

## Examination of animal and plant cells using a light microscope and production of labelled scientific diagrams from observation

### Introduction

Cheek cells are typical animal cells, they have a cell membrane, cytoplasm and a nucleus. Onion cells are plant cells, they have a cell wall, cell membrane, cytoplasm, nucleus and vacuole. This practical requires you to prepare cheek cell slides and onion cell slides. These slides can then be observed using a microscope.

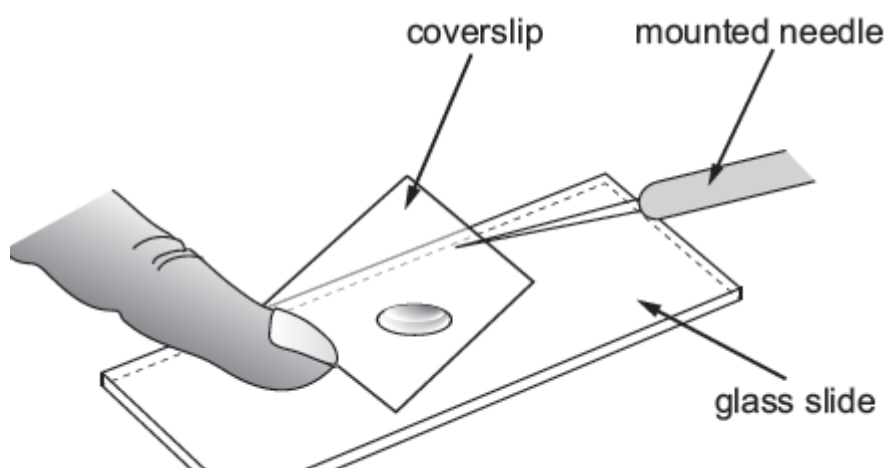
### Apparatus

light microscope  
 2 × glass slides  
 2 × cover slips  
 cotton wool bud  
 mounted needle  
 forceps  
 freshly cut onion  
 0.1 % methylene blue solution  
 iodine solution

#### Access to:

beaker of disinfectant

### Diagram of Apparatus



## Method

### Cheek Cells:

1. Put a drop of methylene blue on a glass slide.
2. Gently rub the inside of your cheek with a cotton bud.
3. Wipe the end of the cotton bud in the drop of methylene blue on the glass slide.
4. Place the cotton bud in the beaker of disinfectant.
5. Use the mounted needle to gently lower a coverslip onto the glass slide.
6. Using a light microscope, examine the slide using the  $\times 10$  objective lens.
7. Use the  $\times 40$  objective lens to identify some of the cell structures.
8. Draw a cell diagram. Identify and label: cell membrane, cytoplasm and nucleus.

### Onion Cells:

1. Using forceps, peel a thin layer of epidermis from the inside of a freshly cut onion piece.
2. Lay the epidermis onto a glass slide.
3. Add a drop of iodine solution to the onion epidermis on the glass slide.
4. Use the mounted needle to gently lower a coverslip onto the glass slide.
5. Using a light microscope, examine the slide using the  $\times 10$  objective lens.
6. Use the  $\times 40$  objective lens to identify some of the cell structures.
7. Draw a cell diagram. Identify and label: cell wall, cell membrane, cytoplasm and nucleus.

## Analysis

1. Calculate the total magnification of the image seen by multiplying the power of the objective lens by the power of the eyepiece.
2. Your teacher will tell you the actual size of the cell, calculate the magnification of your diagram.

## Risk Assessment

Hazard	Risk	Control measure
Methylene blue is harmful and/or irritant	Methylene blue can irritate the eyes and lungs. Skin contamination should be avoided.	Use the lowest concentration possible. Wear eye protection when preparing the cheek cell slide. Methylene blue is a stain- avoid contact with skin.
Cheek cells are a biohazard	There is a very small risk of virus transmission.	Only handle samples from your own body. After use, hygienically dispose of cotton buds and slides in a disinfectant such as Milton or Virkon.
Coverslips/ mounted needles are sharp	Can cut skin	Handle carefully

## Teacher/Technician notes

Methylene blue and iodine solution are stains. Avoid contact with the skin. Iodine is a low hazard chemical as a dilute solution.

Suitable disinfectant would include Milton or Virkon which would need to be diluted to suitable concentrations.

If the lamp is not an integral part of the microscope, a desk lamp will be needed for each group.

Freshly cut onion is recommended. This should be prepared for student use in pieces approximately 1 cm<sup>2</sup>.

Students will need to be briefed regarding safe and effective microscope use prior to this practical activity. This practical activity is effective at developing microscope skills and biological drawing skills.

Students can calculate the total magnification of the image as the power of the objective lens multiplied by the power of the eyepiece. The actual size of the cells can be given to the students to enable them to calculate the magnification of their diagrams.

## Working scientifically skills covered

### **1. Development of scientific thinking**

Appreciate the power and limitations of science and consider any ethical issues which may arise.

### **2. Experimental skills and strategies**

Apply knowledge of a range of techniques, instruments, apparatus and materials to select those appropriate to this experiment.

Make and record observations and measurements using a range of apparatus and methods.

### **3. Analysis and Evaluation**

Present observations and other data using appropriate methods.