

## HOMEMADE MICROSCOPE

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### INTRODUCTION:

Since I started exploring microscopic subjects I have developed an interest for doing certain things on a DO IT YOURSELF basis. Sometimes because there is no other option since the thing I need is too expensive and unaffordable, but most of the time for the pleasure of achieving something by myself with my own resources.

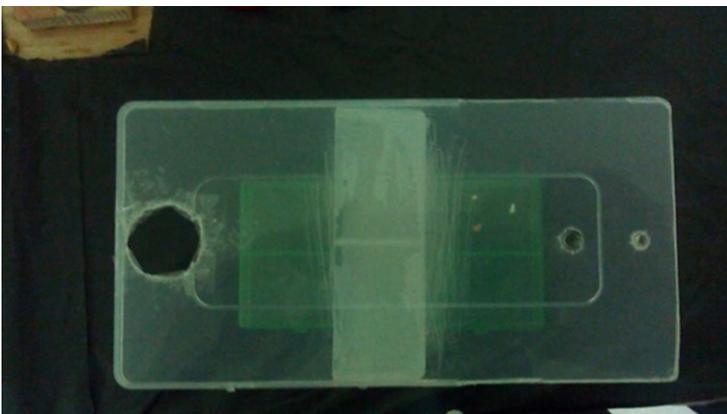
This is the case for the homemade microscope that today I present in this article, probably it is not the best option but it is a very good one when you need to give a glance to a subject and you either cannot use or do not have a professional microscope with you. It may give you an idea of something you want to observe with certain good resolution.

### DEVELOPMENT:

I like to surf the Internet looking for things that can be useful to explore the microscopic world and I found a lot of information on how to create a homemade microscope. There are many versions of how to make one, I took some inspiration from two videos that used a laser pointer lens, a cellphone and a support created by the same authors. The support could hold the cellphone, and allow the lens to move up and down above the sample and had a basic illumination system.

My version of the homemade microscope is as follows:

First I inserted the lens onto a piece of plastic that I took from the cover of a pencil box. I used two of those pencil boxes to create the support which I glued with cyanoacrylate. There are two lenses because I also tried for this experiment a lens from a CD player.



I used a tungsten lamp because it was possible to plug it directly to the electric system of my house, but could be a LED one.

To hold the sample I used two tubes that come with aluminum foil and a small plastic caliper like this:



**NOTE: As I have shown in other articles I have found these kind of tubes a very good form of moving up and down something that requires to be held and adjusted and the benefit is that these tubes can be found everywhere.**

As everybody knows a tungsten lamp is powerful for illuminating but it gives a kind of yellowish color to the sample. In addition, since this microscope for the moment lacks a condenser, I have learnt that a blue filter would correct partially this inconvenience and would give a better resolution and the color of the sample would be appreciated better too.

If you don't have a filter or one large enough, it is possible to build one by using as in my case parts of a transparent light blue cover of those used to bind a school book. Like this:

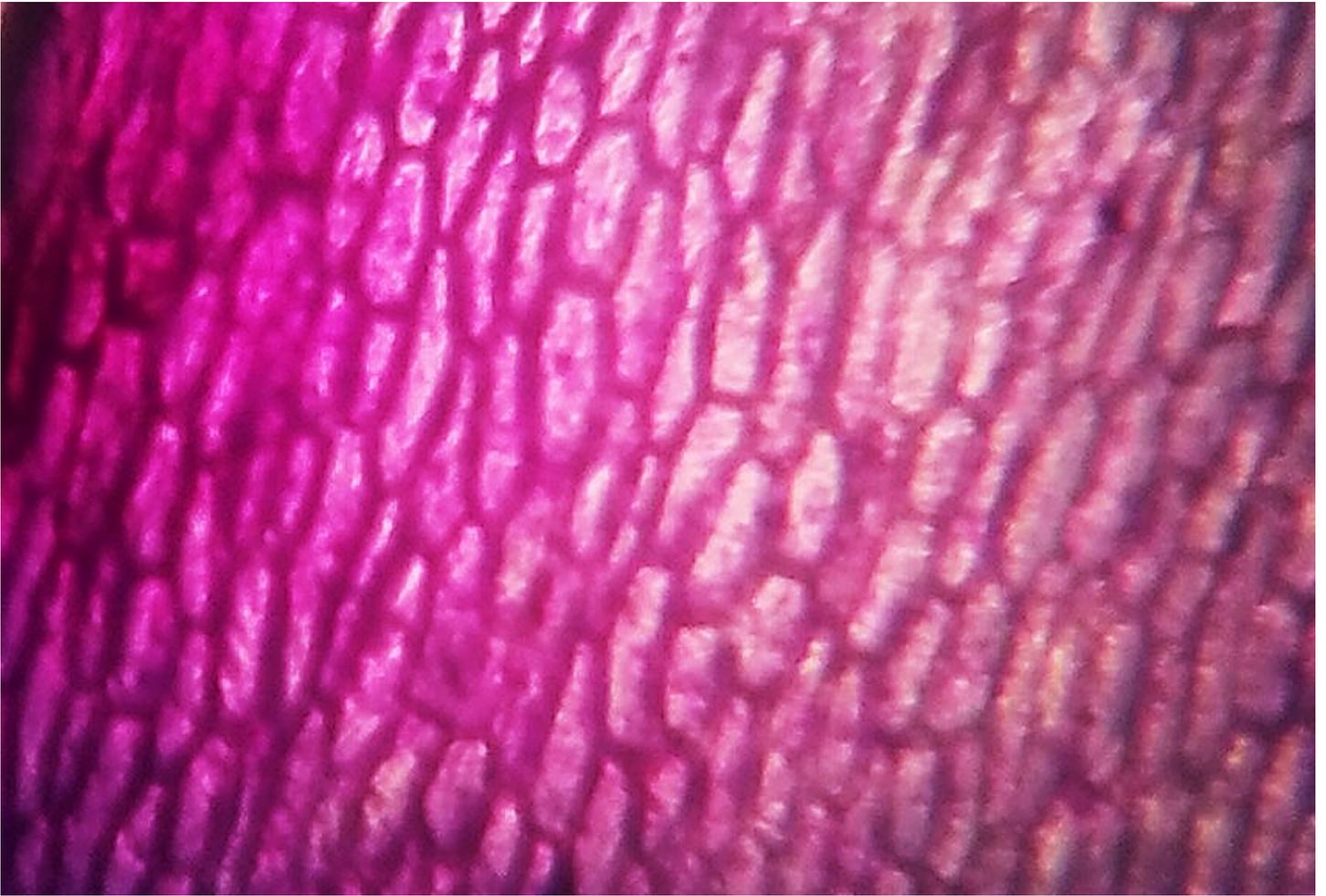


To support this filter again the tubes mentioned above are useful.

The final project looks like this:



Results:



Onion stained with gentian violet.



Daphnia



Part of a lily flower and pollen upon it



Spider

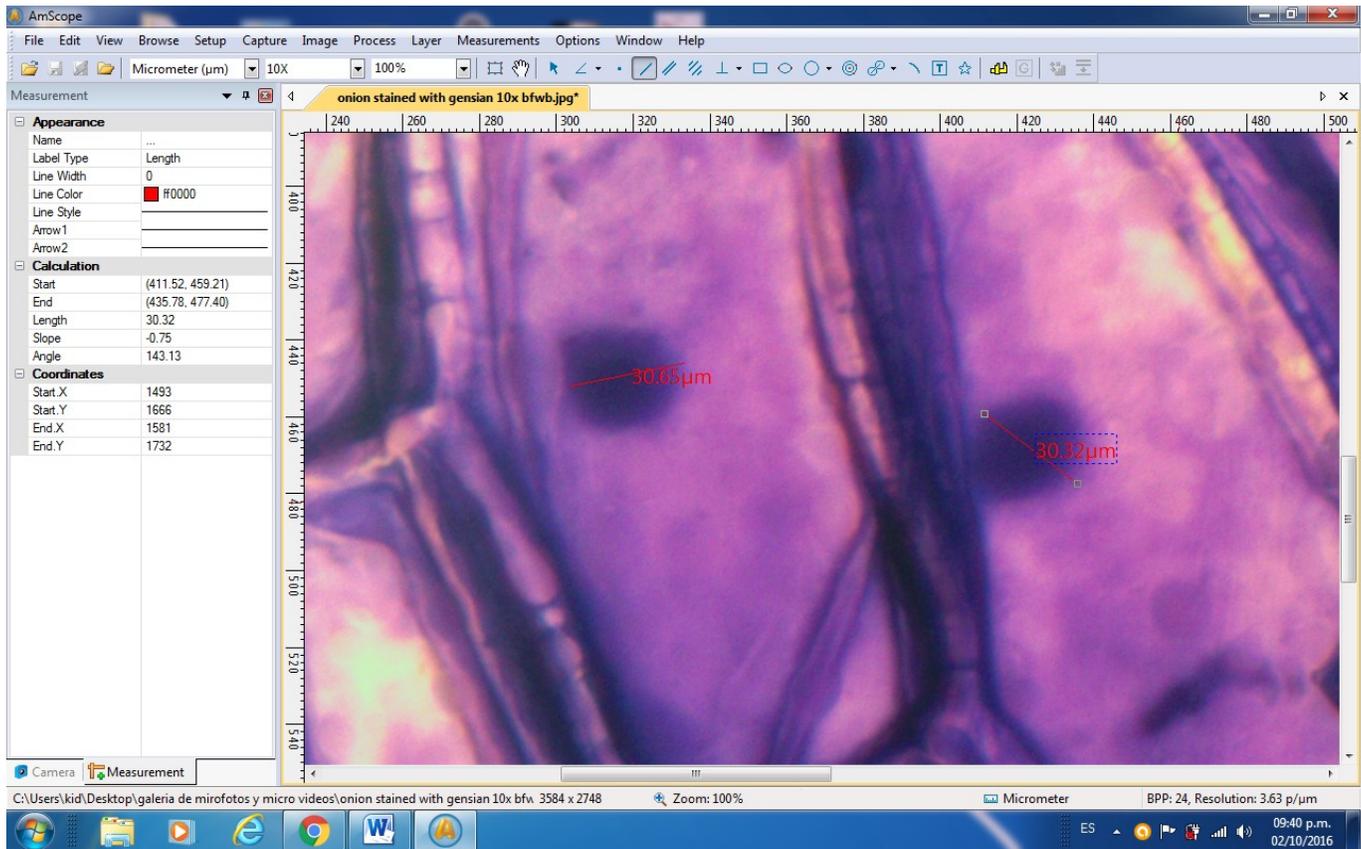


Mosquito

## CONCLUSION:

Is it worth building this microscope? Of course it is, the resolution is better than 30 microns but how do I know that?

Well let us take as an example the onion stained with gentian violet shown above where some nuclei of the cells are appreciated. The same sample I have photographed several times for different purposes with my professional microscope and my professional camera, so I have the correct sizes of the nuclei as a reference and here is the image from the professional microscope.



As can be seen it is not so bad a microscope considering the kind of lenses that are being used.

This can be regarded as an “emergency” microscope or for those who have don't access to any proper microscope.

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(Above in anti-spam format. Copy string to email software, remove spaces and manually insert the capitalised characters.)

Published in the October 2016 issue of *Micscape* magazine.

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