

Digital cameras

NEED TO KNOW

The price of high-end digital cameras – those with a resolution of at least 5.1 megapixels (Mp) – has tumbled and one of our Best Buys is just £330.

All these pixels make a big difference to image quality: if there's too little resolution, pictures look pixelated or blocky when printed large (A4, say) or if you enlarge just part of the picture using photo-editing software.

High-megapixel cameras also tend to have more features, so you can be more creative, with extra control over things such as shutter speed and focusing.

MORE ON QUALITY

Megapixels aren't the be all and end all, though – lens and sensor quality play a big role in the sharpness of pictures and accuracy of colours.

So, to measure image quality, we take and analyse photographs of test charts and real-life pictures indoors and outdoors – including flash and close-up shots.

In total, to assess the 33 cameras in the table, our experts rated around 4,000 photos.

You may not want to print photos bigger than, say, 7x5 inches. If so, cheaper cameras with fewer megapixels will still take excellent pictures – you just can't blow them up as large.

The small table on p54 has details of Best Buys with less than 5.1Mp.



BEST BUYS

Higher-megapixel models make it easier to print large, high-quality photos, as well as giving more flexibility for cropping. Our Best Buys combine good picture quality with excellent battery life.

We always recommend you try out any camera you're considering, to see how it feels. This is especially important as some of our high-megapixel Best Buys are pretty heavy.

The best three cameras

The 8Mp **Sony (1)**, around £700 from independent camera shops, is one of these heavyweights, crashing in at a monster 955 grams – hold a bag of sugar in front of your face to get an idea of the weight. However, it's one of the best digital cameras we've

ever tested. Shutter delay is minimal at 0.3 seconds, and the flash is bright and lights up whole scenes well. This Sony has a flexible zoom range of 28mm–200mm and takes impressive pictures, although there can be a little distortion of straight horizontal lines at the wide-angle end of the zoom. A novel feature is the movable lens, which swivels away from the body to make certain shots easier. For example, if you want to shoot a bird at the top of a tree, you can keep your head and camera body looking straight ahead, while the lens points up at the unsuspecting bird.

The **Olympus (2)**, around £455 online, is another big 8Mp camera, weighing in at almost 800 grams. Like the Sony, it's good for landscapes,

as its minimum zoom setting is a low 28mm (however, it has a zoom of only x5, compared with the x7.1 of the Sony). Its shutter delay is 0.7 seconds, which is about average. But what really stands out is its overall image quality – it's terrific, with little noise (see 'Image quality', right) and not a million miles away from a ★.

Image quality on its little brother, the 7.1Mp **Olympus (3)**, isn't as outstanding but is still good. It takes excellent flash pictures, and has a better shutter delay of 0.6 seconds. However, like the Sony (10), it has an optical rather than an electronic viewfinder. Electronic viewfinders have a tiny electronic screen that

SHUTTER DELAY

When you press the button, the camera will focus and calculate the exposure before it takes the picture. We measure this gap using a device to simultaneously start a stopwatch and take a picture. On this Sony, the delay is 0.3 seconds – that on the Canon (25) is 1.6 seconds. Reduce the delay by making the camera calculate exposure and focus in advance – point the camera at your subject, and half press the shutter button. Keeping the button half-pressed, compose the picture, and press the button fully to take the picture. You can also use 'burst mode': the camera takes several pictures in rapid succession. You choose the best shot afterwards.



Shutter delay may mean you miss the shot



2 Olympus

PRIORITY MODES

Aperture and shutter-speed priority modes give you more precise control over a picture. Most 5.1 Mp-plus cameras, including this Olympus, have these features.

Shutter-speed priority controls motion blur. You can deliberately freeze a football in mid-air with a fast shutter

speed, or use a slow one and make it blurry to depict movement. Aperture priority adjusts the camera's f-value, controlling how much of a scene is in focus. On this Olympus f-values range from 2.4 to 8. The 2.4 setting puts the background out of focus; at 8, lots of the scene will be in focus.



Changing the f-value alters the focusing

IMAGE QUALITY

At small print sizes, such as 6x4 inches, a 3Mp camera scoring ☆ for overall image quality produces pictures as good as those from an 8Mp camera scoring ☆. The difference is that you can't enlarge the 3Mp image as much without quality suffering.

But it's not just resolution that affects image quality. Other factors that we test for mean that, although all our Best Buys score ☆ for quality, none is rated as ★.

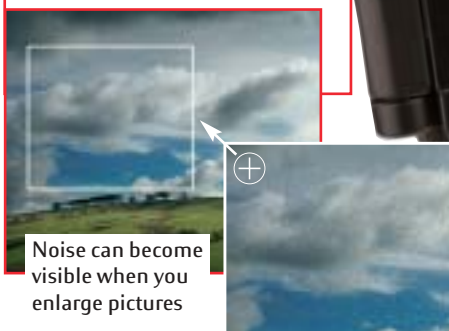
For instance, only this Olympus scored ★ for colour reproduction (how true to life colours are). Another problem is noise – random speckles, especially in even areas of colour, like the sky. The Casio (20) did particularly poorly here. To reduce noise, reduce the camera's sensitivity to light by lowering the ISO number to around 100 (although this increases the chance of camera shake). We also check for distortion when you zoom in.



3 Olympus



4 Nikon



Noise can become visible when you enlarge pictures

mimics the big one on the back of the camera. Like an optical viewfinder, you put your eye against it to view the picture – but it's more accurate than an optical viewfinder, which doesn't show the full picture. As with the higher-scoring Olympus, you can adjust the LCD screen to various angles, but it has a less powerful zoom of 27mm–110mm.

It's also 200 grams lighter and costs £500 from Jessops and John Lewis.

70 to 74 per cent

The 8Mp **Nikon (4)**, with its 24mm–85mm lens, is great if you like to shoot landscapes because of its very low minimum lens setting and good colour reproduction. But 85mm is pretty low for a maximum setting, so zooming is limited. It has a shutter delay of just under 0.6 seconds, and BSS (see 'Keeping the camera steady', right). It's £650 from Miller Brothers.

The **Fujifilm (5)**, £330 from Jessops, is a long-standing Best Buy and still one of our favourites. But budget for a set of rechargeable

batteries and a charger as it's the only Best Buy that doesn't come with them. It has a super-short shutter delay of 0.3 seconds, and strong all-round qualities. Like the Sony (1), this Fujifilm has a USB 2.0 connection for transferring pictures from camera to computer, which is 40 times faster, if your computer supports it, than the normal USB.

The **Canon (6)**, £315 from Jessops, PC World, Dixons and Currys, is by far the lightest high-megapixel Best Buy. At a shade under 200 grams, it's the only one that's compact and pocketable. It takes great flash pictures and has a minimal 0.2-second shutter delay and a big two-inch screen so you can review photos easily. It's also one of the best cameras you can buy if you like to take short video clips, as the quality is very good for a digital camera (though still much worse than a decent camcorder). Video clips take up a lot of memory card space, so make sure you have a big enough

card before you start filming (or shoot at lower quality, to take up less memory). It lacks creative features such as shutter speed, aperture priority control and manual focus, but it is still a great camera.

Under 70 per cent

The **Konica Minolta (7)**, £450 from Jessops and Miller Brothers, has image stabilisation ('Anti-Shake' as Konica Minolta calls it). Another heavyweight at nearly 700 grams, it looks quite conventional, unlike Konica's space-age Minolta Z-series. Flash performance lets it down slightly – on automatic mode, the camera doesn't always pick the right intensity for correct exposure. It has a powerful zoom of 28mm–200mm, its screen can be adjusted to various angles and its shutter delay is only 0.4 seconds.

The 7.1Mp **Canon (8)** has a long shutter delay – a snail's-pace one second – and this, alongside the fact that transferring pictures from camera to computer via USB is relatively slow, drags its ease-of-use score down to a ○.



An unsteady hand can lead to blurred images



KEEPING THE CAMERA STEADY

Although the camera might be perfectly focused, your photos might still be blurry, especially if you take a picture when there's little light or when you have zoomed in a lot. This is the curse of camera shake – sometimes the smallest hand movements affect the picture. Putting your camera on a tripod or something else stable is a solution but not always practical.

A small number of digital cameras now have image-stabilisation technology to help create sharper images. Typically, this involves the lens or digital sensor moving slightly to compensate for hand movements. Two of our Best Buys, the Konica Minolta (7) and Nikon (9), have these systems, and both work well.

Some other Nikons have a Best Shot Selector (BSS) feature. As you press the button, the camera shoots ten images as quickly as possible, and then chooses the sharpest while automatically deleting the rest. BSS can help achieve a sharp image but it isn't quite so good as a proper image-stabilisation system.



BEST
BUY

7 Konica Minolta

BATTERY LIFE

Digital cameras aren't kind to batteries. The screen, zoom and flash all eat up battery life, as does the sensor that takes the picture.

A film camera's batteries may last for months – digital camera batteries do not. This Konica, like all our Best Buys, scored ★ for battery life, but still gives just a few hours of intensive use.

All our Best Buys, except the Fujifilm (5), come with rechargeable batteries. If your camera comes with disposables, we recommend you buy a charger and rechargeable batteries separately (around £10 to £15). In the long run, this will be much better value.

Alternatively, if you want to stick with disposables, the Panasonic Digital Xtreme batteries reviewed in July's 'All Change' are good value at around £4.50 for four.

BEST
BUY

8 Canon

It's practical in other ways, though, with a big two-inch screen that you can adjust to various angles. It takes great pictures, with good colour reproduction and little noise and distortion. In manual mode, image quality is even better. It's £450 from Jessops.

The 8Mp **Nikon (9)**, £700 from Jessops, Miller Brothers and Argos, has image stabilisation (called Vibration Reduction). It works well, but isn't quite up to the very high standard of Anti-Shake on the Konica Minolta (7). This Nikon's 35-350mm zoom is by far the most powerful of all our Best Buys. You can adjust the screen to various angles but it isn't so easy to use in other ways – it suffers from a poor shutter delay of 1.1 seconds and, after the power

is turned on, the camera takes almost five seconds before it's ready. Digital cameras normally take a moment or two to power up but, with this long a delay, you might miss a spur-of-the-moment shot. Image quality is very good, though, with little noise. In manual mode, quality is even better – one of the best we've seen, in fact, with excellent colour reproduction.

The 7.1Mp **Sony (10)**, £550 from Argos, is lighter than all our Best Buys except the Canon (6). But its zoom isn't huge (34mm-136mm), it has an optical viewfinder and some images suffer from more noise than most of our other Best Buys. Overall image quality is still good enough to make it a Best Buy, though.

ZOOM

Digital cameras have two types of zoom – optical and digital. Optical zooms move the lens to make things appear further or closer, and there is little, if any, loss of resolution.

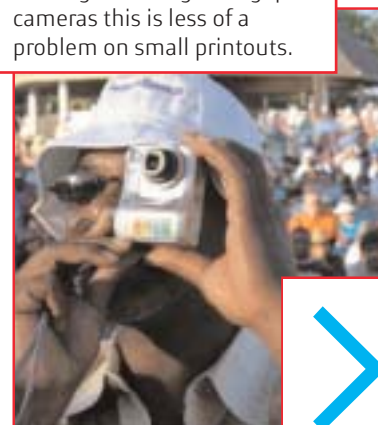
Most digital cameras quote their optical zoom range as '35mm-film equivalent'. The lower the first figure, the more of a landscape you can fit in your picture. The higher the

second number, the closer you can zoom into distant objects. This Canon has an optical zoom of 35mm-140 mm, which isn't that big a range.

Digital zoom is different. It's done electronically by enlarging the image, and quality can suffer a lot, although with high-megapixel cameras this is less of a problem on small printouts.

Memory cards: beware

Digital cameras store photos on memory cards. Annoyingly, four Best Buys came without one: two **Sonys** (1 and 10), the **Konica Minolta** (7), and **Nikon** (9). A 512MB Compact Flash (CF) card bought separately will hold about 145 8Mp pictures, and cost about £25 to £40 online.





100 more digital cameras on test

If you don't want to spend lots on a high-end camera (especially if you don't want to enlarge photos), you need only a 2.2Mp camera for top-quality 6x4-inch prints, and a 3.2Mp model for 7x5-inch prints – and you can often get

reasonable prints with around half these pixels. The main table, right, shows all the cameras we've tested with at least 5.1Mp. Go to www.which.co.uk/digitalcameras for results on 100 more cameras with fewer

megapixels. The table below shows the Best Buys from these cameras (all have optical zooms). Some score more highly than their high-end counterparts – but you can't enlarge photos as much. Last report June 2005

Model	Description	Price (£)	Mp	Score (%)
Olympus C-5000	Wonderful images but some shutter delay	156	4.9	71
Olympus C-770	Powerful x10 zoom (38mm–380mm lens)	280	3.9	70
Nikon Coolpix 5900	Compact and takes good movies	230	5.0	68
Panasonic DMC-FZ5	Great for flash pictures; image stabilisation	350	4.9	68
Konica Minolta Z20	Very little image noise; unusual design	200	4.9	67
Canon Digital Ixus 40	Small and light; takes good movies, too	225	3.9	67
Nikon Coolpix 4800	Great focusing accuracy	350	3.9	67
Olympus C-760	Powerful x10 zoom (42mm–420mm lens)	300	3.2	67

TABLE NOTES

We tested digital cameras with at least 5.1Mp from leading manufacturers.

Specification

Price Typical high-street price (unless footnoted as an online price). **Resolution** The number of usable pixels may differ from the manufacturer's claimed number. **Optical zoom** The lower the first

Digital cameras

MODEL

- 1 Sony Cyber-shot DSC-F828
- 2 Olympus Camedia C-8080 Wide Zoom
- 3 Olympus Camedia C-7070 Wide Zoom
- 4 Nikon Coolpix 8400
- 5 Fujifilm Finepix S7000
- 6 Canon Digital Ixus 700
- 7 Konica Minolta A200
- 8 Canon PowerShot G6
- 9 Nikon Coolpix 8800
- 10 Sony Cyber-shot DSC-V3
- 11 Olympus Camedia C-70 Zoom
- 12 Sony Cyber-shot DSC-P150
- 13 Samsung Digimax V700
- 14 Olympus Camedia C-60 Zoom
- 15 Sony Cyber-shot DSC-W1
- 16 Sony Cyber-shot DSC-P200
- 17 Ricoh Caplio GX
- 18 Pentax Optio 750Z
- 19 Fujifilm FinePix F810
- 20 Casio Exilim Pro EX-P600
- 21 Sony Cyber-shot DSC-P93
- 22 Fujifilm FinePix F610
- 23 HP Photosmart R707
- 24 Sony Cyber-shot DSC-P100
- 25 Canon PowerShot Pro 1
- 26 Kodak EasyShare DX7630
- 27 Sony Cyber-Shot DSC-V1
- 28 Sony CyberShot DSC-F88
- 29 Nikon Coolpix 5400
- 30 Casio Exilim EX-Z750
- 31 Casio QV-R61
- 32 Nikon Coolpix 7600
- 33 Fujifilm Finepix F450

a Online price – not widely available in shops

figure, the wider the angle of view. The higher the second figure, the more you can zoom in.

Features

Shutter priority This mode helps you be more creative. You can alter the shutter speed to help you blur or freeze movement. **Aperture priority** This mode allows you to change how much of a scene is in focus. **Manual focus** Lets you

focus exactly where you want. It's useful for close-ups, when auto-focusing won't work, or for deliberately shooting something out of focus (for artistic effect).

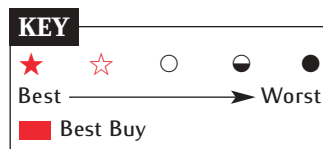
Image stabilisation See 'Keeping the camera steady', p52, for more details.

Performance

Shutter delay A rating of ★ means a delay of 0 to 0.3 seconds. Those

cameras rated ● have a delay of worse than 1.2 seconds.

Viewfinder/screen How visible the screen is, for instance, in adverse conditions such as bright sunlight or poor lighting.



SCORE

Ignores price and is based on:

Image quality	30%
Ease of use	25%
Viewfinder/monitor	12%
Features	12%
Battery Life	10%
Flash	8%
Movie quality	3%

Specification					Features				Performance					Score
Price (£)	Resolution (Mp)	Optical zoom	Size (cm) hwxwd	Weight (g)	Shutter priority	Aperture priority	Manual focus	Image stabilisation	Shutter delay	Viewfinder/screen	Ease of use	Image quality	Flash	(%)
700	8.0	28-200	9.5x14x17.5	955	✓	✓	✓		★	☆	☆	☆	★	77
455 ^a	8.0	28-140	12.5x9x12	772	✓	✓	✓		○	☆	☆	☆	☆	76
500	7.1	27-110	9x12x7.5	537	✓	✓	✓		☆	☆	☆	☆	★	75
650	8.0	24-85	12x9x8	514	✓	✓	✓	✓ ^b	☆	☆	☆	☆	☆	73
330	6.3	35-210	8.5x13x11	617	✓	✓	✓		★	○	☆	☆	☆	72
315	7.1	37-111	6x9x2.5	197					★	○	☆	☆	★	70
450	8.0	28-200	8.5x11.5x12.5	692	✓	✓	✓	✓	☆	☆	☆	☆	○	68
450	7.1	35-140	11.5x8x7.5	497	✓	✓	✓		◐	☆	○	☆	☆	68
700	8.0	35-350	12x9x13	726	✓	✓	✓	✓	◐	☆	○	☆	☆	67
550	7.1	34-136	7.5x13.5x6.5	428	✓	✓	✓		○	○	☆	☆	☆	67
370	7.1	38-190	10.5x6.5x4.5	257	✓	✓	✓		◐	○	○	☆	☆	66
290	7.1	38-114	11x5.5x2.8	184	✓				★	○	☆	☆	○	66
250	7.1	38-114	6x11x3.5	185	✓	✓	✓		☆	○	☆	☆	○	66
200	6.1	38-114	10.5x6x4.5	236	✓	✓			☆	○	☆	☆	★	65
260 ^a	5.1	38-114	9.5x6.5x4	250	✓		✓		★	○	☆	○	○	65
270	7.1	38-114	5.5x10.5x3	183					☆	○	☆	○	☆	64
250	5.1	28-85	12x6.5x4.5	264	✓		✓		★	○	☆	○	○	63
400	7.0	37.5-187	10.5x7x4.5	187	✓	✓	✓		●	○	◐	☆	☆	62
300	6.1	32.5-130	11.5x6x3.5	224	✓	✓	✓		○	○	☆	☆	○	62
400	6.0	33-132	10.5x7x4.5	262	✓	✓	✓		☆	○	☆	○	○	62
200	5.1	38-114	11.5x6x4	236	✓		✓		★	○	☆	○	○	62
300 ^a	6.3	35-105	7.5x9.5x3.5	216	✓	✓	✓		☆	○	☆	☆	☆	61
145 ^a	5.1	39-117	10x6x3.5	210			✓		☆	○	☆	☆	○	61
230	5.1	38-114	11x5.5x3	185	✓		✓		★	○	☆	○	○	61
530	8.0	28-200	12x8x10.5	668	✓	✓	✓		●	☆	◐	☆	★	60
230	6.1	39-117	10.5x7x5.5	271	✓	✓			◐	○	○	☆	☆	60
330	5.3	34-136	10x7x6	294	✓	✓	✓		○	○	☆	○	☆	60
350	5.1	38-114	10x7.5x3	201	✓		✓		☆	○	☆	○	◐	59
500	5.3	28-116	12x8x7	414	✓	✓	✓	✓ ^b	◐	○	○	☆	☆	57
300	7.1	38-114	6.5x9.5x2.5	168	✓		✓		★	○	☆	○	☆	56
200	5.9	39-117	9.5x6.5x3.5	227			✓		☆	○	☆	○	○	56
275	7.1	38-114	6.5x8.5x4.5	152				✓ ^b	◐	○	○	☆	○	55
200	5.2	38-130	8x6.5x3	167					☆	○	○	○	○	54

^b This is BSS – see 'Keeping the camera steady', p52