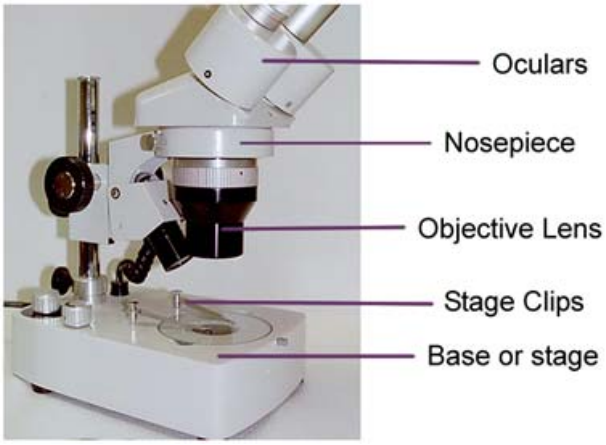
Microscopes commonly used in aquatic laboratories

Dissecting (stereo) Microscope

Great for examining "large" specimens (macroscopic, that is, visible to the human eye). Magnification usually 10x, 20x…



http://www.microscope-camera.net/tag/stereo-microscope/

Compound Light Microscope

Magnification usually 100x - 400x. Basic structural components:

1) Ocular lens (10x or 15x)

2) Objective turret (holds multiple objective lenses)

3) Objective (note: three shown; usually 10x, 20x, 40x; sometimes also has a 100x objective for oil immersion)

4,5) Focus knobs (4 - course adjustment; 5 - fine adjustment).

6,9) Stage / frame; **this microscope has a short *working distance* between the stage and the objective lens.

7) Light source

8) Diaphragm and condenser lens

NOTES: *Field of view* = the area you can see (decreases with increasing magnification. *Total magnification* = Ocular mag. x objective mag. Example: Ocular (10x) x objective (20x) = total magnification at 200x = 200 times bigger than the actual size of the specimen.

Compound light microscopes are used to view small specimens (not visible to the human eye) on thin microscope slides. The specimen is in a drop of water, and covered with a microscope "cover slip" of very thin glass (except with 100x objective used for oil immersion). This preparation is called a "wet mount." It is temporary; cannot be stored and quickly dries out under the high heat on the microscope stage.

How do light compound microscopes work? -
Light from the mirror or lamp (below the stage) passes through the slide and the specimen, then through the objective lens, through the ocular lens, and to the human eye.

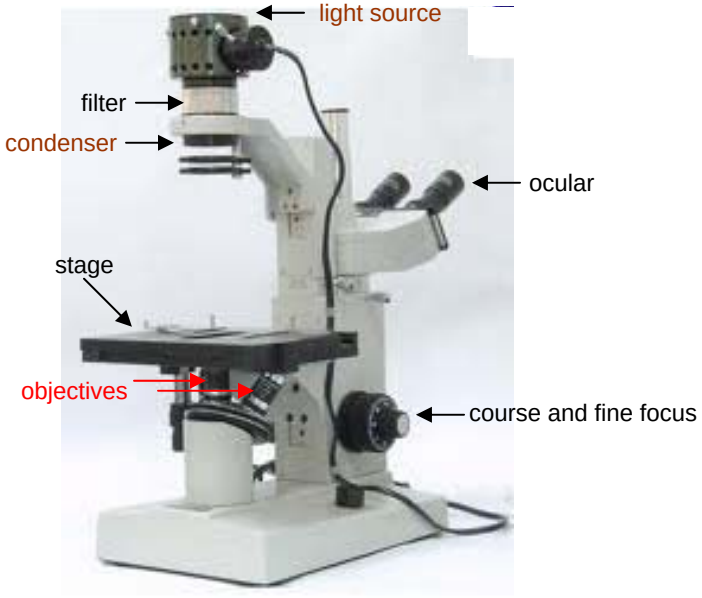
A light microscope gathers light from a very small area of a thin, well-lit specimen. The condenser is a lens system that focuses the light from the source onto the specimen. The objective lens is small and spherical, and brings the image of the object into focus at a short distance. The image is magnified by a second lens, the ocular lens (eyepiece).

Inverted Microscope

This type of microscope is constructed "upside down" from the typical (light compound) microscope:

An inverted microscope has its light source and condenser at the *top*, above the stage, facing down; and the objectives are *under* the stage, facing up. Inverted microscopes are used to observe and count organisms that have settled to the bottom of a thick container (for example, a "counting chamber" or tissue culture flask).

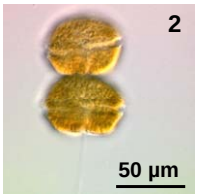
The inverted microscope has a much longer working distance between the stage (specimen) and the objective lens. It can be used to examine a thicker sample than the compound light microscope.



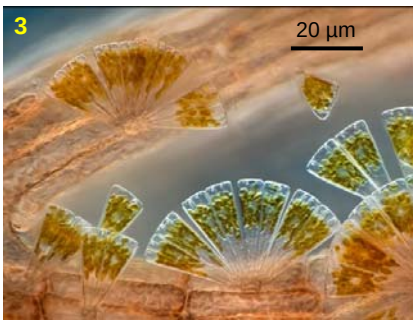
Question

What would be the best microscope, of these three types, for viewing each of these specimens?

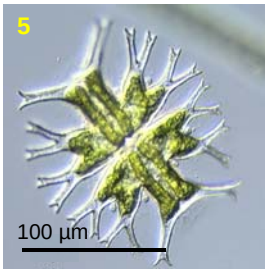
copepod zooplankter



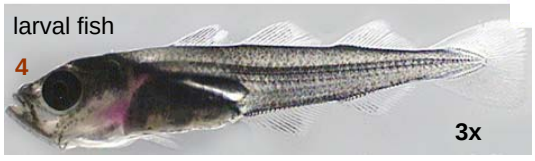
toxic dinoflagellate



diatoms and red alga



freshwater desmid (green alga)



tissue culture flask with algae

1) _____ 3) _____ 5) _____

2) _____ 4) _____ 6) _____