Health problem addressed
Microscopic analysis of blood cells helps diagnose infections and allergies, leukemias, anemias, and other blood disorders. Microscopic examinations can detect abnormal changes in cells or tissues to differentiate benign, inflammatory, precancerous, or malignant conditions. And, examinations of urinary sediment are valuable in laboratory evaluation of kidney function. Selective staining techniques can be used in microscopy to help identify parasites, fungi, and bacteria.

Product description
The basic parts of a light microscope are the lens system (eyepieces, objectives, and substage condenser), the body (observation tubes with dioptr adjustment, interpupillary adjustment, and revolving nosepiece), the stage and stage controls, and the illumination system. Most microscopes use Koehler illumination, which requires a light source, a lamp condenser, an iris diaphragm, a corrected substage condenser, and a first-surface mirror or silvered right-angle prism.

Principles of operation
Objectives collect light from the light source and focus it to produce a magnified image of the specimen on the opposite side of the lens system. The eyepiece magnifies the image of the specimen produced at the rear of the objective. The total magnification equals the objective magnification multiplied by the eyepiece magnification. The substage condenser focuses light from the light source onto the specimen plane, supplying enough convergent light for the microscope to achieve the full resolving power of the objective. The stage, on which the specimen slide is placed, is in the center of the microscope; the stage can be moved in the X, Y, or Z direction. The microscope body also features a revolving nosepiece on which the objectives (4 or 5) are mounted. Various contrast methods enhance contrast and color in specimen images, including darkfield, fluorescence, interference, phase, and polarized-light methods. Many microscopes offer two or more contrast method options.

Operating steps
- Place specimen slide on to stage.
- Adjust dioptr wheel and interpupillary wheel to adjust for operator’s eyesight and distance between the operator’s eyes.
- If applicable, select contrast method depending on specimen type.
- Select appropriate eyepiece and objective lenses to adequately view specimen details.

Reported problems
Special care must be taken in fluorescence microscopy. A field radiated in ultraviolet light should never be observed without the barrier filter in place; permanent eye damage may result. The repeated use of microscopes that are improperly designed may increase the potential for cumulative trauma disorders. Injury can occur if the user is forced to lean over the eyepieces or bend the wrists at an unnatural angle. Viewing sharp, crisp images helps reduce eyestrain and fatigue.