The Microscope

I. The Microscope – An Introduction

A. The microscope is among the most widely used _____.

B. A microscope is an instrument that _____.

C. Biologists use microscopes to study cells, cell parts, and organisms that are _____ to be seen with the naked eye.

D. Microscopes both _____ the image of an object and _____.

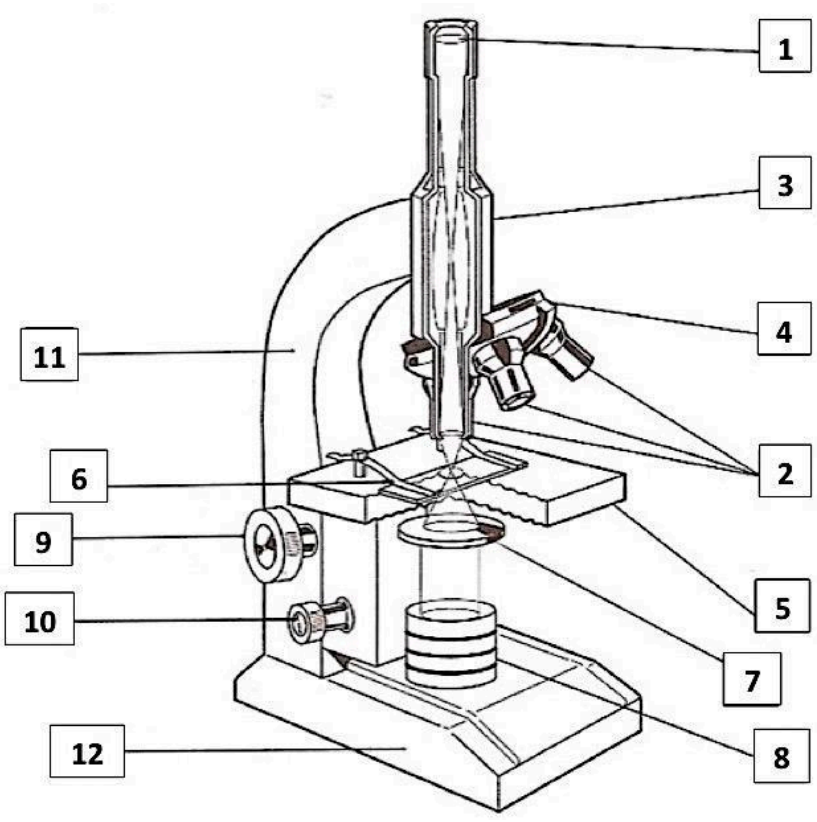
E. There are two types of microscopes:

1. _____

   _____

2. _____

   _____



II. The Modern Compound Light Microscope

A. Parts of the microscope

1. _____

2. _____

   _____

3. _____

   _____

4. _____

   _____

5. _____

   _____

6. _____

   _____

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____

B. Compound (Light) Microscope

1. This microscope allows light to _____ and uses _____ to form an image.
2. The modern compound microscope is capable of two things:
   a) _____
   b) _____
3. Microscopes vary in powers of magnification and resolution.

IV. Rules for Using the Compound Microscope

1. Always carry the microscope by _____ _____.
2. Turn on the microscope and place your slide on the stage.
3. Always start with the _____. Focus this objective using the _____.
4. Once the image is in focus, carefully swing the _____ in place. Focus this objective using the _____.
5. Once the image is in focus, very carefully swing the _____into place. Focus this objective using **ONLY** the _____.
6. _____
7. Keep the stage _____ and always make sure the bottom of your _____ is dry before putting it on the microscope.
8. Return your objective to _____ before you put the microscope away.

VII. The Electron Microscope

A. _____ is the limiting factor to a light microscope. At greater magnifications, the light microscope is unable to _____. At powers of magnification beyond _____, the image becomes _____.

B. To examine cells or cell parts at magnifications greater than 2000x, scientists use _____.

C. Characteristics of the Electron Microscope

1. _____
2. _____
3. Both the electron beam and the specimen must be placed inside a _____ so that the electrons in the beam will not bounce off _____ in the air. Since _____ cannot survive in a vacuum, the _____ cannot be used to view living cells.
4. Electron microscopes are _____.

D. There are two types of electron microscopes:
1. _____
2. _____

E. The Transmission Electron Microscope (TEM)
1. It uses a _____ transmitted through a very thinly sliced _____. _____ guide the stream of electrons toward the specimen, and the image is projected on a _____.
2. Advantage: _____
3. Disadvantage: _____ _____

F. The Scanning Electron Microscope (SEM)
1. Provides excellent _____.
2. The specimen is not _____ for viewing, but the specimen is _____ with a _____.
   Like the transmission electron microscope, _____.
3. When the beam of electrons is passed over the specimen's surface, it causes the metal coating to emit a shower of electrons. A _____ of the _____ of the specimen is projected on a photographic plate.
4. The scanning electron microscope can magnify _____ times.