tectonics, popular until the 1960s? (Continental Drift)
2. Who first published an important scientific paper on continental drift in 1912? (Alfred Wegener)
3. Why did most Earth scientists reject continental drift as proposed by Alfred Wegener?
(Either a. Continents can't plow through solid rock.
or, b. Wegener was not trained as a geologist., etc.)
4. What feature of this theory was observed and published by Sir Francis Bacon in 1620? (Parallel Shore Lines)
5. What name has been given to the rigid parts of Earth's surface that move as a single piece? (Plates)
6. **(Multiple Choice)** About how fast do most plates move with respect to one another?
a. 1 inch per minute, b. 1 inch per day, c. 1 inch per year, d. 1 inch per century (C)

7. What form of heat flow drives the motions of the crustal plates? (Convection)
8. Paleontologist Alexander du Toit supported the idea of continental drift because he found similar fossils on what two continents? (South America and Africa)
9. **(Multiple Choice)** Approximately how old is the Atlantic Ocean?
 a. 2 million years b. 200 million years c. 2 billion years d. 200 billion years (B)
10. What are the “zebra stripes”? (Bands of Normal and Reversed Polarity adjacent to the spreading ridges)
11. What name is applied to the disappearance of crustal plates into the Earth? (Subduction)
12. What feature, found on bedrock surfaces in tropical Africa and India, indicate a much colder climate in the geological past? (Glacial Striations)
13. What is the longest, but not the highest, mountain range on Earth? (Hint: It’s mostly under water.) (The Ocean Ridges)
14. In what decade did the theory of the moving continents become widely accepted by geologists? (the 1960s)
15. What characteristic of heated rock within the Earth causes it to rise toward the surface? (Low Density)
16. How does igneous rock become permanently magnetized? (By cooling within Earth’s magnetic field)
17. What ocean is surrounded by a zone of crustal activity? (the Pacific)
18. The deepest place in the oceans of the world is the Challenger Deep in the Mariana Islands region south of Japan. What geographic name is applied to this type of feature? (Ocean Trench or Subduction Zone)
19. What surprising rock type was discovered in Antarctica, supporting the idea of the drifting continents? (Coal)
20. Name the super-continent that broke apart to form the Atlantic Ocean? (Pangaea or Gondwanaland)
21. Why don’t the granitic rocks of the continents descend into the Earth in the subduction zones? (They are too low in density)

22. By training, what was Alfred Wegener's main area of scientific expertise? (Astronomy, Climatology and/or Meteorology)
23. What is the modern name for "continental drift"? (Plate Tectonics)
24. The Himalayas are a result of a collision between what two land masses? (India and Asia)
25. What two large American cities are being moved closer together by plate motions? (San Francisco & L.A.)
26. Which continent has *not* been attached to any other continent for the longest period of time? (Australia or Antarctica)
27. What continent was adjacent to the East Coast of the United States before the Atlantic Ocean opened? (Africa)
28. What fault separates the North American plate from the Pacific plate? (San Andreas)
29. What natural disaster occurs when the plates move past each other too quickly? (Earthquake)
30. Where do the crustal plates grow larger? (Ocean Ridges or Rift Zones)

THE FOLLOWING ANSWERS ARE WORTH *TWICE* AS MANY POINTS.

31. Define "diverging." Moving apart
32. What change in Earth's core causes the zebra stripe pattern at the ocean ridges? (convection motions in the outer core)
33. What New York university played a central role in research leading to the theory of Plate Tectonics? (Columbia University)
34. Iceland is located along what plate tectonic feature? (the Mid-Atlantic Ridge)
35. What state of the United States is being made larger, in part, by plate motions? (Hawaii)
36. Where do the deepest earthquakes occur? (Subduction Zones or Ocean Trenches)

37. In what direction is the North American plate moving? (West or Northwest)
38. Along what linear plate tectonic feature is Earth's heat escaping fastest? (the Mid-Ocean Ridges)
39. What mountain range is being created as the Pacific and Nazca plates slide beneath South America? (The Andes)
40. What is the most common rock type in the oceanic crust? (Basalt)
41. Where is Earth's crust the thickest? (On the Continents or in the Mountains)
42. Where are the oldest sediments in the ocean found? (Near the Continents, Away From the Ridges)
43. What part of the crustal plates have the *fewest* earthquakes? (The Centers)
44. Is granite more, or less, dense than basalt? (Less Dense)
45. Is New York State now located at the edge of a crustal plate, or near the center? (Near the Center)
46. What causes Earth's magnetic field? (Convection Currents within the Outer Core)
47. In what direction is Africa moving relative to North and South America? (East)
48. Name a body of water that is just beginning to open as a result of plate motions. (the Red Sea)
49. What word, often used in reference to continental drift, means "the natural dynamic process of mountain building"? (Tectonic)

(Go to additional questions?)

50. **(Multiple Choice)** Approximately how much wider is the Atlantic Ocean today, than it was when Columbus made his first voyage to the New World in 1492?
- | | |
|--------------------|-------------------|
| (A) 15 millimeters | (C) 15 meters |
| (B) 15 centimeters | (D) 15 kilometers |

(Tie Breaker) Name any scientist, other than Alfred Wegener, who was a principal contributor to the paradigm of Plate Tectonics.

Additional Questions

51. What continent may be splitting apart at the “Great Rift Valley”? (Africa)
52. What word describes the rifting motion of the plates at the ocean ridges?
(HINT: It starts with the letter “d” and means pulling apart.) (diverging)
53. Name any city that is relatively close to a transform plate boundary.
(Los Angeles, San Francisco, etc.)
54. Name any city that is relatively close to a subducting plate boundary.
(Lima,, Peru; Anchorage, etc.)
55. Name any city that is relatively close to a diverging plate boundary. (Rejkivik, etc)

New York State Earth Science Reference Tables Questions

(2001 Tables can be downloaded from the NYS Education Department Web site:
<http://www.emsc.nysed.gov/ciai/testing/reftable.html>

56. According to the Reference Tables, what is the density of Earth’s core?
(Hint: You must include metric units.) (10-15 g/cm³)
57. What plate is Great Britain located on? (Eurasian)
58. What do the thick lines on the tectonic world map on page 5 represent? (Subduction Zones)
59. What name(s) are applied to the outermost layer of the Earth? (Crust and Lithosphere)
60. Which two major layers of the Earth have the same composition? (Outer and Inner Cores)
61. If an earthquake occurs at 11:30 am, when will the first
P-waves be detected at a station 4000 km away? (11:37 am)
62. What terrestrial coordinate of this place is changing
fastest as a result of motion of our tectonic plate? (Longitude)
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63. - ??? Ask students to identify features on a diagram showing plate tectonic features.