

Volcanology in the Cosmos

Volcanology · Answer Key · 12 Questions

1. Which moon in our solar system is known to have active cryovolcanism, spewing plumes of water ice and organic compounds?

- A) Io (Jupiter)
- B) Titan (Saturn)
- C) Europa (Jupiter)
- D) Enceladus (Saturn)**

2. Mars features the largest known volcano in the solar system, Olympus Mons. What type of volcano is it?

- A) Stratovolcano
- B) Shield volcano**
- C) Caldera
- D) Fissure vent

3. Venus exhibits extensive volcanic features, including vast lava plains and numerous volcanoes. What is the primary reason for Venus's lack of significant plate tectonics, which influences its volcanic style?

- A) A much smaller core compared to Earth
- B) A thick, dense atmosphere creating immense pressure
- C) A complete absence of water**
- D) A lack of a strong magnetic field

4. The intense volcanic activity on Jupiter's moon Io is primarily driven by what gravitational force?

- A) Solar radiation pressure
- B) Jupiter's immense gravity and tidal forces from other Galilean moons**
- C) The solar wind
- D) Collisions with comets

5. Triton, Neptune's largest moon, displays evidence of active cryovolcanism. What substances are believed to be erupted?

- A) Molten rock and lava
- B) Water, ammonia, and methane ices**
- C) Sulfur dioxide and carbon dioxide
- D) Metallic hydrogen

6. Observations of exoplanets have provided evidence suggesting volcanic activity. For example, WASP-18b, a hot Jupiter, shows signs of what type of volcanic atmospheric process?

- A) Water vapor geysers
- B) Silicate cloud formation from volcanic ash**
- C) Methane eruptions
- D) Cryovolcanic ice fountains

7. Which of the following terrestrial planets in our solar system is NOT currently considered to have active volcanism, though it has extensive evidence of past volcanic activity?

- A) Earth
- B) Venus
- C) Mars
- D) Mercury**

8. The 'dark side' of Iapetus, Saturn's third-largest moon, is significantly darker than the rest of its surface. This unique coloration is thought to be related to ancient volcanic activity and the deposition of what material?

- A) Iron oxides
- B) Carbonaceous dust from Saturn's rings**
- C) Water ice crystals
- D) Ammonia compounds

9. The existence of super-Earth exoplanets with volcanic activity is hypothesized to be influenced by their higher mass. This can lead to what type of geological process that is more vigorous than on Earth?

- A) Glaciation
- B) Mantle convection and volcanic resurfacing**
- C) Erosion by stellar winds
- D) Atmospheric escape

10. The volcanic features on Io are dominated by sulfurous compounds, giving it a distinct colorful appearance. This is largely due to Io's interaction with Jupiter's magnetosphere and the presence of what specific compounds ejected from its volcanoes?

- A) Water ice and ammonia
- B) Silicates and basaltic lava
- C) Sulfur and sulfur dioxide**
- D) Carbon dioxide and nitrogen

11. Which dwarf planet, located in the asteroid belt, exhibits evidence of past cryovolcanism, including features resembling lava flows made of water ice?

A) Pluto

B) Ceres

C) Eris

D) Haumea

12. The search for extraterrestrial life often considers environments with volcanic activity. On which moon, known for its subsurface ocean, is tidal heating due to volcanic processes believed to be a significant factor in maintaining its liquid water?

A) Enceladus

B) Titan

C) Europa

D) Ganymede