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LABORATORY ACTIVITY

FISH DISEASE MANAGEMENT DYQ20023

EIRNA LIZA BINTI NORDIN
POLITEKNIK
SANDAKAN SABAH

LABORATORY ACTIVITY

FISH DISEASE MANAGEMENT DYQ20023

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PREFACE

FISH DISEASES MANAGEMENT: This laboratory activities book is designed for Diploma of Aquaculture 2nd Semester students of Politeknik Sandakan Sabah. This book complies with the polytechnics syllabus for subject DYQ20023 for Fish Disease Management which is designed to equip students with the knowledge and understanding of fish diseases and their management. This book covered laboratory activity from the syllabus and it is designed as a laboratory excercise book. This book also provides students with the knowledge and skills in microscope handling, disease prevention, treatment method, and, handling of chemicals.

Eirna Liza binti Nordin

TABLE OF CONTENT

LABORATORY ACTIVITY 1 : INTRODUCTION TO MICROSCOPY

EQUIPMENTS / MATERIALS :

Compound microscope and dissecting microscope.

PROCEDURES :

1. Identify parts of the compound microscope and a dissecting microscope.

OBJECTIVE :

1. To identify the parts found on a compound microscope and a surgical microscope.

2. To understand the function of parts found on a compound microscope and a surgical microscope.

3. To understand the correct method of operating a microscope.

INTRODUCTION:

A microscope is an instrument that can be used to observe small objects, even cells. The image of an object is magnified through at least one lens in the microscope. This lens bends light toward the eye and makes an object appear larger than it actually is.

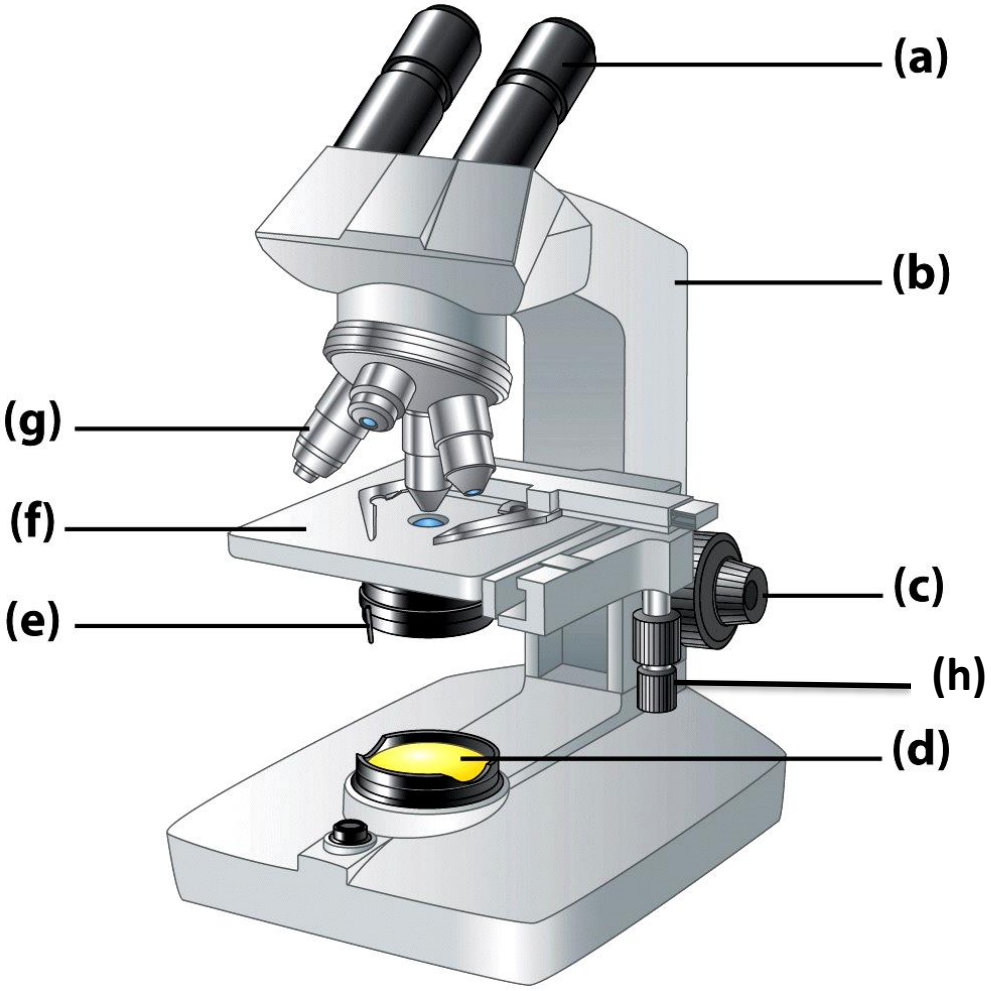
While the modern microscope has many parts, the most important pieces are its lenses. It is through the microscope's lenses that the image of an object can be magnified and observed in detail. A simple light microscope manipulates how light enters the eye using a convex lens, where both sides of the lens are curved outwards. When light reflects off of an object being viewed under the microscope and passes through the lens, it bends toward the eye.

Two types of microscope commonly used in the laboratory are dissecting microscope and compound microscope. The dissecting microscope provides a lower magnification than the compound microscope but produces a three-dimensional image. This makes the dissecting microscope good for viewing objects that are larger than a few cells but too small to see in detail with the human eye. The compound microscope is typically used for observing objects at the cellular level.

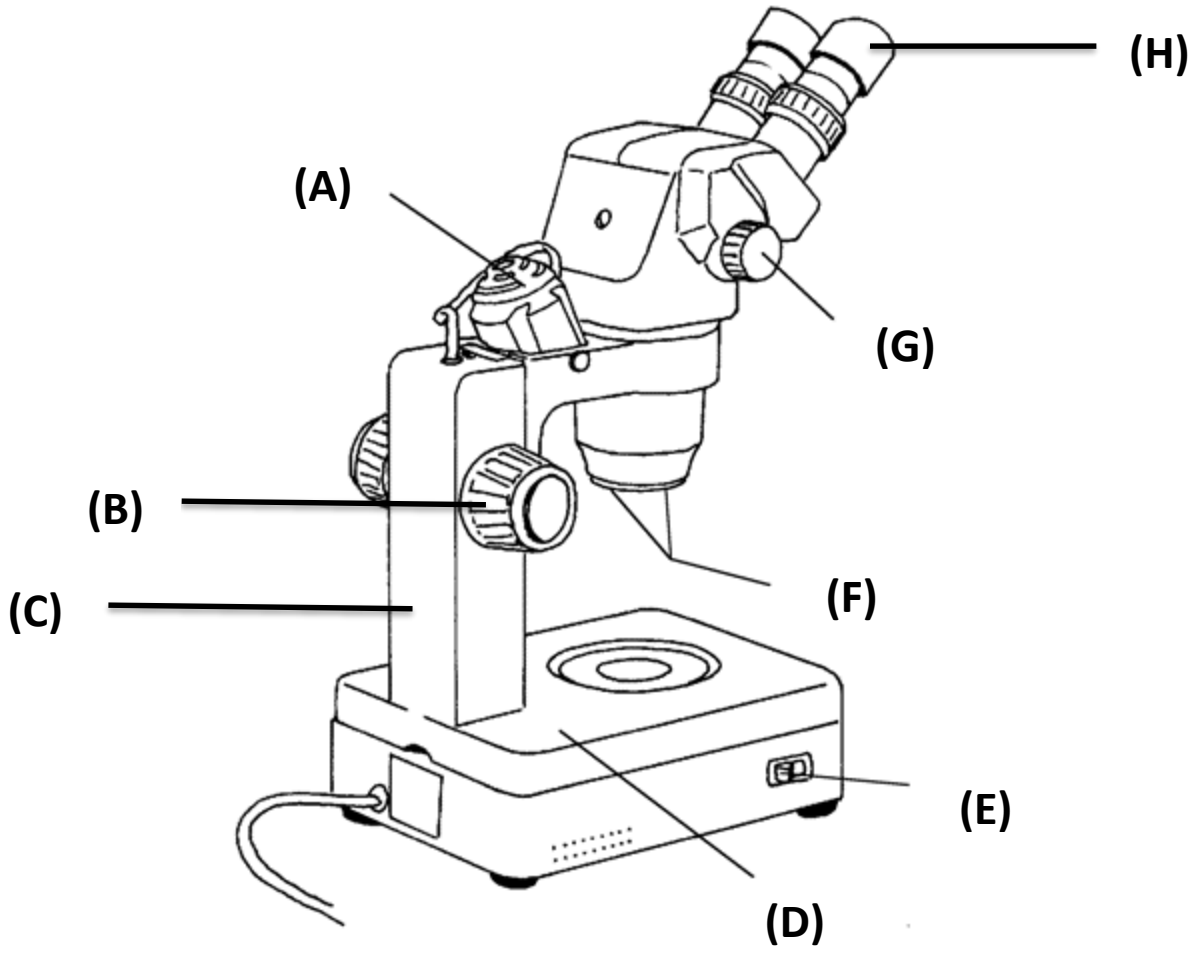
RESULTS/DATA:

Fill in the blanks with the function of each part of a microscope:

No.	Parts	Function
1	*Eyepiece*	
2	*Body tube*	
3	*Arm*	
4	*Nosepiece*	
5	*Objectives*	
6	*Scanning power objectives*	
7	*Low-power objective*	
8	*High-power objective*	
9	*Oil immersion objective*	
10	*Coarse-adjustment knob*	
11	*Fine adjustment knob*	
12	*Diaghpragm*	
13	*Light source*	
14	*Base*	
15	*Stage*	
16	*Stage Clip*	
17	*Mechanical stage*	
18	*Mechanical stage control knob*	



No.	Name	No.	Name
a		e	
b		f	
c		g	
d		h	



No.	Name	No.	Name
A		E	
B		F	
C		G	
D		H	

DISCUSSION:

1. State two types of microscope used in laboratory activity?

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2. Explain the function of *oil immersion*?

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3. State the difference between the two types of microscopes you have studied.

CONCLUSION:

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LABORATORY ACTIVITY 2 : SPECIMEN OBSERVATION

EQUIPMENTS / MATERIALS :

Compound microscope, permanent slide (sample)

PROCEDURES :

1. Place the permanent slide (sample) onto the microscope stage.
2. Turn the coarse focus knob slowly then turn the fine focus knob slowly until the sample is in focus and seen clearly.
3. Observe specimen under different magnifications (4x,10x,40x, and 100x)
4. Draw / picture the results.

OBJECTIVE :

1. To observe the specimen under a compound microscope.
2. To develop students' technique on specimen observation using a microscope.

INTRODUCTION:

An observation method in which phase, objects are visualized. A diaphragm with a slit is arranged at a position away from the center of the optical axis in the optical path of the illumination. The illumination light with an angle that passes through that slit illuminates the specimen.

RESULTS/DATA:

Specimen name: Magnification:
Specimen name: Magnification:

RESULTS/DATA:

Specimen name: Magnification:
Specimen name: Magnification:

DISCUSSION:

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CONCLUSION:

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LABORATORY ACTIVITY 3 : MAGNIFICATION CALCULATION

EQUIPMENTS / MATERIALS :

Pen, calculator, specimen

PROCEDURES :

1. Calculate the real size of specimen using the formula given.

OBJECTIVE :

1. To calculate the real size of specimen (mm)

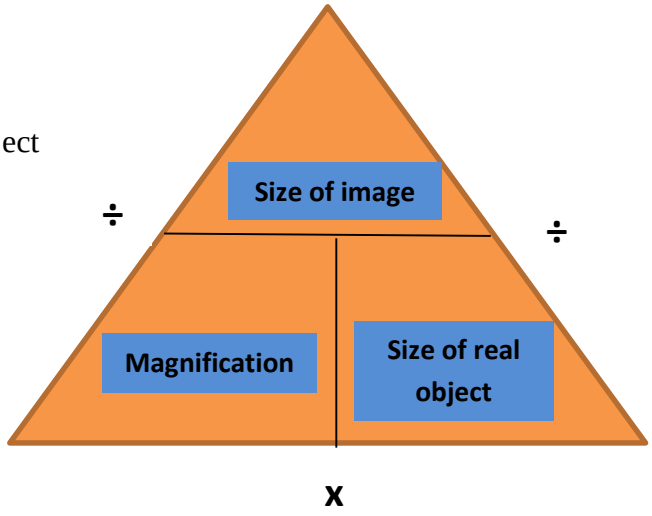
INTRODUCTION:

Most cells are very small and can only be seen through a microscope. The cell image that you see through the microscope will be much larger than the object in real-life, and so it can be hard to imagine exactly how small it actually is. However, if we know the magnification of the microscope, then we can use the image size to calculate the actual size of the cell using the following formula: size of real object = size of image magnification. We can also rearrange this equation so that, if we need to, we can work out what the image size will be or what the magnification of the microscope is.

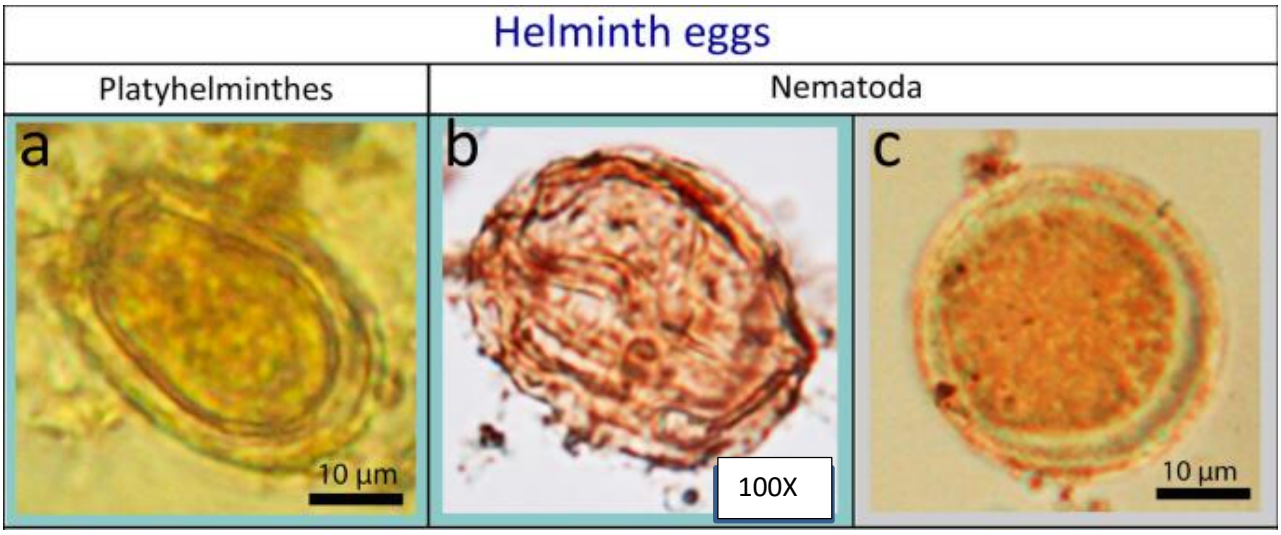
These two equations are:

Size of image = magnification × size of real object

Magnification = size of image size / size of real object



RESULTS/DATA:



Picture by: Sandra et al (2020)

No	Size of image (mm)	Magnification	Real size of the specimen (mm)
a	10	40x	
b		100x	0.05
c	10		0.25

Calculation:

DISCUSSION:

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CONCLUSION:

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LABORATORY ACTIVITY 4 : ECTOPARASITE EXAMINATION

EQUIPMENTS / MATERIALS :

Fish, dissecting set, compound microscope, dissecting microscope, fish tray, petri dish, glass slide, coverslip, sodium chloride (NaCl), distilled water

PROCEDURES :

Preparation of saline water:

1. Put 8.5g of NaCl in 1000 ml of distilled water.

Ectoparasite examination:

1. Pitch the nerve cord to kill the fish.
2. Smear on the surface of the body, abdomen, pectoral fin, caudal fin, and dorsal fin.
3. Cut off the operculum and take out the gill arches and smear the gill part.
4. Put the mucus on the glass slide and add a few drops of saline water.
5. Carefully put the cover slip on the glass slide and examine the slide under miscrosope.

OBJECTIVE :

1. To identify different types of ectoparasite that infects aquatic animals.

INTRODUCTION:

Parasitic diseases are common in fish. Diagnosis can be made through gill biopsy, skin cytology, fecal examination, or necropsy. Common ectoparasites include protozoa, helminths, and crustaceans. Determining the cause of death in a fish is important for maintaining the health of other fish in the same environment.

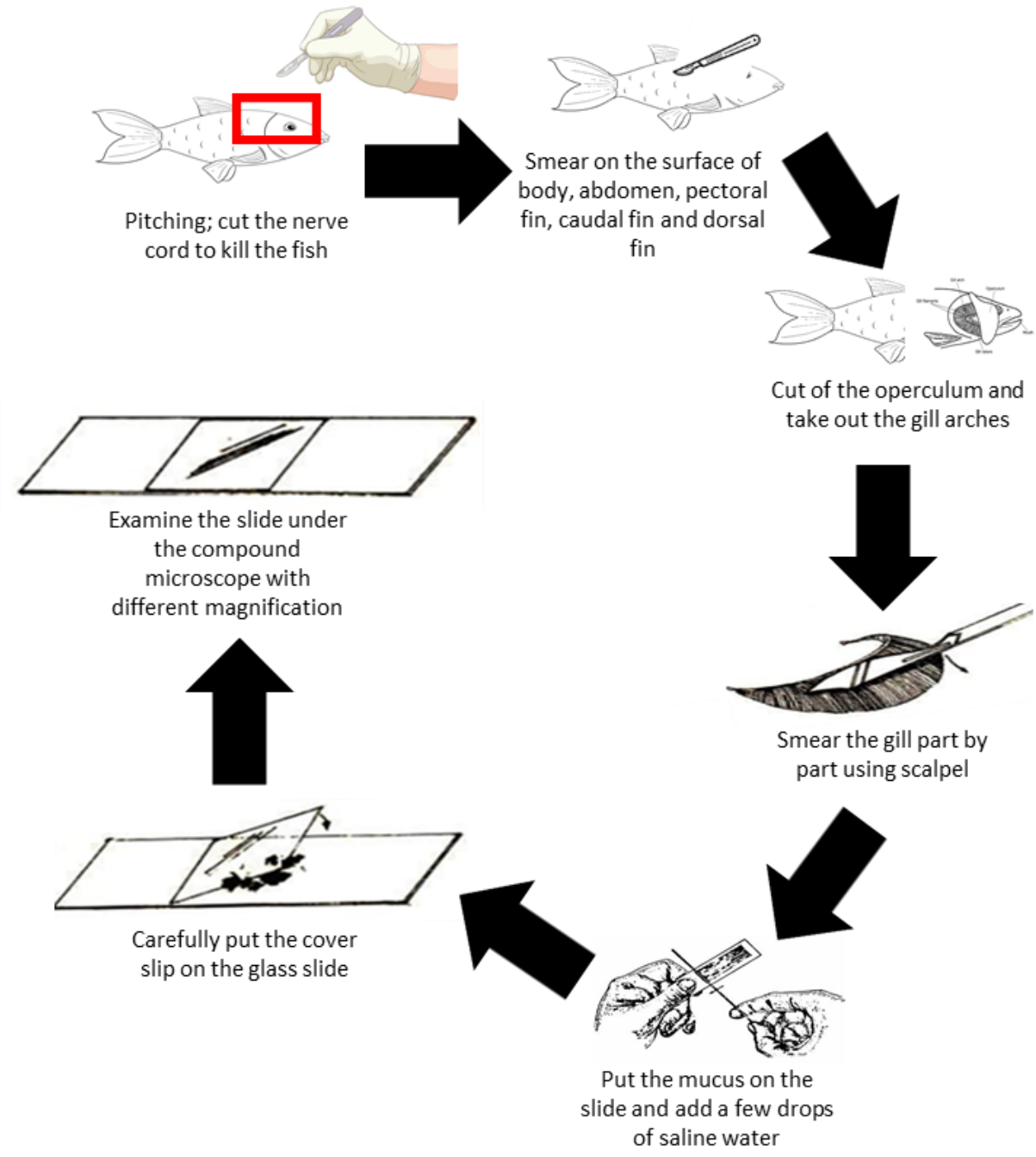

Figure 1: Flowchart of ectoparasite examination

RESULTS/DATA:

No.	Common name	Scientific name

No.	*Weight of fish* (g) / Berat ikan	*Standard Length* (cm) / Panjang Piawai	*Total Length* (cm) / Panjang Keseluruhan /

Name of Parasite	Picture of Parasite
	Magnification:
	Magnification:

DISCUSSION:

1. Explain the life cycle and effects of each parasite you found on the host.

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2. Suggest treatments that can be applied to the parasite-infected host.

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CONCLUSION:

What have you learned during the activity?

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LABORATORY ACTIVITY 5 : ENDOPARASITE EXAMINATION

EQUIPMENTS / MATERIALS :

Fish, dissecting set, compound microscope, dissecting microscope, fish tray, petri dish, glass slide, coverslip, sodium chloride (NaCl), distilled water

PROCEDURES :

Preparation of saline water:

1. Put 8.5g of NaCl in 1000 ml of distilled water.

Endoparasite examination:

1. Pitch the nerve cord to kill the fish.
2. Cut the fish's abdomen area.
3. Cut out the internal organ and put it into a petri dish and add saline water.
4. Observe under a dissecting microscope. Collect parasites if present.
5. Cut the abdominal organ part by part. Use a pair of scissors and cut to open the stomach and intestine.

OBJECTIVE :

1. To identify different types of endoparasites that infect aquatic animals.

INTRODUCTION:

Parasitic diseases are common in fish. Diagnosis can be made through gill biopsy, skin cytology, fecal examination, or necropsy. Common endoparasites include nematode and cestode. Determining the cause of death in a fish is important for maintaining the health of other fish in the same environment.

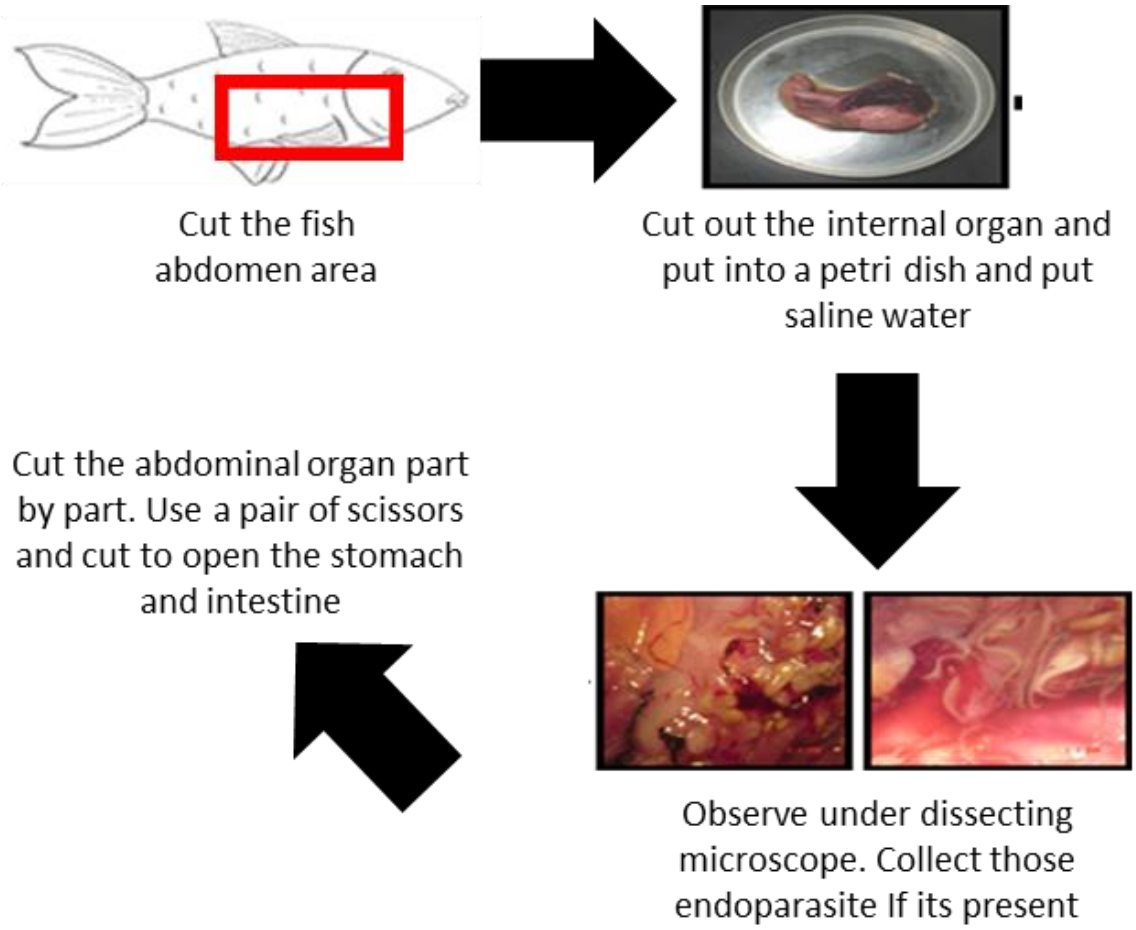

Figure 2: Flowchart of endoparasite examination

RESULTS/DATA:

No.	Common name	Scientific name

No.	*Weight of fish* (g) / Berat ikan	*Standard Length* (cm) / Panjang Piawai	*Total Length* (cm) / Panjang Keseluruhan /

Name of Parasite	Picture of Parasite
	Magnification:
	Magnification:

DISCUSSION:

1. Explain the life cycle and effects of each parasite you found on the host.

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2. Suggest treatments that can be applied towards the parasite-infected host.

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CONCLUSION:

What have you learned during the activity?

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LABORATORY ACTIVITY 6 : PERMANENT SLIDE PREPARATION

EQUIPMENTS / MATERIALS :

Glass slide, coverslip, specimen, clear nail polish.

PROCEDURES :

1. Choose one specimen (parasite) then dry it to remove water.
2. Place the specimen on glass slide.
3. Put clear nail polish as glue onto glass slide.
4. Cover the glass slide with coverslip on top.
5. Dry the glass slide until the slide was sufficiently hardened.
6. Label the glass slide.

OBJECTIVE :

1. To preserve and mount specimen to be kept for a long time.

INTRODUCTION:

Permanent slides carry specimens that are preserved and mounted in mounting medium. They can be kept for a long time. Permanent slides can be bought or they can be made at home. Some people are perfectly satisfied with observing commercially prepared slides. Others find much enjoyment in observing specimens of their immediate environment and in preparing their own permanent slides. Permanent slides use a mounting medium that becomes solid (other possibilities exist as well, such as dry-mounted slides. The specimen is preserved and if properly made, the slide can withstand a century and still be usable.

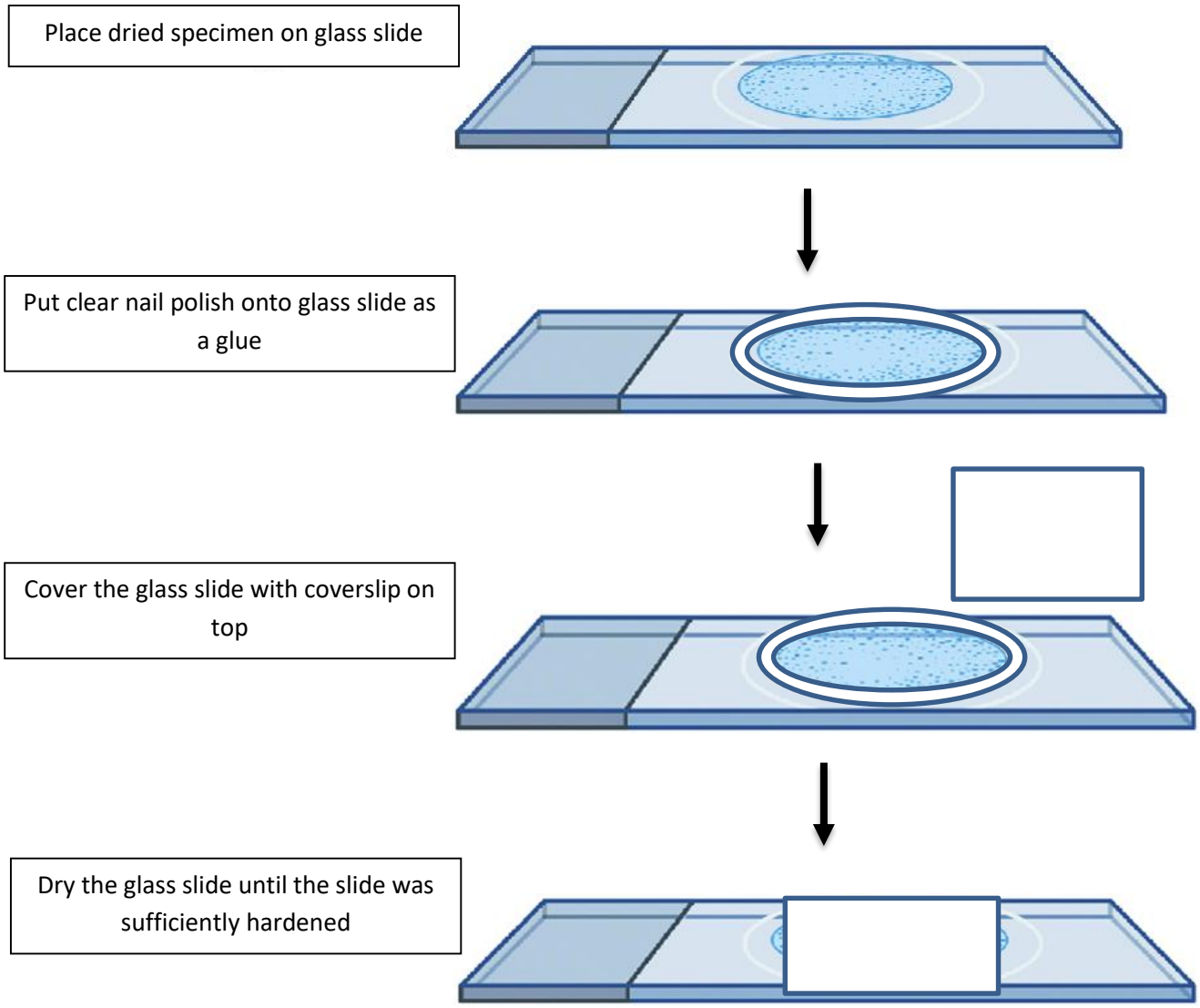

Figure 1: Flowchart of permenant slide preparation

RESULTS/DATA:

No.	Common name of sample	Scientific name of sample

Name of Parasite	Picture of permanent slide

DISCUSSION:

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CONCLUSION:

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LABORATORY ACTIVITY 7 : BIOSECURITY AND GOOD AQUACULTURE PRACTICE (GAP)

EQUIPMENTS / MATERIALS :

Fish scope, basin, tank/aquarium, floor brush, pipe hose, soap, disinfection chemical

PROCEDURES :

1. Manually remove dirt and organic matter from fish scope, basin and tank/aquarium. Otherwise, the disinfectant may not be effective on those items.
2. Wash the items with soap and water.
3. Rinse the items with clean water.
4. Apply an appropriate disinfectant at the proper concentration and duration.
5. Rinse again the items to remove the disinfectant chemical.
6. Dry the items if possible under the sun.

OBJECTIVE :

1. To apply good sanitation and disinfection procedure to comply with the principle of biosecurity and Good Aquaculture Practice (GAP).

INTRODUCTION:

Fish diseases can be prevented and reduced by applying the principle of Biosecurity and following the standard of Good Aquaculture Practice (GAP). Biosecurity is the establishment and implementation of a system or procedures to prevent the introduction of pathogens into a fish hatchery from outside the facility or into a section of the hatchery from another section in the same hatchery. A necessary component of disease prevention and control in a hatchery is disinfection. A disinfectant is an agent that destroys infection-producing organisms. Concentration and duration are important factors that are dependent on the conditions and procedures. Wear protective gear when handling disinfectants, and follow instructions carefully

RESULTS/DATA:

No.	Disinfectant agent	Duration	Concentration

Sanitation / Disinfection method	Picture

DISCUSSION:

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CONCLUSION:

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LABORATORY ACTIVITY 8 : ISOLATION OF PURE BACTERIAL CULTURE

EQUIPMENTS / MATERIALS :

Bunsen burner, inoculation loop, L-shaped bent glass, nutrient agar, fish (tilapia), parafilm

PROCEDURES :

a. Streak Plate Method

1. Sterilize the inoculation loop
2. Streak the inoculation loop onto fish mucus
3. Streak the fish mucus onto the agar plate.
4. Seal the agar plate and leave it at room temperature for 24 hours.
5. Observe the bacterial growth and take pictures.

b. Spread Plate Method

1. Pick an isolated colony from the agar plate culture. Put it in the center of the plate.
2. Spread the culture using an L-shaped rod.
3. Incubate the culture for 24 hours. Observe the growth and take pictures.

OBJECTIVE :

1. To practice the technique to isolate and grow bacteria.
2. To apply handling laboratory equipment and chemical techniques correctly.

INTRODUCTION:

Generally, bacteria exist in a mixed population. It is very rare to get a single and pure form. For studying the cultural, morphological, and physiological characteristics of an individual species, it is essential to separate them from the others to get it in the pure cultured form.

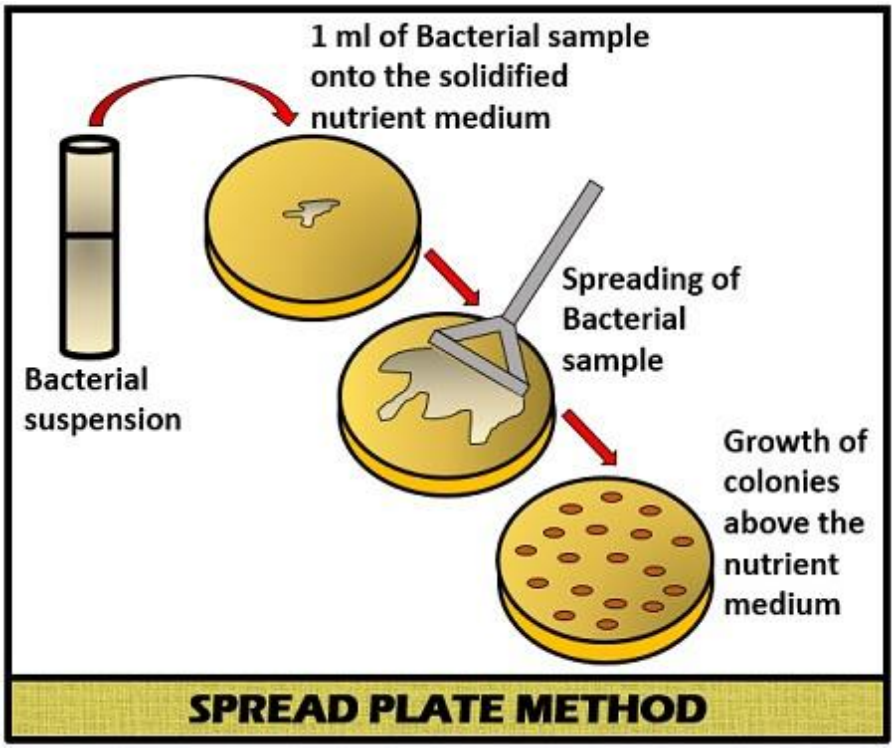

Figure 1: Spread plate method (Picture by: Supriya, 2021)

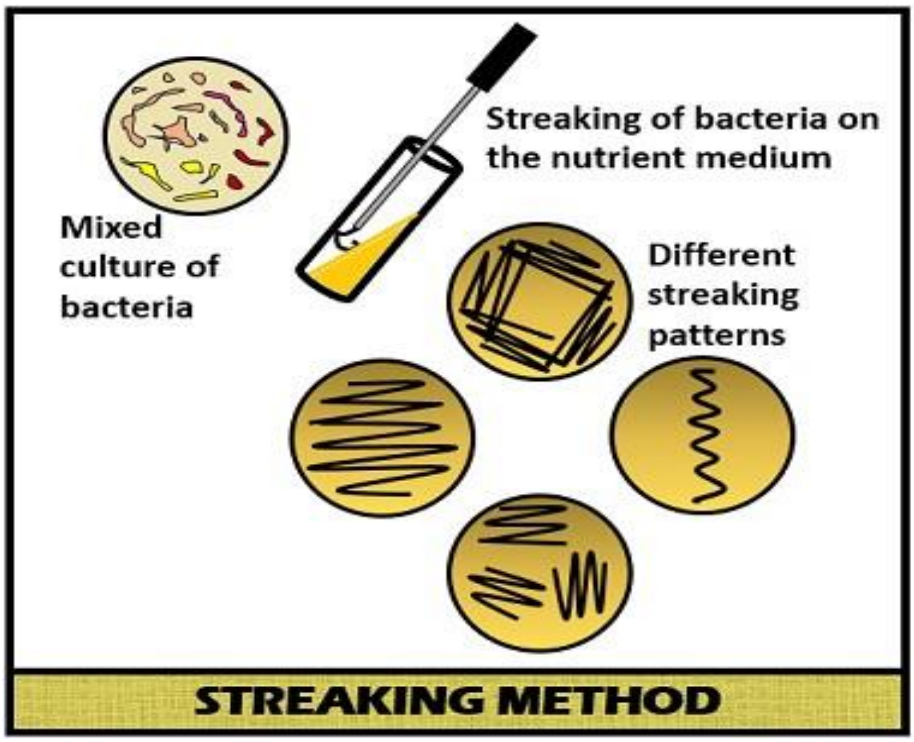

Figure 2: Streaking plate method (Picture by: Supriya, 2021)

RESULTS / DATA:

METHOD	PICTURE OF BACTERIAL GROWTH
Streak Plate Method	
Spread Plate Method	

DISCUSSION:

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CONCLUSION:

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LABORATORY ACTIVITY 9 : HAZARD CHEMICAL HANDLING

EQUIPMENTS / MATERIALS :

Hazardous chemical, glass bottle, permanent marker pen

PROCEDURES :

1. Take one sample of a hazardous chemical.
2. Identify the hazard pictogram of the sample.
3. Take a glass bottle and transfer the sample into the glass bottle.
4. Re-label the new transfer bottles.

OBJECTIVE :

1. To identify and classify a hazardous chemical's class and type.
2. To demonstrate ways to assess and manage the hazards associated with chemicals.
3. To re-label any new transfer bottles.

INTRODUCTION:

A hazardous substance is a material or substance that poses a physical or health hazard. Health hazards occur when a chemical produces an acute or chronic health effect on exposed individuals. Physical properties of a substance determine a physical hazard.

RESULTS/DATA:

CHEMICAL	HAZARD PICTOGRAM	DESCRIPTION

CHEMICAL	PICTURE OF RE-LABELED BOTTLE

DISCUSSION:

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CONCLUSION:

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