

## Worksheet – The Nitrogen Cycle

These descriptions correspond to the numbers on the diagram. Fill in the blank with the correct terms for each process or bacterial group described.

1. All fish \_\_\_\_\_ nitrogen into the water as ammonia and organic nitrogen. These chemicals are byproducts of their metabolism and respiration.
2. All heterotrophic bacteria eat organic nitrogen and release ammonia as a byproduct. This process is called \_\_\_\_\_ or \_\_\_\_\_.

What is the difference between heterotrophic and autotrophic bacteria?

Remember that the ammonia that is released into the water is chemically converted to ammonium, so the following statements use ammonium instead of ammonia.

3. There are other bacteria that use the ammonium in the water as a nitrogen source and take it up to make organic nitrogen and new bacteria. When they do this and hold the nitrogen inside bacterial cells it is called \_\_\_\_\_.
4. \_\_\_\_\_ is when certain bacteria use ammonium as their energy source and convert it to nitrite or use nitrite and convert it to nitrate.
  - a. The bacteria that convert ammonium to nitrite are the \_\_\_\_\_-bacteria. An example is \_\_\_\_\_.
  - b. The bacteria that use nitrite and make nitrate are the \_\_\_\_\_-bacteria. An example is \_\_\_\_\_.
5. \_\_\_\_\_ occurs when the ammonium in the water becomes a gas and enters the atmosphere.
6. In anaerobic (no oxygen) environments, like sediments, some bacteria use nitrate as their final electron acceptor (instead of oxygen). This process is called \_\_\_\_\_ and produces nitrogen gas or nitrous oxide gas, which then leaves the water and enters the atmosphere.