

Name \_\_\_\_\_

## Beneath the Surface: Bacteria's Vital Role in the Nitrogen Cycle

### Open-Ended Response Answer Key

1. Nitrogen-fixing bacteria contribute to sustainable agriculture by providing plants with a direct source of nitrogen, reducing the need for synthetic fertilizers and enhancing soil fertility.
2. Excessive nitrogen runoff can lead to eutrophication, causing algal blooms, oxygen depletion, and harm to aquatic ecosystems.
3. Nitrogen-fixing cover crops offer benefits such as nitrogen fixation, soil improvement, and weed suppression, but their effectiveness depends on factors like crop selection and management practices.
4. Human activities such as fertilizer use, industrial emissions, and deforestation disrupt the nitrogen cycle, leading to nutrient pollution, air and water pollution, and biodiversity loss. Implementing practices like precision agriculture and reforestation can help mitigate these impacts and restore ecosystem health.

