Botany: is the scientific study of plants and plant-like organisms. It helps us understand why plants are so vitally important to the world. Plants start the majority of food and energy chains, they provide us with oxygen, food and medicine.

Plants and plant communities are very important to humans and their environment as shown below:

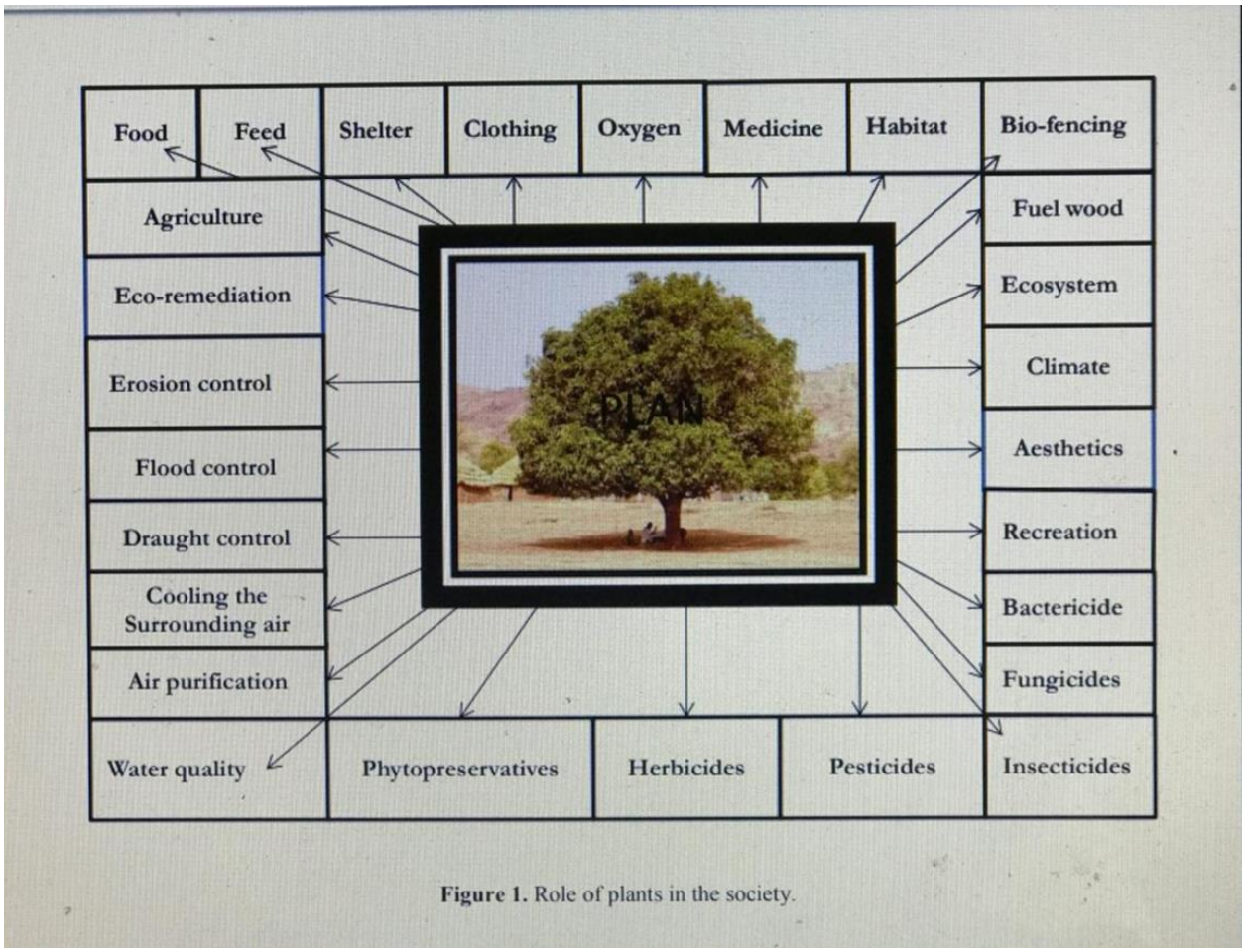

Figure 1. Role of plants in the society.

Compound microscope :- it is a device (tool) for magnifying small objects than 0.1 mm in diameter that cannot be seen with the unaided eye , by virtue of its lens . system extends our vision a thousand times.

- It is called compound because it uses more than one major optical part . it uses objective lenses and the eyepiece to provide you with a better view of the specimen.
- In the older times (Compound microscope) can be monocular or binocular . Now the world has already modernized and there is already a better way of appreciating the micro-world through the (binocular) compound microscope.

Parts of a microscope :

1- **Ocular lens** :- system of several lenses that contains the magnifying lens you look through, may it is include a pointer and a measuring scale called an ocular micrometer .

2- **Body tube** :- it is a hollow housing through with light travels to the ocular ,also it holds the Ocular lens.

3- **Objective lenses** :- set of three to four lenses mounted on a (rotating – turret) or (revolving nose piece) at the bottom of body tube . more the revolving nose piece and note the click as each objective comes into position .

The magnification abilities of objectives lenses are divided into :

a- **Scanning lens (small)** : - provides (3-4.5)x magnification

b- **Low –power lens (medium)** :- provides (10)x magnification

c- **High power lens (large)** :- provides (40)x magnification

d- **Oil immersion lens (largest)** :- provides (100)x magnification , it is used only with oil drop.

4- **Revolving nose piece** :- it hold high and low power objective lenses , can be rotated to change magnification.

5- **Stage** :-the horizontal surface on which the slide is placed is called the stage. It may be provided with simple clips for holding the slide in place ,or stage may be provided with a mechanical stage ,it is a device for precisely moving the slide .

6- **Coarse focus adjustment** :- depending on the type of microscope , either raises and lowers the body tube or the stage to focus the optics on the specimen

Note : use the Coarse adjustment only with scanning (4)x and never use it with the high power (40)x objective .

7- **Focus adjustment** :- also call fine adjustment , it changes specimen to objective distance very slightly with each turn of knob and is used for all focusing of the 40x objective . it has no notice able effect on of the scanning objective (4)x .

8- **Sub stage condenser lens** :- it is located immediately under the stage ,it focuses light on the specimen .

older microscope may have a concave mirror instead .

9- **Mirror** :- reflects the light upward through the diaphragm to the objective and ocular lens .

10- **Diaphragm control** :- regulates the amount of light which enters the body .

11- **Light source** :- it has an (off-0n) switch and may have adjustable lamp intensities and color filters .

12- **Base** :- it is one of metal parts of the microscope ,it is supports the microscope .

13- **Arm** :- it is one of metal parts of the microscope ,it is supports the body tube and it holds the microscope .

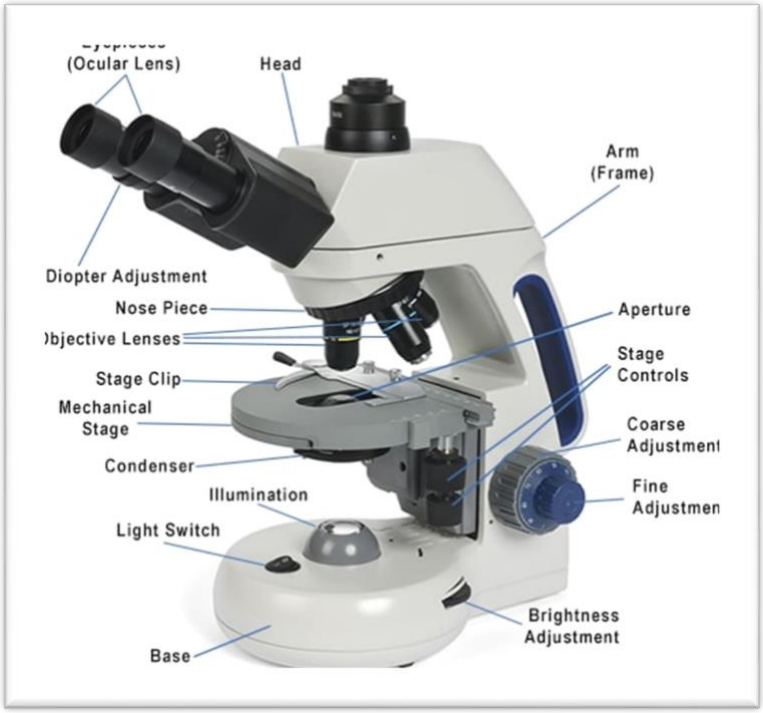

Figure 1-2 show binocular Compound microscope

Experimental - procedure

Making slides :- (onion epidermal cell)

1- Cut a small piece of *Allium cepa* plant (a small ,thin transparent layer of cells from the inside of a fresh onion leaf) .
2- Place it gently on a clean, dry slide and add a drop of water or(drop of iodine solution) or (methylene blue) in middle of slide
3- Cover with cover slide a 45° angle to the slide .
4- Place the slide on microscope stage and use the stage clips to hold the slide in place figure (1- 3) .
5- Observe under the microscope and locate the cell wall and the nucleus as in figure (1- 4) .

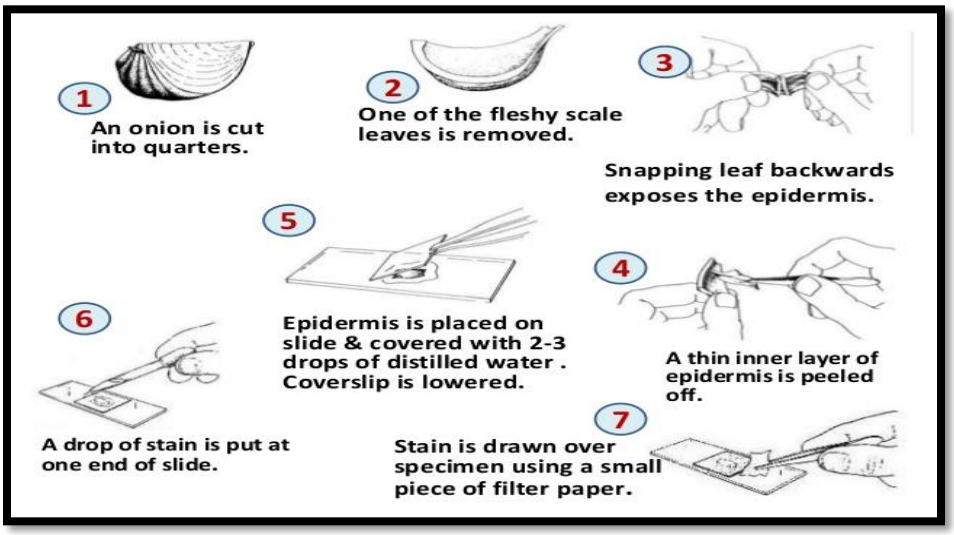

figure (1- 3) preparing slide of onion epidermis

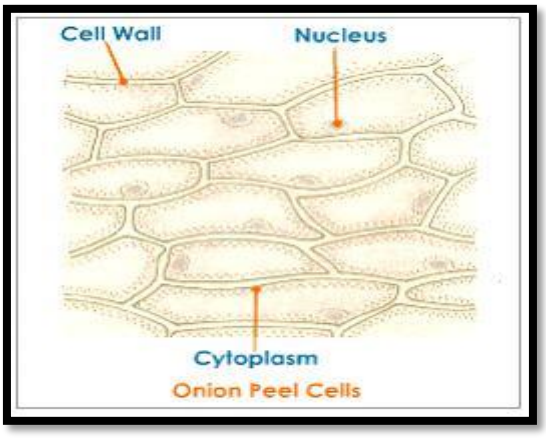

figure (1- 4) onion epidermal cell