Ancient Subsurface Waters May Reveal Secrets of Unique Ecosystems

Description

Deep beneath the Earth's surface, life exists in ways we are just starting to discover. Most of this life is made up of tiny organisms, called microbes, and they may have just as much genetic diversity as life above ground.

Some strange ecosystems likely live with ancient water trapped deep inside rocks. These rocks, called Precambrian shield rocks, are some of the oldest on Earth. A study from 2014 found hydrogen-rich water in 19 mines in Canada, South Africa, and Finland. One mine near Timmins in Canada had liquid water that was isolated for up to 2.64 billion years.

This ancient water can support life because chemical reactions in the rocks produce hydrogen. Two main processes help create hydrogen: radiolytic decomposition, which splits water molecules due to natural radiation, and serpentinization, where certain minerals change and release hydrogen.

Since Precambrian rocks form over 70 percent of Earth's crust, such places may be more common than we think. Geochemist Barbara Sherwood Lollar described them as a "sleeping giant," suggesting a large area could support life.

The study of these environments could also offer clues about life on other planets, like Mars, where similar processes could be happening. Earth’s interior might even hold three times the amount of water found in our oceans, but it is trapped within minerals, not as liquid, ice, or vapour.

Vocabulary List:

1. **Microbes** /ˈmaɪkroʊbz/ (noun): Tiny living things that we cannot see.
2. **Ecosystems** /ˌiːkoʊˈsɪstəmz/ (noun): Communities of living things and their environment.
3. **Hydrogen** /ˈhaɪdrədʒən/ (noun): A basic chemical element very light gas.
4. **Radiation** /ˌreɪdiˈeɪʃən/ (noun): Energy that comes from a source in waves.
5. **Minerals** /ˈmɪnərəlz/ (noun): Natural substances found in rocks and earth.
6. **Crust** /krʌst/ (noun): The outer layer of the Earth.

Comprehension Questions

Multiple Choice

1. What are the tiny organisms that make up most of the life beneath the Earth's surface?

Option: Plants
Option: Animals
Option: Microbes
Option: Fungi

2. What type of rocks are known as the Precambrian shield rocks?

Option: Igneous rocks
Option: Sedimentary rocks
Option: Metamorphic rocks
Option: Some of the oldest rocks on Earth

3. How many mines in Canada, South Africa, and Finland were found to have hydrogen-rich water in the 2014 study?

Option: 5
Option: 10
Option: 19
Option: 25

4. How old was the isolated liquid water found near Timmins in Canada?

Option: 1 billion years
Option: 2.64 billion years
Option: 500 million years
Option: 3 billion years

5. What process involves the splitting of water molecules due to natural radiation?

Option: Serpentinization
Option: Radiolytic decomposition
Option: Hydrogenation
Option: Photosynthesis

6. What phrase did geochemist Barbara Sherwood Lollar use to describe Precambrian rocks?

Option: Sleeping giant
Option: Frozen wilderness
Option: Hidden treasure
Option: Ancient guardians

True-False

7. Most life beneath the Earth's surface is made up of large animals.

8. Precambrian rocks cover over 70 percent of Earth's crust.

9. The ancient water found underground can support life.

10. Earth’s interior holds less water than found in our oceans.

11. The processes of radiolytic decomposition and serpentinization are responsible for creating oxygen.

12. The study of life beneath the Earth's surface has no relevance to understanding life on other planets.

Gap-Fill

13. Most of the life beneath the Earth's surface is made up of tiny organisms called _____

14. The ancient water in the rocks can support life because it produces _____.

15. The ancient water in one mine near Timmins had been isolated for up to _____ billion years.

16. Precambrian rocks are some of the _____ rocks on Earth.

17. Geochemist Barbara Sherwood Lollar referred to Precambrian rocks as a _____ giant.

18. Earth's interior might hold _____ times the amount of water found in our oceans.

Answer

Multiple Choice: 1. Microbes 2. Some of the oldest rocks on Earth 3. 19 4. 2.64 billion years 5. Radiolytic decomposition 6. Sleeping giant
True-False: 7. False 8. True 9. True 10. False 11. False 12. False
Gap-Fill: 13. microbes 14. hydrogen 15. 2.64 16. oldest 17. sleeping 18. three

Answer

CATEGORY

1. Sci/Tech - LEVEL2

POST TAG

1. ancient waters
2. Earth's surface
3. ESL learning
4. esl news
5. Level 2
6. strange ecosystems

Tags

1. ancient waters
2. Earth's surface
3. ESL learning
4. esl news
5. Level 2
6. strange ecosystems

Date Created
2026/02/27
Author
aimeeyoung99