

DIY: LASER MICROSCOPE

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Introduction:

Most of us during our childhood or probably during our school days bought a laser pointer. Most of the time this laser pointer came with some caps that could be placed on the top of it and those caps had an image that got bigger when projected on a wall. It worked better in a dark room.



DEVELOPMENT:

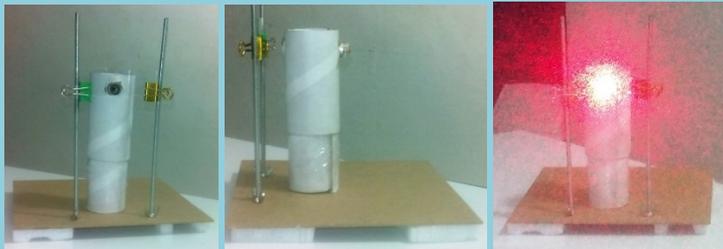
If we accept that the concept of a microscope is a device that allows us to see an object in a sample bigger than it is by magnifying it a certain number of times, then a laser pointer would be a kind of microscope because it magnifies an object that is probably two millimeters across producing an image several centimeters larger than the original.

Probably a year ago I saw on the Internet a page that said MICROSCOPE 10000 X <https://www.youtube.com/watch?v=Mpq2PLVHmuE>, I opened the file and it took me to an experiment using a laser pointer, a syringe and a drop of water. I got a laser pointer and tried the experiment and the results were promising that time. I am not going to show this experiment, in another article I will explain it.

Nevertheless, I tried to do the same but instead of the syringe I used some samples on a slide but the results were poor, so I was thinking how could I project a sample on a slide and I found that removing the lens of the laser pointer and just using the laser diode I could achieve magnification of a sample. I have to remark that the level of resolution achieved by this kind of experiment is low. Nevertheless, it is promising to see morphology at least and the best application for the moment is objects of one, two or three millimeters that we want to magnify.

For using my LASER MICROSCOPE I got a piece of wood for a base, two rods with screwed ends and nuts for supports. Wing nuts and two binder clips on the rods hold a sample microscope slide in front of the laser. The laser is supported inside a stiff cardboard tube such as those that come with aluminum foil. Also some glue is needed that here in Mexico we call kola loka but that is made of cyanoacrylate, it is an instant glue.

Here is a picture of the setup:

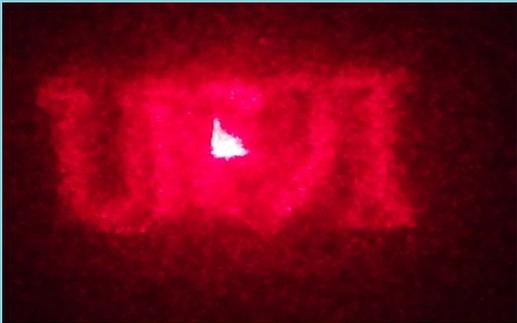
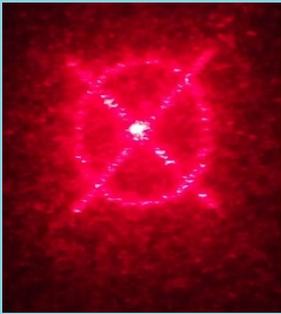
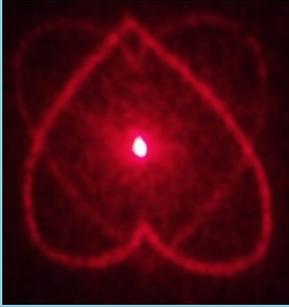
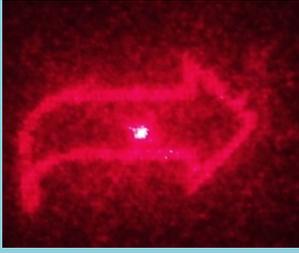


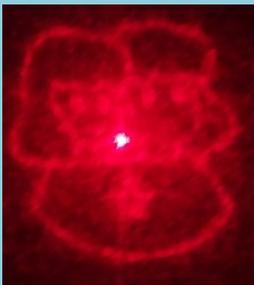
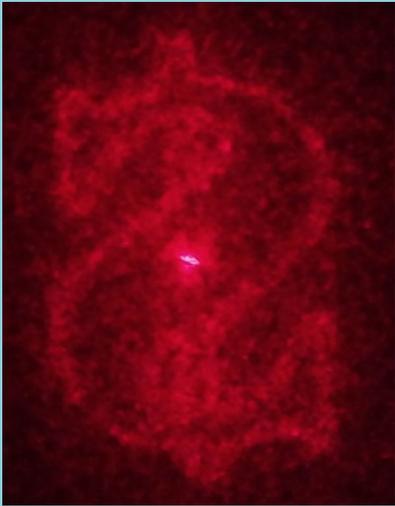
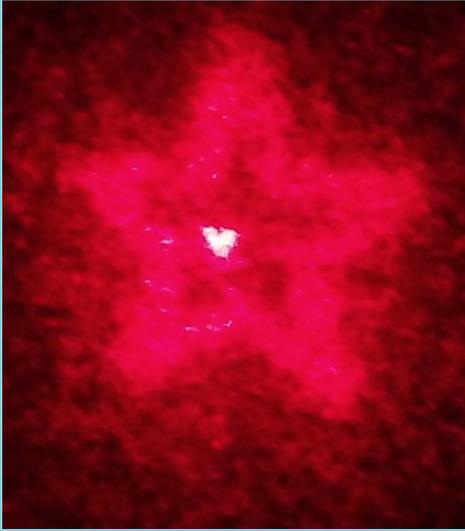
For holding the laser pointer I use the tube which I cut into two parts and made one slide inside the other so that this may be used to raise or lower the laser pointer as needed, here is a picture of it:

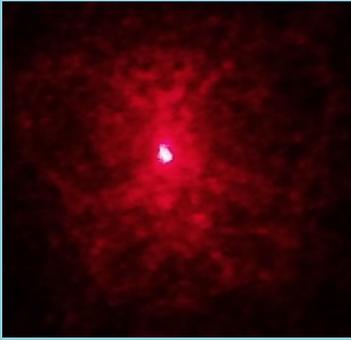


RESULTS:

Try first the sample caps that come with the laser pointer set which varies from set to set. It is important to turn off the room light because the projection would appear better on a dark background.







Here are some samples of my own. I tried two methods of projection: 1) using the laser diode without the lens and projecting just the laser beam upon the sample; 2) place an empty cap without figures on the laser, when you do this it establishes a round field to the sample and a little more of definition, see below.

For looking at the samples, it is necessary to turn off the light again and place the sample slide in front of the laser and adjust the height of the laser pointer to meet the sample.



Daphnia



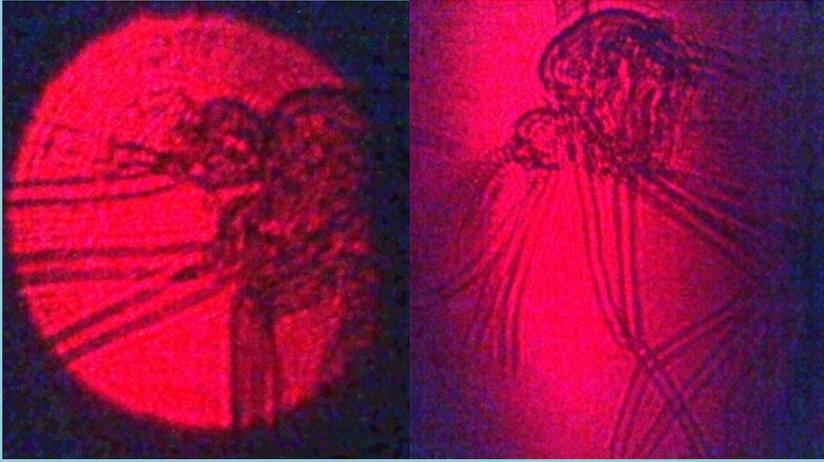
mosquito



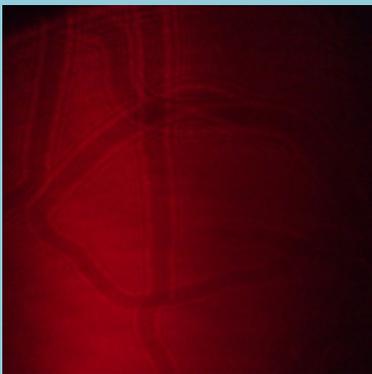
spider



sugar crystal



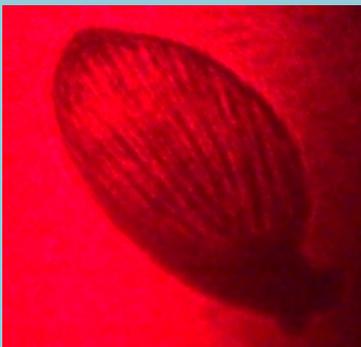
another mosquito



cotton fibers

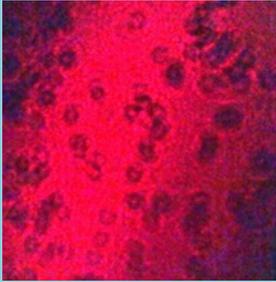


white hair



A mosquito's wing

Unfortunately since the resolution is low, with tiny particles such as these in the sample below they look like small circles without definition, nevertheless they are projected.



sodium bicarbonate particles

CONCLUSION:

The project is promising and useful regarding small objects that we want to magnify, probably acquiring a more powerful laser beam could give us better resolution in a DIY project, and we could include bacteria and other specimens of pond life other than daphnia.

Obviously the pictures here do not look as beautiful as if you were seeing them directly on the wall using the laser beam. The camera takes away the beauty of the laser light and for that reason I invite you to try it for yourself.

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

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