The N/O₂ ratio at large depths in the World Ocean has been recognized as being elusive. Here we demonstrate that this elusiveness is caused by waters of different origin having different N/O₂ ratios. These differences can be identified by considering the potential temperature of water samples, which allows an examination of the data in terms of the temperature of the water when it was subducted. We employ data obtained from the World Ocean Circulation Experiment Hydrographic Program. In the temperature range less than 5°C, we find two distinct slopes to the N/-O₂ ratio (0.06 and 0.13). The latter is close to the Redfield ratio (N/-O₂) 16:138 (Redfield et al., 1963). Remarkably, waters with these different N/-O₂ ratios in the Indian Ocean can be traced back to subduction regions in the North Atlantic and around Antarctica, respectively. In the temperature range greater than 10°C (and thus water subducted at lower latitudes) the N/-O₂ ratio is essentially constant throughout the World Ocean (= 0.12, i.e. close to Redfield). Our results suggest the stoichiometry at the point of subduction is preserved as the water is circulated. The reasons for this are unclear, but it does provide the potential of using the N/-O₂ ratio as a useful tracer of the deep circulation.