

C1 - Chemistry of the Earth

1. How can nitrogen, hydrogen, carbon monoxide and form amino acids?

Nitrogen and hydrogen can form ammonia; carbon monoxide and hydrogen can form methane and water; methane, ammonia and water formed amino acids in the Urey-Miller experiment.

2. Why don't scientists know for sure how life began?

Because no one was around when the first organisms formed.

3. What causes the amount of carbon dioxide to increase rapidly?

Increased burning of fossil fuel, deforestation.

4. What do we mean by 'locked up carbon'?

Carbon dioxide that was used to form fossil fuels or carbonate rocks.

5. What causes carbon dioxide to be removed from the atmosphere?

Photosynthesis, formation of carbonate rocks and marine shells, dissolving in the oceans, locked up in fossil fuels.

6. What causes carbon dioxide to be released into the atmosphere?

Respiration, combustion of fossil fuels, warming of oceans releases dissolved carbon dioxide.

7. Why is the Urey-Miller experiment not fully reliable?

Because they only selected the gases that are needed to produce amino acids. There might not have been any lightning and other gases might have been present.

8. What is the composition of the atmosphere?

78% Nitrogen, 21% oxygen, 0.03% carbon dioxide, 1% argon

9. The early atmosphere contained mainly carbon dioxide (95%), methane, ammonia and water vapour. Where did these gases come from?

Volcanic activity

10. Describe what happened to the gases that made up the early atmosphere (ammonia, methane, carbon dioxide).

Plants absorbed CO_2 during photosynthesis. CO_2 dissolved in the oceans. Plants released O_2 which reacted with the methane to form more CO_2 and H_2O . O_2 also reacted with ammonia to form N_2 and H_2O

11. How did the oceans form?

As the atmosphere cooled, water vapour condensed.

12. Nitrogen boils at -196°C , methane at -169°C . If the temperature is -179°C , what is the state of nitrogen and methane?

Nitrogen will be a gas because its boiling point is lower than -179°C , methane a liquid because its boiling point is higher than -179°C .

13. Describe fractional distillation of air.

Filter air to remove water vapour and dust. Cool air to remove water and carbon dioxide as these would freeze and block the pipes of the fractionating tower. Cool air to -200°C to liquefy it. Liquid air enters the tower and gradually warmed up. Nitrogen gas boils off first and rises to the top of the tower. Liquid oxygen and argon are left behind and tapped off at the bottom of the tower. To separate the oxygen and argon, a second fractionating column is used.

14. Where do earthquakes happen?

At plate boundaries.

15. How do new islands form?

When plates move apart, magma rises from the mantle to fill the gap. Magma rises due to convection currents inside the mantle.

16. How do earthquakes form?

Plates rub against each other. The friction forces build up until the force becomes too big and the plates move suddenly.

17. What is the name of the super continent?

Pangaea

18. What causes continental drift?

Convection currents inside the mantle caused by radioactive processes inside the core.

19. Why did no one believe Alfred Wegener?

He had no evidence that continents moved.

20. Describe Alfred Wegener's idea of how continents formed.

All continents once were joined together but moved apart over time.

21. How did other scientists explain matching fossils in Africa and South America?

Continents were joined by land bridges. Animals walked over these which were later flooded and disappeared which cut the animals off from each other.

22. What evidence do we have that continental drift is happening?

Volcanoes, earthquakes, tsunamis, ocean ridges, new mountains and islands form.

23. How did scientists before 1900 explain mountain formations?

As the Earth cooled, the crust shrank which caused it to form wrinkles.

24. Why is it difficult to predict earthquakes?

Scientists cannot see what is going on below the crust and cannot measure the forces that build up and say when the forces become too big.

25. Why are not all earthquakes reported in newspapers?

Because the effects cannot be felt or the damage done is not big enough.