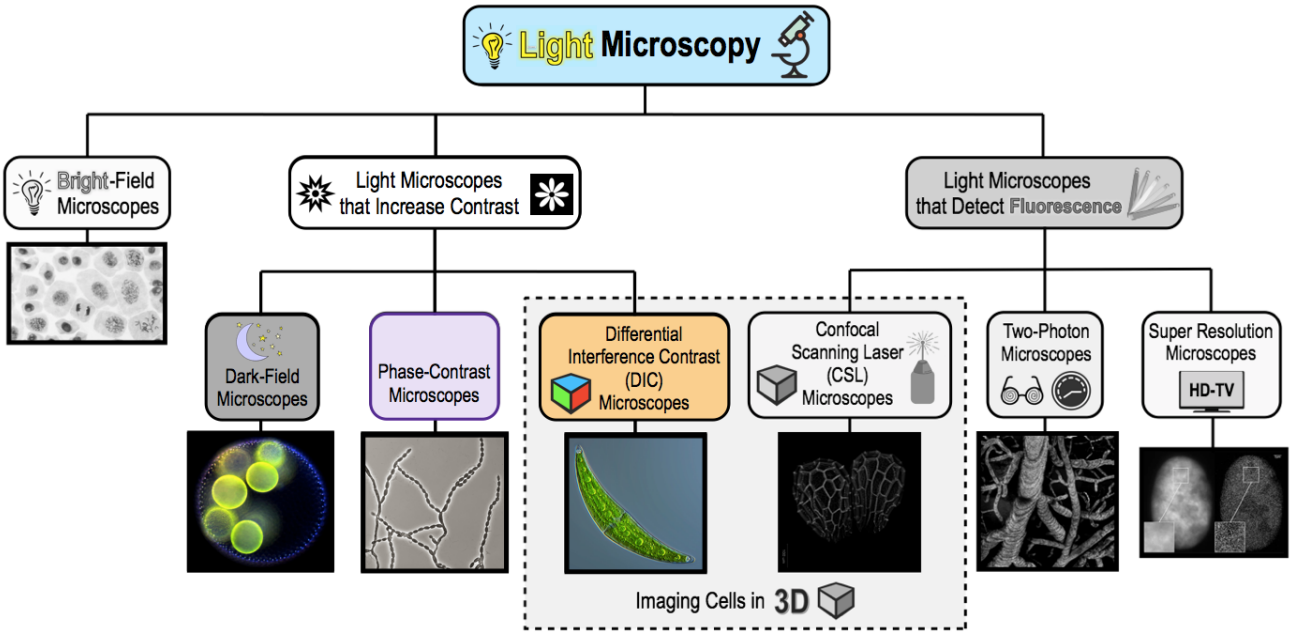
CONCEPT: LIGHT MICROSCOPES THAT INCREASE CONTRAST

●Recall: a drawback of brightfield-light microscopy is visualizing unstained transparent organisms due to poor contrast.

□ Staining cells with dyes can increase contrast but it can also kill cells and/or distort their features.

●Other *special types of light microscopes* help *improve* _____ when visualizing unstained cells:

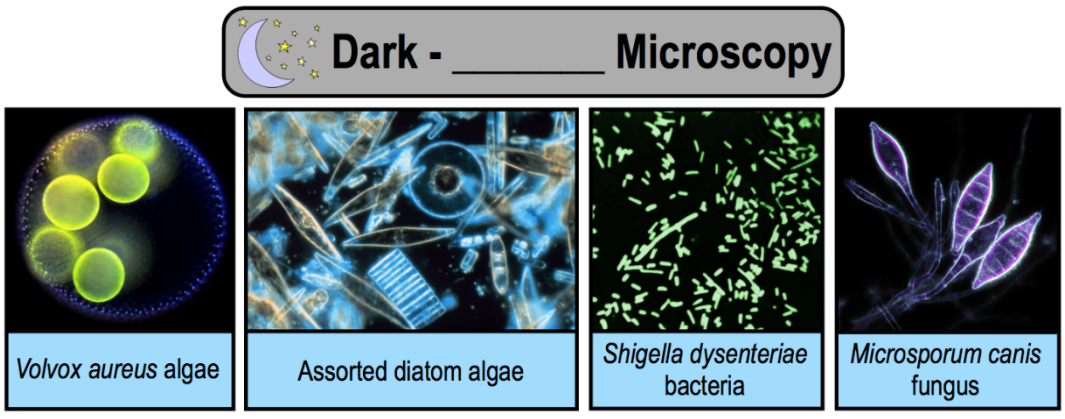
□ _____-Field Microscopes. □ _____-Contrast Microscopes. □ _____ Microscopes.



Dark-Field Microscopy

●_____**-Field Microscopes**: observe bright specimens against a _____ background.

□ A special mechanism directs light at an angle so that only light scattered by the specimen is observed.



PRACTICE: What type of microscopy uses a special condenser that only allows light scattered by the specimen to reach the objective lens and causes the specimen to appear bright?

a) Phase-contrast microscopy.

b) Differential interference contrast (DIC) microscopy.

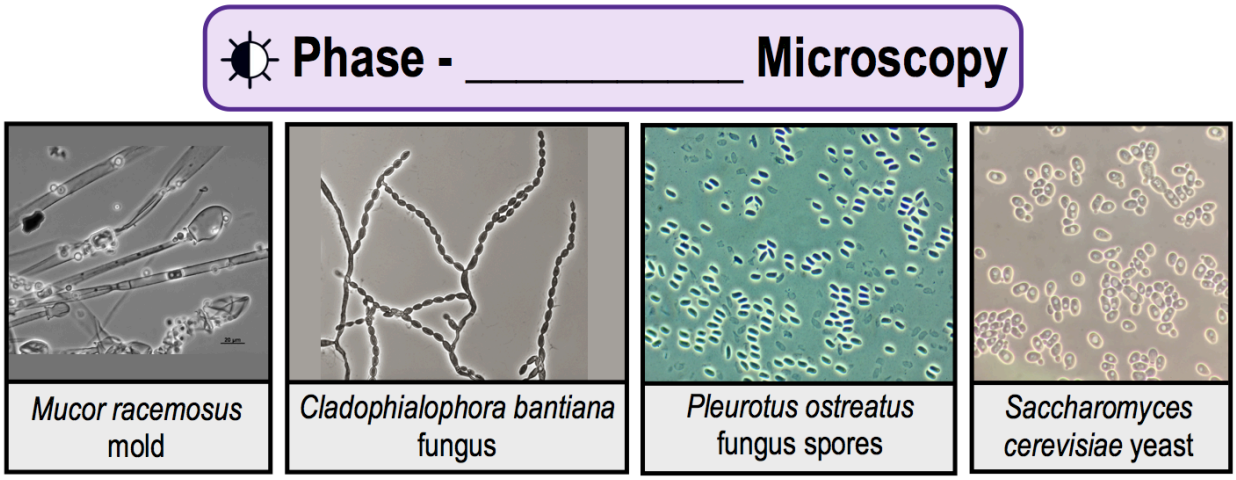
c) Dark-field microscopy.

CONCEPT: LIGHT MICROSCOPES THAT INCREASE CONTRAST

Phase-Contrast Microscopy

- _____**-Contrast Microscopes**: makes cells & their dense structures appear darker than the gray background.
  - □ Special optic devices increase the differences in how different substances/surroundings refract light differently.
  - □ Excellent for enhancing contrast of _____ details in unstained, living cells.

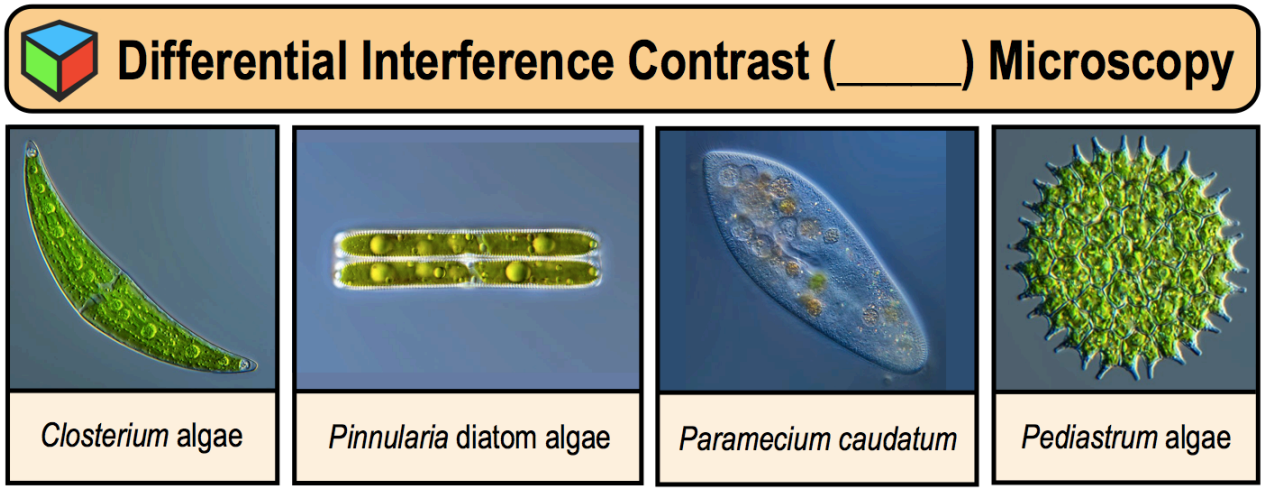
EXAMPLE: Images from a Phase-Contrast Microscope.



Differential Interference Contrast (DIC) Microscopy

- _____ **Microscopes**: creates very detailed, highly contrasting, _____-images of live specimens.
  - □ Similar to phase-contrast microscopy, but different mainly by adding contrasting *colors* & creating *3D*-images.

EXAMPLE: Images from a Differential Interference Contrast (DIC) MIcroscope.



CONCEPT: LIGHT MICROSCOPES THAT INCREASE CONTRAST

PRACTICE: This form of microscope is able to refract light off of the dense structures of a cell making them appear brighter than the gray background.

a) Phase-contrast microscope.
b) Bright-field microscope.
c) Differential interference contrast microscope.
d) Dark-field microscope.

PRACTICE: The microscope that increases contrast and allows the specimen to appear three-dimensional is the…

a) Phase contrast microscope.
b) Differential interference contrast microscope.
c) Fluorescence microscope.
d) Dark-field microscope.

PRACTICE: Which of the following microscope types would be least useful in viewing unstained living cells?

a) Phase-contrast microscope.
b) Differential interference contrast microscope.
c) Bright-field microscope.
d) Dark-field microscope.

PRACTICE: Which type of microscopes use light that hits the specimen indirectly, producing a darker image of the specimen on a brighter background?

a) Phase-contrast microscope.
b) Differential interference contrast microscope.
c) Bright-field microscope.
d) Dark-field microscope.