

Chapter 1: An Invisible World – Study Guide (BIOL 2420)

TERMS TO KNOW (with memory cues)

- **Acellular** – *Not made of cells* (e.g., viruses)
 - **Bacteriology** – *Study of bacteria*
 - **Binomial nomenclature** – *Two-name system (Genus + species)* for naming organisms
 - **Domain** – *Highest taxonomic level* (Bacteria, Archaea, Eukarya)
 - **Eukaryote** – *"You" are eukaryotic* = has nucleus and organelles
 - **Helminth** – *Parasitic worms* (multicellular eukaryotes)
 - **Immunology** – *Study of immune system*
 - **Microbe / Microorganism** – *Tiny living things*, too small to see unaided
 - **Microbiology** – *Study of microscopic organisms*
 - **Mycology** – *Study of fungi*
 - **Parasitology** – *Study of parasites*
 - **Pathogenic** – *Disease-causing*
 - **Phylogeny** – *Evolutionary relationships tree*
 - **Prokaryote** – *No nucleus* (e.g., bacteria, archaea)
 - **Protozoology** – *Study of protozoa*
 - **Taxonomy** – *Naming and classifying organisms*
 - **Virology** – *Study of viruses*
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CONCEPTS TO UNDERSTAND

Are all microbes harmful?

- **No!** Most are beneficial: digest food, make vitamins, decompose waste, produce oxygen, and make food (e.g., yogurt).

How did ancient people suspect microbes existed?

- Spoiled food, disease transmission, fermentation—all hinted at "**invisible agents.**"

Why is Antonie van Leeuwenhoek important?

- Called “**Father of Bacteriology & Protozoology**” because he:
 - Created powerful simple microscopes
 - First to see bacteria & protozoa, calling them “**animalcules**”

What is a phylogenetic tree?

- A “**family tree**” showing how organisms are related.
- Based on **genetics, anatomy, biochemistry, and evolution**

What is taxonomy?

- System to **classify and name** organisms.

Taxonomic levels (big → small):

Domain, Kingdom, Phylum, Class, Order, Family, Genus, Species

(Mnemonic: *Dear King Philip Came Over For Good Spaghetti*)

Which levels name a species?

- **Genus + Species** (e.g., *Escherichia coli*)

Who invented this system?

- **Carl Linnaeus**

How to format species names:

- *Italicized* (or underlined when handwritten)
- Genus capitalized, species lowercase: *Staphylococcus aureus*

What are the 3 domains?

1. **Bacteria** – prokaryotes
2. **Archaea** – prokaryotes
3. **Eukarya** – eukaryotes (animals, fungi, protozoa, plants)

Carl Woese proposed this system.

Are viruses in any domain?

- **No!** They’re **acellular** (not made of cells)

What is Bergey's Manual used for?

- Classifying and identifying bacteria
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MAJOR GROUPS OF MICROORGANISMS

Group	Cell Type	Uni-/Multicellular	Example
Bacteria	Prokaryotic	Unicellular	<i>E. coli</i>
Archaea	Prokaryotic	Unicellular	<i>Halobacterium</i>
Fungi	Eukaryotic	Uni or Multi	Yeasts, molds
Protozoa	Eukaryotic	Unicellular	<i>Amoeba</i>
Algae	Eukaryotic	Uni or Multi	<i>Diatoms, seaweed</i>
Helminths	Eukaryotic	Multicellular	Tapeworms, roundworms
Viruses	Acellular	Neither	<i>Influenza virus</i>

FIELDS OF MICROBIOLOGY

Field	Focus
Bacteriology	Study of bacteria
Mycology	Study of fungi
Protozoology	Study of protozoa
Parasitology	Study of parasites
Virology	Study of viruses
Immunology	Study of immune system

Suggested Review Questions from OpenStax

- **Multiple Choice:** #1, 3, 6, 8–14
- **Fill-in-the-Blank:** #18, 20–25

- **Short Answer:** #27–29
- **Critical Thinking:** #36–39

(You can find answers in the textbook or ask if you want them explained!)