Read *Shape-shifting supercontinents* and answer questions 33 to 39.

Shape-shifting supercontinents

Many people perceive *terra firma* to be immovable, dependable and permanent. However reassuring this perception may be, it is false. The continents are in a state of flux driven by enormous convection forces within Earth's mantle. Far from being static, the continents are actually mobile 'rafts' of rock, somewhat analogous to the 'skin' that forms on top of soup as it cools. Earth's crust is actually a series of interlocking continental and oceanic plates with an average thickness of 100 kilometres. The plates 'float' on a flexible and ductile layer. Oceanic plates are denser, thinner and younger than continental plates.

Figure 1 shows the main interactions between crustal plates. The edges of some oceanic crustal plates are continually being destroyed as they subduct beneath other crustal plates. Where oceanic plates meet continental plates they form vast mountain chains, such as the Andes. Where oceanic plates meet other oceanic plates, volcanic archipelagos such as Indonesia occur. Where two continental plates collide, they crumple like vehicles to create mountain ranges such as the Himalayas and high plateaus such as the Tibetan Plateau. The movement of crustal plates most visibly manifests itself as volcanoes, earthquakes and tsunamis, which have wreaked havoc on humans throughout history. However dramatic, all this is merely the crustal plates flexing and stretching as they shape-shift the continents.

Geologists have theorised that continents merge to form new supercontinents every few hundred million years in what they refer to as the supercontinent cycle. Eventually each

33. What does the writer do in the first two sentences to engage readers' attention?

(A) use an analogy to explain a difficult concept
(B) refer to conflicting scientific theories
(C) challenge a common misconception
(D) match a perception with geological evidence

34. According to the text, what causes the movement of crustal plates?

(A) the convection forces within the mantle
(B) the activities of volcanoes, earthquakes and tsunamis
(C) the relative position of the continents and oceans
(D) the orbit of Earth around the Sun

35. The volcanic mountains represented in the first diagram of Figure 1 are most likely to be part of

(A) an archipelago such as Indonesia.
(B) a mountain chain such as the Andes.
(C) a mountain range such as the Himalayas.
(D) an elevated plateau such as the Tibetan Plateau.

36. Which of these is **NOT** an accurate description of Earth's crustal plates?

(A) Oceanic crustal plates are subducted under continental crustal plates because they have a lower density.
(B) The edges of some crustal plates are dynamic places where new crust may be created and old crust destroyed.
(C) The interactions between adjoining crustal plates can produce volcanoes and mountain ranges.
(D) Continental crustal plates have a greater thickness and age than oceanic crustal plates.

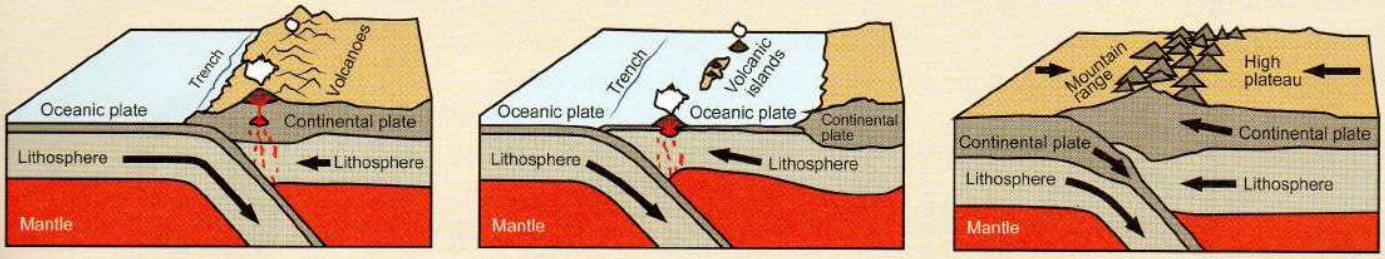

Figure 1: Three scenarios where crustal plates meet

supercontinent disintegrates along major fault lines and large fragments drift away to form new continents and oceans. Sea floor spreading results from the movement of crustal plates. The continual oozing of new oceanic crust at mid-oceanic ridges acts like a conveyor belt pushing older crust further apart.

The supercontinent cycle is a slow-motion dance of Earth's crustal plates that started when the surface of the planet first solidified. Some of the earliest supercontinents were Colombia, Rodinia and Pannotia. The most recent supercontinent, centred on modern-day Africa, was Pangaea. It began to fragment approximately 200 million years ago at the start of the Jurassic Period. The next predicted supercontinent has been called Amasia, based on the geological fusing of North and South America with Asia. According to a new model proposed by a team of geologists led by Ross Mitchell from Yale University, Amasia is predicted to form around the Arctic Ocean in approximately 100 million years.

Traditionally, geologists have predicted the location of supercontinents using two models: 'introversion' which predicts that new supercontinents form in the same place as the previous ones, and 'extroversion' which predicts that new supercontinents form on the opposite side of the planet. Both models have been challenged by Mitchell's team. Their research, published in *Nature* (February 2012), proved that the geological evidence in ancient rocks from multiple locations did not match the predictions made by the traditional models. As a result, they proposed an alternative model called 'orthoversion' which predicts an intermediate location between that predicted by the two traditional models.

As Earth whirls on its annual waltz around the Sun, it is sobering to reflect that the continents are also engaged in their own slow-motion tango across its surface. And all the while, many people are oblivious to the shape-shifting nature of the lumps of rock on which we live.

37. According to the text, geologists have theorised that new supercontinents develop

(A) when the formation of new crust has gained enough momentum.
(B) after a period of intense volcanic activity.
(C) during times of accelerated drifting of the continents.
(D) as part of a regular pattern of events.

38. What is the main purpose of the second last paragraph?

(A) to outline the evidence for an alternative model that predicts the location of supercontinents
(B) to describe the two traditional models that predict the location of supercontinents
(C) to question the importance of continual research
(D) to dispute the research findings of Mitchell's team

39. Which option matches the imagery from the text with its purpose?

	Imagery	Purpose
(A)	soup	to highlight the power of the forces moving the crustal plates
(B)	vehicle collision	to explain the structure of crustal plates
(C)	conveyor belt	to detail the nature of the two types of crustal plates
(D)	dance	to describe the interactions of the crustal plates