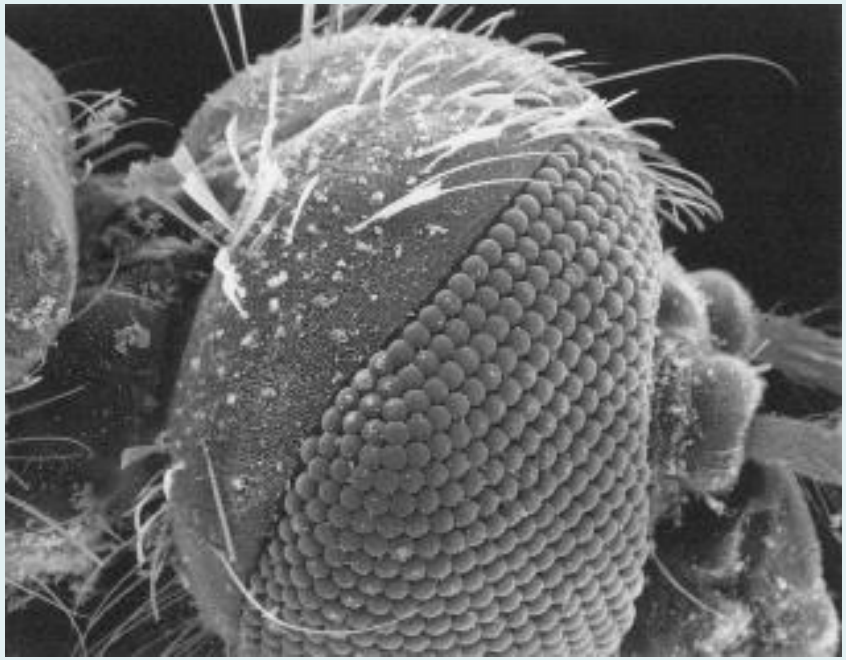
TYPES OF MICROSCOPES

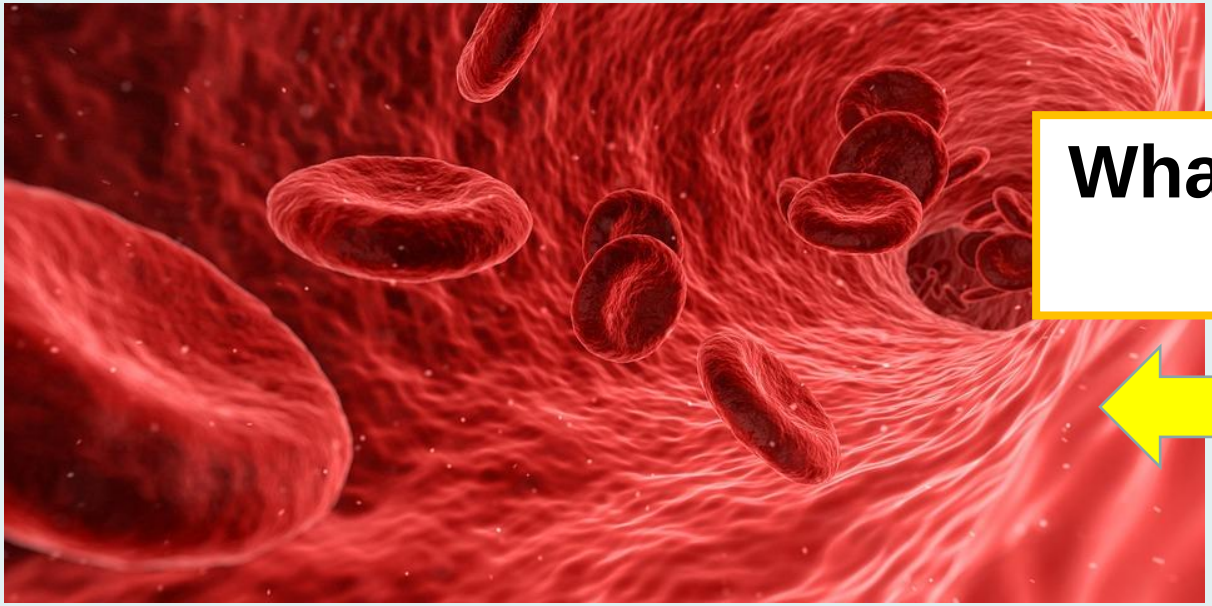
Created by Marie @ thehomeschooldaily.com



What is a microscope?

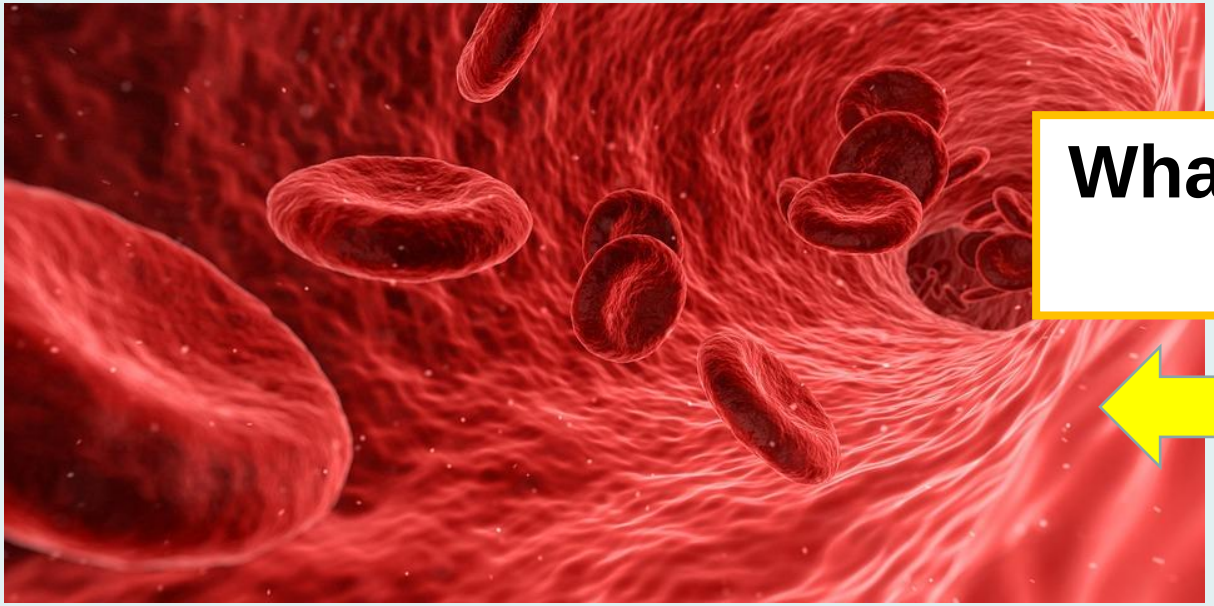
- An instrument that makes small objects look larger
- This invention made it possible for us to discover and learn about cells

For microscopes to be useful, it must combine two important properties- **magnification** and **resolution**.



What do you think this is?

For microscopes to be useful, it must combine two important properties- **magnification** and **resolution**.



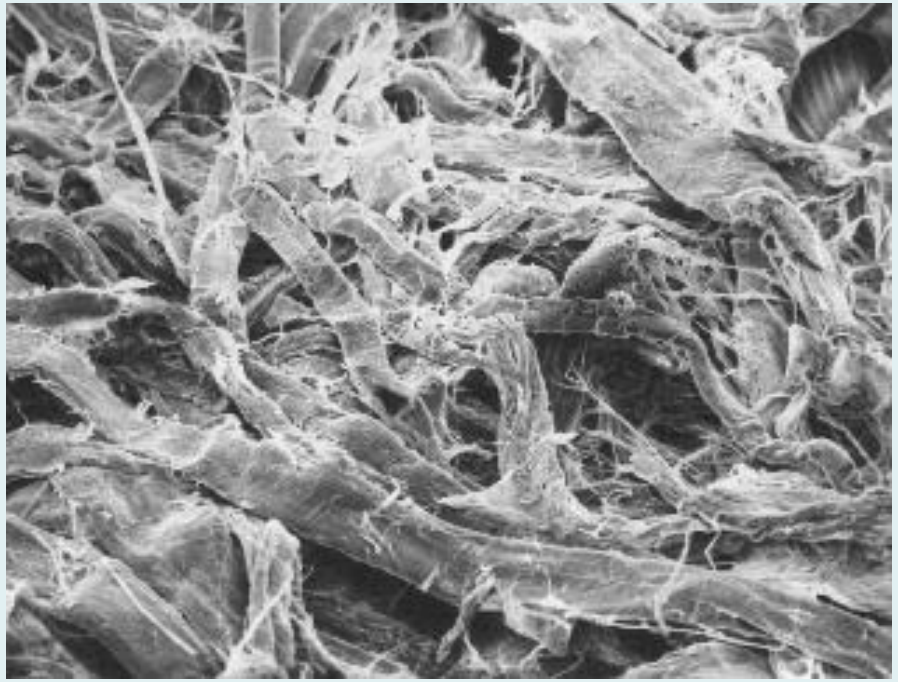
What do you think this is?

Red blood cells magnified

What is magnification?

- Ability to make things look larger than they are

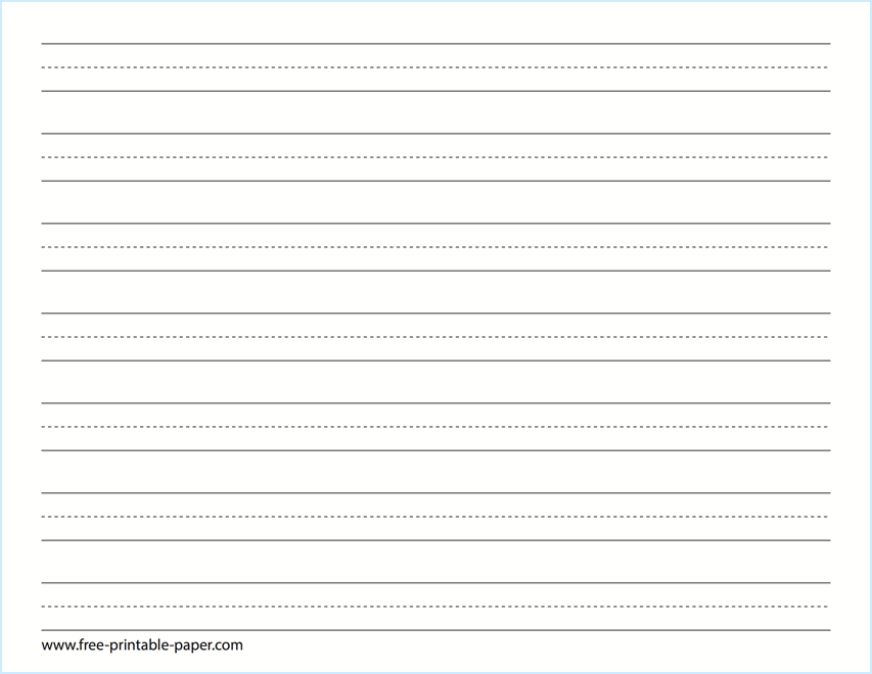
What do you think this is?



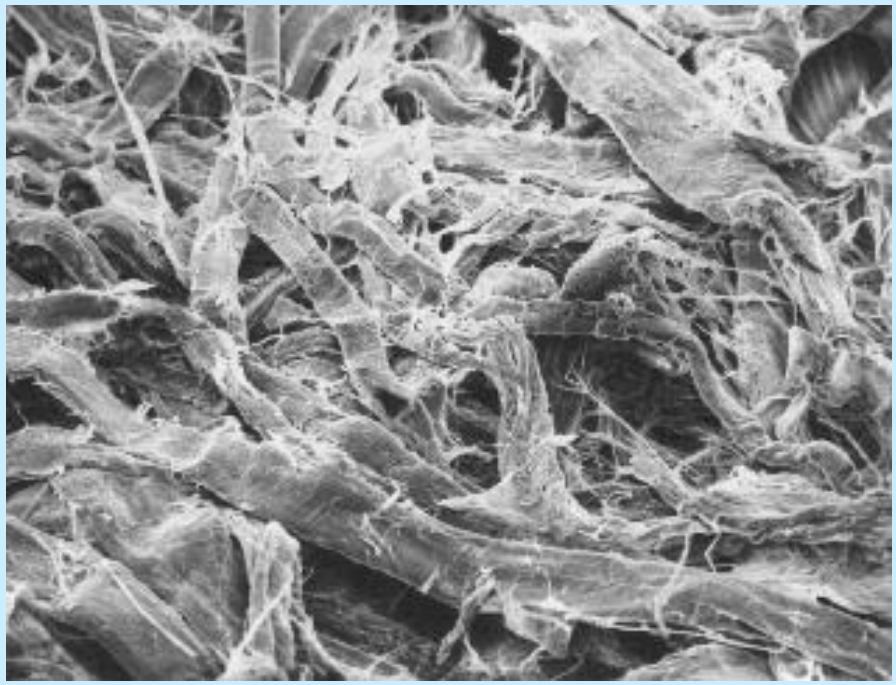
What is magnification?

- Ability to make things look larger than they are

Paper

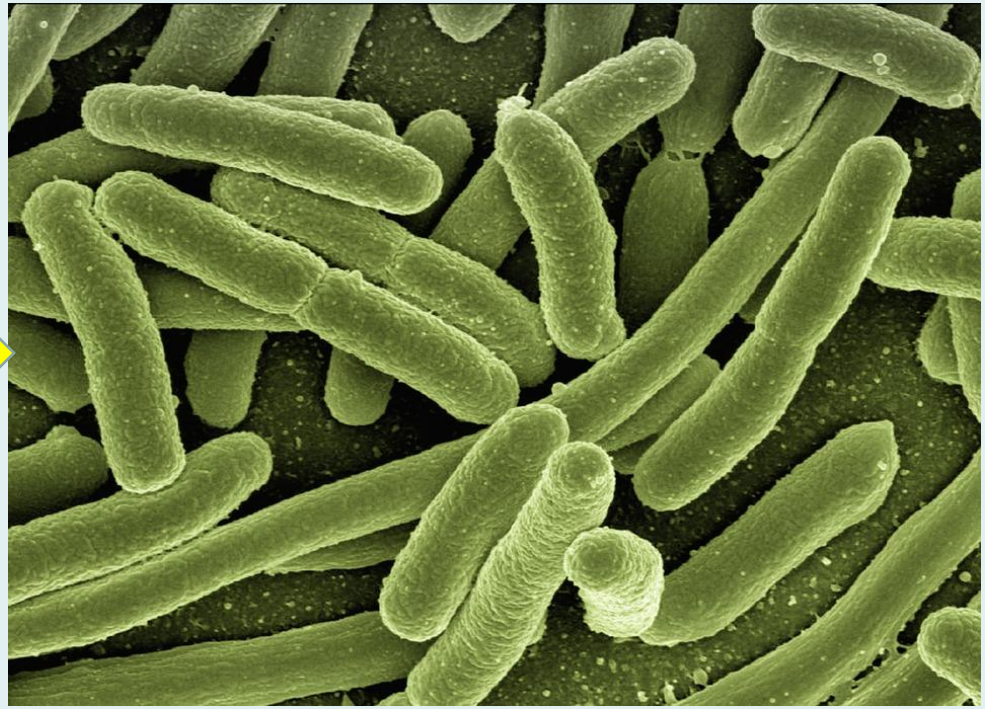


What do you think this is?



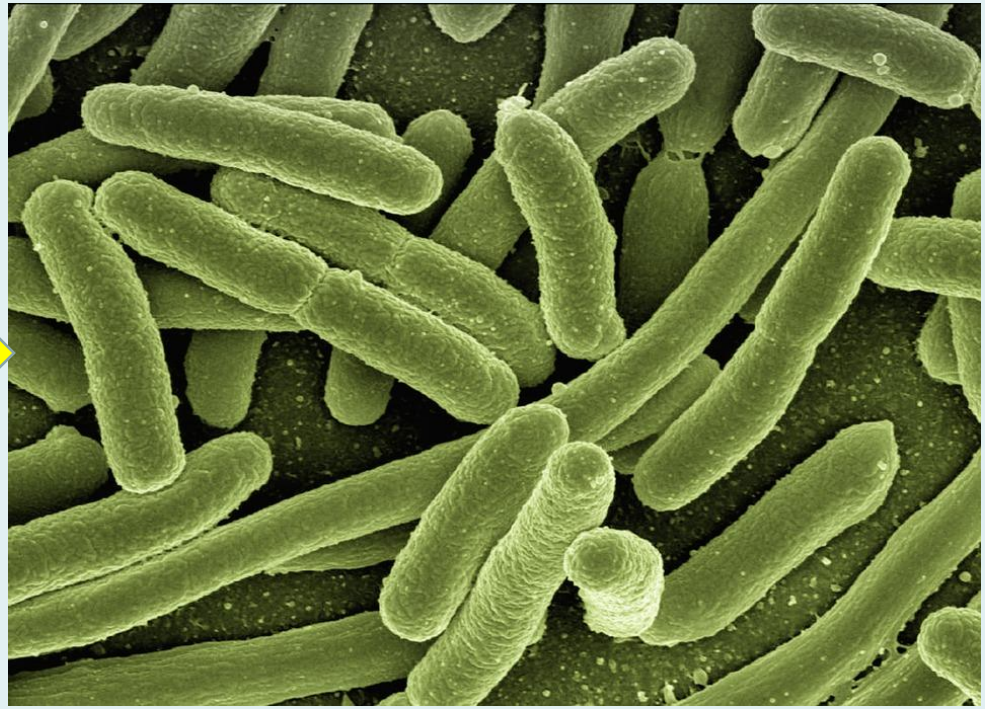
Microscopes magnify things that are too small to see with our eyes.

What do you think this is?



Microscopes magnify things that are too small to see with our eyes.

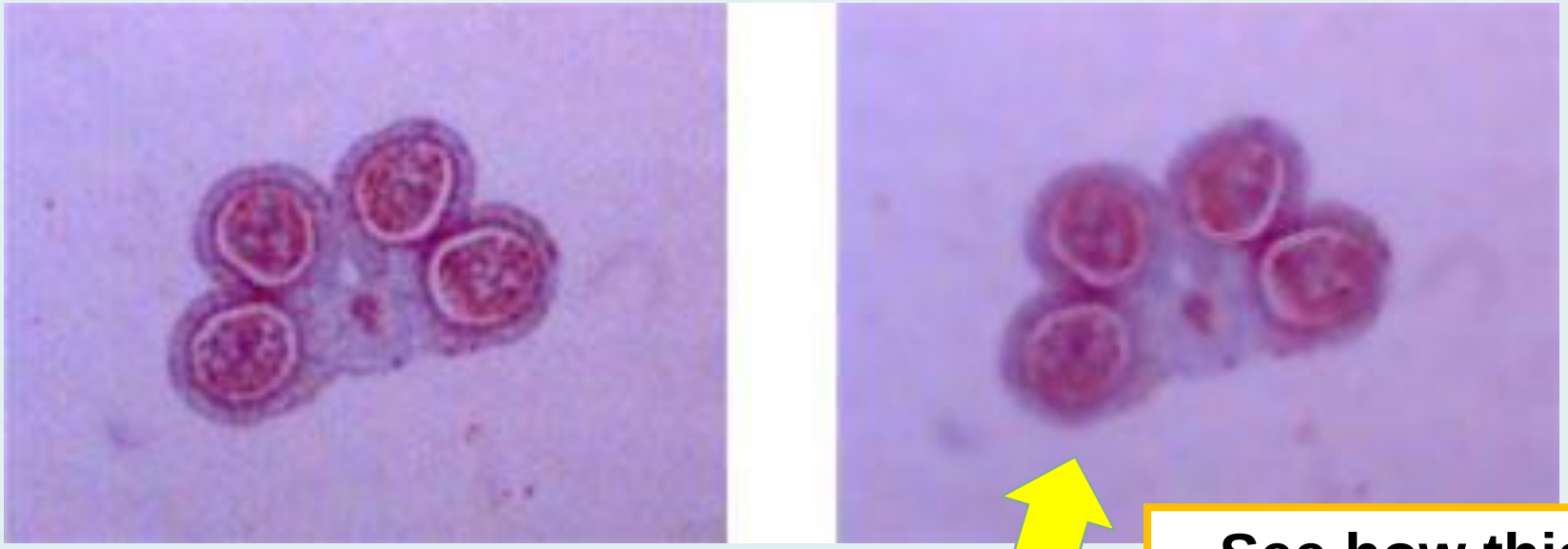
What do you think this is?



E. Coli Bacteria

What is resolution?

- It is the sharpness of an image

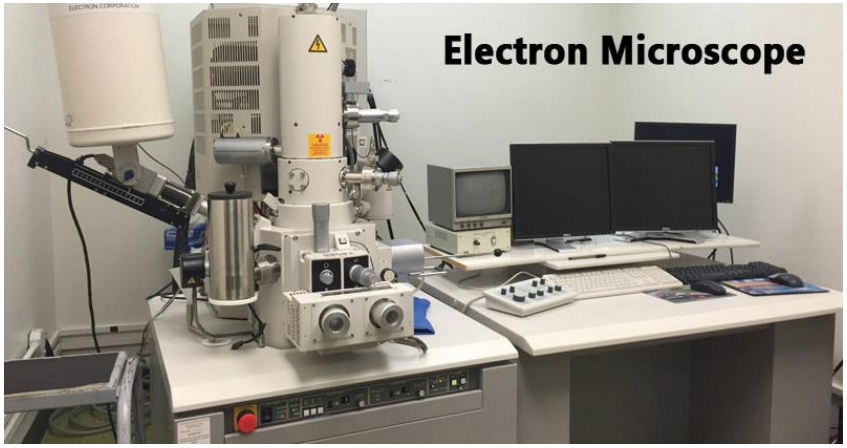


See how this image is not as clear.

Scientists use 2 types of microscopes.

- Light Microscopes

- Electron Microscopes



What is a light microscope?

- A light microscope magnifies an image by bending light that passes through glass lenses.

You would use a light microscope in your class

Also known as an <u>optical microscope</u>

2 Main Types of Light Microscopes

- Stereo Microscope

- Compound Microscope

What is a stereo microscope?

- typically used to inspect larger, opaque, and 3D objects, such as insects or plants
- Also called Dissection Microscope
- Lower magnification than the compound microscope
- Light is reflected off the object

Only magnifies 8x - 80x

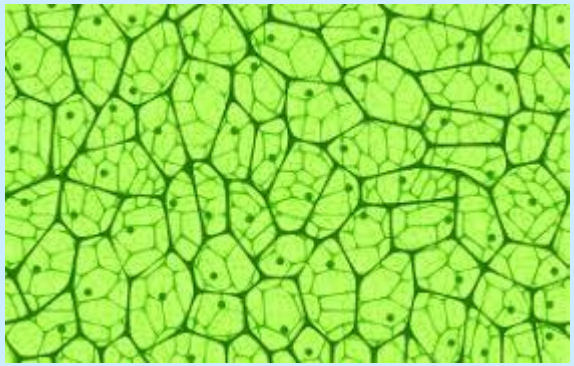
What is a compound microscope?

- commonly used to view something in detail that you can't see with the naked eye, such as bacteria or cells on a glass slide
- Also called Biological Microscope
- Light is transmitted through the object

Specimen is encased in a glass slide for viewing

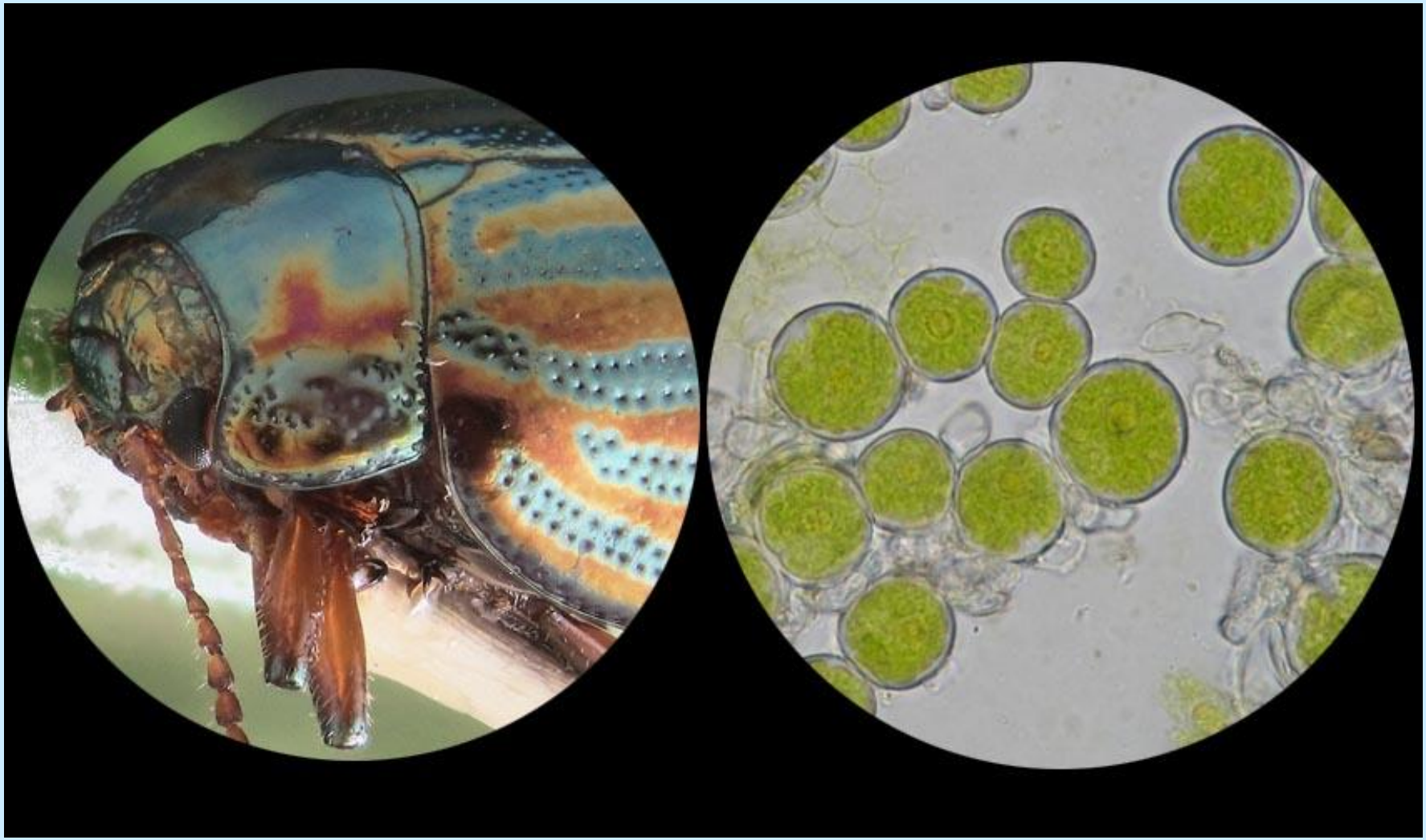
What is a compound microscope?

- Higher magnification than stereo
- The overall magnification of a compound microscope is calculated by multiplying the magnification of both lenses together.

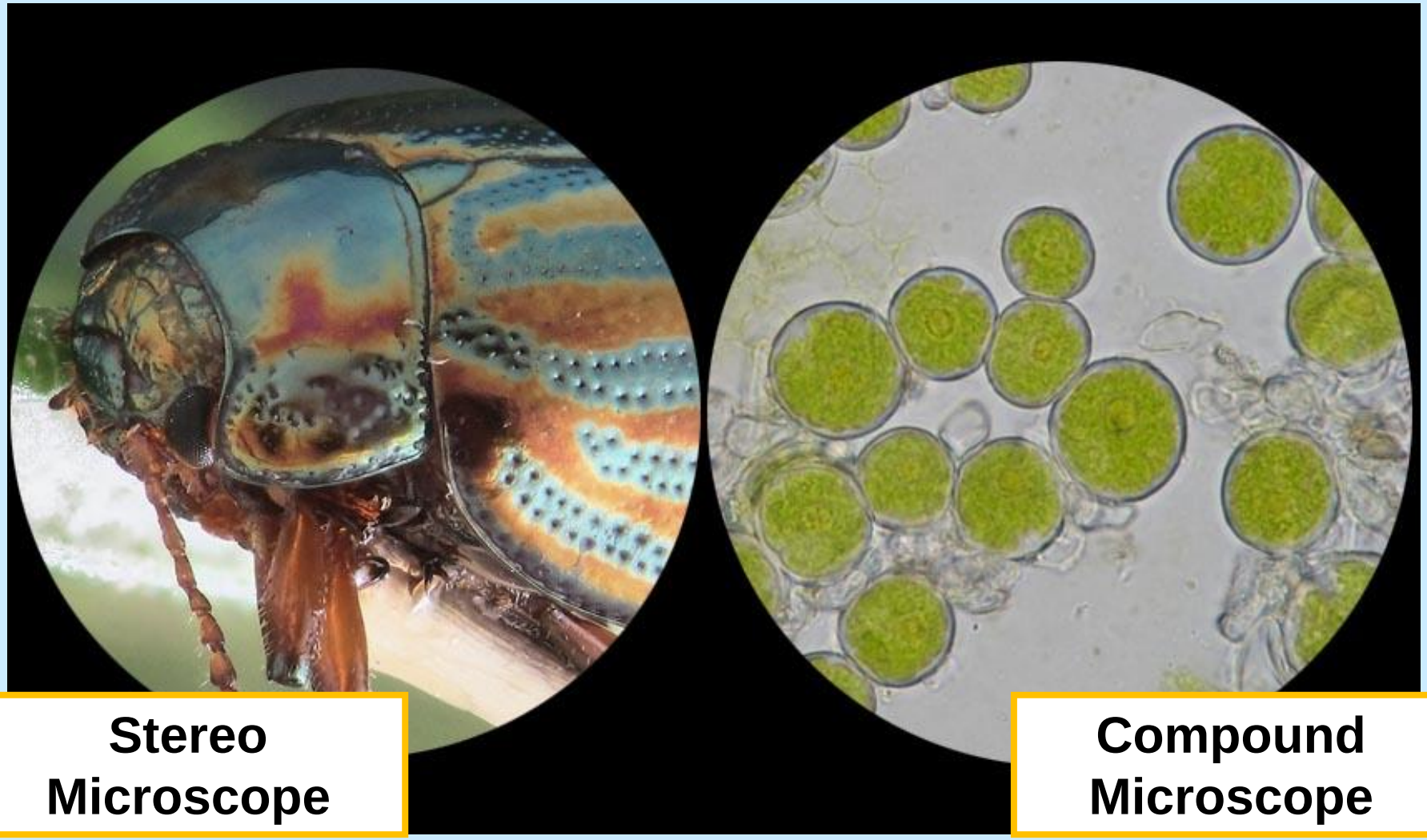


Magnifies 40x - 1000x

What microscope would inspect the bug? The cells?



What microscope would inspect the bug? The cells?

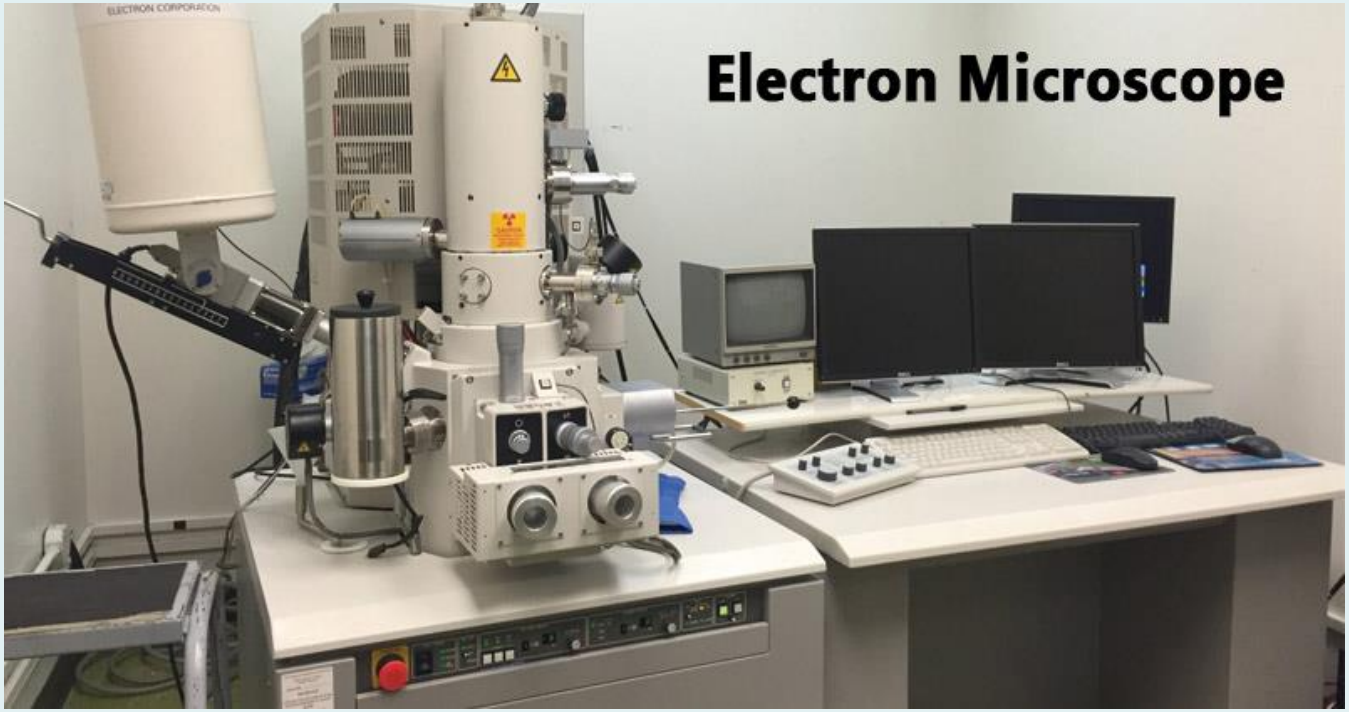


Stereo Microscope

Compound Microscope

What is an electron microscope?

- An electron microscope uses a beam of electrons instead of light to produce a magnified image.



2 Main Types of Electron Microscopes

- Scanning Electron Microscope (SEM)

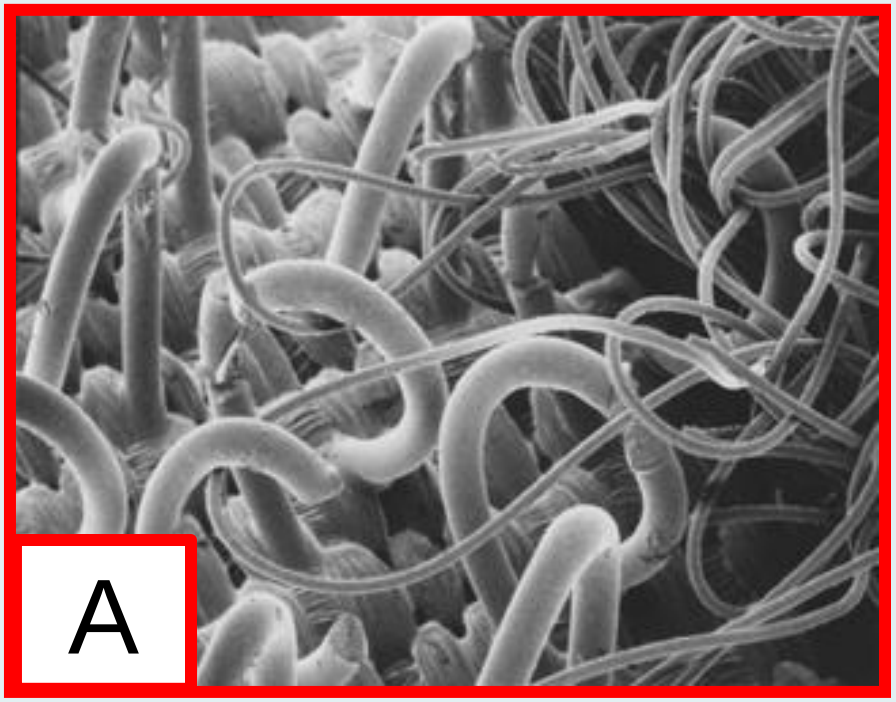
- Transmission Electron Microscope (TEM)

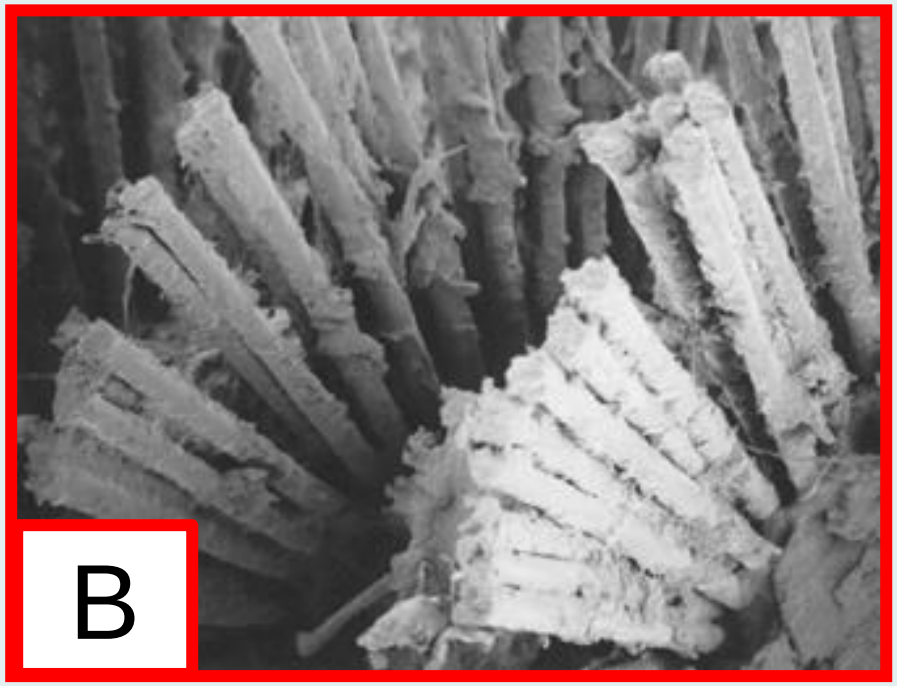
What is a Scanning Electron Microscope?

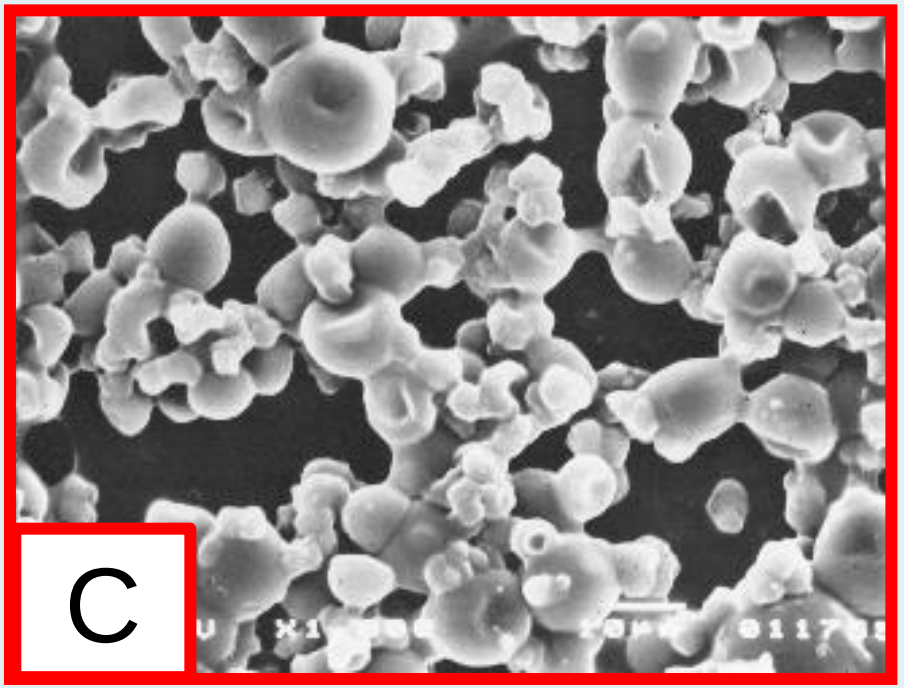
Known as SEM

- Creates an image by detecting reflected or knocked-off electrons
- Provides a 3D image
- Can magnify up to 1-2 million times

What do you think each is?



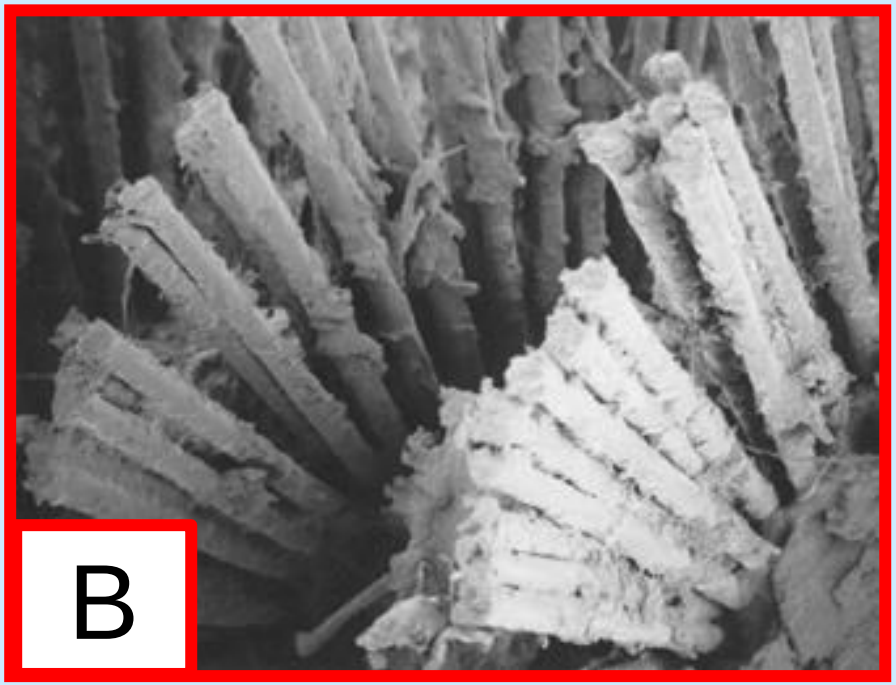




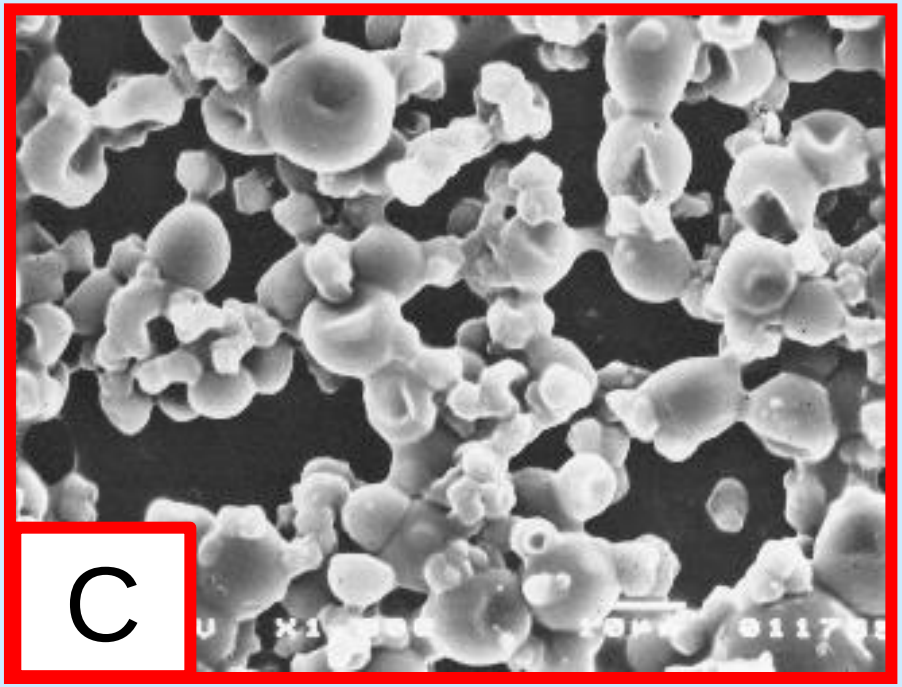
What do you think each is?

Velcro

A



B



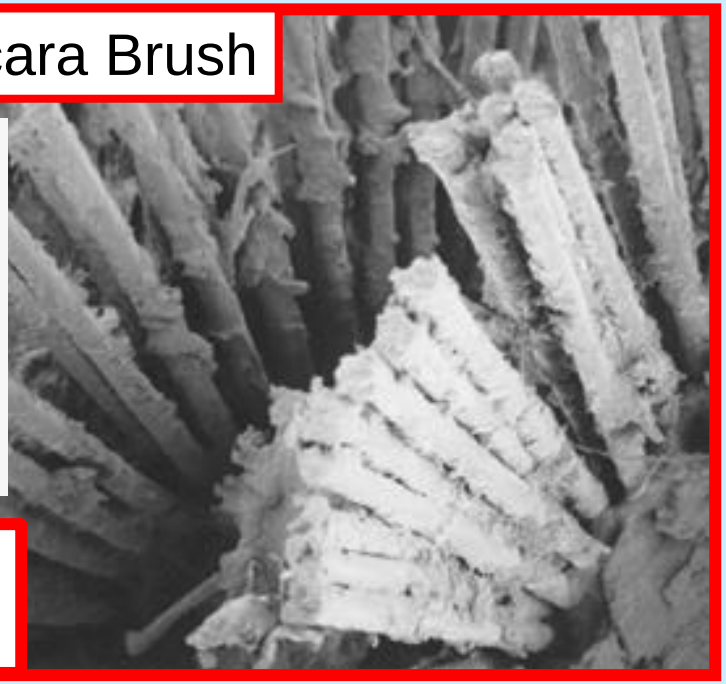
C

What do you think each is?

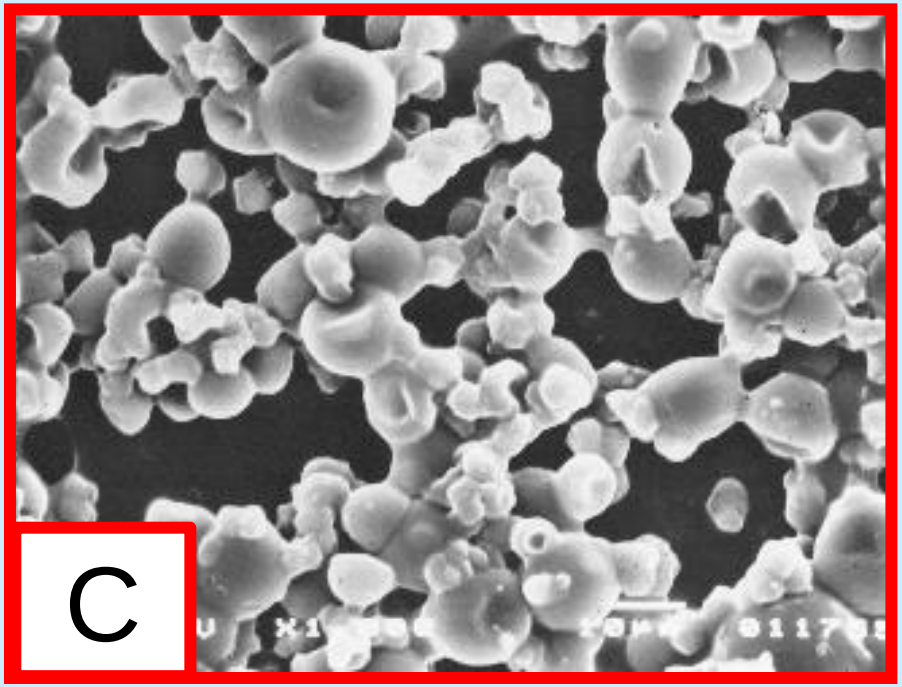
Velcro

A

Mascara Brush



B



C

What do you think each is?

Velcro

A

Mascara Brush

B

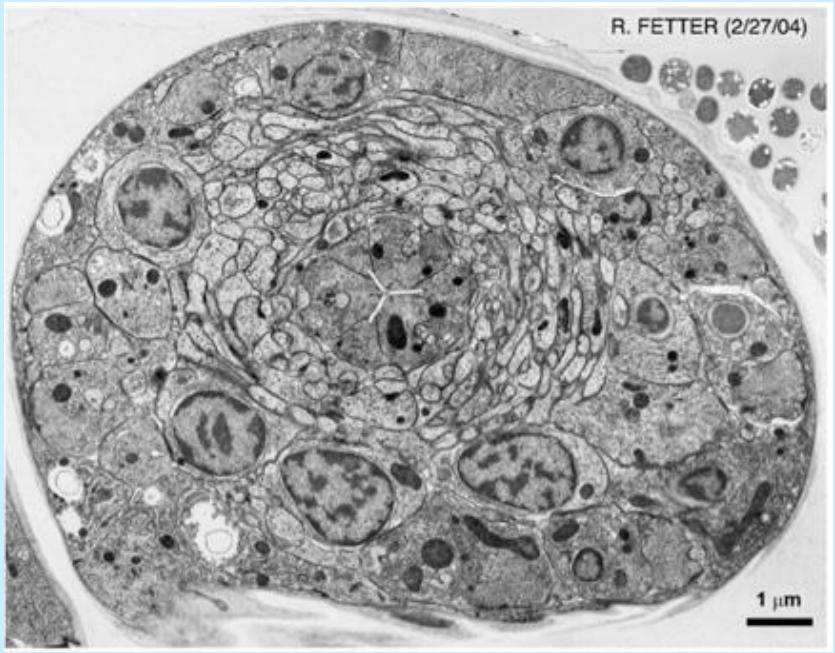
Scratch & Sniff Paper

C

What is a Transmitting Electron Microscope?

Known as TEM

- Uses transmitted electrons (electrons which are passing through the sample) to create an image.
- Provides a 2D image
- Can magnify samples by more than 50 million times
- TEM would be used to study a tiny virus



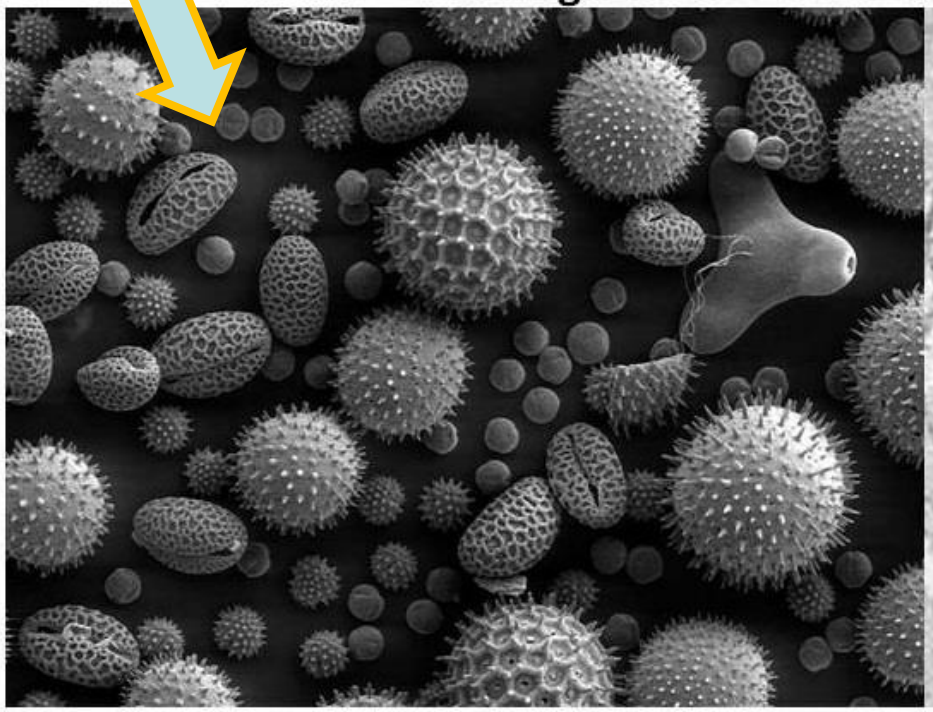
Scanning Electron Microscope (SEM)

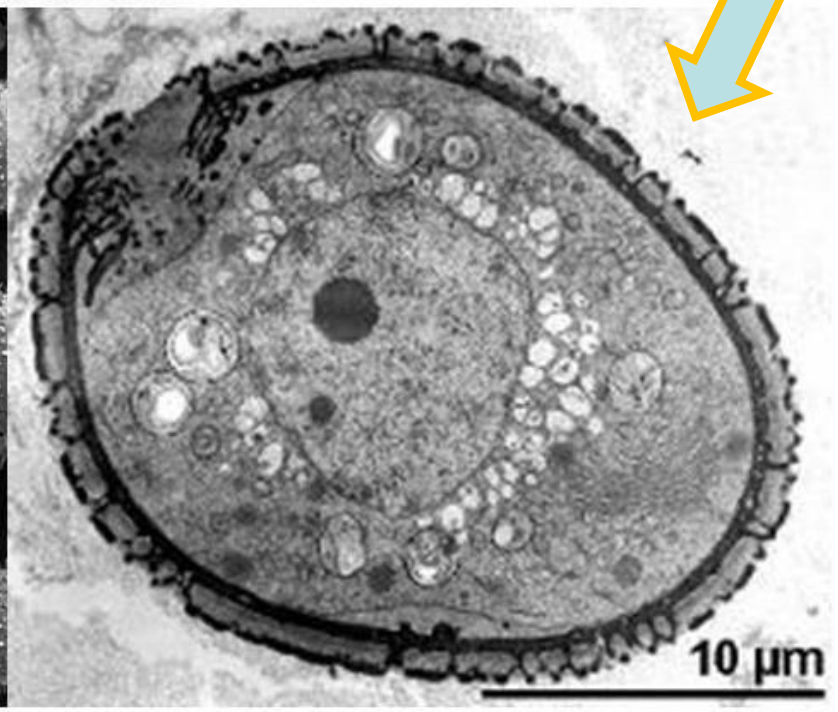
Notice how the pollen grain is 3D in this image with lower magnification.

Transmitting Electron Microscope (TEM)

Notice how the pollen grain is 2D in this image with higher magnification.

Pollen grain under SEM and TEM

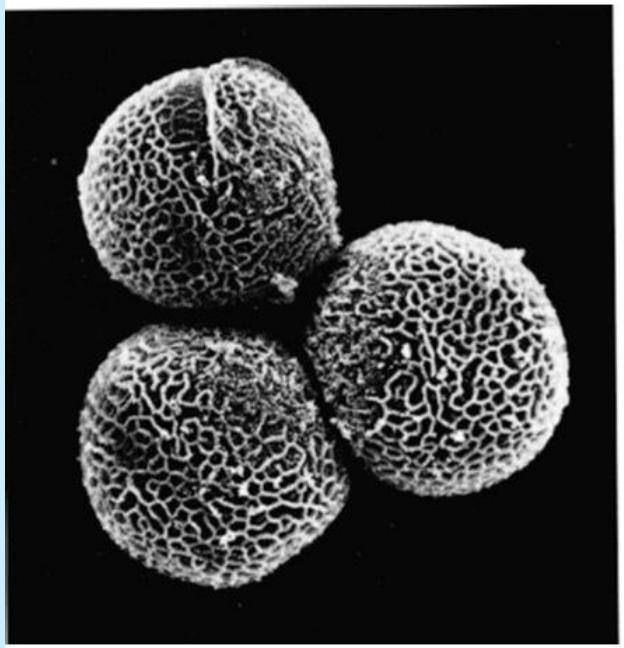


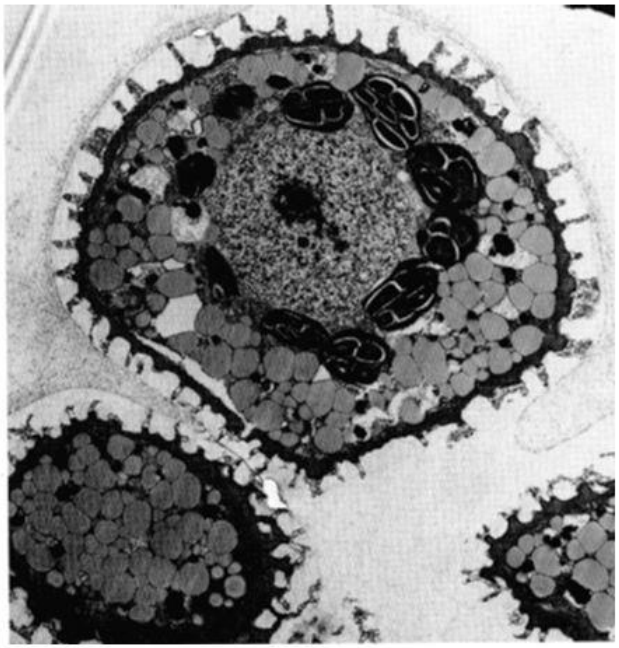


Scanning Electron Microscope (SEM) vs Transmission Electron Microscope(TEM)

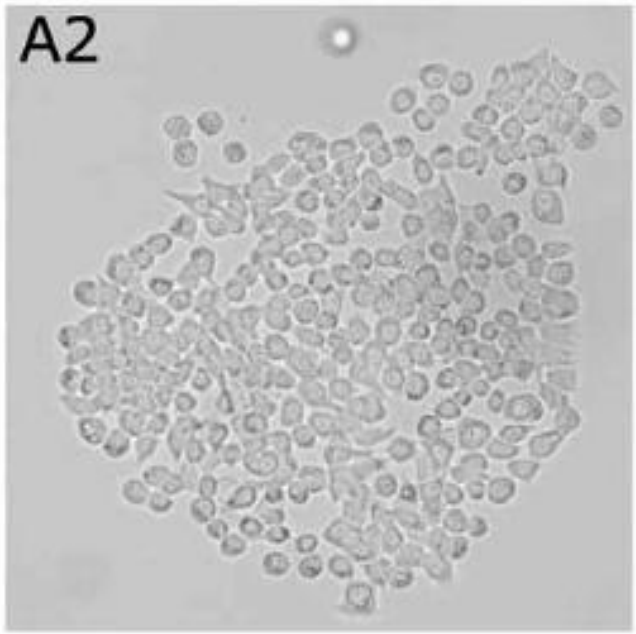
Scanning Electron Microscope (SEM) focuses on the exterior of a specimen while the Transmitting Electron Microscope (TEM) focuses on the interior.

SEM vs. TEM

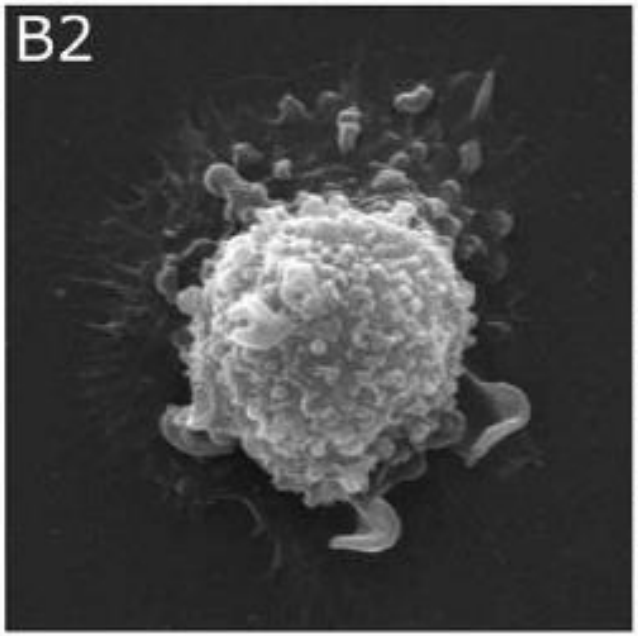




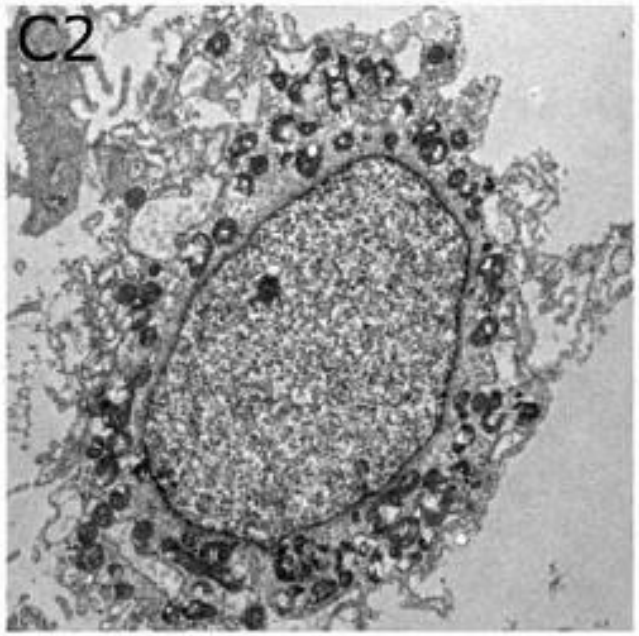
Look at how the same specimen can be magnified differently using the light microscope, scanning electron microscope, and the transmitting microscope.



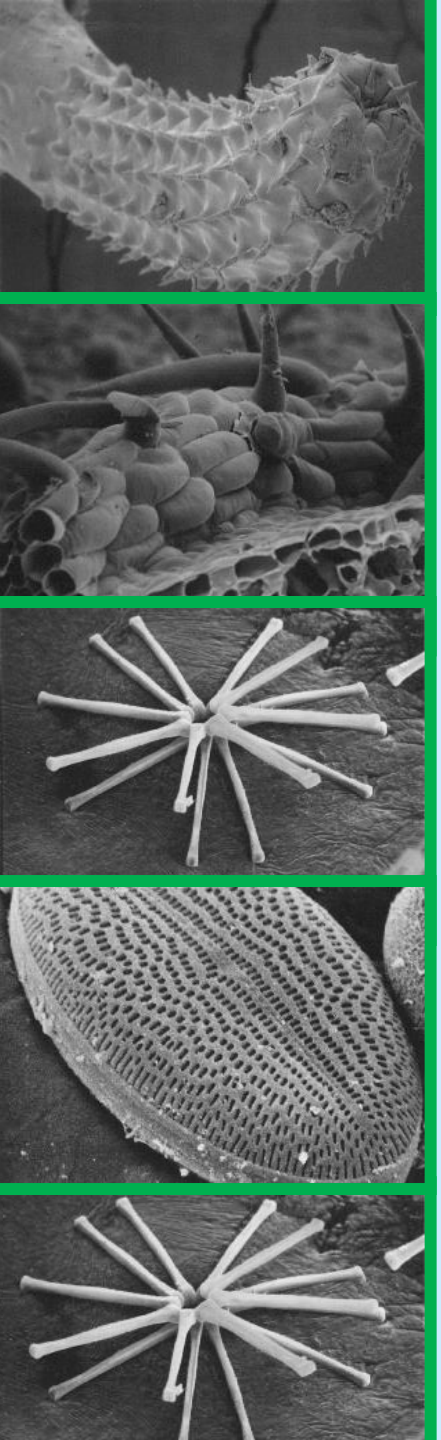
light microscope



scanning electron microscope



transmission electron microscope

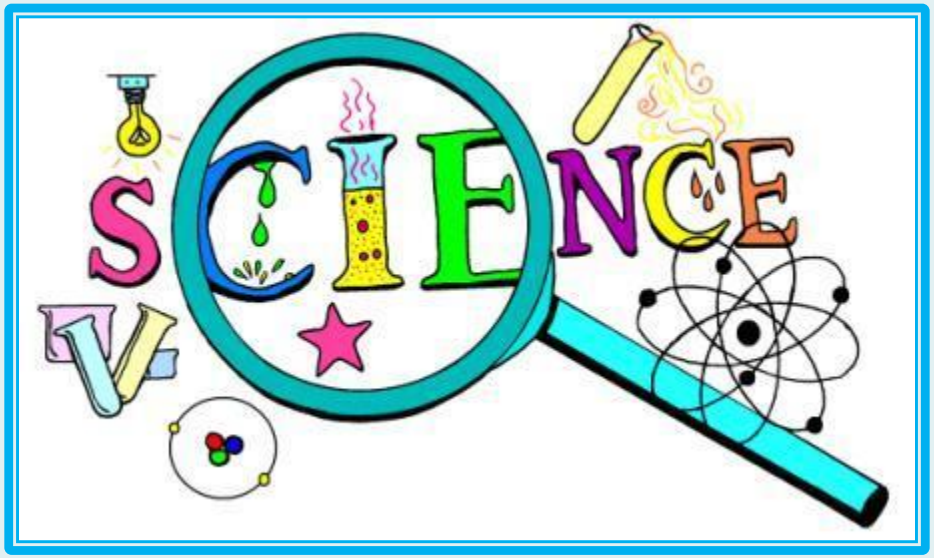


A **microscope** is an important scientific tool. Microscopes help scientists and doctors see things that are too small to see with their eyes by making them appear larger. When microscopic things can be seen, they can then be examined and studied.

Microscopes are also commonly used in schools to help students in science classes such as biology or chemistry.

Why do you think microscopes are important tools for scientists?

Have fun learning! If you are interested in more science related PowerPoints and activities, check out thehomeschooldaily.com



For he looketh to the ends of the earth, and seeth under the whole heaven; Job 28:24

References

- https://www.dkfindout.com/us/science/microscopes/what-is-microscope/
- https://blog.phenom-world.com/sem-tem-difference
- http://ibbiologyhelp.com/Cells/ultrastructure.html
- https://kids.kiddle.co/Microscope

Thank you!