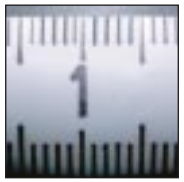
Everyday Objects Under the Microscope



The field of view with the 10x lens covers 20 mm.

Under the 60x lens, the field measures 3 mm across. Not 4 mm.

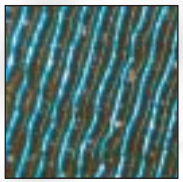
The highest power lens, 200x, covers 1 mm exactly.

How much does your microscope magnify? 'Depends on the printer,' they say. There is a way to work it out. Look at a millimetre rule under the lenses and take a photograph. The 10x lens of the QX3, for instance, covers 20 millimetres. With the 60x lens the field of view is 3 mm, and the image with the 200x lens is 1 mm across. You can easily tell the size of an object by relating it to the width of the picture. In this manual "60x" means that the picture was taken with the 60x lens, and not that it's been printed exactly sixty times larger than life. One of the first things everyone looks at is a coin. There isn't much to see, except a coin (only larger). You can see details of the relief that was stamped onto the metal and at 200x the dents and wear on the coin are easy to observe.

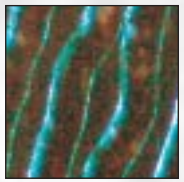
There is a limit to the detail you can see with any microscope, and the objective lens above the specimen needs to have a good condenser lens below the stage if you are going to see fine detail in a section. Since the QX3 has an illuminated stage rather than a condenser, the amount of fine detail you can see is limited. You will need to tweak the image for the best results. Since you take a digital photo, you can easily manipulate it with one of the image-optimising programs. Auto adjust (or auto levels) will allow you to optimise the picture, or you can increase contrast and brightness manually (p 27). There will be many familiar objects worth study. Vinyl discs are excellent. How many grooves are there on the record? Get your chums to guess. The answer? One. These records store information as an analogue of the original sound, not digitally. The waveform of the sound is imprinted on the surface of the plastic and a stylus that follows the line recreates the sound and feeds it to an amplifier. The microscope gives a detailed look at the record surface. A mobile phone or a digital watch have liquid crystal diode screens, which are not vividly revealing under the microscope, but a mechanical wind-up watch is an excellent subject for microscopy. You can see the details of the mechanism, study the imperfections in printing or embossing, and get a good look at the jewels that provide the bearings for the main wheels. You can even use the microscope hand-held, out of its stand, to look at the monitor screen and see the glowing coloured dots that make up the picture. Look at other everyday objects; badges, jewellery, computer cards, hair, magazines, furniture, paper. There are more examples in this manual.

Have fun.

The spiral single groove of a record shows well under 10x.



At 60x magnification it is better to use light from an extra lamp.

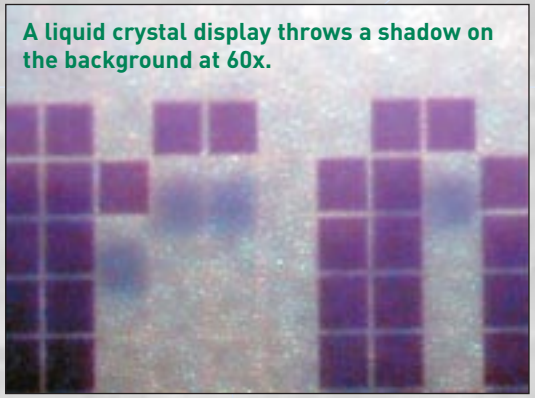


Particles of dirt in the record groove can be seen at 200x.

Look at coins under the 10x lens - at least they look larger.

At 60x the wear on the coin is visible, and so is the dirt.

Damage to the coin, invisible to the eye, is clear at 200x.



A liquid crystal display throws a shadow on the background at 60x.

At 60x you can vividly reveal the coloured dots on a monitor.

Take the back off a mechanical watch to study the works.

Fine lettering shows its imperfections at 200x.

The 200x lens reveals the finely made gear-wheels.

Ruby is used for its hardness as a bearing in the watch - 60x.