Why do organisms share features (possess same characters)

Convergent Evolution
Two organisms experience similar environments
They evolve similarities in form or behavior
These similarities could be used as characters

Homology
a similarity between species that is not functionally necessary
similarity exists because two organisms share a common ancestor that possessed the same feature

example homologies
Exoskeleton of arthropods
Insect wings

Types of homologies
Ancestral homology—original state of character
Derived homology—evolutionary change has occurred along a lineage

Possible groupings based on characters

Polyphyly
Made based on convergently evolved character
Does not include common ancestor

Paraphyly
Made based on ancestral homology
Does include common ancestor, but not all descendants

Monophyly
Made based on derived homology
Includes common ancestor and all descendants

Review of phylogeny handout to demonstrate how characters form groups and to illustrate phylogeny reconstruction