



## **ABLE 2019 Major Workshop Using Foldscoptes™ For Offline Exploration in Online Biology Courses**

### **Microscopy and Plasmolysis – Student Questions**

This is a modified version of the student questions handouts from two labs in BIOL 1020 (Introductory Biology I: Cells, Genetics, and Evolution); it should be used alongside the online content. Students submit an electronic version of this document via Brightspace for grading; this version has been formatted for handwritten notes. Section titles in bold correspond to page titles in the online content.

### **Assembling Your Foldscope**

No questions for this section; please see online content.

### **Finding Specimens for the Foldscope**

No questions for this section; please see online content.

### **Slide Preparation and Photo Tips**

No questions for this section; please see online content.

### **Sharing Your Discoveries**

1. In the space below, insert one or two photographs:

- an image of red onion cells captured with your foldscope
- an image of any other specimen of interest captured with your foldscope (optional)

All photos should be taken by you. For photos inserted into this document, reduce the file size to tens or hundreds of kilobytes (there are a range of web-based tools and apps that can resize an image for you). If you use your device's optical zoom, do not zoom in so far that you lose the 'circle' of the foldscope field of view – you will need this for a question later on in the lab.

In addition to inserting the photos into this document, post your foldscope photo(s) to the Padlet gallery as instructed in the online content for this lab. Feel free to “like” and comment on other posts!

INSERT PHOTOS: [*ABLE 2019 workshop participants: post to Padlet only*]

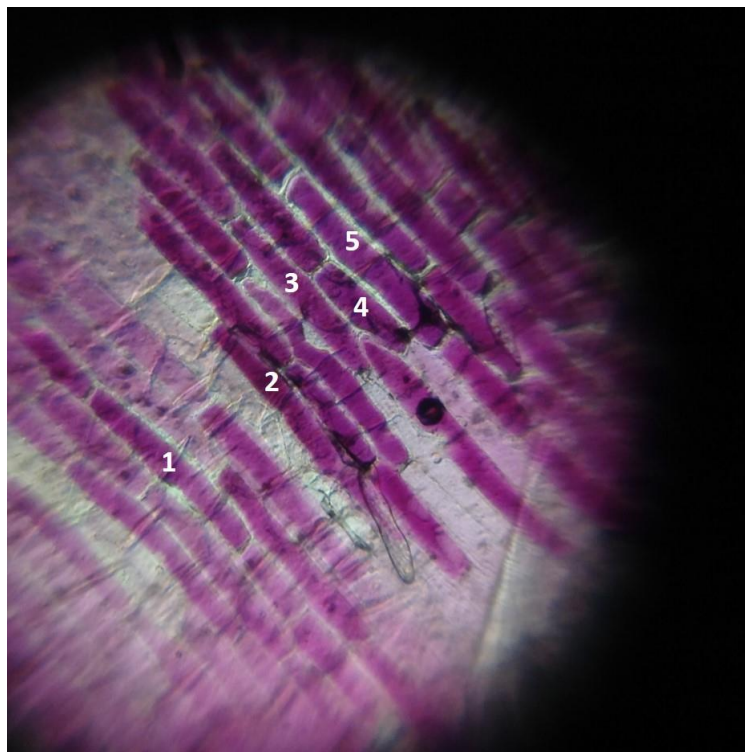
### **The UD Virtual Compound Microscope**

Omitted from the ABLE 2019 workshop.

### **Measuring What You See: Viewing Magnification, Field of View, and Specimen Size**

Several student questions from this section omitted from the ABLE 2019 workshop.

1. The approximate field of view of the foldscope is 88  $\mu\text{m}$ . Working from your photo, choose any five cells and determine the average length and width of a red onion cell. Show your work. If you were not able to obtain a satisfactory photo, you may work with the one below, using the numbered cells.



RESPONSE:

*The lab activities on the following pages of the lab have been omitted from the ABLE 2019 workshop:*

**Image Magnification and Scale Bars**

**Interpreting Micrographs**

**Diffusion**

**Molarity and Osmolarity**

**Osmolarity and Tonicity**

**Red Blood Cells**

**Osmosis in Red Blood Cells**

**Observing Evidence of Hemolysis and Crenation**

**Time to Transparency: Results**

**Measuring Red Blood Cell Diameters**

**Red Blood Cell Diameters: Results**

## Observing Plasmolysis

2. In the space below, insert three photographs: one of each of the three red onion cell 'treatments' described in the online content for the lab.

All photos should be taken by you. For photos inserted into this document, reduce the file size to tens or hundreds of kilobytes (there are a range of web-based tools and apps that can resize an image for you). It is okay to use the optical zoom on your device if doing so improves your image and allows you to see the cell better – for this lab, your photo does not need to include the entire field of view.

In addition to inserting the photos into this document, post your foldscope photos to the class padlet as instructed in the online content for this lab. Feel free to “like” and comment on other posts!

INSERT PHOTOS: [*ABLE 2019 workshop participants: post to Padlet only*]

3. Examine your three best photos, one for each treatment, and describe what you SEE. (This is different from describing *what happened*...that comes next!)

RESPONSE:

4. Briefly explain your observations in terms of osmosis and what you know about the structure of plant cells. Address the following points explicitly:

- in comparing the Tap Water and Salt Water treatments to each other and to the No Treatment condition, whether there is an apparent change in the size of the cells, and why or why not
- the net direction of water flow for each treatment
- the net direction of solute flow for each treatment
- the tonicity of Tap Water and Salt Water treatments

RESPONSE: