Name _____

Volcanoes: Critical Thinking Answer Key

1. **Earth vs. Mercury/Moon:** Earth has strong internal heat and active plate tectonics, which allow magma to rise. Mercury and Earth's Moon are smaller and have cooled more quickly, so their volcanic activity has mostly stopped.
2. **Mars:** The huge volcanoes on Mars suggest that lava flowed for millions of years in one spot because there are no moving plates. Their inactivity today shows that Mars has lost much of its internal heat.
3. **Io:** Io's volcanic activity is caused by tidal heating—Jupiter's immense gravity (and that of other moons) stretches Io's interior, generating heat that melts rock into magma.
4. **Venus:** Venus is covered by thick clouds of carbon dioxide and sulfuric acid, making it impossible to directly observe the surface with normal telescopes. Space probes and radar images are needed, but evidence is still hard to confirm.
5. **Loss of Heat:** If a planet or moon cools down, volcanic activity will eventually stop because magma cannot form without enough internal heat.

Reflection (Sample Answer):

Studying volcanoes on other worlds helps scientists compare Earth's activity to planets that have cooled or behave differently. It shows us how planetary size, heat, and gravitational forces affect geology. This comparison also helps predict what might happen to Earth in the far future.