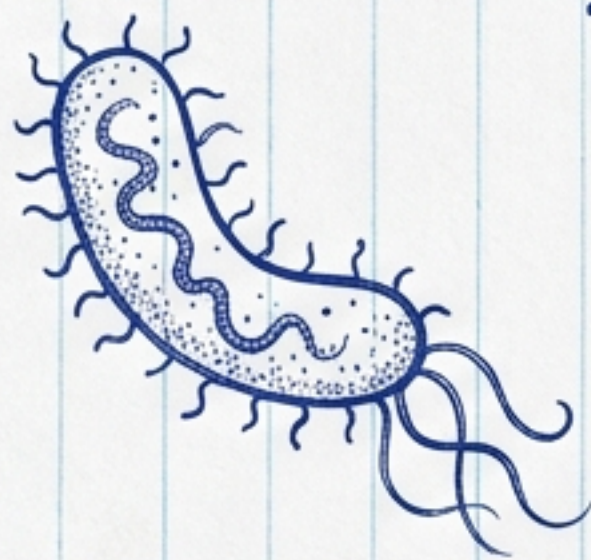




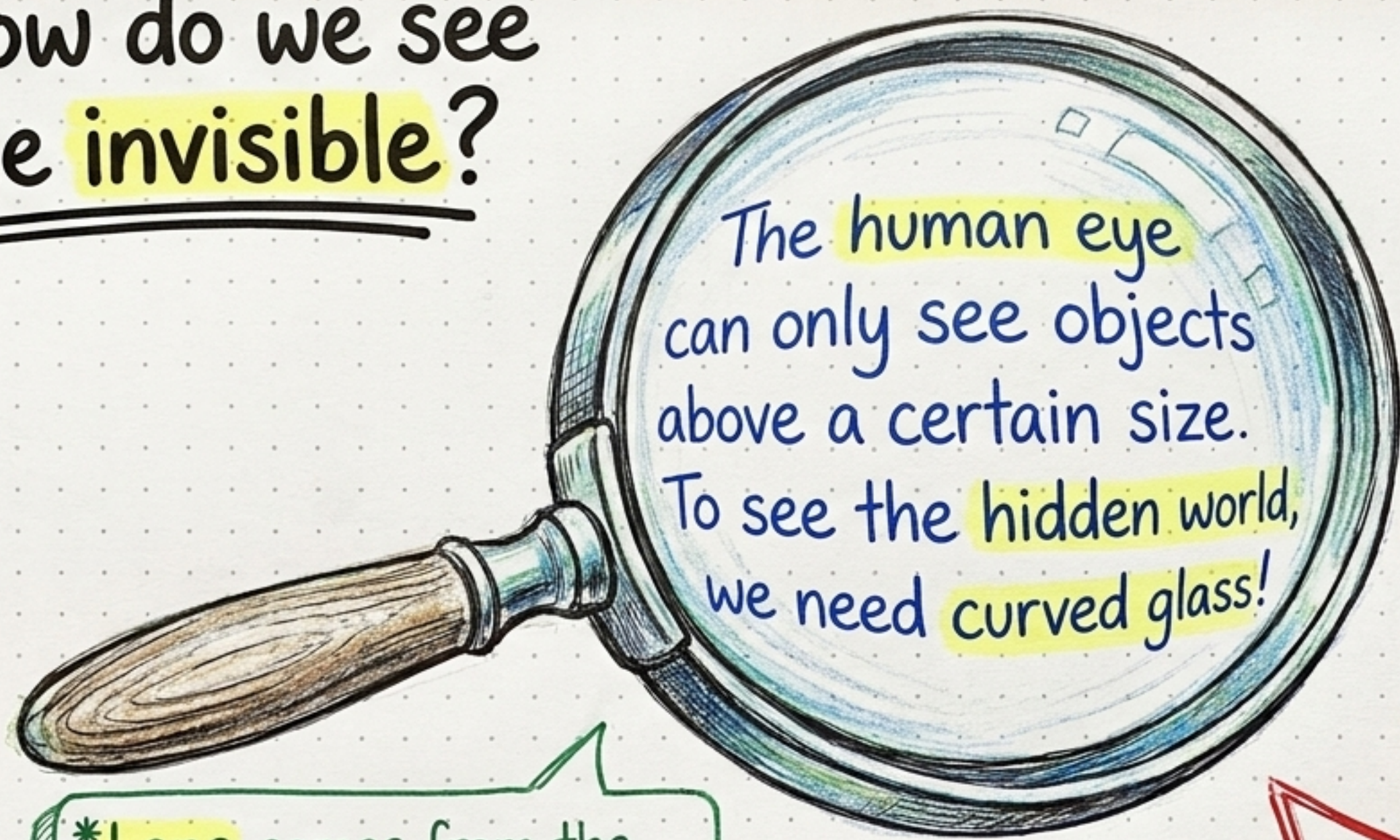
The Invisible Living World

Beyond Our Naked Eye 🙄🙄



Unit 2
Study Guide!
Everything we
can't see but
know is there.

How do we see the invisible?



* Curved surfaces bend light!
- Refraction

* Lens comes from the word "lentil seed" because they are thick in the middle and thin at the edge!

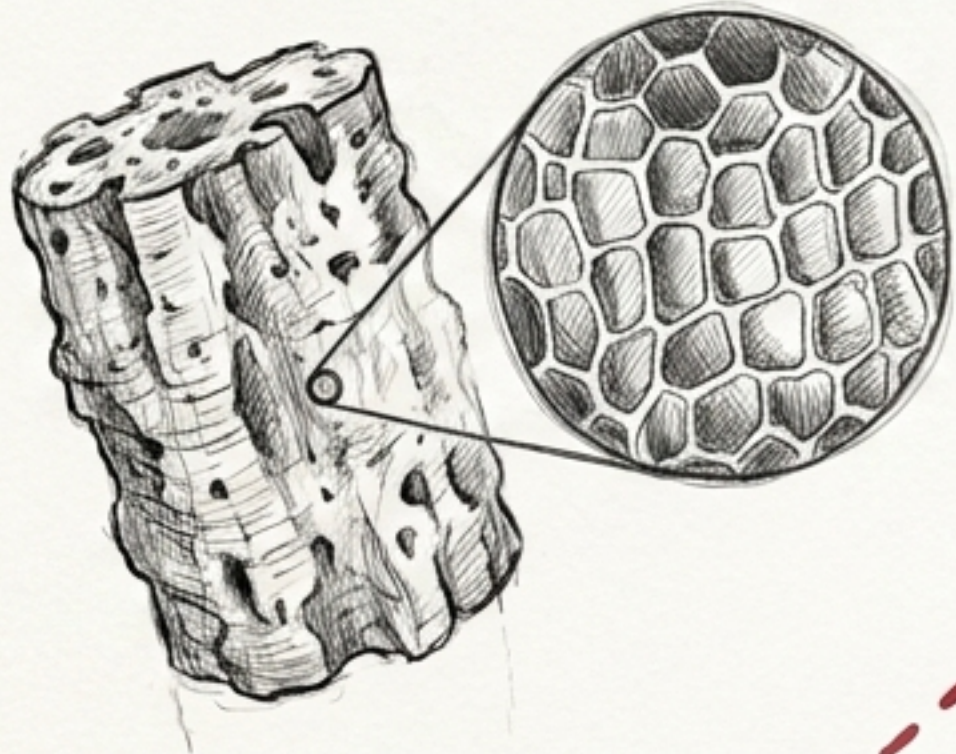


* Biology is full of tiny things!

Better lenses →
Magnifying glasses →
MICROSCOPES!

The Pioneers (How we discovered it!)

1665: Robert Hooke



Tiny motile, empty spaces.

- Looked at cork. ← Looked at cork.
- Saw small, empty spaces. ← Tiny oonvers about the small's kindy the chather?
- Coined the word **CELL** (basic unit of life!).

1660s: Antonie van Leeuwenhoek



- Made way better lenses!
- First to clearly see bacteria & blood cells.

Coined the word (basic unit of life!)

Made way better organism

The Father of Microbiology!

Zooming In: What is a Cell?

All living beings are made of cells! Let's look at a plant cell.

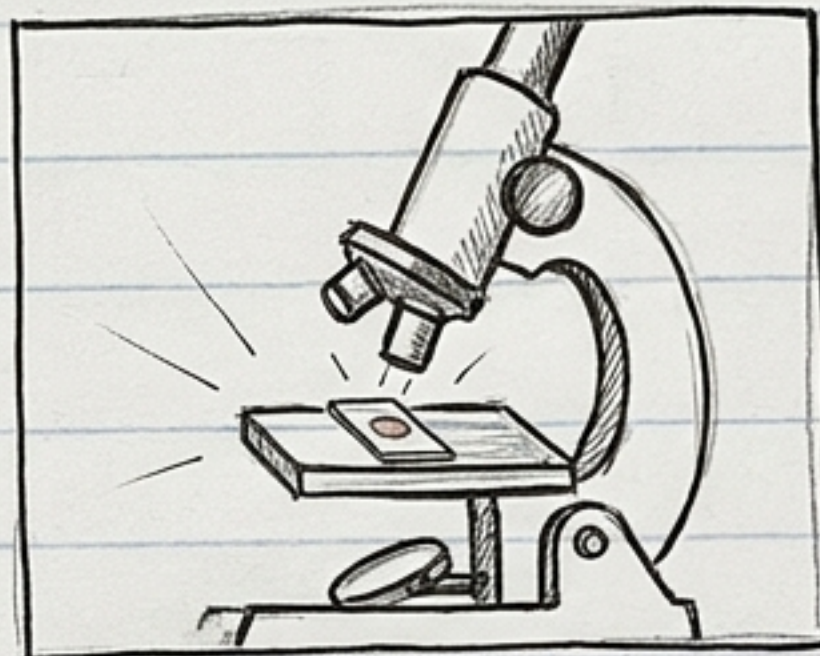
Lab Activity 2.2



1. Get onion peel.



2. Add Glycerin & Safranin stain.

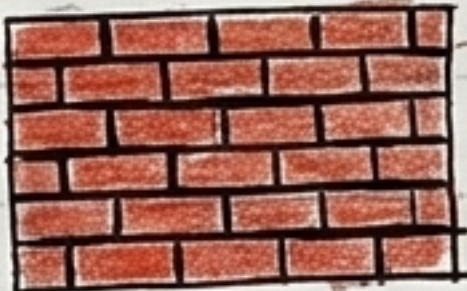


3. Observe!

* Safranin stains the nucleus!

← eraser WEIDED

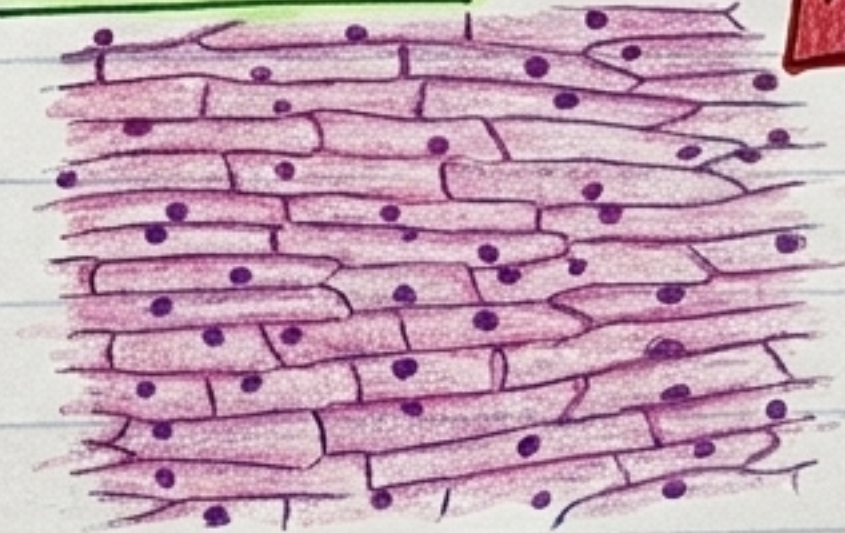
Notice how they are closely packed with NO spaces! Like a brick wall!



* Be careful with glass slides!

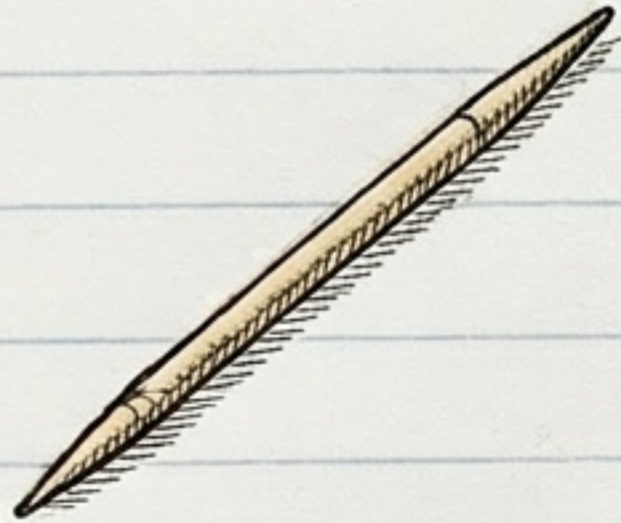
sketch onion epidermal cells →

What I saw!



Lab 2: Human Cheek Cells! (Animal Cell)

Lab Activity 2.3

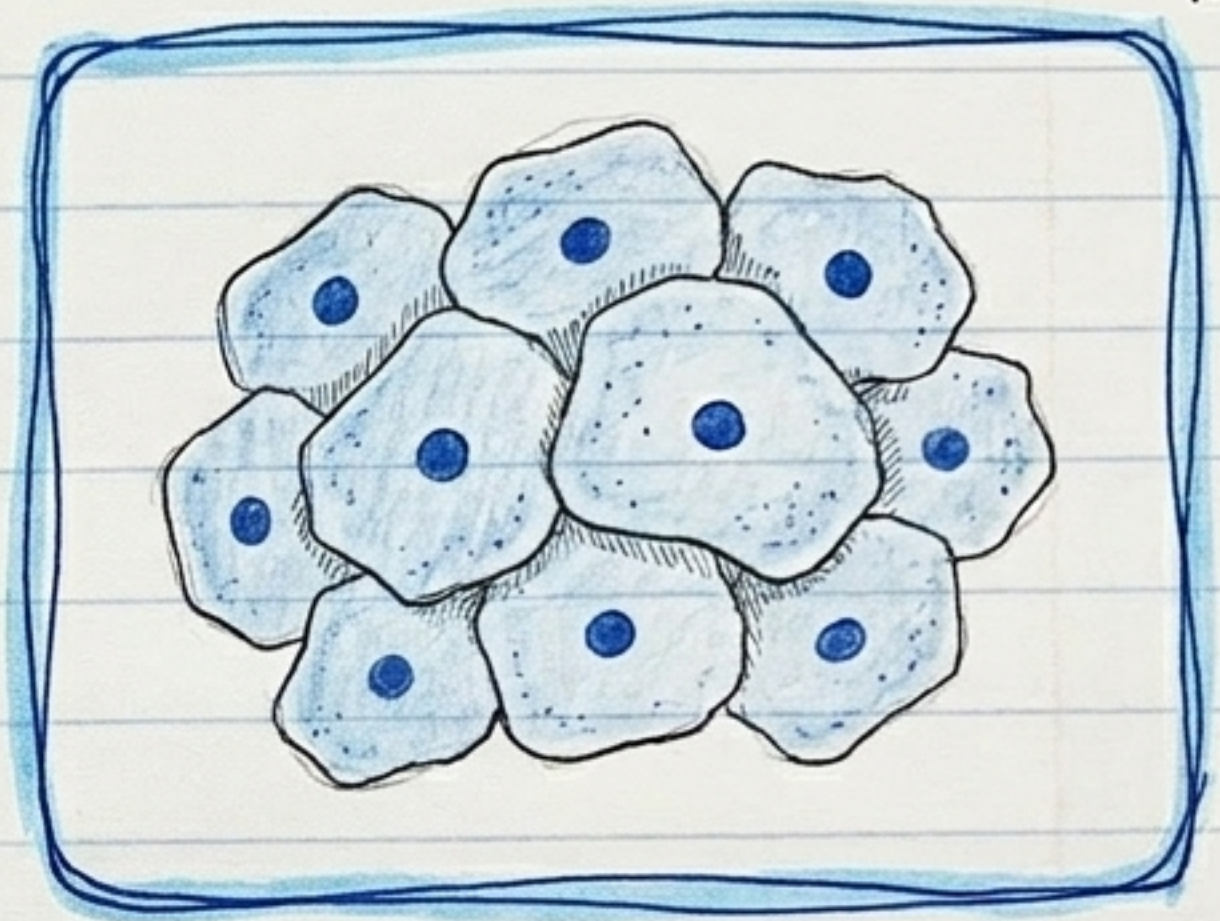


Tiny and scrape the wood with toothpick.

1. Gently scrape inside cheek.



2. Add Methylene Blue (stain).



onion now made the toothpick safely!

Unlike the onion, these are flat polygons. What's that dot in the middle?

Why stain? It improves visibility by increasing contrast! Otherwise, it's clear and hard to see!

Don't forget to dispose of toothpick safely!

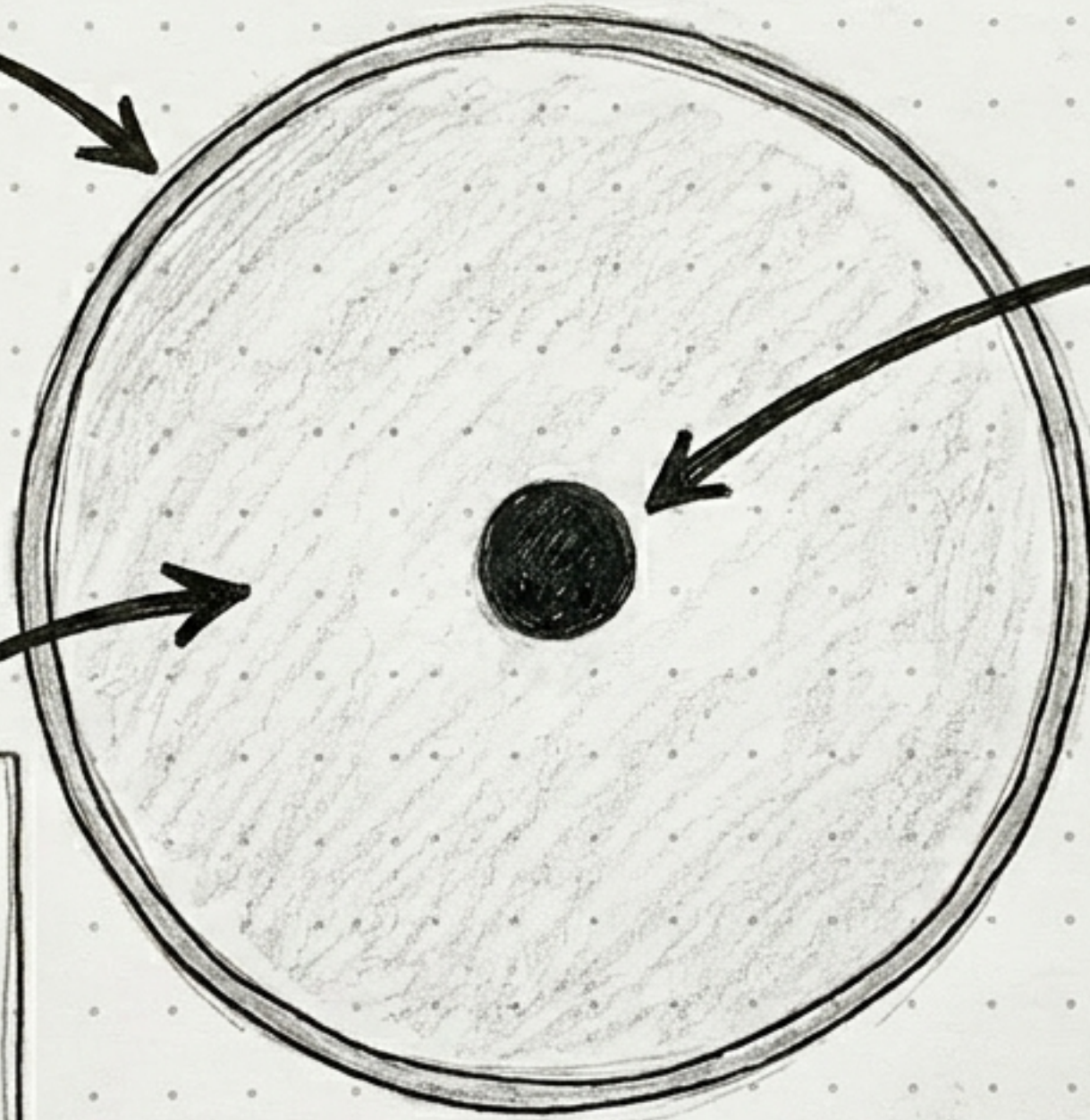
Basic Anatomy of a Cell

Cell Membrane

*Analogy: "The Bouncer." The thin outer layer that holds it all together.

Cytoplasm

*Analogy: "The Jelly." Fills the space between the membrane and the nucleus.



Nucleus

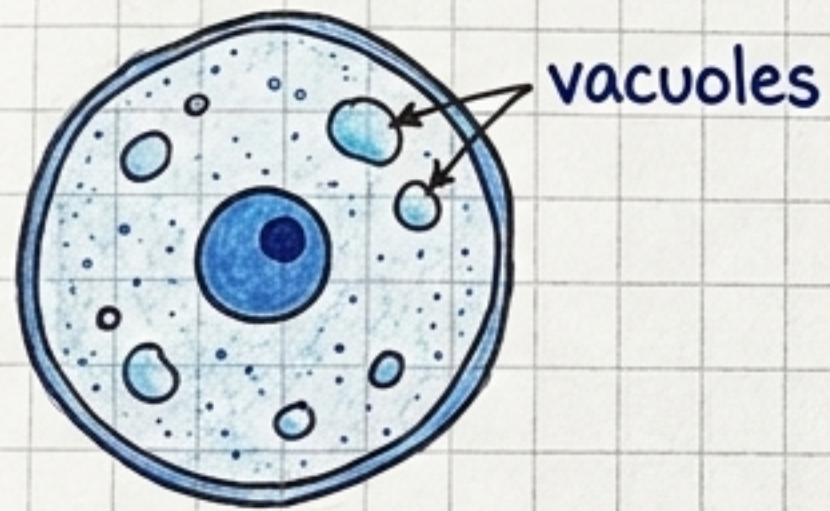
*Analogy: "The Boss/Brain." Covered by its own thin membrane.

Wait, plant cells have extra stuff!
See next page →

Plant Cell vs. Animal Cell

Remember:
Only plants
have the
green stuff!

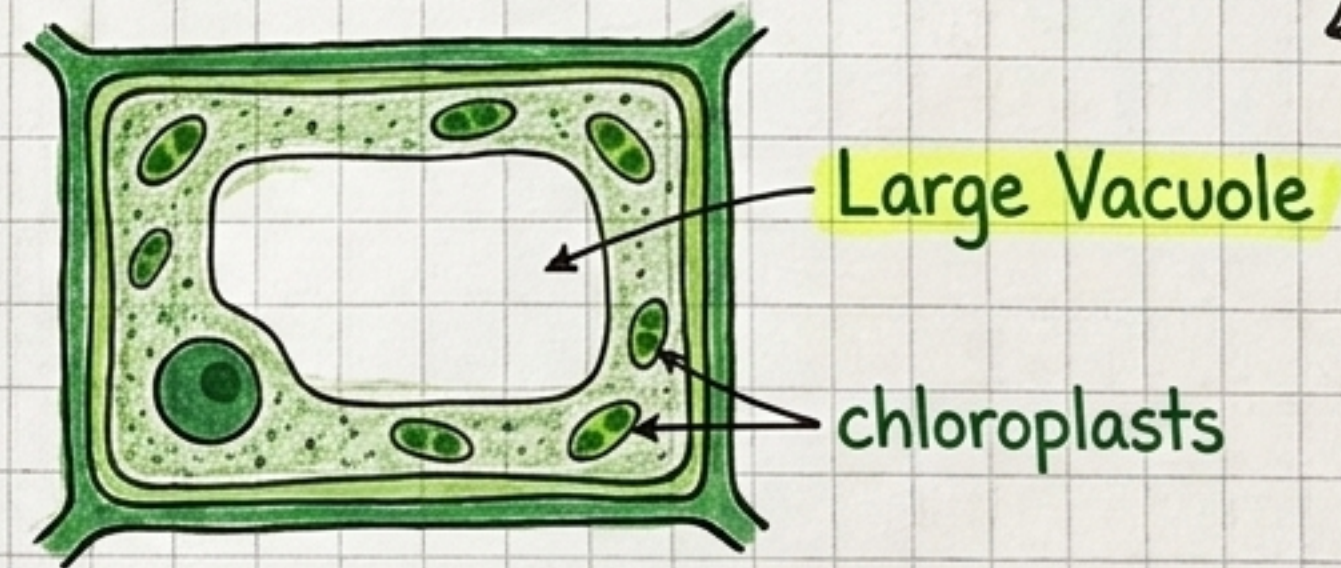
Animal Cell



- Has the "Big 3" (Membrane, Cytoplasm, Nucleus).
- Small vacuoles (storage bubbles).
- Flexible shape.

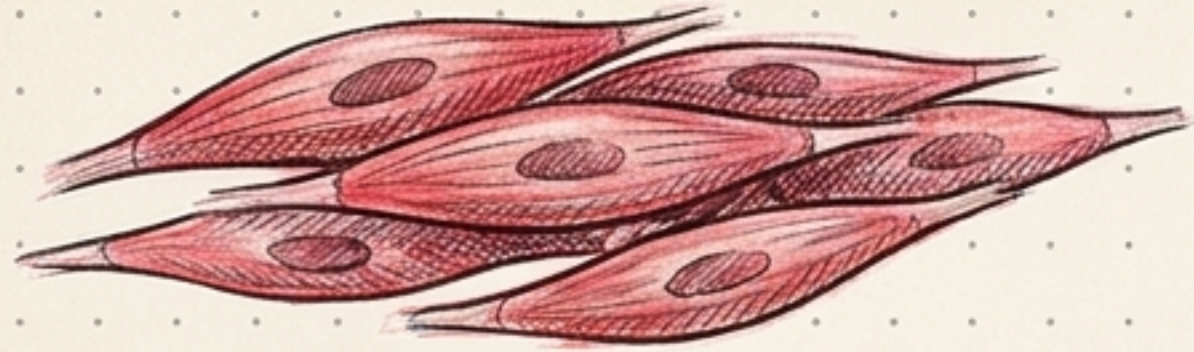
Animal cells
can change shape,
plants can't!

Plant Cell



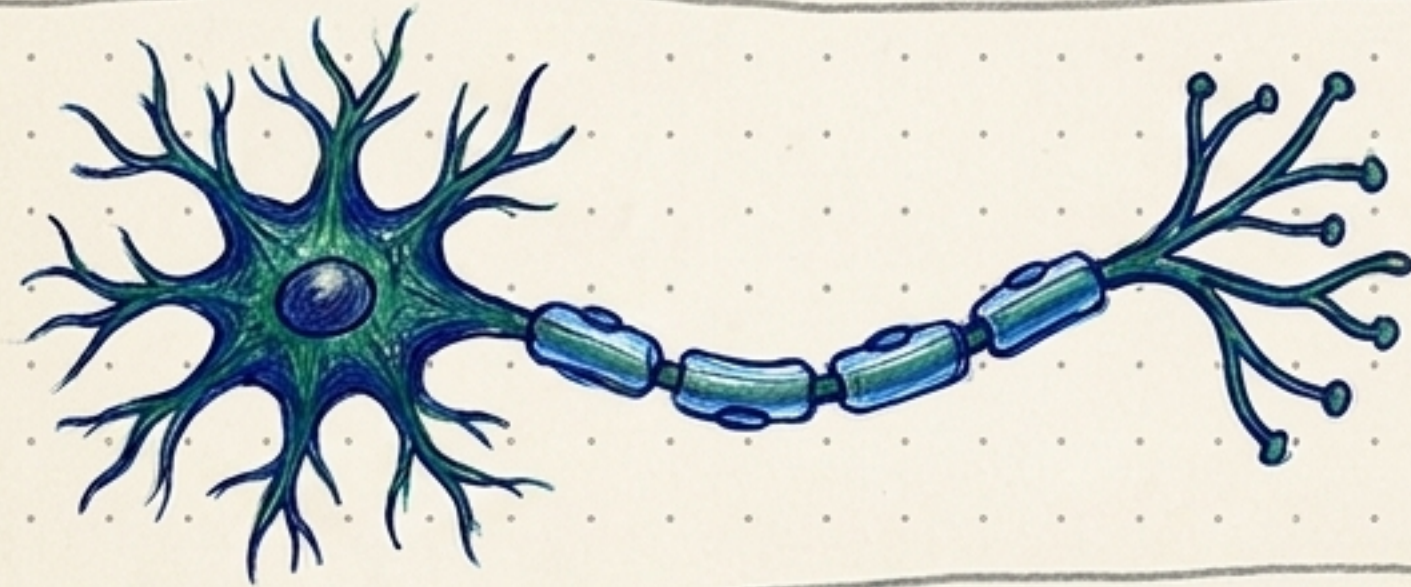
- Has the "Big 3" PLUS...
- Cell Wall: Extra outer layer for structure (Plants don't have skeletons!).
- Chloroplasts: Green structures for making food.
- Large Vacuole: Huge central storage!

Cell Shape = Cell Job!



Spindle-shaped muscle cells.

↳ Elongated to stretch and contract.



Branching Nerve Cell (Neuron).

↳ Long and branched to carry messages across the whole body super fast!

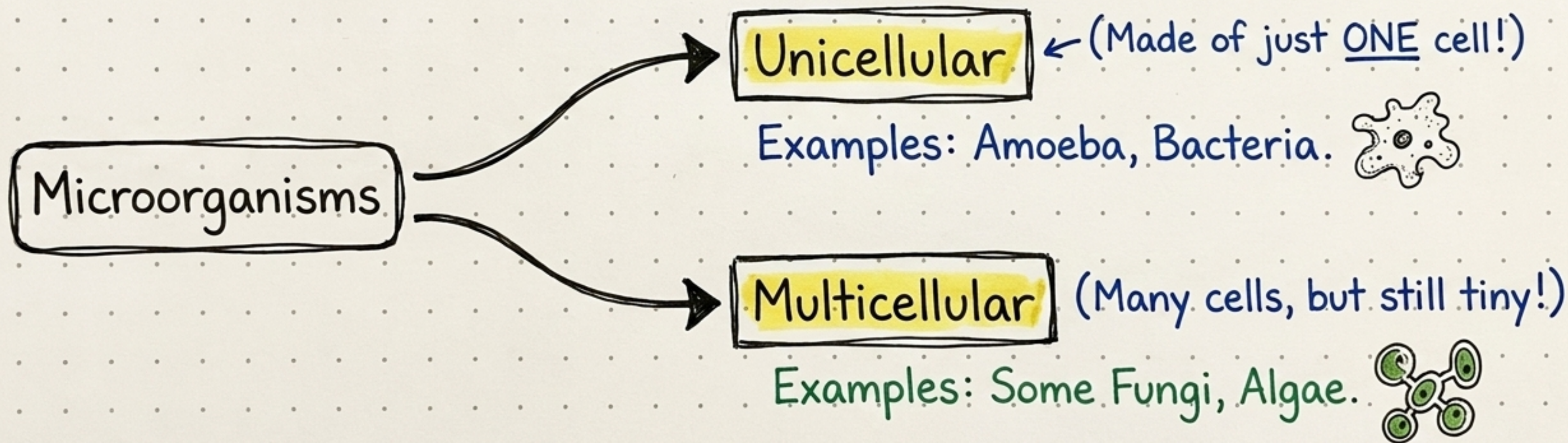


Did you know?

The largest known single cell in the living world is the yolk of an Ostrich Egg! It measures 130mm to 170mm! (Mind blown 🤯)

Welcome to the Micro-Zoo!

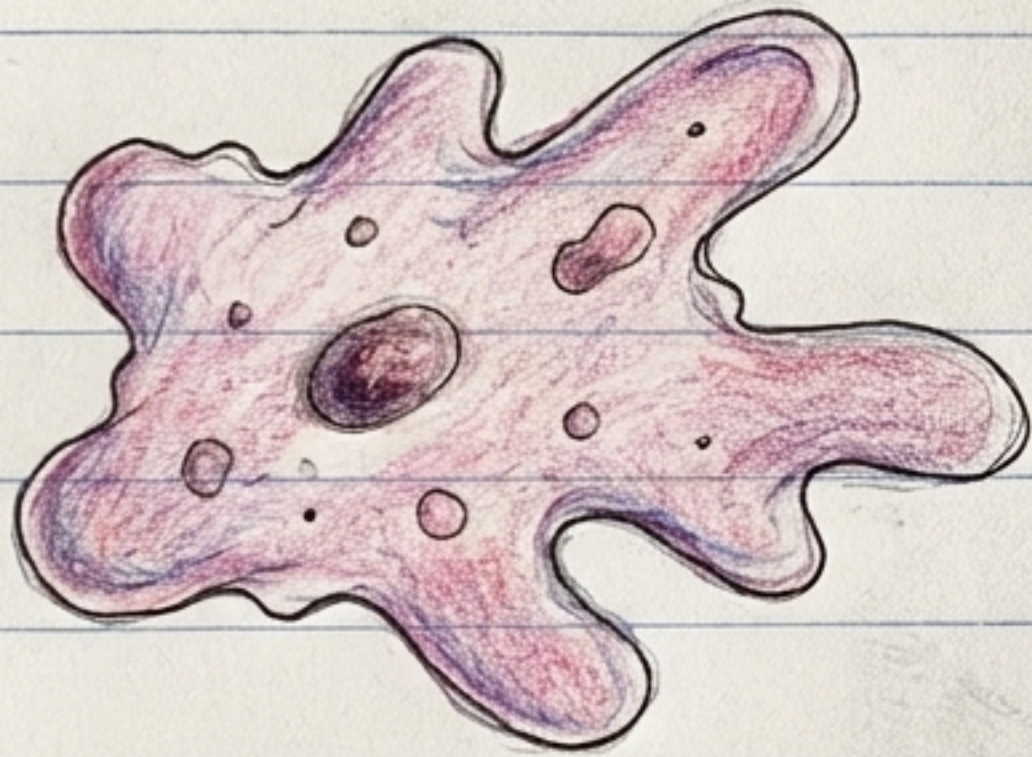
What are **Microorganisms**? They are living things so small we can't see them with the naked eye. They live everywhere: water, soil, air, and inside US!



“Let's look at the 4 main types... and one weird rule-breaker.”

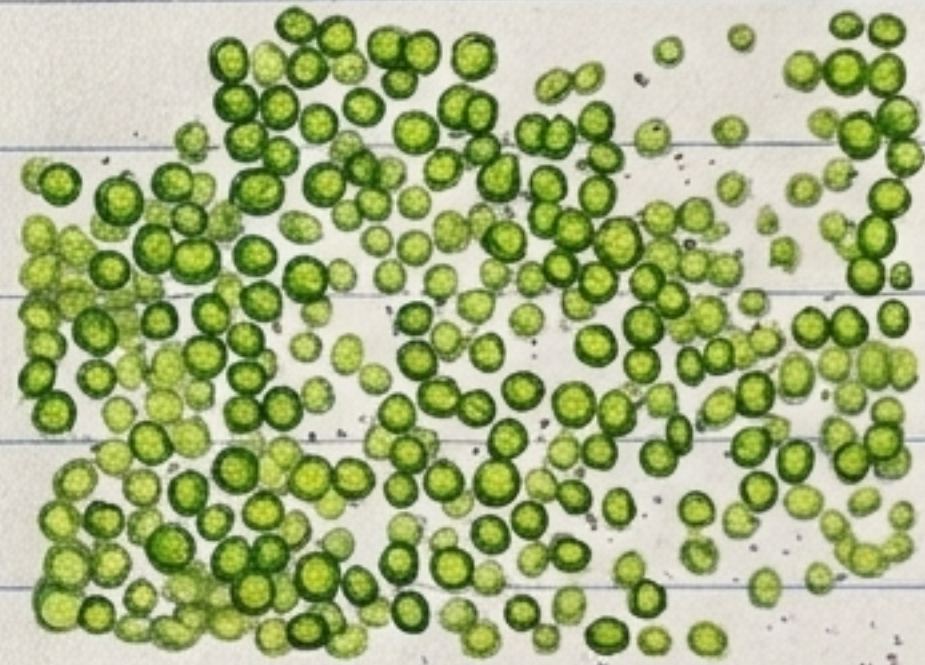
The Microbe Categories (Part 1)

Protozoa



- Single cell.
- Moves around.
- Irregular shape!
- Another example: Paramecium.

Algae



- Look green because they have chlorophyll!
- Example: Spirulina (grows in ponds).

* Remember:
Some protozoa
cause diseases!

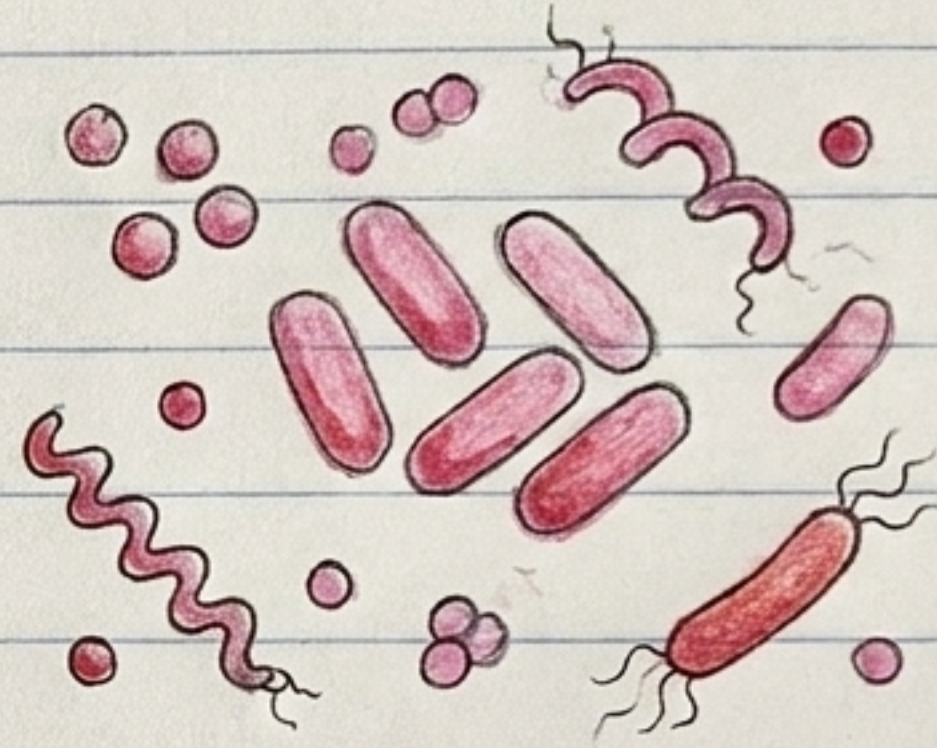
The Microbe Categories (Part 2)

Fungi



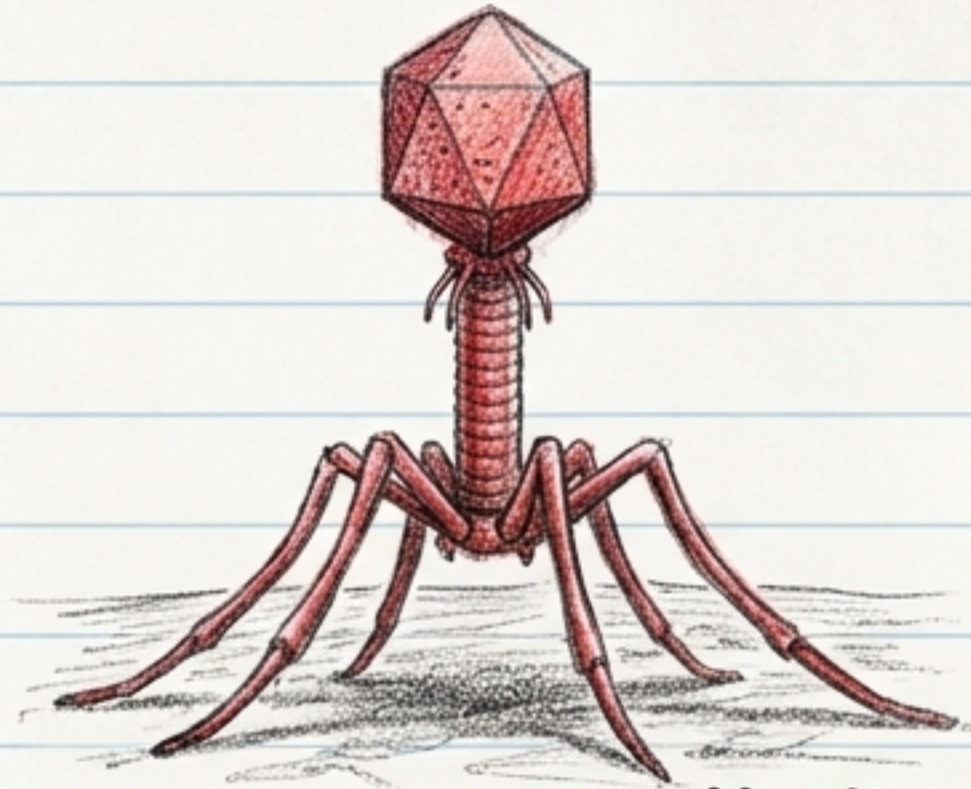
- Branched filaments.
- NO chlorophyll (they don't make their own food).

Bacteria



- Come in many shapes (spheres, rods, spirals).
- Often have tiny hair-like projections to move.

⚠ The Quarantine Zone: VIRUSES ⚠




Viruses are super small, but they are **DIFFERENT** from other microbes.

They can **ONLY** reproduce inside a host organism (like a plant, animal, or bacteria cell). They hijack the cell!

Are they even alive?
Scientists still argue about it!

Friends or Foes?

FRIENDS

- Decomposers: Break down dead leaves/animals into soil nutrients (Recyclers!) 
- Nitrogen Fixers: Trap nitrogen from air for plant roots. 
- Food Makers: Yeast (for bread/idli/dosa) & Lactobacillus (turns milk into curd). 

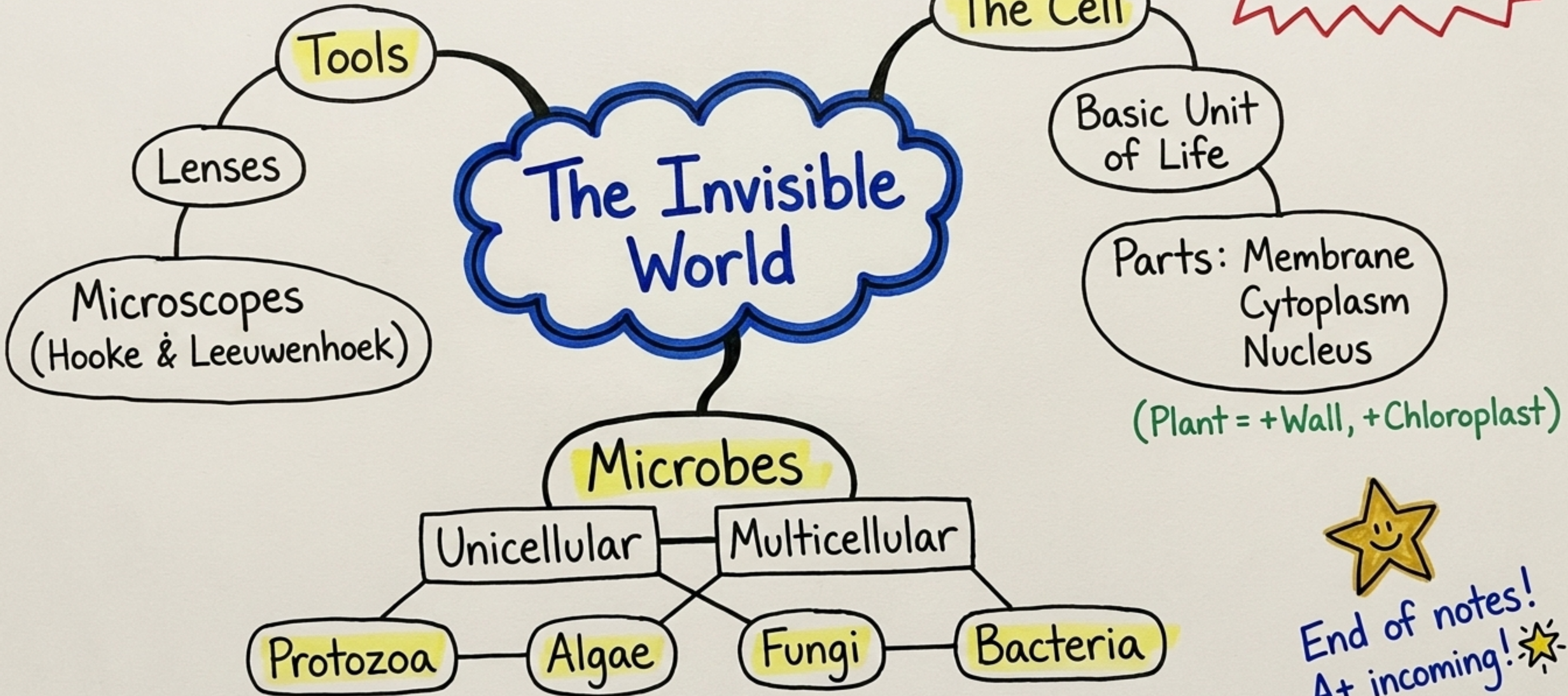

FOES

- Disease Causers: Some microbes make plants, animals, and humans sick.

Historical Note: The Vedas called these invisible entities *Adrishya Krimi*.

Chapter Summary Map!

Viruses
(Need a host!)



★
End of notes!
A+ incoming! ✨