

sexually during their lifetimes, producing high motile larvae. As you observe both your known and unknown specimens, you may not be able to gather data on all of the characteristics you might expect organisms in that Domain or Kingdom to have, but you could hypothesize what events or features you might observe in other life stages.

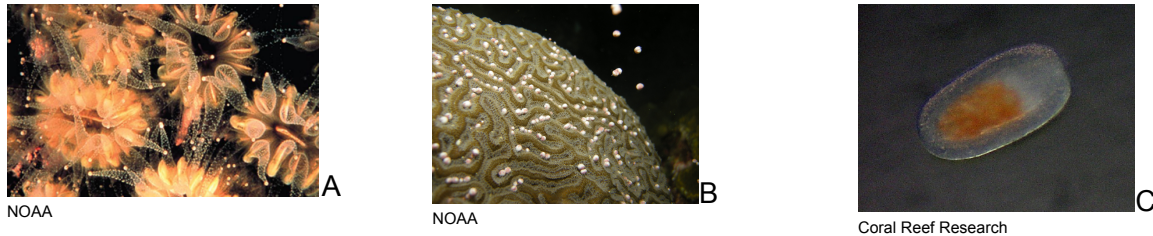


Figure 1: Corals have several life stages. Sessile adult polyps (a) asexually reproduce by cloning, but also sexually reproduce (B) by spawning, which can produce a motile planula larva (C).

Today, you are going to have the opportunity to examine some examples of different Domains and Kingdoms and gather data about their characteristics. You will use that data to to develop and test a hypothesis about the taxonomic affiliation of an unknown organism.

**Table 1: Generalized Characteristics of Domains and Kingdoms**

Domain: Kingdom	Complex and organized	Grow and reproduce	Process energy	Maintain homeostasis	Respond to stimuli
Bacteria	Small, single celled, have cell walls but no nucleus. May have chlorophyll but no chloroplasts	Reproduce asexually by dividing in half (binary fission)	Many are autotrophic, others absorb energy and nutrients	Inhabit wide variety of specialized environments, many anaerobic (without oxygen)	Some can enter resting phases, may reproduce very rapidly under optimal conditions
Archaea (we won't be observing these today)	Small, single celled, have cell walls but no nucleus	Reproduce asexually by dividing in half (binary fission)	Autotrophs, including using chemosynthesis and heterotrophs	Many inhabit extreme environments (e.g. hot springs or hydrothermal vents)	Some can enter resting phases, may reproduce very rapidly under optimal conditions
Eukarya: Protista	Single to multi-celled. All have nucleus, some have cell walls	Protists reproduce both sexually and asexually	Includes autotrophs, and heterotrophs—some absorb and others ingest food	Lack specialized transport tissues and rely on environmental diffusion	Some are active and motile, others are sessile, few sensory structures
Eukarya: Plantae	Multicellular. All have a nucleus and cell walls and chloroplasts	Reproduce sexually, many also reproduce asexually, all plants alternate haploid and diploid generations	Photosynthetic autotrophs	Most, but not all, plants rely on vascular tissues to convey water, nutrients, sugars through body	Sessile for most of life cycle; respond to environmental cues throughout life. Many enter seasonal dormant phases
Eukarya: Fungi	Multicellular. All have a nucleus and cell walls. No chlorophyll or chloroplasts	Reproduce sexually via fruiting bodies and asexually among hyphae	Heterotrophs that <i>absorb</i> energy and nutrients	Absorption of materials across body surface	Fruiting bodies are produced when conditions appropriate for reproduction
Eukarya: Animalia	Multicellular. All have nucleus. No cell walls or chlorophyll or chloroplasts	All reproduce sexually. Some animals also reproduce asexually	Heterotrophs that <i>ingest</i> energy and nutrients	Complex tissues to convey materials throughout body	Motile at some stage of life, most but not all have complex sensory structures