

Solutions

2.1 Kingdom, phylum, class, order, family, genus, species.

2.2 Genus; species.

2.3 Archaea; bacteria; eukaryota.

3.1 Linnaeus classified by structure and characteristics into kingdom → species; improvements in microscopes revealed more about internal structures; progress in understanding biochemical processes, and chemical analysis of organisms, showed deeper relationships; Carl Woese proposed the three-domain system – archaea, bacteria and eukaryota – from that chemical evidence.

3.2 Chemical analysis of their genetic material/biochemistry shows they are only distantly related; archaea are primitive bacteria adapted to extreme environments, while bacteria are true bacteria; classification now reflects evolutionary relatedness from chemical evidence, not just single-celled appearance.

3.3 The two species whose branches meet at the closest branch point share the most recent common ancestor; a species on a branch that splits earlier diverged longer ago. Trees are built from current classification data for living organisms and fossil data for extinct organisms.