



## INTRODUCTION TO THE USE OF PRACTICAL LABORATORY

### General Lab Safety

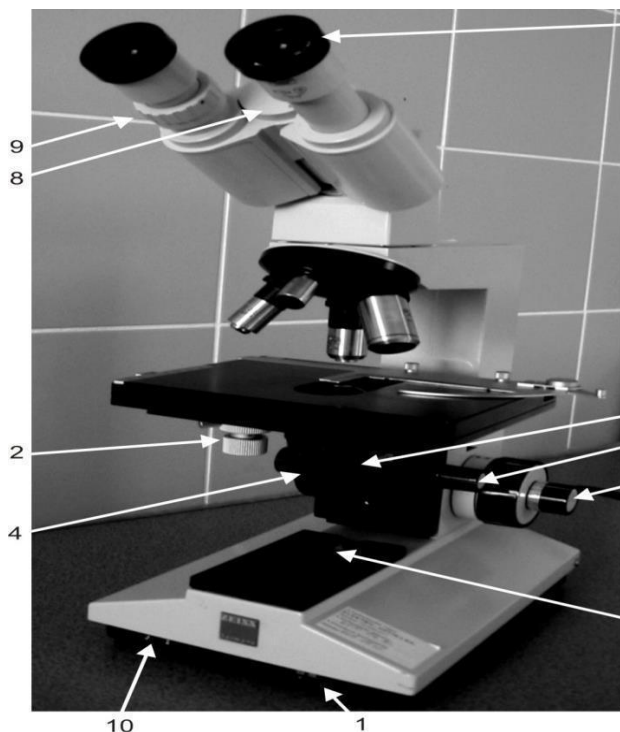
1. Do not eat, drink and apply cosmetics while in the lab.
2. Always wear shoes at all times.
3. Never place any personal items on the floor and the countertops.
6. If you wear long sleeves, roll them back up your arm.
7. Disinfect your work area before lab starts and at lab's end.
8. Disinfect your work area if you make a spill.
9. Wash your hands before and at the end of the lab period.
10. Wash your hands if they become contaminated with microbes.
12. Wash your hands when you remove your gloves.
13. For whatever reason, always scrub your hands for a minimum of 24 seconds.
14. Keep hands, pencils, pens etc. out of your mouth.
15. Keep your work area uncluttered.
16. Do not insert contact lenses in the lab.
17. Wear eye protection when heating chemicals or if you wear contact lenses.
18. Turn off Bunsen burners when not in use. They are a hazard and also a source of heat in the room.
22. Never pipette by mouth.
24. Don't touch broken glassware. Use a broom to remove.
25. Wear disposable gloves while staining or handling microbes.

## Contaminated Materials Disposal:

1. Place all plate cultures in an autoclavable bag for disposal when finished with them.
2. Place all microscope slides in the container marked “slides”. They will be immersed in a disinfectant solution in this container.
3. Remove all labels from plates or tubes before disposal.
4. Place all gloves in their respective autoclavable bag.

## MICROSCOPES

The eyepiece draws a direct image of the test object. The fine structure of an image observed in the microscope depends on the details of the real picture, which in turn is determined by the resolution of the objective. This image, however, is not visible to the naked eye; it can only be visualised in the magnification of the eyepiece.



6 **Fig (1.) Laboval type microscope.**

- (1) power switch
- (2) stage x and y axis travel knobs
- (3) condenser focus knob
- (4) field lens
- (5) coarse and fine focus knobs
- (6) eyepiece
- (7) condense aperture diaphragm control ring
- (8) interpupillary distance scale of the binocular tube
- (9) diopter ring
- (10) brightness control dial
- (11) gray filter

## **EXERCISE 1: EXAMINATION OF MICROORGANISMS INHABITING NATURAL WATERS BY BRIGHT-FIELD LIGHT MICROSCOPY**

### **Object of study, test organisms:**

bacteria and protists of natural waters

### **Materials and equipment:**

environmental water sample (e.g. from a lake or an aquarium)

glass slides

cover slips

glass dropper dispenser alcohol (for sterilisation)

Bunsen burner






light microscope






### **Practice:**





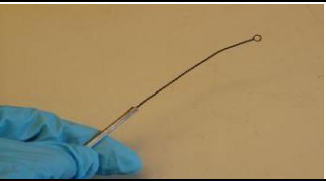



1. Degrease the surface of a glass slide with alcohol over a Bunsen burner and then label the slide.
2. Put one drop of the sample to the slide with a glass dropper.
3. Place the edge of a cover slip on the slide so that it touches the edge of the water drop. Slowly lower the cover slip to prevent the formation and trapping of air bubbles.
4. Place the sample under the microscope, and locate the focal plane.
5. Use first an objective lens of 16x, and then 40xmagnification.
6. Observe the shape and movement of microbes, in case of protists and eukaryotic algae, try to identify the different cell organelles (e.g. chloroplasts).

**Draw the field and put observations about the drawings.**




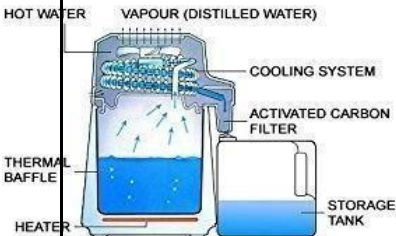
## Some of tools and devices used in microbiology laboratory

N.	Tools and devices	pictures	The use
1	The Light Microscope		used to see objects that are too small to be seen by the naked eye
2	Autoclave		used to carry out industrial processes requiring elevated temperature and pressure different from ambient air pressure
3	Incubator		used to grow and maintain <u>microbiological cultures</u> or <u>cell cultures</u> . The incubator maintains optimal <u>temperature</u> , <u>humidity</u> and other conditions such as the <u>carbon dioxide</u> (CO <sub>2</sub> ) and <u>oxygen</u> content of the atmosphere inside.
4	Incubator shaker		This equipment is very useful since in order for a cell to grow, it needs Oxygen, and nutrients, and that require shaking so that they can be distributed evenly around the culture
5	pipette		is a laboratory tool commonly used in <u>chemistry</u> , <u>biology</u> and <u>medicine</u> to transport a measured volume of liquid, often as a <u>media dispenser</u> .
6	Biosafety cabinet		used for aseptic transfer of sterilized materials, as well as for inoculation of microbes.

7	<b>Oven</b>		It is used for sterilization of glassware's, such as test tubes, pipettes and petri dishes.
8	<b>PH Meter</b>		A pH meter is an instrument for determining the pH of liquid media
9	<b>Colony Counter</b>		In enumeration of bacteria in samples, it is assumed that a single bacterium gives rise to a single visible colony, when grown on a plate of solidified nutrient medium.
10	<b>Vortex Mixer:</b>		It is an instrument used for thorough mixing of liquids in test tubes.
11	<b>Delicate scales</b>		<u>measure weight</u> or calculate <u>mass</u> .

12	<b>Petri Dishes</b>		used to make <u>agar plates</u> for <u>microbiology studies</u>
13	<b>Microscopically Slides</b>		used to hold objects for examination under a <u>microscope</u> .
14	<b>Cover Slide or Cover Slip</b>		that is placed over objects for viewing with a <u>microscope</u> .
15	<b>Bunsen Burner</b>		for heating, sterilization, and combustion.
16	<b>Inoculating Loop</b>		used mainly by <u>microbiologists</u> to retrieve an <u>inoculum</u> from a <u>culture</u> of microorganisms.
17	<b>Inoculating Needle</b>		used in the field of <u>microbiology</u> to transfer and inoculate living <u>microorganisms</u>
18	<b>Cork Borer</b>		is a metal tool for cutting a hole in a cork or rubber stopper to insert glass tubing
19	<b>Filter Paper</b>		is a semi-permeable <u>paper</u> barrier placed <u>perpendicular</u> to a liquid or air flow. It is used to separate fine substances from liquids or air.



20	<b>Refrigerator</b>		Stock cultures of bacteria are also stored in it between sub-culturing periods. It is also used for the storage of sterilized media, so as to prevent their dehydration.
21	<b>Centrifuge</b>		used to separate substances of greater and lesser density.
22	<b>Thermometer</b>		a temperature sensor (e.g. the bulb of a <u>mercury-in-glass thermometer</u> or the digital sensor in an <u>infrared thermometer</u> ) in which some change occurs with a change in temperature.
23	<b>Water distillatory</b>		
24	<b>Flask</b>		
25	<b>Funnel</b>		
26	<b>Beaker</b>		
27	<b>Forceps</b>		