

Using a Microscope



Disclaimer

A series of booklets has been developed by the Clinical Skills Lab team (staff, recent graduates and students) from the School of Veterinary Sciences, University of Bristol, UK.

Please note:

- Each booklet illustrates one way to perform a skill and it is acknowledged that there are often other approaches. Before using the booklets students should check with their university or college whether the approach illustrated is acceptable in their context or whether an alternative method should be used.
- The booklets are made available in good faith and may be subject to changes.
- In using these booklets you must adopt safe working procedures and take your own risk assessments, checked by your university, college etc. The University of Bristol will not be liable for any loss or damage resulting from failure to adhere to such practices.

This work is under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.



© The University of Bristol, 2017



University of
BRISTOL

Year Group: BVSc1 +



Equipment for this station:

- Microscope
- Power supply and a level surface to work on
- Gloves
- The sample to examine
- Marker or pencil for labelling the slide or sample
- Immersion oil and lens tissue
- Stains as appropriate

Considerations for this station:

- All glass slides must be disposed of into a sharps container
- Immersion oil is an irritant so ensure you wear gloves when handling it.
- Wear gloves if using stains.

Anyone working in the Clinical Skills Lab must read the 'CSL_I01 Induction' and agree to abide by the 'CSL_I00 House Rules' & 'CSL_I02 Lab Area Rules'

Please inform a member of staff if equipment is damaged or about to run out.



University of
BRISTOL

Clinical Skills: Using a Microscope



1
Turn on the power at the wall and the power switch on the microscope

NB: The microscope should be set up in a laboratory area but away from wet areas such as sinks and staining materials.

Comfortable seat positioning and lighting are important, especially if you are going to be using the microscope to examine many slides.



2
Ensure the light beam diaphragm is opened.

Tip: If you are using the microscope and the illumination is low (dark) check the light beam diaphragm is not partially or completely closed.



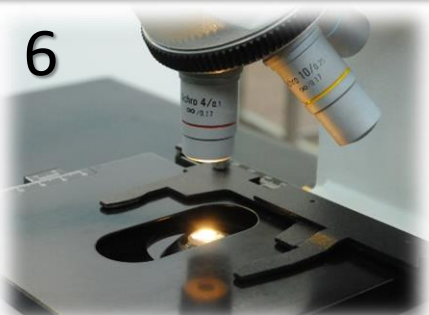
3
Start with the light setting at low to medium.



4
Depending on the sample being examined, the condenser may need to be adjusted. For example, some larger objects are better viewed under lower light with the condenser down to give better definition. Whereas when using oil immersion increased light and a raised condenser improve the visibility of small structures.



5
Secure the slide using the arms on the microscope stage.



6
When starting to examine a slide, select the low powered (X4) objective lens first.



Clinical Skills: Using a Microscope



7
Your eye level should be just above the eye pieces. Then look down the eye pieces and gently slide them together until you see a single image.

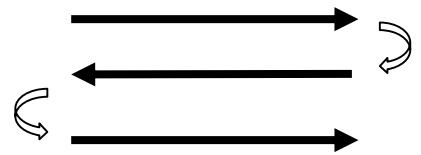
NB: The eyepieces can be adjusted by rotating them, which allows you to focus the image for your eyes.



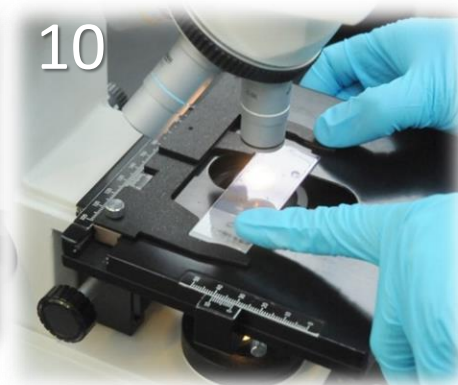
8
Locate an area of the slide that includes part of the sample and/or has uptake of the stain.

To bring the slide into focus rotate the coarse focus slowly until the sample can be visualised clearly.

Scan the slide systematically in parallel rows starting at one corner and working to a pattern. Example pattern below:



9
Once an area of interest has been identified, rotate through the objective lenses to a higher power. If the sample was in focus at low power, it should remain in focus at the higher power. However, it is often necessary to adjust the focus slightly using the fine focus.

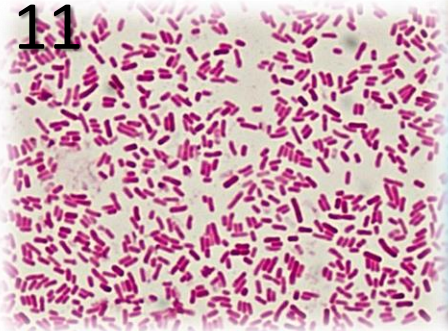


10
The image above shows the vernier scales, which are on two axes of the stage. The scales can be used to record a position of interest e.g. to enable a colleague to examine the same point on the slide.



Clinical Skills: Using Oil Immersion

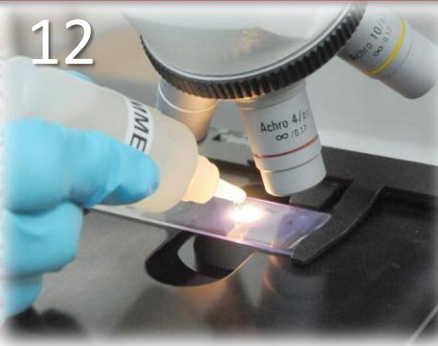
11



The oil immersion lens (and oil) is required to look at cell detail or bacteria.

When using the oil immersion lens turn up the light source to the highest value to provide better visibility and raise the condenser (a bright spot of light is then visible directly under the slide).

12



Rotate the objective lenses slightly leaving a space to add a drop of immersion oil to the slide, directly over the spot of light.

13



Move the oil immersion lens into place, taking care that it does not come into contact with the slide.

If focus has been achieved at lower powered objectives, the oil immersion lens should slide into place without a problem. Any further adjustments should be done via the fine focus.

14



Look down the eyepieces and use the fine focus to bring the image into focus.

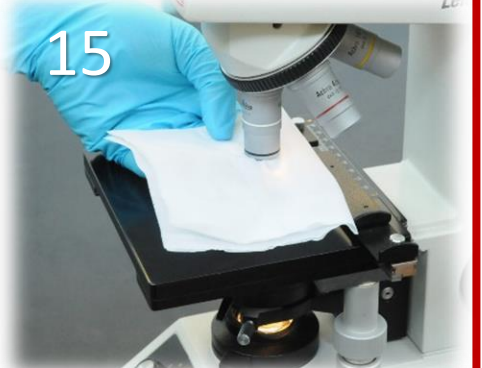
N.B. Another option when changing to the oil immersion objective:

From the lower power lens position, lower the stage and add a drop of oil to the slide, directly over the spot of light. Then rotate the oil immersion lens into position and slowly raise the stage to the lens. Watch from the side until the drop of oil is seen engaging with the lens.



Then use the fine focus to adjust.

15



Once the examination is completed, remove the slide and clean the oil from the immersion lens. Only use lens tissue on microscope objectives.

N.B. If oil is left on the lens it can damage the lens by making it very difficult to remove and will make visibility impaired.

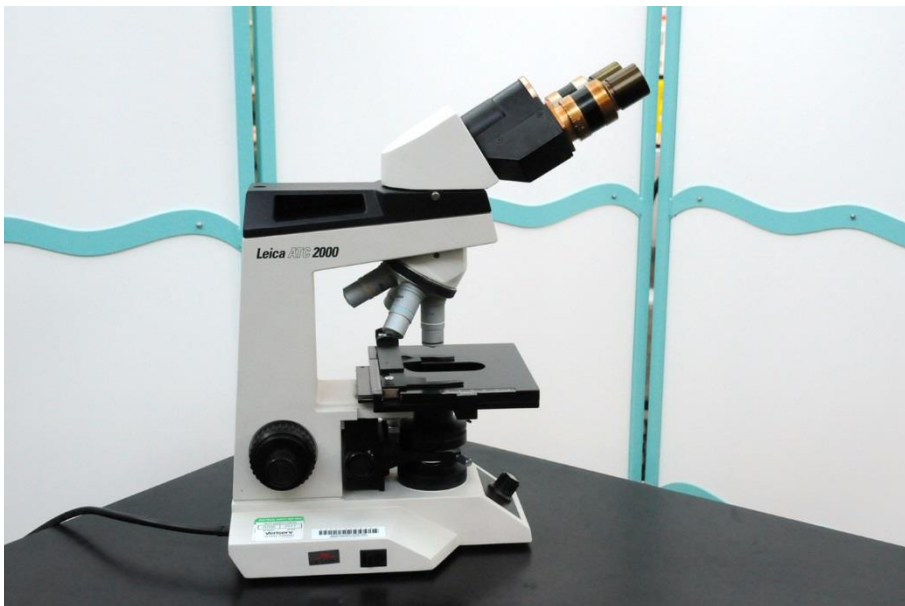


University of
BRISTOL

Resetting the station: Using a Microscope

1. Discard any used samples in the sharps bin and any non-sharps waste in the clinical waste bin.
2. Wipe the lenses used with lens tissue. Do not use any other tissue or any solutions on the lenses.
3. Ensure working areas are clean and tidy.
4. Turn off the light and set to low level.
5. Rack down the stage and leave the low power objective in place.
6. Switch off the microscope.

Station ready for the next person:



Please inform a member of staff if equipment is damaged or about to run out.



University of
BRISTOL

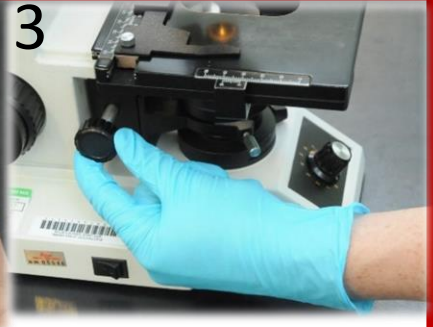
Resetting the station: Using a Microscope



1
Dispose of all glass in the sharps bin and all other waste in the clinical waste bin. Ensure all areas are clean and tidy.



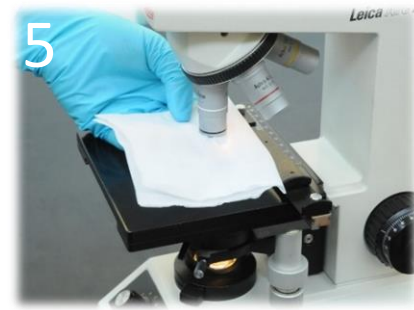
2
Set the light to low power.



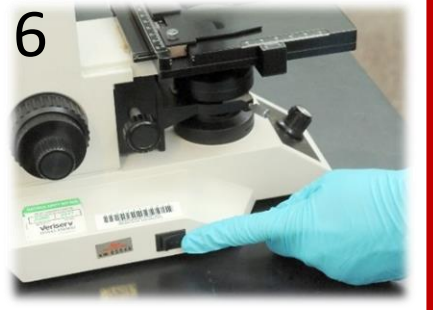
3
Lower the condenser away from the stage and objectives.



4
Rotate the coarse focus control to lower the stage away from the objectives.



5
Wipe clean any objectives that have been used with lens tissue. Make sure you clean the oil lens last to avoid any contamination.



6
Switch off the microscope on the machine and at the power supply.

Please inform a member of staff if equipment is damaged or about to run out.



I wish I'd known: Using a Microscope

What lens objective should be used?

Objective	Uses	Condenser	Light
X4	To obtain initial focus on a sample. To examine coat brushings and skin scrapes. To scan a slide for a point of interest.	Low	Low
X10	To examine any findings more closely. To identify parasites. To scan urine sediment and identify crystals.	Low	Low
X40	To examine any findings in greater detail. To examine pathological samples.	Medium	Medium
X100 (OIL)	To examine in detail: cytology, blood and impression smears, needle aspirates and skin impressions/tape strips.	High	High

NB: This is only a guide and set up may vary depending on the sample and the microscope.



I wish I'd known:

Using a Microscope

- Impression smears can easily be wiped off a slide (risking loss of the sample). Ensure you know which side of the slide the sample is on. Avoid wiping the sample and instead leave the slide to air dry.
- Another potential error is to put the slide on the stage upside down.
- After moving to higher powers, if the slide is slightly out of focus only use the fine focus to bring it back into focus.
- Use immersion oil sparingly and **ONLY** use with the oil immersion objective. If unsure which lens is the oil immersion, look carefully at the lens – on most modern microscopes the word 'oil' will be written on the lens. It is usually the X100 lens, but some microscopes may have a X50 oil lens.
- Do not leave the oil immersion objective in the oil for any longer than necessary. If left in the oil e.g. overnight, it can cause damage.
- Do not put the X4, X20 or X40 objectives into the immersion oil. If this does occur, then the lens should be cleaned immediately with lens tissue.
- Remove slides from the stage after viewing and dispose in the sharps bin. If you wish to save a slide, ensure it is clearly labelled and stored in a labelled microscope slide container.
- Clean the lens with lens tissue immediately after use. Nothing else should be used to clean the lenses.
- The eye pieces may become contaminated with debris from users' eye lashes or hands and may need to be gently cleaned with lens tissue.
- When finished, leave the low power objective in place and lower the stage.
- Always turn off the light source after finishing to prevent over heating.
- An annual service by a professional company is recommended.