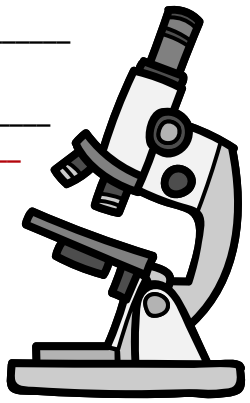
B1.1 - Microscopy, Culturing microorganisms and Standard form

Microscopes allow us to view small structures unable to be seen by the naked eye

Light Microscope



Two Lenses: _____ and _____

Maximum Magnification: _____
Maximum Resolution: _____

Advantages:

-Easy to use
-_____
-Small and portable
-Can observe _____ specimens

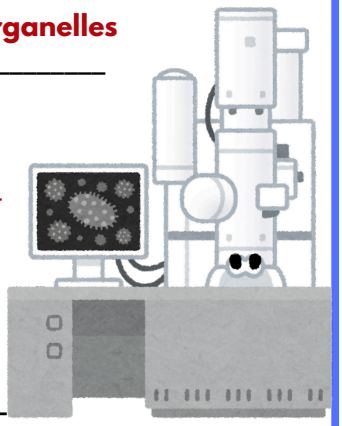
Disadvantages:

-Limited _____
-Smaller magnification compared to electron microscopes

Uses _____ illuminated from beneath

Total Magnification =
_____ x
_____

Electron Microscope



Allows us to see smaller organelles such as: _____

Maximum Magnification: _____

Maximum Resolution: _____ (SEM) or _____ (TEM)

Advantages:

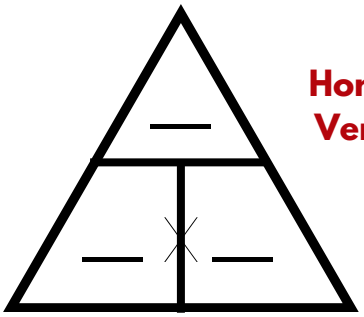
-Greater _____
-Greater _____
-Can transmit _____ (SEM)

Disadvantages:

-Requires _____ to use
-_____
-Large and non-portable
-Can only observe dead specimens
-_____ (TEM)

Uses electrons which, due to _____, allow us to have greater magnification and resolution

The _____ formula



Horizontal lines of these triangles mean divide
Vertical lines of these triangles mean multiply
For example:

__ = __ x __
__ = __ / __
__ = __ / __

Used when calculating:

I = _____
____ = Actual size
M = _____

It's really useful exam practice to just draw this triangle immediately on the first available page. Then, you don't need to remember the equation, only this triangle.

Culturing microorganisms

Bacteria replicate via _____, which is an asexual replication where they split into two.

We can calculate population growth if given: Mean replication time and Length of time population was left to grow (Overall time).

_____ / _____ = Number of times replicated.

(Original bacteria count x 2^_____) = _____

Higher only!

Standard Form

The number is represented as a number that is being multiplied by a power of 10

For example:

1×10^{-5} = _____

3.41×10^{2} = _____

_____ = 2500.0

Often used when culturing due to _____

When converting in and out: just imagine you are moving the decimal point forwards (positive number) or backwards (negative number) for that amount

Culture mediums contain various sugars, proteins, vitamins and minerals to allow bacterial survival and growth!

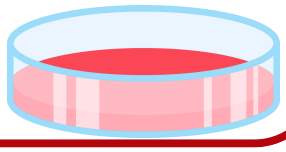
When culturing, there are two different methods to do so

Nutrient Broth

1. Mix a suspension of bacteria with sterile _____ (culture medium) in a tube
2. Plug the tube with wool to avoid _____
3. Frequently _____ the tube to provide _____ to bacteria

Agar gel plate

1. Hot sterilised _____ (culture medium) poured onto a sterile _____, then _____
2. An _____ is then used to spread the cultures along the agar
3. Lid is _____ and dish _____
4. Dish left to let bacteria grow



Antibiotic testing

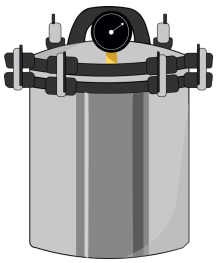
You can soak paper discs in different antibiotics, and place them on the agar plates to see _____, by looking at the _____!

1. Place the discs evenly spaced over the plate, one being a _____.
2. Incubate for 3 days at 25 degrees Celsius
3. _____ bacteria will grow, _____ bacteria will die or not grow
4. The Zone of Inhibition (ring of no growth) can be measured. Larger ring = _____

πr^2

Why do we follow these culturing steps?

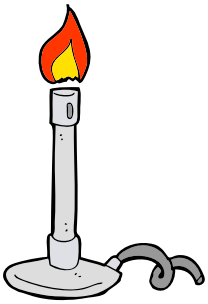
Sterilisation of the dish and medium before use



_____

_____ could _____ with our bacteria and steal the _____

Passing inoculating loop through flame



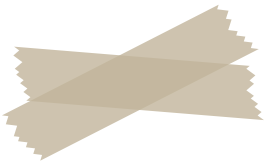
_____

Bacteria cannot survive the **extreme** temperatures of the fire

Taping on the lid

Stops _____

Should **not** be completely sealed, allowing _____ to enter



This stops _____ from growing

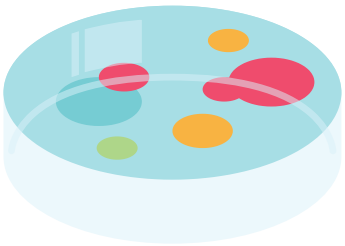
Storing the petri dish upside down

As the bacteria are alive and **respiring**,

_____

Storing it upside down **prevents**

_____



Culture is incubated at 25 degrees Celsius

This temperature is the _____ temperature for the bacterial growth

Human body temperature (37 degrees Celsius) would be **too high**