Digital Photography Basics

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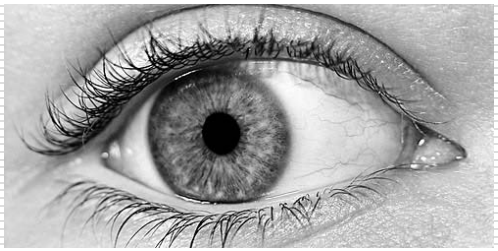
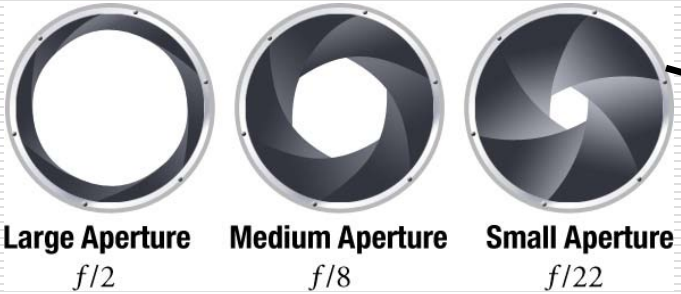
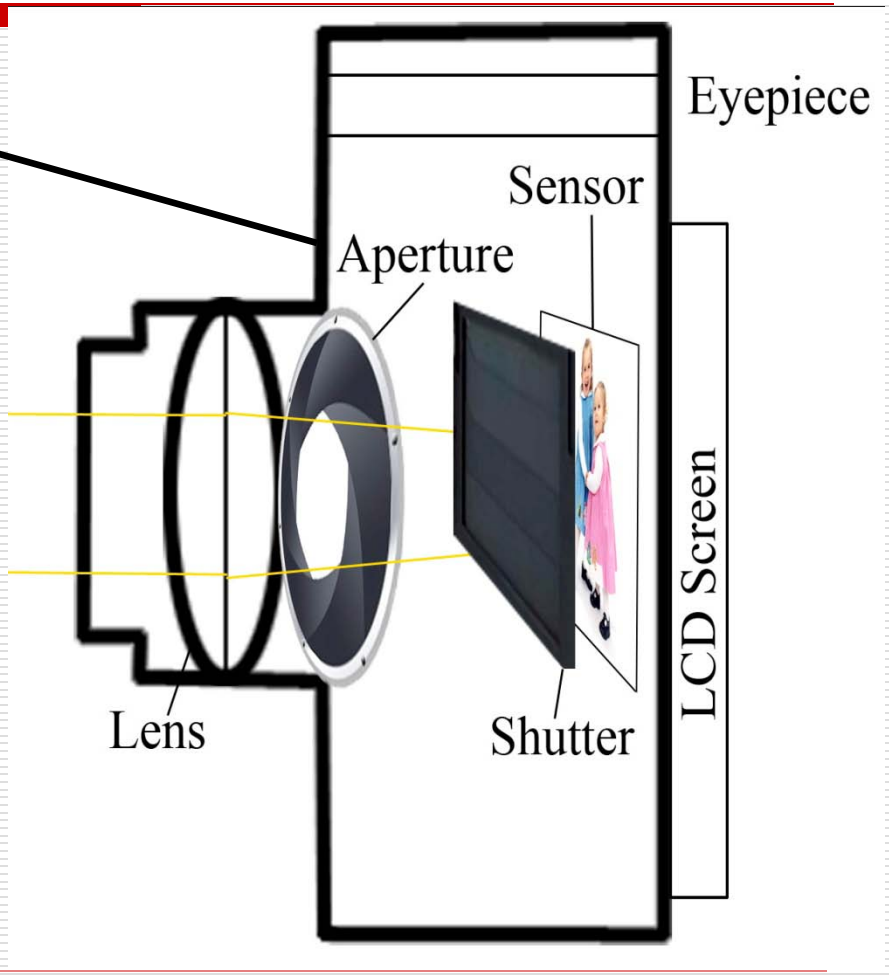
9/5/2011

Exposure







The amount of light that hits the sensor (Exposure) is controlled by:

- the size of the Aperture

-How long the shutter is open (shutter speed)

-Another factor in Exposure is the sensitivity to light of the camera Sensor (ISO)

Quantity of Light

- Quantity of light is an absolute. It can be measured by your camera very accurately
- Quantity of light is called Exposure
- Exposure can be controlled either Automatically in your camera or Manually.
- Accurate Exposure makes the difference between a good photograph and a bad photograph

Exposure

- Quantity of Light or Exposure is controlled by three factors:

How sensitive to light is the sensor in your camera?

ISO

Aperture or f/stop

How wide is the lens opening in your camera?

Quantity of Light

How fast does the shutter in your camera open and close

Shutter Speed

Accurate Exposure can be achieved by more than one selection of these three controls

Characteristics of Digital Cameras

- **Low end Point & shoot.**
  - $75 - $500
  - Zoom Lens 4x to 9x (35 to 135 mm; 35 to 300 mm)
  - Resolution 300-600 mp – don't pay for more as you probably won't print greater than 8x10 print
    - Maximum size for good prints
    - Display size on a computer monitor
    - Size of image file, which in turn affects how storage space to hold the file
  - Don't pay for a lot of extras (such as RAW format) as you probably won't use them, or if you do, you won't be satisfied with the results
  - Major advantages of P&S over DSLR are, small size & quick snapshots
  - Make sure you get a Manual control capability (aperture, shutter, ISO)

Resolution needed for print sizes		
Resolution (megapixels)	*Avg. quality*	*Best quality*
.5 mp	3x5 in.	N/A
2 mp	8x10 in.	3x5 in.
4 mp	11x14 in.	5x7 in.
6 mp	16x20 in.	8x10 in.
8 mp	20x30 in.	11x14 in.
10+ mp	25x40 in.	13x17 in

- **Mid-range Point & Shoot**
  - $500 to $1000
  - These are basically point & shoot cameras with these differences:
    - They are easier to use like DSLRs
    - They have a manual capability that is usable
    - They do not have interchangeable lenses, but do have great zoom lenses
    - If you have a long telephoto lens, image stabilization is worth it.

P&S Zoom Lenses

- Most P&S cameras identify lenses as 3X, 4X, 9X.
- These ratings are somewhat meaningless.
- A better comparison is the “35 mm equivalent”
- The X is arrived at by dividing the maximum “35 mm equivalent by the minimum, e.g. a 35 to 135 mm zoom lens would be 4X while a 35 to 300mm would be 9X.
- Be sure to ask what the “35 mm equivalent would be.
- Optical versus Digital Zoom – Some Camera Manufacturers advertise a combined optical and Digital Zoom, which is misleading.
  - Optical Zoom is a factor of the lens. This is what counts when purchasing a Camera.
  - Digital Zoom is simply blowing up the image in the camera after the picture is taken.

Ultra Wide - 10-20 - Architecture
Wide Angle - 24-35 - Landscapes
Normal - 45-55 (50mm is our eye)
Medium Tele - 85-135 - Portraits
Telephoto - 150-300 - Animals
Super Tele - 400-600 – Small Birds

Memory Cards

- **SD (Secure Digital) –** small size, reliable, and high capacity, supported by a wide variety of digital cameras. Has a lock tab on the card.
- **SDHC (Secure Digital High Capacity)-** look just like SD. Has a lock tab on the card, but greater storage capacity
- **MiniSD:** About half the size of an SD card. Often used in small digital cameras.
- **CompactFlash -** Larger and square shaped. Wide range of capacities and speeds.
- Cards such as Sandisk's Extreme III provide fast recording in the camera and fast download to your computer.
- The faster the card, the more expensive it is.

Single Lens Reflex Cameras

- Amateur or Professional – DSLR
- Compatibility with existing Lenses - Interchangeable lenses (**This is the big advantage of DSLRS so invest in a set that you can live with a long time. You will probably change bodies several times but will be locked in to your lens investment**).
- Expandability
  - Lens selection – Canon and Nikon have the largest selection of quality lenses
  - Flash- If you expect to use flash a lot, look at the flash systems
- Canon & Nikon are the market leaders and either will give you satisfaction. Sony is coming on strong with its purchase of Konica and Minolta
- The choice is basically a budget decision. Put your money into a good zoom lens wide angle to telephoto, e.g. 35 to 135 mm or 24 to 200 mm.
- Buying a Kit (Camera Body plus lens) is not always the best decision as the lens may be of low quality and you may have to replace it later.

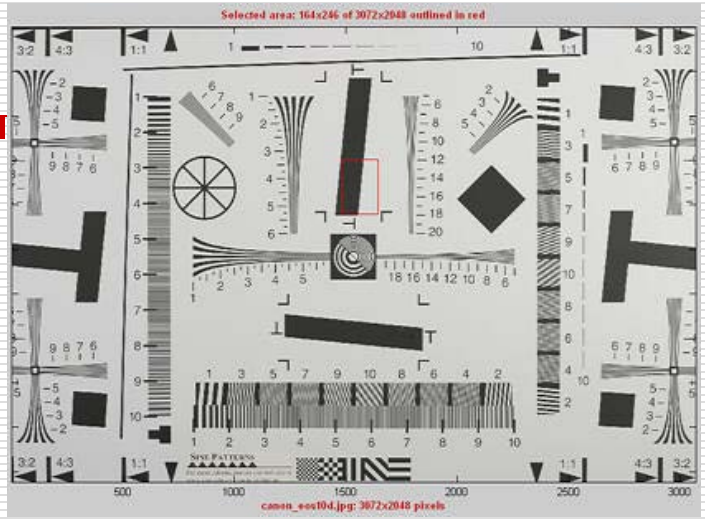
Single Lens Reflex Cameras

- Image Sensor Size (full frame or cropped)
  - Full Frame = 1.0x – Wide Angle, high quality, and low noise advantage
  - APS-H = 1.3x
  - APS-C = 1.6x – Telephoto advantage
- Resolution? 6 – 25 mp
- Large, bright LCD screen 2.5-3”
- Frame Rate – how fast can the camera shoot? 2 – 10 fps
- Weather and dust resistance
- Cost $1000 - $8000

Resolution needed for print sizes

Resolution (megapixels)	*Avg. quality*	*Best quality*
.5 mp	3x5 in.	N/A
2 mp	8x10 in.	3x5 in.
4 mp	11x14 in.	5x7 in.
6 mp	16x20 in.	8x10 in.
8 mp	20x30 in.	11x14 in.
10+ mp	25x40 in.	13x17 in

Resolution



- Resolution has two meanings
  - Ability to resolve pairs of fine lines (an indicator of sharpness)
  - Number of pixels a camera can capture
  - (2816 x 2112 pixels = 6 mega pixel camera)
- Camera costs rise with more pixels
- More Pixels means larger image files
- Larger Image files require more Computer storage space

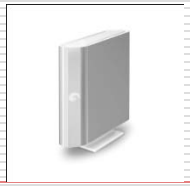


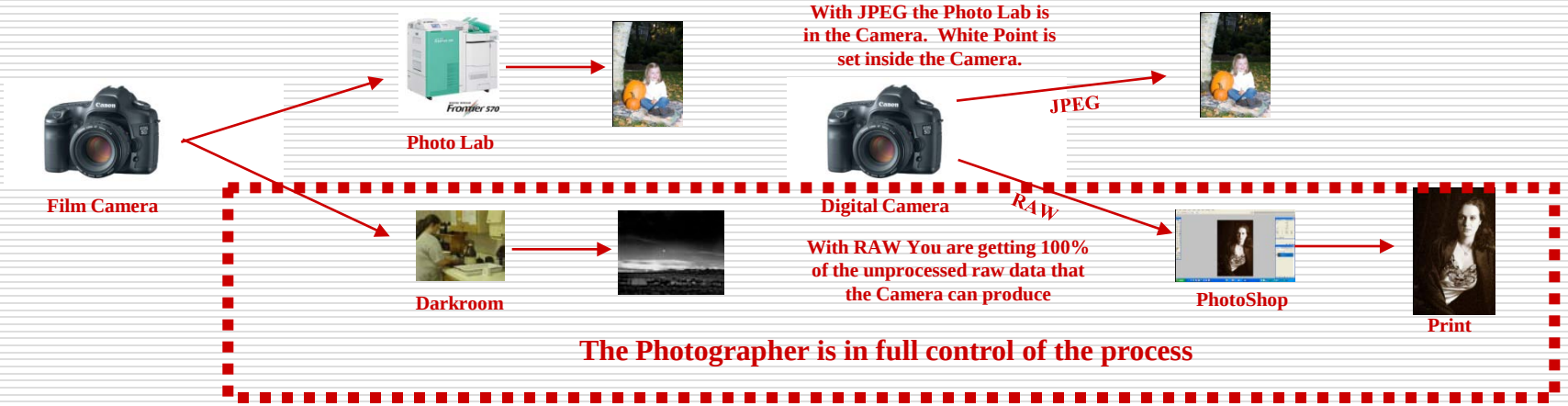
Image Stabilization

- Common cause of blurry pictures is *camera shake*.
- The longer the exposure time, the longer you have to hold the camera still to avoid blur.
- Camera shake is greater problem with a telephoto lenses.
- *Image Stabilization (Canon - IS) or Vibration Reduction (Nikon - VR)* can enable sharper shots when you handhold camera.
- Steadies image by fast spinning gyroscope, which compensates for vibration.
- Can be implemented in either the Camera or the lens.
  - In Camera offers stabilization no matter what lens you have attached
  - In lens tailors required amount of stabilization to the specific lens.
- **Can gain two stops hand held.**

Processing software

- Photoshop is high end – Adobe.com ($699) - Recommended
- Lightroom – PC/MAC - Adobe.com($299) - Recommended
- Photoshop Elements ($99) - Adobe.com - Recommended
- ACDC Pro ($130)
- Lightzone ($99.95) - lightcrafts.com
- Paint Shop Pro ($80) - corel.com
- Camera Manufacturers software (usually free)
- Gimp (free) – gimp.org
- Gimpshop (free) – Gimp hacked to resemble Photoshop
- Google's Picasa (free) - picasa.google.com

RAW versus JPEG



JPEG –

- **Advantages**
  - **Smaller File sizes**
  - **Can shoot faster (Good for Action Photography**
  - **Great for snapshots**
- **Disadvantages**
  - **Only 8 bit Pixel depth**
  - **Must manage processing in Camera at time of shot (Exposure, Tone Curve, White Balance)**
  - **Some of the RAW image data is lost as image is processed, therefore you do not have a "negative" master of your image.**

RAW –

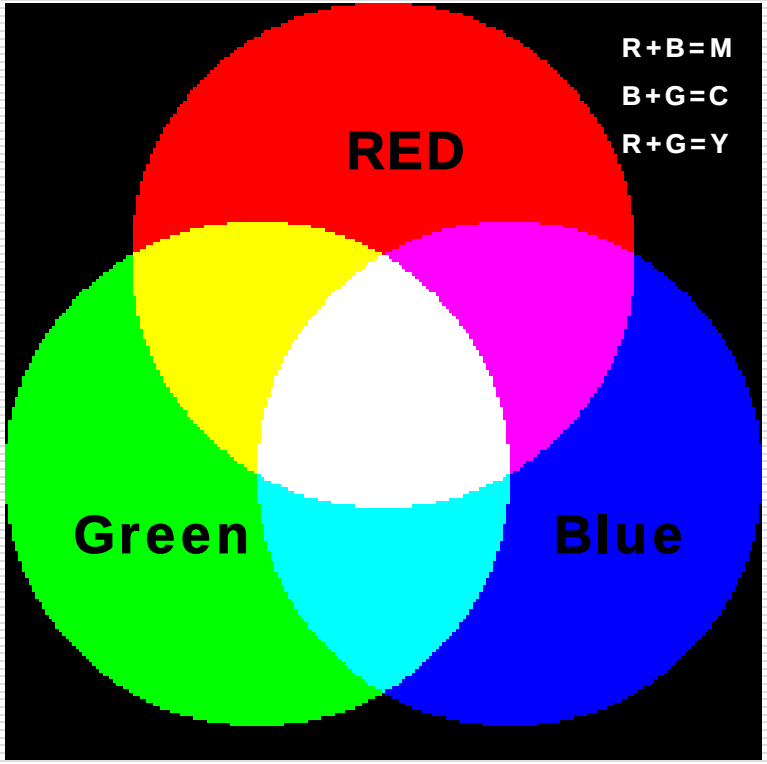
- **Advantages**
  - **Give 100% of image data Camera has captured**
  - **16 bit Pixel depth**
  - **Processing can take place in Photoshop/other image software. This processing offers "after image" choices as to how the image will look**
  - **Can correct some photographer errors such as poor exposure**
  - **Great for Artistic types (Ansel Adams would have loved it**
- **Disadvantages**
  - **Must Process in Photoshop/other image software**
  - **Large File Sizes**
  - **You paid a lot of money for that image processor that is built into your camera**

File Formats

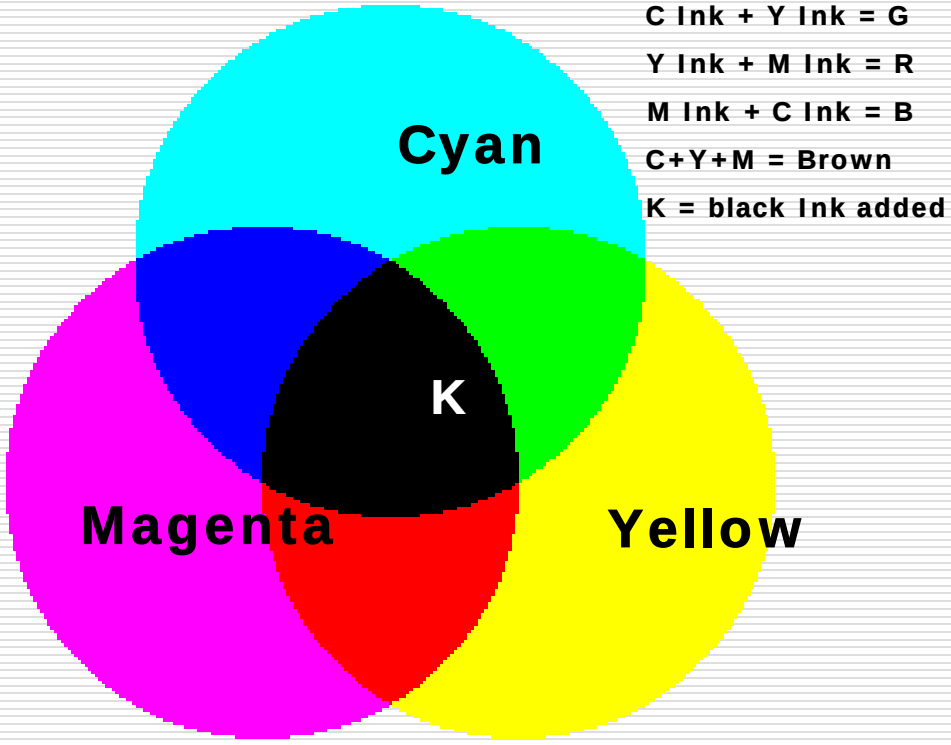
Format	Description	Pros	Cons
JPEG	Lossy compressed file format with compression percentage selectable	Can achieve very large reductions in file size Resulting smaller files take up less drive and media space and transmit much faster. Almost universally supported by imaging programs such as browsers. Sorting, viewing, and cataloging are quick and easy. In Camera shooting of JPEG allows faster loading of image into memory card resulting in faster shooting of multiple images. Good for sports photography.	Produces artifacts and causes loss of detail that may be difficult to notice at low compression ratios but gets progressively worse as compression increases. Multiple compression of files results in quality loss. JPEGs are finished RGB images, meaning you have limited capability to alter or reverse the effects of in-camera settings such as white balance, tone curve, or sharpening.
TIFF	LZW compression available RGB - 24 or 48 bits Grayscale 8 or 16 bits Indexed color 1 to 8 bits Line art 1 bit	No quality loss from compression Excellent for archival storage Almost universally supported by imaging programs.	Files are many times larger than even low-compression JPEGs. TIFFs are finished RGB images, meaning you have limited capability to alter or reverse the effects of in-camera settings such as white balance, tone curve, or sharpening.
RAW	Raw files are minimally processed data from the sensor, which you convert to finished RGB images using special software on your computer.	Highest potential image quality. Depending on your raw-conversion program, you can make extensive changes to image parameters such as exposure, white balance, tone curve, and sharpening. Typically about one-third the size of an RGB TIFF but with none of the information loss of a JPEG.	Images are unfinished, so they need to be converted to another format for printing and posting on the Web, which is often a time-consuming process. Raw formats are proprietary and usually camera-specific and are often not supported by image editors and other software.
DNG	A propo9sed industry standard by Adobe A nonproprietary version of raw that essentially encapsulates the raw sensor data within a TIFF data structure. A few manufacturers, such as Pentax and Samsung, have started supporting DNG in-camera. Canon & Nikon do not support.	Image quality on par with raw. You can make extensive changes to image parameters such as exposure, white balance, tone curve, and sharpening. Encapsulates side care files	Images are unfinished, so they need to be converted to another format for printing and posting on the Web, which is often a time-consuming process. Not yet widely supported in cameras.
PNG	RGB - 24 or 48 bits Grayscale 8 or 16 bits Indexed color 1 to 8 bits Line art 1 bit; Supports transparency	Supports Transparency	
GIF	Indexed color 1 to 8 bits supports transparency	Supports transparency	Small set of colors supported

Color Models

RGB - Additive Color

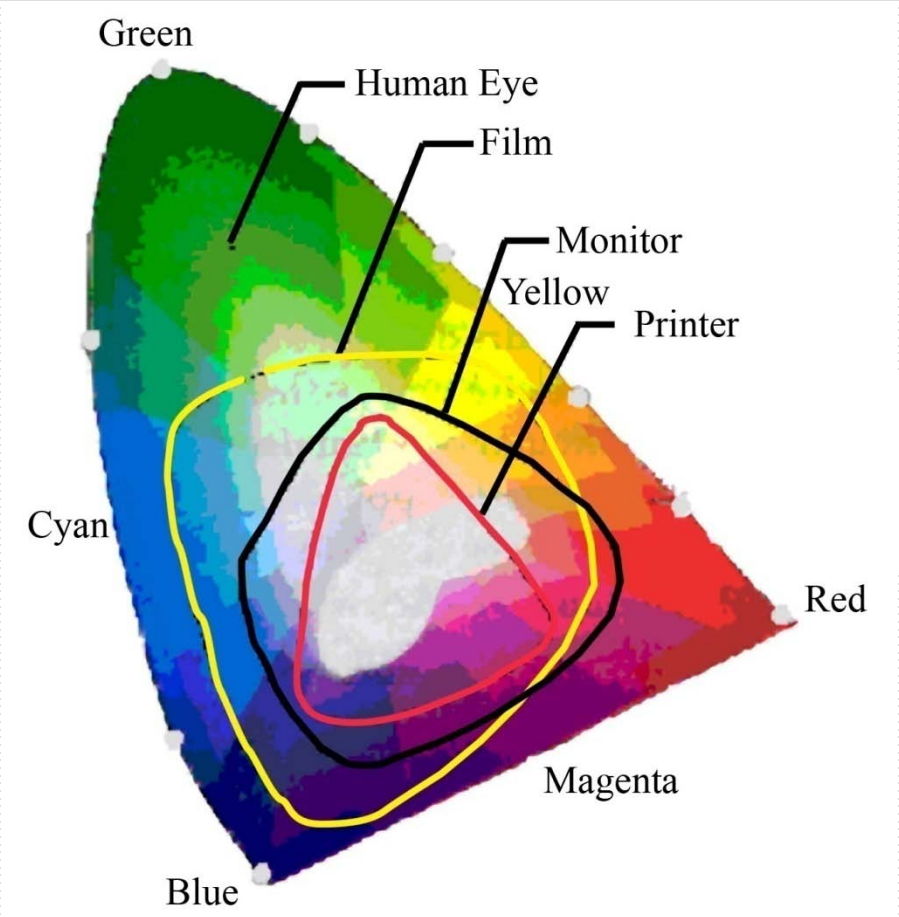


CMYK – Subtractive Color



Color Gamut

Commission Internationale de l'Eclairage (CIE)

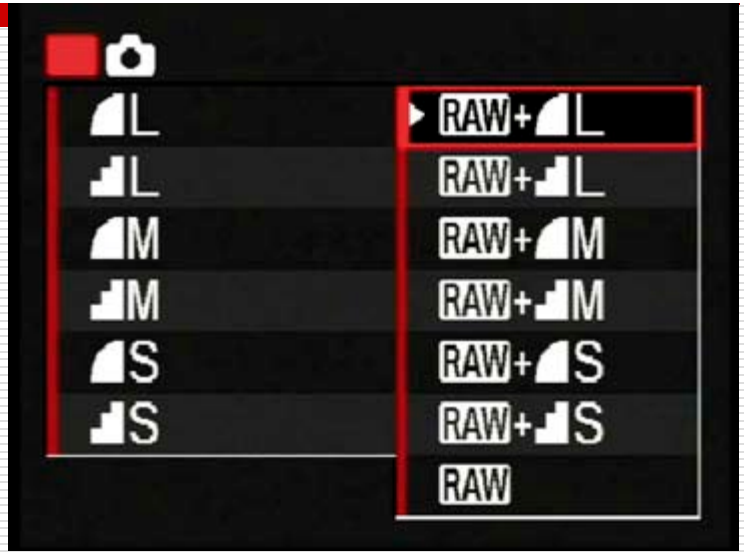


Gamut is like a box of crayons

How many crayons are in your Camera's box?

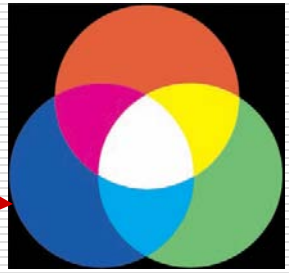
Camera Controls –File Format & Color Space

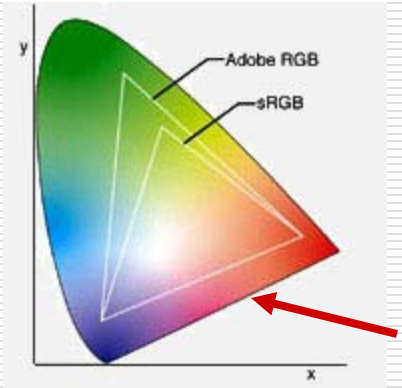
- **File Format - JPEG or RAW**
  - How do you select jpeg or RAW format?
  - How do you set jpeg quality (size)?
  - Can you select both JPEG & RAW?



- **Color Space Adobe RGB or sRGB?**
  - How to you select Color Space?

RGB Color Model (additive)

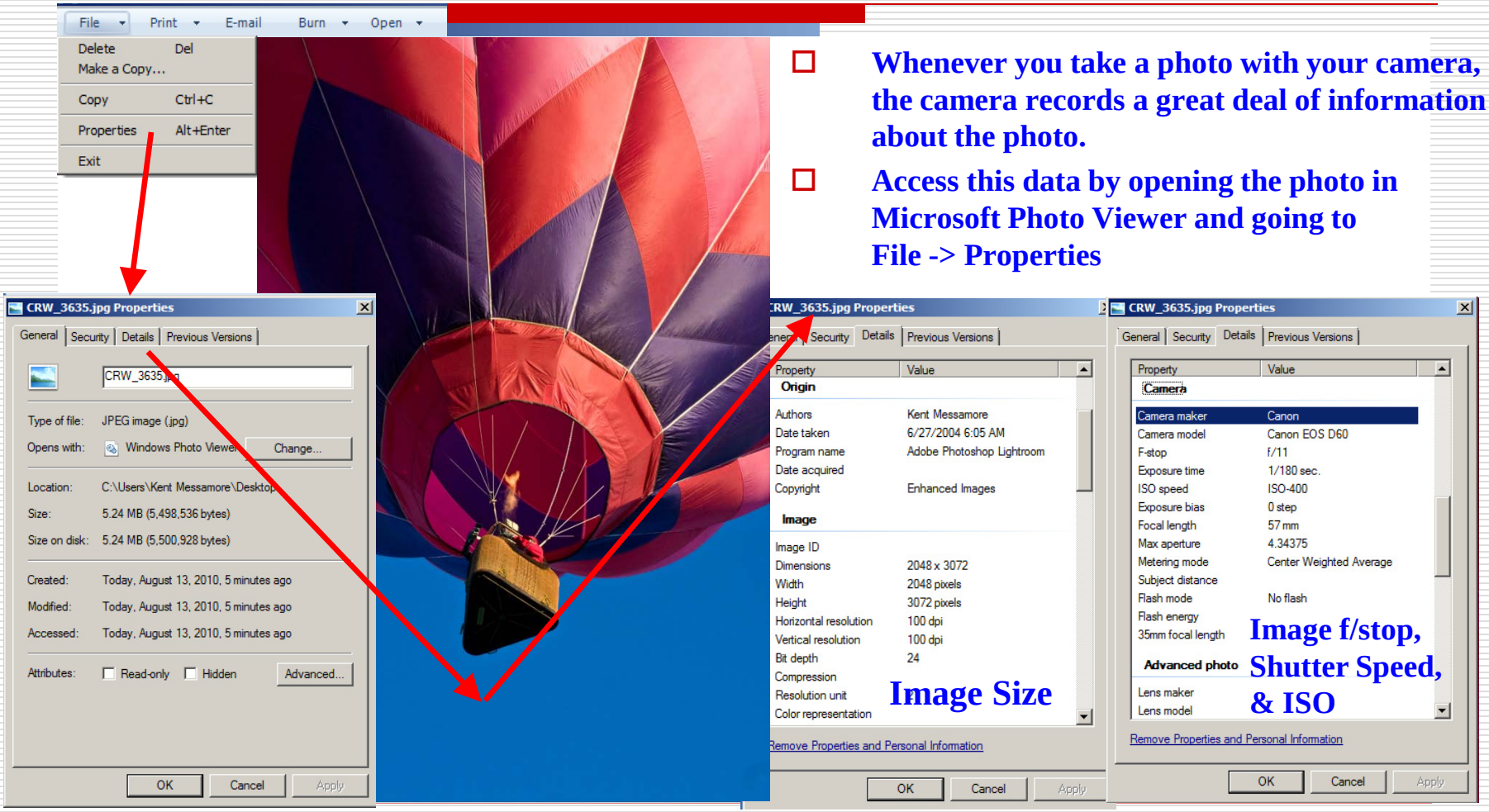




Graph of human eye Color Space

How many crayons are in the box?

Metadata



- Whenever you take a photo with your camera, the camera records a great deal of information about the photo.
- Access this data by opening the photo in Microsoft Photo Viewer and going to File -> Properties

Manual shooting – With a point & shoot camera, Manual shooting is cumbersome at best.

- **Manual exposure:**
  - You specify both aperture and shutter speed to precisely control exposure.
  - Most cameras display an exposure meter that lets you know whether your picture will be properly exposed

Does your Camera have Manual Exposure?

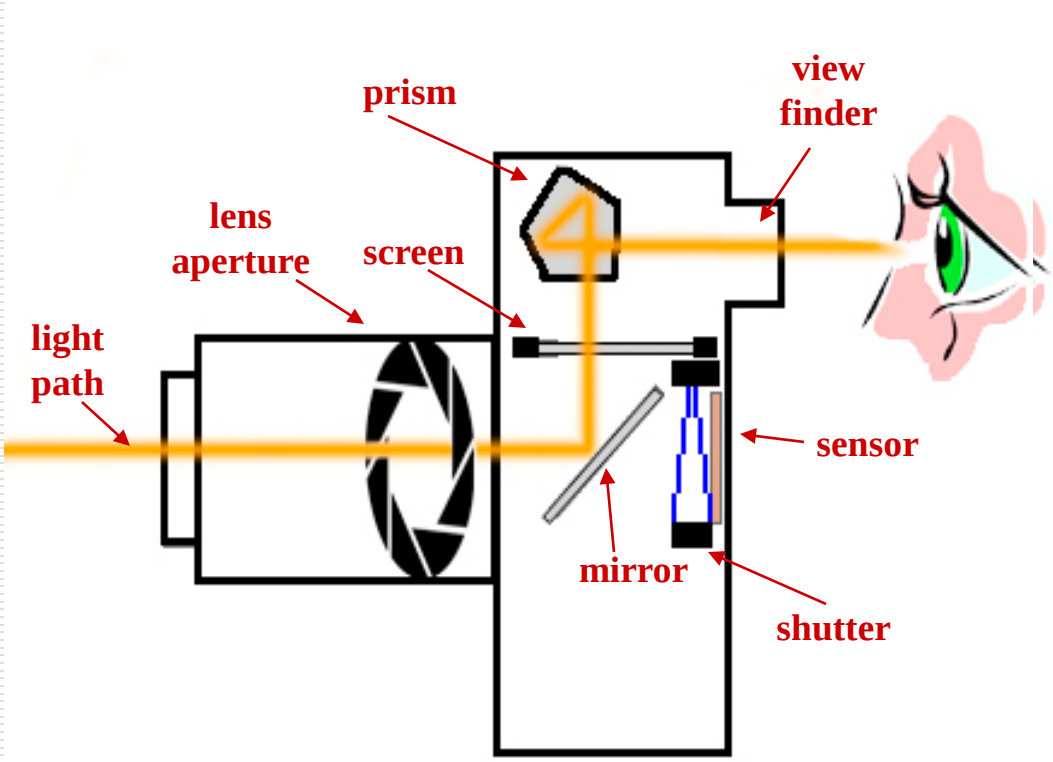
What is the Aperture or f/stop range?

What is the Shutter Speed range?

Shutter Release Mode

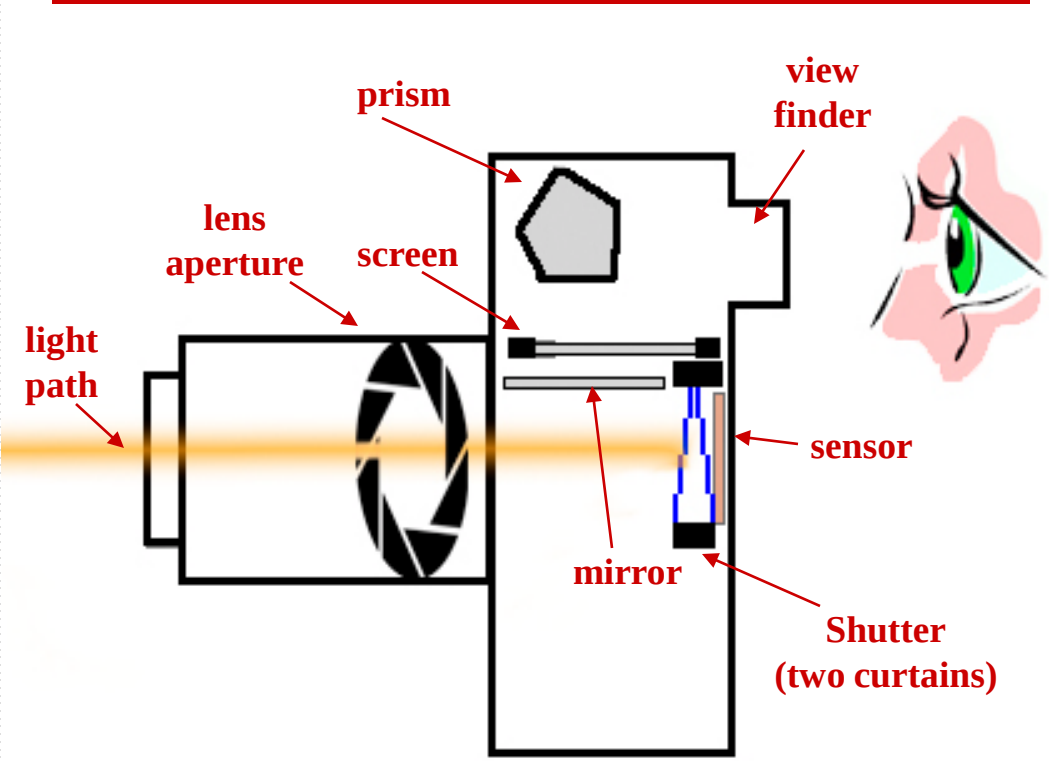
- **Shutter-release mode:** Many cameras offer choice of shutter-release modes, which controls what happens when you press the shutter button. Common modes include:
  - *One-shot or single mode:* Camera records one image every time you fully depress the shutter button. In other words, this is normal photography mode.
  - *Continuous or burst mode:* Press and hold shutter button down to record continuous series of images at a rapid pace. The camera keeps recording pictures until you let up on the shutter button.
  - *Self-timer mode:* Press and release the shutter button, and image is captured several seconds later. (This is the mode you use when you want to put yourself in the picture.)
  - *Remote-control mode:* Some cameras enable you to trigger the shutter button with a remote control unit; if so, this mode sets up the camera for that option.
- Option that controls the shutter-release mode varies; it may be named Drive mode, Release mode, or Shooting mode.

SLR Camera Firing Sequence



- Set Aperture (f/stop) and Shutter Speed
- Press Shutter Button Half Way
- Lens Aperture stops down
- Press Shutter Button full down
- Mirror pops up

SLR Camera Firing Sequence



- Set Aperture (f/stop) and Shutter Speed
- Press Shutter Button Half Way
- Lens Aperture stops down
- Press Shutter Button full down
- Mirror pops up
- Rear Curtain opens
- Front curtain opens
  - Exposure begins
- Rear curtain closes
  - Exposure ends
- Front curtain closes
- Mirror drops down

Before taking a shot, ask yourself:

- What is the story I am telling?
- What do you want viewers eyes to see?
- Are there any distracting objects that I should exclude from the image.
- Is anything in the scene moving?
- What is in the background of the shot?
- Are you close enough?
- What is the main source of light?
- Should I move to another position?
- Should I shoot Portrait or Landscape?
- How will the eye travel through this image?

Using your Digital SLR

ESSENTIAL GUIDE

SPECIAL ADVICE FOR D70 & 350D USERS

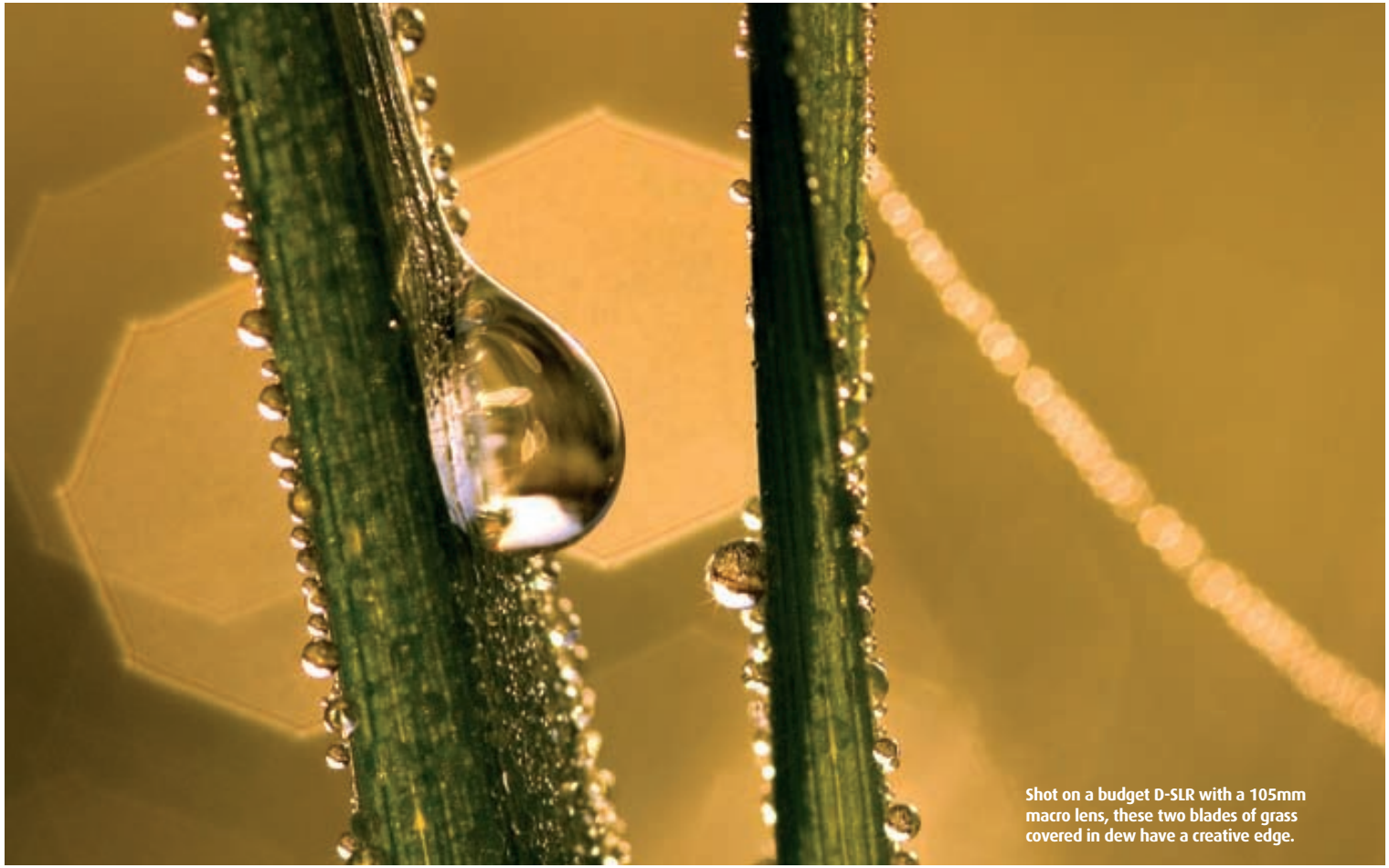
FREE WITH Practical Photography

Tips for every D-SLR owner

- ✔ Shooting checklist
- ✔ Histogram lessons
- ✔ Filter advice & technique
- ✔ Using white balance
- ✔ JPEG & RAW know-how

AND MORE...

GEAR ADVICE: RECOMMENDED LENSES & ACCESSORIES



Shot on a budget D-SLR with a 105mm macro lens, these two blades of grass covered in dew have a creative edge.

Welcome from editor Andrew James

A digital SLR is the hottest thing around right now. But if you've just taken the plunge (or are about to), it can seem scary. There's new technology to master and words that read like a foreign language. At least at the heart of it all is a desire to shoot great pictures and I know many people who have had their passion rekindled by digital capture. There is a danger that the freedom offered by digital leads to a gung-ho approach – shoot as much as you can as fast as possible, in the hope that one or two images will be perfect. Don't let this happen. Enjoy the freedom and benefits that owning a D-SLR brings. You can be more creative certainly, but a thoughtful approach to every picture you take is still the best way forward. I hope you find this guide useful. We've tried to touch on many of the issues you will encounter on your journey.

Contents

Shooting advice

Camera settings & care

Gear advice

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Shooting advice

Your digital SLR gives you freedom and flexibility to explore as many creative avenues as you like. But it also raises a number of different questions from traditional film photography. In this section we'll explore some of the advantages of digital capture and some of the key points you need to know. ➥

Get out with your digital SLR and discover how effective a creative approach is. This lone silver birch was shot mid-morning on the Isle of Skye.

Five-step digital SLR shooting checklist

Your digital SLR is a highly sophisticated piece of kit but it will only do what you tell it to do. And if you've told it to do one thing on one day it will do exactly the same the next, unless you override those instructions. As a result, perfectly good pictures can be ruined simply because you forgot to press a couple of buttons. It sounds obvious, but running through a simple checklist in your head will prevent silly mistakes from occurring and ultimately mean better pictures. Here are five simple but important things you need to remember every time you plan a photo-session...

Have you charged your batteries?

A digital SLR is completely power-reliant, so if your battery is only half-charged or, worse still, completely dead when you come to shoot, then you'll be down the pub earlier than expected. It's best to slot batteries into the charger after every trip out and give them a blast. When they're fully charged pop one set back into the camera itself and tuck a spare (you should always carry an extra set) safely in your camera bag.

Check the settings on your digital SLR every time you start shooting to be sure that you're using the correct settings for the subject you're tackling.

Have you formatted your memory card?

By formatting the memory card you wipe all the information held on it. So when you do format, be certain that any images on it you want to keep have already been downloaded and safely stored. If you haven't, you can still shoot as the card will store your new images into a separate folder, but space on the card will be limited. To format your card, simply access the Format Card option in your camera's menu. Once you've hit the Okay button and formatting has started there's no going back. Once formatted, you will have plenty of free card space on which to store your new images.

Have you checked the ISO setting?

Back in the 'old days' of film and manual cameras, when you put a roll of film into your camera you needed to set the ISO manually too. Then along came modern electronic film cameras and the DX coding on the film allowed the camera to automatically rate the film at the required ISO. With a D-SLR, of course, there's no film at all, but ISO rating still plays a role. It effectively alters the sensitivity of the camera's sensor, allowing you to continue shooting in different light levels. But larger ISO also brings greater visible noise (unwanted graininess) on an image, meaning it's best to use as low an ISO setting as possible. So if you have used ISO 800 to shoot fast-moving action in low light and then forgot to change back to ISO 100 for a landscape shoot, you may feel your resulting pictures are ruined by excessive noise. Remember, on a D-SLR you can change ISO from shot to shot.

Have you selected the right file type?

A D-SLR gives you various options as to what format your digital file is saved in. The most popular is JPEG, but even this gives you various choices that relate to the final quality of the image itself. All you need to know is how big you are likely to want to print your image at and how much post-capture control you want over it. If, for example, you want a small image for use only on a website or for e-mailing, you may choose to shoot the smallest JPEG option available. On the flip side, if you want as big a file as possible and as much post-capture control over it, then shooting RAW is the best option. From a shooting checklist perspective, you just need to have the right file option selected for the job at hand. More on JPEGs and RAWs later.

Have you chosen the white balance?

There's a whole issue wrapped up in white balance choice that we will cover later, but at the checklist stage just be sure that you don't have a completely inappropriate white balance selected that could make your picture look a bit weird. If you're in any doubt as to which white balance you should use, then go for the fail-safe of auto white balance. The camera will make the decision for you. More on white balance selection and use later.

tip

Most D-SLR users will format their memory card out in the field. But it's better to get in the habit of doing this at home. Download your images, check everything is okay, then pop the card back into the camera and format it then and there. This way you know you have a clean card for every outing.

How to hold your digital SLR

To improve your chances of getting a first-rate shot, you need to go back to basics and make sure you're holding your D-SLR properly. Correctly supporting the camera and bracing yourself where possible will minimise the effects of camera shake and allow you to get more stunning, pin-sharp images and less blurry snaps. Camera shake is the distracting blur that you sometimes see across an image, and is a particular problem in lowlight conditions where long exposures are needed. It's caused by a slight movement in the camera as the shot is taken, and the longer the shutter is open the greater your chance of having problems.

Get it right

RIGHT HAND

1. Your right thumb should sit at the back of the camera, near or over the rear shuttle wheel (if your camera has one).
2. Your forefinger should not carry any weight and be free to press the shutter button and use the other controls on the top of the camera.
3. Your other fingers should clasp the grip and bear some of the camera's weight.

LEFT HAND

4. Bear the majority of the camera's weight on the palm of your left hand. Position it on the camera body, just below the lens.
5. Hold the focus ring or the zoom ring with your thumb, forefinger and middle finger, as shown.

NOT LIKE THIS... Zooming and focusing like this will rely on three fingers and the thumb of your other hand to support the weight of your camera and lens. This is not very stable and is hard work with heavier kit. Try to hold the weight of the camera with the palm of your left hand.

NOR LIKE THIS... If you're used to holding a compact you may be tempted to hold your digital SLR like this. The weight of the lens will make this unstable and tend to tip it down to the front. You won't have quick access to the zoom ring to reframe the composition either.

How to hold your digital SLR

Now you've got a good grip on your digital SLR we're going to show you four ways to position yourself while you're holding your camera, to ensure you're rock steady no matter what you're shooting.

SHOOTING AT EYELEVEL

Stand with your legs shoulder-width apart, so you're really stable. You may find that it's more comfortable to stand with one leg in front of the other, rather than the side-by-side as shown here. In either case, just ensure your legs are a good distance apart. Try to keep your arms low, and support your elbows against your body if possible. When holding the camera vertically for a portrait shot, rest your left elbow on your body. Just before you take the shot, hold your breath for a moment so as to minimise movement.

tip **The chances of getting camera shake increases proportionally as the focal length of the lens increases. To combat this, use a fast shutter speed. If handholding your camera, aim to use a shutter speed that is 1 stop over the focal length, or faster. With a 50mm lens, a shutter speed of at least 1/50sec should be used. A 300mm lens will need a faster shutter speed of 1/300sec. The 35mm equivalent focal length should be used, see page 38 for more on lenses.**

WAIST-HEIGHT SHOTS

When eyelevel shots are too high, crouching with one knee on the ground allows you to rest an elbow on your other leg for good support. This is generally very useful for landscape shoots, when trying to bring foreground detail into the scene, or to achieve a better perspective when shooting portraits of children.

LOW VIEWPOINT

For an ants-eye view on the world, or when taking close-ups of nature, a prone position like this offers a very solid support. A bin bag is a cheap and effective tool for keeping mud and grime off your clothes, so is worth keeping in your kit bag.

FINDING SUPPORTS AROUND YOU

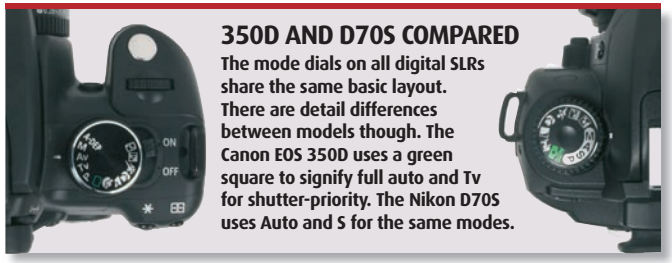
Where possible it is best to improvise and use objects surrounding you to support your camera and hold it steady. This is particularly useful when using long telephoto zoom lenses, as the further you zoom in, the greater your chances of camera shake when even tiny movements become amplified. Rest your camera on a nearby fence or wall, or find a comfortable way to brace the camera and yourself against a post. This will massively increase your chances of getting a sharp shot.

Selecting your exposure modes

One of the major advantages of a digital SLR over a compact camera is the sheer number of creative controls it offers. Some creative compact cameras may come close but they still don't offer the same range of shutter speed and aperture options as even the cheapest of digital SLRs. It follows then, that taking control of these features unlocks the full creative potential of your digital SLR. You'll find the main mode dial on the top-plate of most D-SLRs, allowing you to select the appropriate setting for your subject.

The main mode dial is located on the top-plate of the camera.

Program mode is ideal for capturing scenes when you don't need to worry about the shutter speed or aperture being used.



350D AND D70S COMPARED

The mode dials on all digital SLRs share the same basic layout. There are detail differences between models though. The Canon EOS 350D uses a green square to signify full auto and Tv for shutter-priority. The Nikon D70S uses Auto and S for the same modes.

"Taking control of these features unlocks the full creative potential of your digital SLR"

Full auto

This completely automatic mode doesn't allow you to override the settings on the camera. It's great for point-and-shoot simplicity, but you're missing out on the benefits of using a D-SLR if this is the only mode you ever use, as you've got no control over the shutter speed, aperture or exposure. It's often indicated on the mode dial by being picked out in green.

Program

This mode is still fully automatic, setting both the shutter speed and aperture for you, but gives a little more control than full auto. The main advantage is the ability to set exposure compensation to over or underexpose according to the subject and lighting.

More on exposure modes over the page

Subject programs

Alongside the fully automatic setting, these modes are still completely automatic, taking away some of the skills of using the camera, but they're a good starting point if you're new to shooting with digital SLRs and want to explore how the shutter speed and aperture effects your images.

Each program mode gears the settings towards a particular subject. Here are the basic settings used by most manufacturers.

- **Portrait** – Selects a wide aperture to throw the background out of focus in order to isolate the figure.
- **Landscape** – Selects a small aperture where possible, increases colour saturation and turns off the built-in flash.
- **Close-up** – Selects a small aperture to give maximum depth-of-field for close-up images. Unlike the close-up mode on a compact camera this setting has no effect on how close the lens will focus.
- **Sport** – Selects the highest shutter speed possible to freeze movement, and uses continuous shooting and focusing modes to keep up with moving subjects.
- **Night** – Optimises the camera for shooting at long shutter speeds and turns off the built-in flash.
- **Night portrait** – Allows the camera to shoot with flash and long exposures in order to record both foreground and background detail.

Exposure modes

Aperture-priority

With this semi-automatic setting you choose the aperture, with the camera selecting the appropriate shutter speed.

When to use it

Controlling the aperture allows you to determine the amount of the image that's going to be in focus. A wide aperture such as f/4 means that only a small amount of the image will be sharp, whereas a small aperture (f/16) will give maximum depth-of-field.

tip **If you're just starting out with shutter speeds and apertures, try shooting the same subject using a range of settings. Check how the different settings affect the results by looking at the EXIF data either in the camera's software or in Photoshop.**

Shutter-priority

This setting allows you to control the amount of time the shutter is open, with the camera selecting the aperture to suit.

When to use it

When you want to either freeze or blur movement in your subject. To capture fast action you'll need a fast shutter speed of at least 1/250sec. A slower shutter speed will help add creative blur to moving subjects.

"For complete control over the exposure you can't beat manual exposure"

Manual

Fully manual exposure gives you the option of selecting both the shutter speed and aperture. This doesn't give you free reign to select any settings though, as you still need to take a meter reading to determine the correct exposure.

When to use it

For complete control over the exposure you can't beat manual exposure. It's particularly useful when you want a consistent exposure across a number of frames, for example if you want to combine images later on.

Metering

Despite the fact that you can check the exposure on the LCD after you've taken a shot, it still pays to get the exposure right as not every image is repeatable. In most cases it's best to underexpose your shots very slightly to ensure that you retain as much highlight detail as possible.

MULTI-PATTERN

This is the default option on all digital cameras. It takes a range of readings from across the whole image and combines them to determine the correct exposure. These systems are so reliable that they can be used for most of your shots, and you'll only need to use the other options in very tricky lighting conditions.

CENTRE-WEIGHTED

Unlike the multi-pattern metering mode, this mode takes a single reading from the whole of the image, although it takes most of the reading from the centre of the frame. This metering mode is more easily fooled by bright or dark backgrounds than the more sophisticated multi-pattern mode. In these situations you need to point the camera at an area that will be recorded as a midtone in your final image. Centre-weighted metering can give more consistent readings than the multi-pattern mode, as there's no intervention from the camera.

SPOT

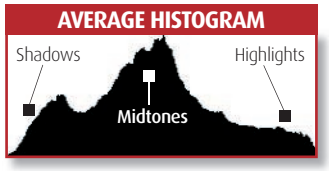
Like centre-weighted, this mode takes a single reading from the image. The difference being that this is taken from a tiny area of the frame, so you need to use this metering mode with some care, and is best used in fully manual exposure mode. To get the correct exposure you have to point the centre of the frame on an area that is a midtone and take a meter reading before re-framing your picture.

Understanding histograms

One of the best things about digital SLRs is the ability to review your captured images on the back of the camera, in order to assess whether or not you've got your shot. Composition and colour are relatively easy to evaluate by glancing at the LCD screen, and sharpness can be determined by zooming in on your photos. Judging the exposure, however, is a little harder, as it's not always easy to tell if your images are too bright or dark on the LCD screen. The same picture will appear bright and vibrant viewed in the dark but much duller if you look at it in direct light. A more reliable way to check your exposures is to use the histogram.

What's a histogram?

A histogram is a simple bar chart showing the distribution of pixels in an image, based on brightness. The left-hand side represents the darkest pixels, the middle corresponds to the midtones and the right-hand side the white pixels. The higher the graph is at a given point, the more pixels of that brightness are present in the image. For an average image with no strong highlights or shadows you can expect to see a peak in the graph in the middle, showing an average distribution of tones. With a darker image, such as a lowlight scene, you can expect to see a peak to the left. A peak to the right would denote a high-key image. That said, there is no such thing as a perfect histogram. You can only judge it to see if the graph looks how you'd expect it to and adjust the exposure to correct it if things don't tally up.



Here the exposure is spot-on, neither too bright nor too dark, and this was quickly checked using the histogram.

Too dark

Here you can see the graph is bunched up to the left and there are no midtones, light greys or whites in the shot. Clearly the image needs to be reshot using a slower shutter speed or wider aperture to bring the histogram to the right.

Too bright

Here the peak extends right into the whites. This shows that lots of the pixels are too bright for the camera's sensor and have burned out to pure white. This shot should be taken again using a darker exposure to bring back this lost detail.

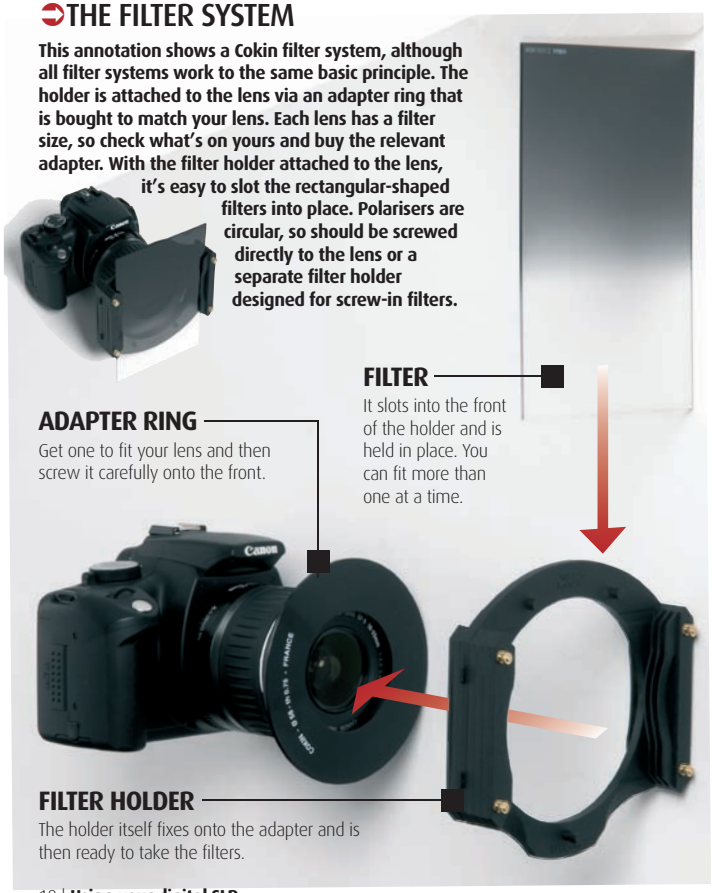
"It's not always easy to tell if your images are too bright or too dark on the LCD screen. A more reliable way to check your exposures is to use the histogram"

Using filters

Shooting with a D-SLR does away with the need for filters, right? You can add your filter effect at the Photoshop stage, so why bother with the extra hassle and expense? Well, while Photoshop can do some of the things a filter will, it certainly can't do all of them. And if you can avoid spending more time on the computer by getting it perfect at the taking stage, that's got to be worth its weight in gold. As a D-SLR user you should invest in a filter system from a manufacturer such as Cokin or Lee. Not every filter will be of use to you though. Colour correction filters are widely used with film but you can simply adjust the white balance on your camera instead (see page 26) and a warm-up filter has also been largely superseded by the white balance too. However, a polariser, a couple of neutral density grads and a straight neutral density filter are all worth having in your kit bag.

THE FILTER SYSTEM

This annotation shows a Cokin filter system, although all filter systems work to the same basic principle. The holder is attached to the lens via an adapter ring that is bought to match your lens. Each lens has a filter size, so check what's on yours and buy the relevant adapter. With the filter holder attached to the lens, it's easy to slot the rectangular-shaped filters into place. Polarisers are circular, so should be screwed directly to the lens or a separate filter holder designed for screw-in filters.



ADAPTER RING
Get one to fit your lens and then screw it carefully onto the front.

FILTER
It slots into the front of the holder and is held in place. You can fit more than one at a time.

FILTER HOLDER
The holder itself fixes onto the adapter and is then ready to take the filters.

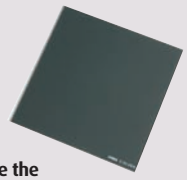
A big sky on the Isle of Skye. An ND grad filter proved handy to balance the exposure.

Recommended filters to use with D-SLRs

POLARISER

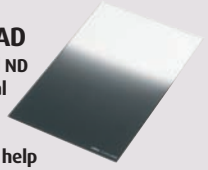
A polariser helps to reduce glare, removes reflections from water and will intensify colours. Blue skies can really sing when you use a polarising filter, but be careful not to overdo it or your sky might end up an unwelcome black colour. It does, however, reduce the amount of light entering the camera so make sure you're still achieving the right shutter speed to prevent camera shake if you're not using a tripod.

NEUTRAL DENSITY (ND)



A straight ND (ie non-graduated) filter is really only of interest if you want to reduce the amount of light entering the camera. You might want to do this for creative effect, such as when you're blurring water or other moving subjects. Without a neutral density filter it could prove impossible to get the slow shutter speeds required for these techniques.

ND GRAD



A graduated ND filter is a real boon for landscape shots. It can help balance exposures between light skies and darker land, so highlight detail is retained in the image. To do this successfully in Photoshop, you'd need to expose one picture for the sky and one for the land, merging the two later. It's effective but takes time and some precise Photoshop skills to get right.

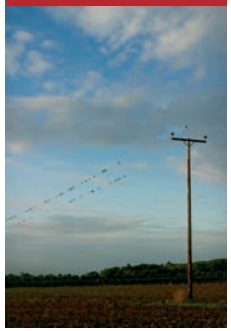
"ND grads can help balance exposures between light skies and darker land, so that highlight detail is retained in the image"

Turn here to see how effective filters can be...

Using filters: Before and after shots

With a polariser

UNFILTERED IMAGE



This shot lacks detail in the sky, and the colours are a little bland.

This shot taken early in the evening shows the advantages of using a polariser. The image (taken as a high quality JPEG) without the filter is a bit flat, with the colours washed out and a limited amount of detail in the sky. Compare it to the polarised version taken just a few moments later and the differences are obvious. The blue in the sky is stronger and there's more detail retained in the lighter cloud area. All the photographer needed to do was rotate the circular polariser and watch how it changed the scene through the viewfinder.

With an ND grad

UNFILTERED IMAGE

The bright sky and dark water results in an unbalanced exposure.

There is a tendency for new filter users to expect a dramatic effect when using an ND grad for the first time, but the truth is the difference is often fairly subtle. In this shot a 0.6 ND grad was used to balance the exposure difference between the large area of sky and the darker final third of the picture. In the unfiltered shot there is sky detail but it's not as strong as it could be. By adding the graduated filter, more sky detail has been retained without affecting the foreground at all. In exposure terms, the 0.6 ND grad has reduced the brightness of the sky by 2 stops.

tip Flare can be a problem when you're using filters. Scratches or water droplets on the surface of the filter will cause flare, so try to keep yours free of dirt and water, and well protected when not in use. Using two filters together will also increase the likelihood of flare, as the light can bounce between the filters.

With an ND

It seems strange to want a filter that actually reduces the amount of light entering the camera, as normally we moan that light levels are too low to achieve the shutter speeds we want. But there are occasions when an ND filter is invaluable. Here the bright morning light meant that the slowest shutter speed possible would still record the water quite sharply. But popping on the ND filter brought down the shutter speed significantly, so allowing the flowing water to record as more of a blur. A tripod prevented camera shake.

UNFILTERED IMAGE

Without an ND, the light was too bright to achieve a slow enough shutter speed to blur the water successfully.

Camera settings and care

JPEG, RAW, white balance, sensor dirt... with digital capture you need to understand many new terms and make decisions that will influence your picture-taking. Here we look at some of these issues so you can ensure your camera is working the way you want it to. ➥

The digital SLR's white balance was set to cloudy for this cheetah photograph, helping to warm the picture in the way a warm-up filter would have for a 35mm film SLR.

Choosing a file format

Before you take a picture with a digital SLR the camera will offer you a choice of formats that the image file can be saved as. There are two main options to choose from, JPEG and RAW, and each has its advantages and disadvantages and is more suited to certain situations.

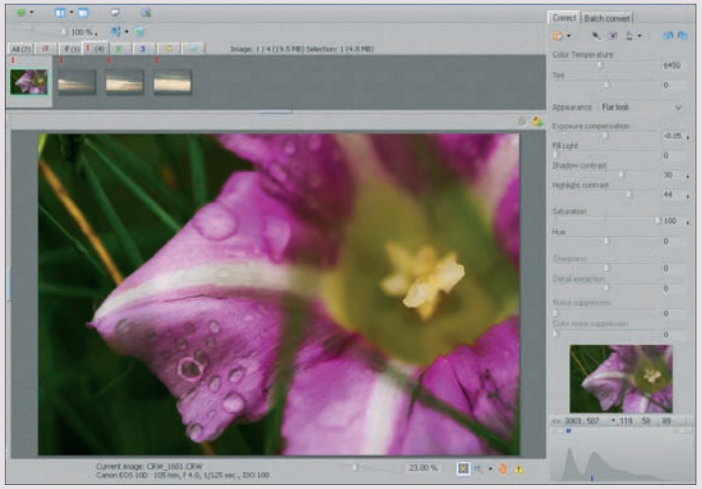
"RAW files offer the ultimate quality, but they need to be converted into a standard file format using a RAW converter to extract the best possible image"

What is JPEG?

JPEG is a very common format that's compatible with most software, including Internet Explorer and even Microsoft Word. JPEG uses a variable lossy compression, which can really crunch down the file size, allowing you to get more shots on a memory card. However, because it's lossy, some picture data is discarded, causing the image quality to suffer – although with high-quality JPEGs this is hardly noticeable. The smaller file size also means that camera write times are much shorter, so the camera buffer is quickly cleared allowing for a greater rate of shots to be taken. This format is ideal where a fast turnover of shots is required, such as press or sports photography. It's also good when full resolution pictures are not needed, such as web use.

What is RAW?

RAW files contain the information exactly as it comes off the camera. All the data is intact, which means a smoother tonality and wider range of colours is available than with a JPEG file. RAWs offer the ultimate quality. However, RAW files need to be converted into a standard file format (such as TIFF or JPEG), using a dedicated RAW converter package, in order to extract the best possible image and become compatible with other imaging packages. Every model and make of camera produces it's own type of RAW file, so finding a compatible converter can be a problem, particularly with new cameras. This format is best for situations where the ultimate quality and flexibility is needed but speed is not so critical, such as portrait, landscape and still-life photography.



Convert RAW files for free

Most digital SLRs come bundled with their own RAW converter software, but these can often be sluggish to use and only offer limited control. In many cases better results can be achieved – and much more quickly – using third party RAW converters. RawShooter Essentials 2005 is a great piece of software that can be downloaded from www.pixmantec.com and is absolutely free.

JPEG v RAW

The benefits and disadvantages of the two most popular file formats.

Subject	JPEG	RAW
IN-CAMERA FLEXIBILITY Can I change the image size or processing parameters?	✔ **The end result can be tailored to suit in-camera. You can vary the compression quality, picture size/ resolution, the image sharpness, the contrast and colour balance settings.**	✘ **RAW files contain the information as it's captured, so can't be altered. Adjustments must be made in the converter software.**
FILE SIZE Which is the bigger file on the memory card?	✔ Thanks to the lossy compression, high-quality JPEGs are generally less then half the size of RAWs, but it does also depend on the complexity of the subject.	✘ Lossless compression may be applied, but RAW files are still very big. Larger sensors will take up proportionally more space, so expect around 1Mb per megapixel.
IMAGE QUALITY How detailed and smooth is the image?	✘ **The lossless compression compromises image quality but is not always obvious unless contrast/ brightness adjustments are made in post-capture software.**	✔ **All captured data is kept intact, offering the ultimate quality. Images can be subtly adjusted in the RAW converter to extract the sharpest and most detailed picture.**
WRITE TIMES Which is quicker to write to the memory card?	✔ The small file size means less needs to be written to the card, so it takes much less time to clear the camera buffer.	✘ Large file sizes means longer write times, so when a series of shots are taken in quick succession the camera buffer can fill easily.
FILE COMPATIBILITY How simple is it to open and view the file?	✔ **The JPEG format is widely used in all software areas. Every imaging package worth mentioning will allow you to view JPEG files.**	✘ **Every camera model creates a different RAW file that has unique processing requirements, so only compatible RAW converters can view these images.**
ENHANCEMENT OPTIONS How easy is it to tweak the image on my PC?	✘ To alter a JPEG you must open it into an imaging package and tweak it using the tools provided. Exposure and white balance are not easily changed.	✔ Most RAW converters offer simple sliders and menus to alter contrast, exposure, sharpness and white balance. It's very easy and very photographic.
WORKFLOW SPEED Which is quicker to process, from capture to print?	✔ **With the image parameters set in-camera to give a punchy image, all you do is to make a print of your JPEG image as it is.**	✘ **Images must be converted and saved before prints can be made. If an image requires work this could still be the quicker method though.**

Using white balance

The type of light falling on your subject makes a massive difference to the colour of the scene. The light in the middle of the day is much more blue than it is at sunrise or sunset, while a household bulb produces light with a strong orange cast. This is due to what's known as the colour temperature of the light source. Our eyes adjust to these changes automatically, but that's not necessarily how your digital camera will record the scene. Every digital SLR has a white balance (WB) setting to adjust the way it records colours, so to get the most out of your camera you need to know when to use the settings available.

Auto

As the name suggests, this mode adjusts the white balance automatically for different lighting conditions to give neutral results. This mode works well for point-and-shoot situations or if there's a mixture of light sources. The problem with auto white balance is that it will try to produce a neutral image, even though you may want the image recorded as a warmer or cooler tone. This is especially true when you're shooting at the start or the end of the day. Sunrise or sunset shots will be ruined by the neutral results of an automatic setting.

RAW ADVANTAGE

Using the RAW file format means that you can change the white balance after shooting when you convert your images. You should still try to choose the right setting when you take the shot though, as this will save you time having to change the setting later on.

Canon EOS 350D: The WB settings are located on the rear command dial.

Nikon D50: The WB button is found on the far-left of the camera's back.

Turn for more info on white balance settings to try...

Using white balance

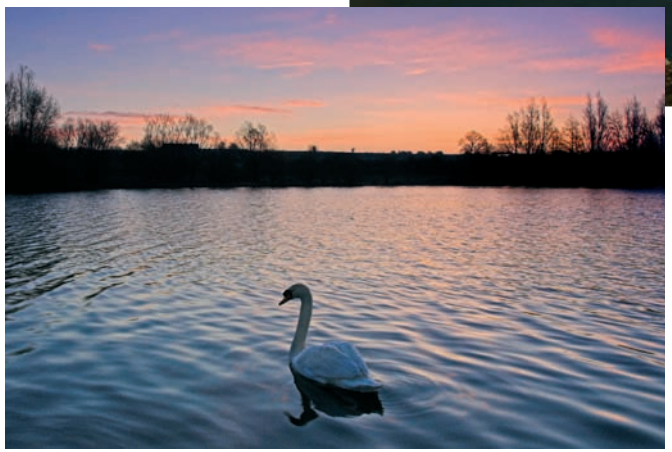
Pre-set white balance

When you're shooting under a fixed type of lighting you can use one of the pre-set options available on your camera. This means that you'll get consistent results while the lighting remains the same. This is especially important when you're using many filters, as using the automatic setting will try to compensate for their effect.

Custom pre-set

This mode works out the correct colours for a scene by taking a reading from a neutral subject and recording this setting in the memory. To use this setting you need to select the custom or pre-set option in the white balance menu on the camera. Then fill the frame with a white or neutral grey subject in the same lighting as your main subject. A grey card or white reflector is ideal for this. You then have to measure the white balance, which is usually done by pressing the shutter release.

The warmth in this landscape has been helped by setting Shade WB, while the dawn image below has been shot with Direct Sunlight WB.



Once this white balance setting is programmed into the camera you'll get consistent results as long as the lighting remains the same, so it's more useful under artificial lighting rather than the changing conditions usually encountered when shooting in natural light. Some pro D-SLRs allow you to pre-program a number of different custom white balance settings, but most models only offer one pre-set option.

Other settings available

- **Incandescent** – For shooting under tungsten bulbs. Colour temperature approximately 3000K.
- **Fluorescent** – For shooting under fluorescent tube lights. Colour temperature approximately 4200K.
- **Direct sunlight** – For shooting in bright, natural light. Colour temperature approximately 5200K.
- **Flash** – For shooting under normal or studio flash lights. Some cameras rely on the direct sunlight setting for flash however. Colour temperature approximately 5400K.
- **Cloudy** – For shooting when the sky is overcast. Colour temperature approximately 6000K.
- **Shade** – To compensate for shooting in full shade. Colour temperature approximately 8000K.

tip

You don't always have to select the 'correct' white balance to get a completely neutral result. Using the cloudy setting on the camera has a similar effect to fitting a warm-up filter to your lens. Use this in sunny conditions and you'll add extra warmth to your images, which is great for portraits, or for eliminating the slight cooling effect of using a polariser filter.

JPEG ADJUSTED IN-CAMERA

Improving your pictures in-camera

All D-SLRs allow you to tweak the JPEG's saturation, sharpness, and contrast in-camera before you take a single shot. You can stick with the camera's default JPEG settings and shoot okay pictures (as right), but by going into the D-SLR's menu and fine-tuning the file parameters, you can make some subtle but effective improvements to your image. Here we show you why it pays to take control of your JPEGs in order to get better results without fuss.

DEFAULT JPEG

There's nothing wrong with this image file, except that it lacks a little colour saturation and contrast. But we can alter the in-camera settings to improve it as shown in the main image above.

THREE SIMPLE STEPS TO BETTER JPEGS

Refer to your camera's manual to find the best way to alter the settings of your JPEG. The most useful areas to look at are saturation, contrast and sharpness. The results may be subtle but even a small improvement in the image is worthwhile. Here are our basic recommendations...

❶ Improve saturation

This is the easiest way to get punchier results. Crank the saturation up and watch those colours look more impressive. Some scenes lend themselves to high contrast, particularly landscapes, while pictures of people generally look better underplayed.

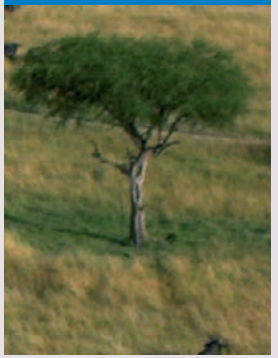
❷ Boost the contrast

Many cameras default this setting to auto. This means that the camera decides how to render every shot you take, occasionally creating inconsistencies between pictures. By lowering the contrast you increase the amount of highlight and shadow detail that is retained, which is good for people shots. Increasing the contrast will improve other types of shots, particularly black & whites.

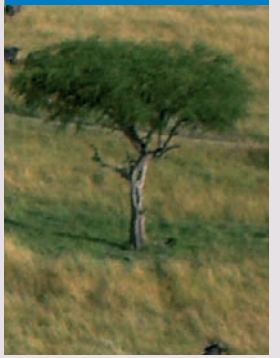
❸ Increase sharpness

Beware! This won't make out-of-focus pictures sharp, but it will help make sharp pictures look a little sharper. Budget cameras tend to use high levels of sharpening anyway, so keep it on normal unless your pictures consistently look a little soft, in which case set it just above standard. Any higher will probably produce horribly oversharpened results.

DEFAULT SHARPENING



ENHANCED SHARPENING



➥Turn over for more on using in-camera settings

Setting up your D-SLR

You've just learned that it's important to tweak your JPEG settings to try to get the best results instantly. Your D-SLR's JPEG default settings are probably perfectly acceptable but if you've got greater control over the image file, why not use it? Here we look at the idea of taking your in-camera settings a stage further, with two different set-ups for each of the most popular budget digital SLRs. If you are using, for example, a Pentax, Sigma, Konica Minolta, Fuji etc, then explore your camera for similar settings that will improve the 'straight out of the camera' appearance of your images.

tip You may find yourself in the situation where you have played with so many camera settings you can't remember how the camera should be set up normally. If this happens, don't worry. All digital SLRs have a Restore Factory Settings or Restore Defaults option in the menu. Using this will set the camera back to how it came out of the box.

"Your D-SLR's default settings are probably perfectly acceptable but if you've got greater control over the image file, why not use it?"

Landscapes with a Canon EOS 350D

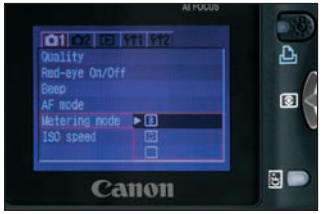
Landscapes are probably the most popular subject for SLR users – be it film or digital. Once you've worked hard to find the perfect vista you'll want to make sure you get your shots while the weather is still on your side.

1 SHOOTING MODE

Use aperture-priority (Av) and operate the command dial to select the aperture. We'd suggest at least f/8 or higher.

2 ISO

You should always select the lowest ISO possible, so push the ISO button on the back of the camera and scroll down to ISO 100. Press Set.



3 METERING

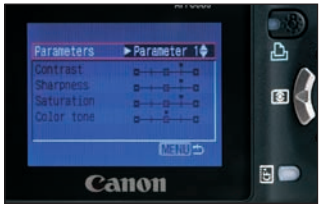
Press the left button on the multi-selector at the back of the camera. Select the top option (Evaluative). This mode will read the whole scene to take your exposure reading.

4 EXPOSURE COMPENSATION

Press and hold EV +/- button, then use the command dial to change the compensation. + makes the image lighter, - makes it darker. In this case err slightly on the dark side (-) to prevent burning out the highlight detail.

5 WHITE BALANCE

Press the down button on the multi-selector. To warm the image slightly select Cloudy, otherwise use the daylight (Sunny) setting. Press Set.



6 SETTINGS

Enter Menu, go across to Camera Menu 2, go down to Parameters, press Set, press Set again to highlight the menu and highlight Parameter 1, press Set. You have now boosted contrast and saturation as shown on the previous pages.

Indoor portraits with a Nikon D50

Many digital SLR users also end up taking loads of pictures of their friends and family, often indoors, which can cause lots of problems. This guide should reduce the likelihood of poor exposures and wasted opportunities.

1 SHOOTING MODE

Set the mode dial to A (aperture-priority). Then use the command dial to select f/5.6 to give a relatively shallow depth-of-field to blur backgrounds.

2 ISO

Press and hold the ISO button on the back. Use the command dial to scroll until you reach 200 on the top LCD display. 200 is the lowest setting on this camera.

3 RED-EYE REDUCTION FLASH

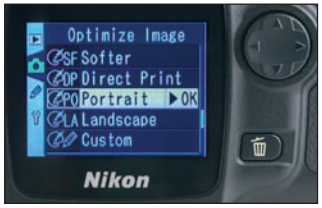
Press the flash button once to pop it up. Press and hold it again and use the command dial to scroll to the eye symbol on the top LCD display.

4 AUTOFOCUS

Press Menu. Use the multi-selector at the back to select the pencil (symbol). Scroll down until you reach 03 AF-Area Mode. Select Dynamic Area. Now the camera will recognise where your subject is in the frame better and focus accordingly.

5 WHITE BALANCE

Hold the WB button on the rear of the camera and use the command dial to select flash on the top LCD display in order to get the right colour balance for healthy-looking skin tones.



6 CUSTOM COLOUR

Press Menu, go to the camera menu and select Optimise Image. Press right, go down and select Portrait Mode which is optimised for people pictures and hopefully your skin tones should improve.

Keeping your sensor clean

Right, so now you have a great camera and clean lenses. But you may still notice strange dark blobs on your pictures. It's likely that this is the result of muck on the camera's sensor. No matter how careful you are when removing the lens, dust, hairs and even moisture can fall on the sensor, creating these rogue elements. It can take hours of Photoshop work to clean your pictures if the sensor has been affected by lots of grime, so it's well worth cleaning your sensor first. To prevent sensor dirt, take great care when changing lenses, especially in dusty environments.

What does sensor dirt look like?

The most common form of sensor grime is specks of dust. You can easily get rid of these with the Spot Healing tool in Photoshop but this can be extremely time-consuming. It's best to tackle the problem at the root cause instead.

How to clean the sensor

1 Carefully read the instructions for both your camera and the cleaning kit you've bought. We used IMS DSLRClean sticks. A pack of ten sticks costs £18.95 (see www.intemos.com or phone 01179 055375).

2 Make sure everything is ready for you to use, then take the lens off the camera. You'll find the mirror between you and the sensor. It needs to be raised, so check your instruction manual for details on how to do this on your digital SLR.

3 Hold the camera so the sensor is facing the floor and then use a blower to dislodge any loose dust. Don't use compressed air, as it is too harsh. A blower like this Giottos Rocket is perfect.

4 Place the tip of your cleaning stick onto the upper right-hand corner of the sensor. Apply pressure until the tip bends at a right angle, then move the stick around the edges, ensuring the whole sensor has been covered.

5 Close the mirror. Replace the lens or attach a body cap over the front of the camera. Also try Photographic Solutions sensor swabs and cleaning fluid (see www.photosol.com).

WARNING

The sensor is the most important part of your digital SLR and is very delicate, so only clean it if absolutely necessary. If you can get away without cleaning your sensor then don't even attempt it – it's a high-risk operation at the best of times. If you're at all unsure then look into sending the camera back to the manufacturer to get it cleaned professionally. Every care should be taken when attempting this yourself, and *Practical Photography* can accept no responsibility for any damage caused during the process.

Gear advice

Knowing how your digital SLR works and choosing the right kit for the job could be the difference between competent shots and outstanding photography. Here we take a look inside your camera and discuss how digital sensors can affect focal lengths.

Inside a digital SLR

While they may look the same as their film SLR predecessors in terms of design and feel – and there's no reason to believe this will change any time soon – they couldn't be more different under the bonnet. And although it's not essential to know and understand how every microchip and piece of electronic wizardry actually works, a basic working knowledge of your SLR's vital 'organs' will certainly prove useful in the field. Here's a brief guide to the absolute essentials to help you get the most from your digital camera...

POP-UP FLASH

Most digital SLRs, much like their analogue predecessors, feature a built-in pop-up flash unit. Although on-camera flash has its drawbacks, it's perfect for adding fill-in and close-ups.

FLASH HOTSHOE

The camera's flash hotshoe allows for detachable flash units to be mounted and used in conjunction with the camera's TTL (through-the-lens) metering system.

SENSOR

There are two main types of sensors used in digital cameras – CCD (charge-coupled device) and CMOS (complementary metal oxide semiconductor). Both capture light on individual light-sensitive cells that convert the resulting signals into digital form.

CONTROL DIAL

Some things never change and, thankfully, digital SLRs' main dial still controls shutter speed and aperture, which means that the switch from film to digital won't cause too many initial headaches.

IMAGE PROCESSOR

Probably the single most important part of the camera, the image processor is responsible for noise reduction, colour interpretation, resolution and sharpness, and image creation.

MIRROR

Many digital SLRs perform a mirror lock-up (freezing the mirror in its up position) when cleaning (or allowing you to clean) the camera's sensor.

DIGITAL CONNECTIONS

Remove the cover and you'll find the USB socket needed to connect your SLR to a computer, as well as a remote cable release socket.

BATTERY

Digital cameras are entirely battery-dependent and are more power-hungry than conventional film cameras. Depending on the manufacturer and model, cameras either have custom batteries or accept AA batteries.

LENS MOUNTS

While each manufacturer employs a lens mount unique to its own system – Canon has relied on its EF mount since 1987, while Nikon has revised and adapted its F mount since 1959 – lens owners are faced with more choice. For example, Nikon lenses fit two SLR systems – Nikon and Fuji.

Choosing the right lens

The flexibility of being able to attach different lenses is what attracts many users to digital SLRs. However, the massive choice of lenses and the added complexities of shooting digitally can be a little overwhelming to new users and potential buyers.

tip **Always buy the best lens that you can afford. Lens quality will directly affect the overall quality of your digital images so dig deep if possible.**

AF/MF SWITCH

This switch allows you to quickly change from autofocus to manual focus. You probably won't use it much to start with but it can prove invaluable once your confidence grows and you start using more of the camera's features.

LENS HOOD

A multi-tasking piece of plastic that will reduce lens flare. It can also help to protect the lens being damaged should it get dropped and should the worst happen it's much cheaper to replace than a whole lens too.

LENS MOUNT

Make sure that you get the correct lens for your camera, as mounts are not cross-compatible. Whenever you take your lens off the camera make sure you turn the camera off and put the caps back on the camera and lens to keep the dust out.

ZOOM RING

SLRs save battery power by making you zoom in and out manually rather than automatically. The feel of the zoom ring is often a quick indication of the overall build-quality of the lens.

FOCUSING RING

On cheaper lenses you focus manually by turning the very front part of the lens, while more expensive lenses give you a proper focusing ring. Also be on the lookout for lenses with internal focusing.

Focal length

The focal length (essentially your zoom range) of SLR lenses is quoted in 35mm equivalent, so when buying a lens you need to remember that most D-SLRs increase the focal length slightly. This amount varies between the available models but is usually around 1.5x. For example, the lens supplied with the Nikon D50 is the 18-55mm. Once mounted on the camera it gives you 27-82mm.

Available apertures

After the focal length, lenses quote a ratio, for example Canon EF-S 18-55mm f/3.5-f/5.6 (or 1:3.5-5.6). These last numbers are the maximum apertures available throughout the focal range. This lens will give you f/3.5 at the 18mm setting but at 55mm it will change to f/5.6. The lower the numbers are, the more expensive the lens is likely to be. Most professional lenses offer f/2.8 throughout the focal range but obviously at a much higher cost.

"Any grease, grime and dust on your optics will reduce the overall quality of your images, so it pays to keep your lenses clean"

Lens choices

The manufacturers' own lenses are often pricey compared to the third party lenses produced by companies such as Cosina, Sigma and Tamron, so it's worth checking what else is available before you buy. Many lenses have been designed specifically for D-SLRs and as such they are not suitable to be used on traditional or full-frame SLRs. Look out for initials such as DC (Sigma), Di II (Tamron), DX (Nikon) and EF-S (Canon) that denote digital-only.

Keep it clean

Any grease, grime and dust on your optics will reduce the overall quality of your images, so it pays to keep your lenses clean. Use a good cloth, ideally one made from good quality microfibre. Before you start wiping, blow as much dirt away first to help minimise scratching. It's also worth getting your hands on some special lens cleaning spray to protect the coating on the glass. Prevention is better than cure, so keep your lens caps on as much as possible and clean your bag regularly because dust will collect in the bottom.

PROTECT YOUR LENSES

If the front element of the lens gets damaged it renders the whole lens useless. To help minimise the risk of any damage buy a skylight filter and keep it on the front of the lens all the time. Replacing a filter is a lot cheaper and less frustrating than having to buy a whole new lens.

Recommended lenses

Arguably the most important weapon in a photographers' arsenal, lenses are also one of the most variable. From the widest 10mm fish-eye to the longest 800mm telephoto, optics are available in every conceivable size, weight and focal length. Due to the smaller sensors used in many of today's digital SLRs, however, focal lengths vary depending on the model in question. See the previous page for more lens/focal length advice. But whether you're a landscaper looking to capture dramatic sunsets or an architectural fanatic looking to isolate fine details, there's a multitude of options that fall into four categories. Here's the lowdown.

"From the widest 10mm fish-eye to the longest 800mm telephoto, optics are available in every size, weight and focal length"

tip **For all the lens buying advice you'll ever need take a look at the all-new *Practical Photography* website at www.practicalphotography.co.uk Our 'Top five of everything' section rates the top products in 17 categories, including the best wide-angle, macro and telephoto lenses. So take a look before you spend your cash.**

Standard

On full-frame digital SLRs standard lenses fall between 40mm and 55mm, though 50mm is the accepted norm. You'll need a 35mm lens to get the same field-of-view on digital SLRs with the smaller APS-sized sensor. Closest to the field-of-view of the human eye, standard lenses offer an undistorted perspective and are often used for flattering portraits. Just for the record, the true field-of-view of the human eye is 43mm!

Wide-angle

With shorter focal lengths and wider angles-of-view than standard lenses, wide-angle lenses are employed by landscape and reportage specialists. Remember you'll need a shorter focal length on many digital SLRs than a 35mm or full-frame digital model. This need for shorter focal lengths on many digital SLRs has produced a raft of new models. A 17-35mm model, such as the one shown below, gives a field-of-view equivalent to 25-52mm on a full-frame SLR.

Macro

If you've ever wondered how photographers fill the frame with small subjects such as petals and insects, the answer is the humble macro lens. Allowing for 1:1 (life-size) reproduction and focusing from as close as 2in, true macro lenses are specifically constructed for close-up photography. They are commonly available in focal lengths between 50mm and 180mm.

Telephoto

Any lens that weighs in with a focal length above 50mm is said to be a telephoto lens. Short telephotos (between 70mm and 120mm) are ideal for portraiture, while longer focal lengths (between 135mm and 300mm and above) are perfect for sports and wildlife. Remember, the magnification of a lens on most digital SLRs is increased by around 1.5x, so a 200mm lens is equivalent to a 300mm on a full-frame camera.

Digital accessories

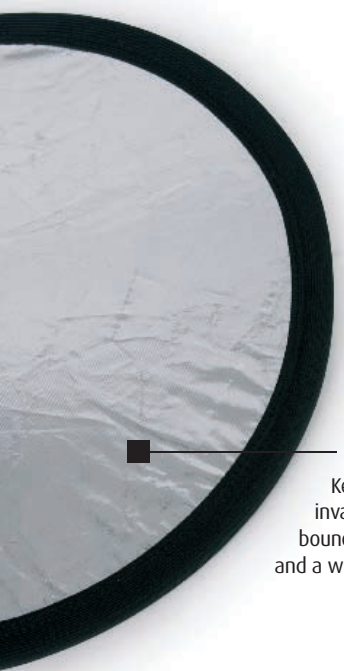
Once you've bought your digital SLR, there are still some items that you need to think about getting your hands on. Check our list of essential extras to see if there's anything else you need.

Printer

Once you start taking a lot of pictures it's well worth investing in a decent photo printer. Print sizes range from 6x4 right up to A3 size. An A4 inkjet often provides the most suitable solution.

Memory cards and wallet

Called 'digital film' by some people, memory cards are integral to digital photography. The more expensive cards usually offer faster and more reliable performance. Keep your memory cards safe in a memory card wallet. These range from small canvas wallets right up to hardwearing waterproof plastic models. Failing that, keep the cards in the little plastic boxes they come in.



Reflector

Keeping a reflector in your bag will prove invaluable on many occasions. Use it to bounce light into a dark subject, lift shadows and a whole host of other applications.

Sensor cleaning

If you feel up to the challenge of cleaning your own sensor, save yourself some time and money by buying a sensor cleaning kit. Remember to follow the instructions as closely as you can or you'll risk ruining your whole camera.

Tripod

It's pretty much essential for a lot of areas of photography, particularly landscapes and night shots. You should get the best quality model you can afford, as cheaper ones often don't perform as well.

Cleaning kit

You can't avoid having to keep your gear clean, so get your hands on a quality lens cloth and special cleaning spray. Make sure that you keep your cloth clean or you'll just be spreading muck around your lenses.

Spare battery and rechargeable batteries

If your camera takes a dedicated battery, make sure you have at least one spare. Rather than buying lots of single use AA batteries, save yourself some money and get yourself some decent rechargeable batteries and a charger.

"Get the best quality tripod you can afford, as cheaper ones often don't perform as well"

Blower brush

The first stage of any cleaning operation should entail blowing the dust and muck off before you wipe it around. A blower can also be used to get dust off close-up subjects.

Portable storage

Rather than shelling out lots of money on memory cards, you could invest in a portable storage device. You can save images from your memory card onto it, then wipe the card and carry on shooting. They are indispensable to those who take lots of pictures.

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Get more from your Digital SLR

ESSENTIAL GUIDE

Release the full potential of your camera

- ✔ **Using focus points**
- ✔ AI Servo explained
- ✔ **Depth-of-field preview**
- ✔ Metering mode tips
- ✔ **Histogram advice**
- ✔ Flash technique

REVEALED: THINGS YOU DIDN'T KNOW YOUR CAMERA COULD DO

This spider's web was shot wide open (f/2.8) with the ISO at 800 because it was in shade. It was the versatilty of the D-SLR that made taking it pretty straightforward.

Welcome from Practical Photography editor Andrew James

HAS A DIGITAL SLR improved your photography? After a very unscientific straw poll I've concluded that most D-SLR users have found that owning one has enabled them to become better photographers. It's the chance to experiment without incurring extra costs that does it. Therefore, D-SLR users try things that they'd never considered in the film days. Of course, that also means that D-SLR users also take a lot of rubbish shots but if they learn from them, so what? Today's D-SLRs are complex but it's a shame if you don't use some of the functions and features that the designers have seen fit to squeeze inside the camera body. This field guide is designed to highlight many of the handy things that your camera will do. Some you will have come across, some may still be hidden within the mind-boggling manual that was supplied with your camera. We've mainly used the Canon EOS 350D and Nikon D70s – two of the most popular enthusiast cameras – as our default models here. You may find slight differences in operation if you own different cameras, so refer to your manual if in doubt. I hope you find this guide useful.

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THIS GUIDE IS BROUGHT TO YOU BY...

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Thanks to: Sara Berry, Claire Maxted

GET MORE FROM YOUR DIGITAL SLR

Focusing

Improve your chances of capturing pin-sharp photos and find out how to predict the effects of different apertures by mastering your camera's focusing options. Here's how...

Focus points

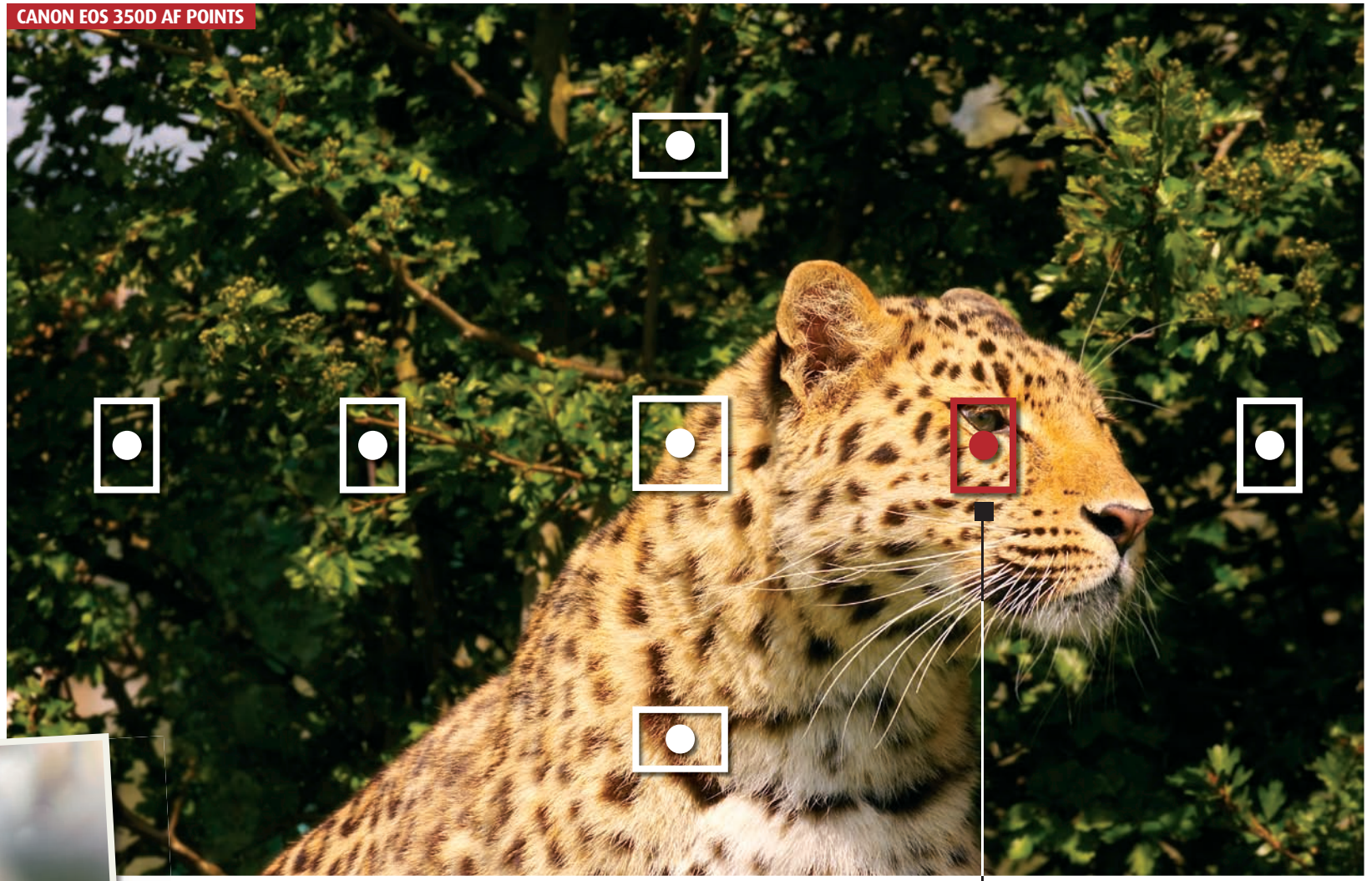
Ever wondered what the little squares are in your D-SLR's viewfinder? These are known as focus points and allow the camera to focus on objects in different parts of the frame. The default setting on most cameras will use the centre focus point, which is fine if your main subject is in the middle of the picture. Most cameras also have a setting where all of the focus points are active and the camera automatically selects the one to use. This is usually the subject closest to the camera and is great for when you can't predict where the subject will be. But like all automatic settings this may not get the expected result as the camera doesn't know what you want to be in focus.

Taking control

To avoid relying on either of these settings you can control the camera by selecting the focus points individually. Selecting the focus point that is on the area of the image that you want to be sharp allows the camera to focus more successfully on off-centre subjects. People and animals are typical subjects where focusing on the centre of the frame can give poor results. It's usually the eyes that you want to be in focus, and they are rarely positioned in the middle of the frame. Selecting the focus point that falls on the eyes ensures a sharper result.

Using a Canon EOS 5D to take this shot allowed us to select a focus point that corresponded to the petals of a single off-centre bloom. Using an aperture of f/4 allowed us to blur the rest of the flowers surrounding it.

CANON EOS 350D AF POINTS



For this shot we selected the focus point that was closest to the eye of the cat to ensure that the camera focused on the most important area of the subject. Using an aperture of f/8 meant that we could keep the whole head of the leopard sharp, but blur the background enough to remove distractions.

DID YOU KNOW?

Most D-SLRs use a passive autofocus system that uses the light naturally reflected by the subject. This system detects changes in contrast, which explains why AF systems struggle in low light conditions or when pointed at large single-coloured surfaces. In particularly low light conditions you'll find an AF assist beam essential.

Turn the page for more on focus point selection

Focus point selection

Different cameras offer various numbers of focus points and ways of selecting them. The precise detail of how to change them will be given in your instruction manual, but to give you an idea of how they work we've taken two of the most popular D-SLRs, the Canon EOS 350D and Nikon D70s, to show you how to select individual focus points...

Canon EOS 350D

1 Before you can use this option you have to be in aperture-priority, shutter-priority, manual or program mode. You can't select focus points in the subject program or automatic (green) exposure modes. Press the far right button on the back of the main handgrip to activate the focus point selection.

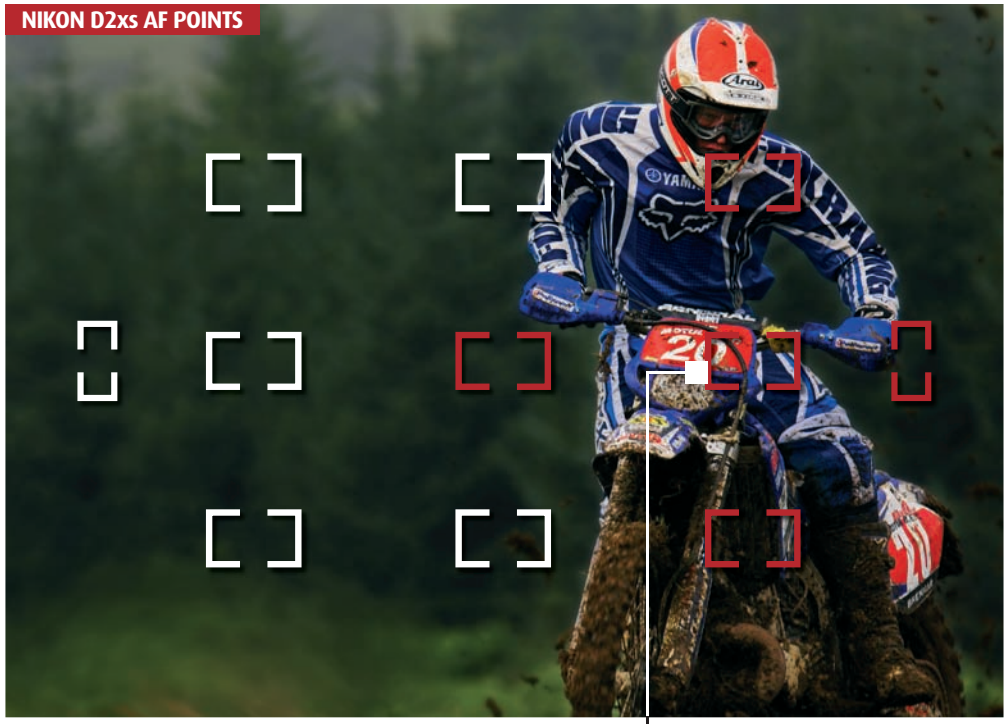
2 With the focus points activated turn the front control dial on the handgrip to scroll through the different focus points. This allows you to select individual points, which are highlighted in red in the viewfinder and shown on the rear LCD.

Nikon D70s

1 In the Custom menu, option 0, ensure that the AF-area mode is set to Single area and, like the Canon, the exposure mode is set to one of the creative modes rather than the fully automatic or subject program modes.

2 Ensure that the D-pad lock on the rear of the camera is set to ● and use the D-pad to select the individual focus point from the five options. The selected point will be indicated on the top LCD and highlighted as the darkest brackets in the viewfinder.

NIKON D2xs AF POINTS



Group selection

Rather than selecting individual focus points, some higher spec models (Nikon D2xs & Canon EOS-1Ds Mk II) allow you to use groups of focus points together. This combines some of the advantages of both individual area and fully automatic focus point selection. It's ideal for shooting moving subjects where it's difficult to keep an individual focus point positioned on the subject, but you know approximately where the subject will be. It still relies on the camera selecting the exact point of focus, however, which can result in a blurred subject.

Group area selection is ideal for fast-moving subjects such as sports and action, when you know roughly where the subject is likely to be. We knew that the bike would appear over the rise to the right of our shot, so we selected the right-hand area.

Dioptre adjustment

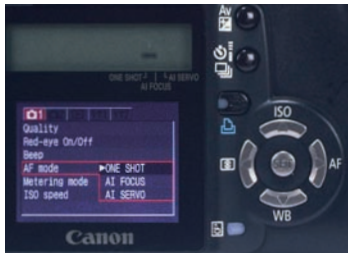
Getting any picture in focus will be impossible if you can't see clearly through the viewfinder. Most D-SLRs have a feature called dioptre adjustment, which enables you to focus the eyepiece to suit your eyesight. This is usually either a slider or wheel next to the viewfinder. Make sure this is set so that you can see the image and display clearly through the viewfinder.

Focus modes

As well as selecting individual focus points, your D-SLR's autofocus (AF) system also offers various focus modes. The two main settings are known as single shot and continuous (or Servo) focusing, and which setting you choose will depend on whether you're shooting a static or moving subject.

Single shot mode

In single shot mode the AF will lock onto the subject when you press the shutter, and stay focused at the same distance for as long as the shutter is held down. This is great for static subjects, but if either you or the subject moves the camera will stay focused on the original point, resulting in a blurred picture. You have to press the shutter again to refocus on the subject. In single shot mode the camera won't allow you to take a picture until the focus has locked onto the subject, which is usually indicated by a green circle in the viewfinder display (and often an audible beep). Here's how to set single shot focusing on the Canon EOS 350D and Nikon D70s...



Canon EOS 350D

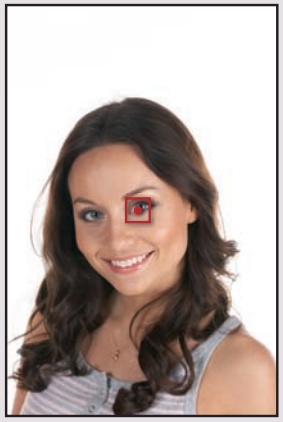
With the exposure mode of the camera in one of the creative options, rather than the subject program modes, press the right button on the rear multi-selector marked AF. Then use the up or down controls to select the One Shot option and press Set.

Nikon D70s

Press the Menu button on the rear of the camera to bring up the on-screen menu. Choose the 02 Autofocus option in the Custom Menu using the D-pad. Now select AF-S from the two options and press the right side of the D-pad to confirm.

Focus lock

Single shot AF is also useful when you want an area to be in focus that doesn't match any of the focus points available. Before you frame the subject, point the camera so that the focus point falls exactly on the area that you want to be in focus and press the shutter halfway down until the camera locks onto the subject. As long as you keep the shutter half-pressed you can now re-frame the picture before pressing the shutter all the way down to take the picture. This can take a little practise to ensure that you get the focus spot-on, as you must remain the same distance from the subject, but it means that you don't always have to focus where the focus points are positioned.



Place the focus point over the area you want to be sharp, then half-press the shutter to lock focus on this point.

Keep the shutter half-pressed, re-frame your shot and, once happy, fully press the shutter to take the shot.

Turn the page for more on focus modes

Focus modes

Continuous AF

The continuous focus mode (also known as Servo) is usually used when either the subject or the camera is moving. In this mode the camera continuously adjusts the focus for as long as you half-press the shutter release so it can track movement. When you fully press the shutter release the camera will take the photograph regardless of whether the subject is in focus or not, so you need to take a little more care with this mode than the single shot option. You can also use this mode for static subjects, but it's less useful than single shot mode for this type of subject because it doesn't have to lock on to the subject to allow you to take the photo. This means that features such as focus lock are more difficult, or even impossible, to use successfully.

Canon EOS 350D

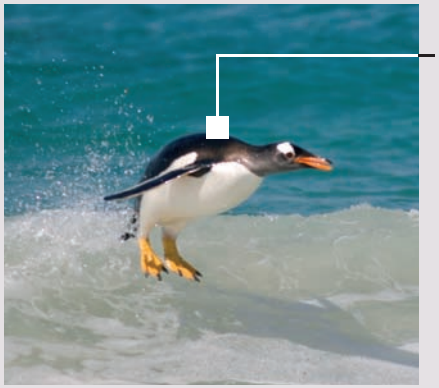
To select the Servo focus mode the camera needs to be in one of the creative exposure modes, not a subject program or fully automatic mode. Press the right button on the rear multi-selector marked AF and use the up or down controls to select the AI Servo option. Press Set to confirm.

Nikon D70s

To access the focusing modes press the Menu button on the rear of the camera. Use the D-pad to scroll down to the Custom Menu and select the 02 Autofocus option. In this menu select AF-C from the two options and press the right side of the D-pad to confirm this setting.

How to use continuous focusing

Even the best autofocus systems still need some help when shooting moving subjects – it's easy for the camera to struggle to lock onto the subject, or focus on the background rather than the subject you are shooting. The trick to getting sharp results with continuous autofocus is to make sure that the focus point stays on the subject for as long as you half-press the shutter release. If the focus point strays onto something in front of or behind the subject the camera will focus on that rather than the main subject.



Soft subject

When you're using continuous focusing it's very easy for the camera to focus on the background, rather than the main subject. This is often a problem when the subject is moving. Unlike the single shot mode, the camera will let you fire the shutter whether it's in focus or not.

Moving penguins

Because these penguins were constantly ducking and diving, single shot AF would have been impossible to use. Continuous AF (Servo) has allowed the camera to track the penguins and keep them in focus right up until the shots were taken. This technique can be tricky and requires some patience and practise, but once mastered you can get pin-sharp action shots.

Depth-of-field preview

The image you see through your D-SLR's viewfinder is shown using the lens' maximum aperture (usually f/4 or f/5.6), so if you set a smaller aperture there'll be more of the scene in focus than you see when you take the shot. This can mean that elements in the background or foreground that were blurred (or even invisible) in the viewfinder become visible and distracting in your final shot. Most D-SLRs offer a useful feature called depth-of-field preview, which gives you a much better idea of how the final image will look by stopping the lens down to the aperture that you've set.

Through the viewfinder

Compose your shot through the viewfinder as normal but ensure that you've set the aperture using either manual or aperture-priority exposure mode. At this stage the image in the viewfinder will be shown at the lens' maximum aperture, so you won't see the effect of the aperture setting.

Press the depth-of-field preview button

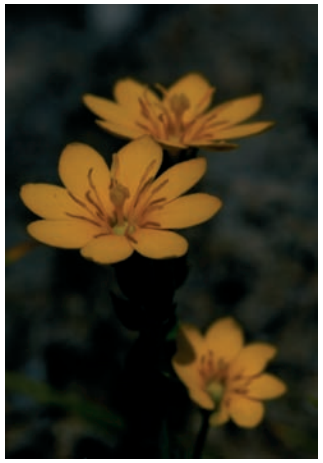
This will stop the lens down to the aperture that you've set on the camera, but the image will look much darker than the normal viewfinder image. To allow you to see the effect you need to look through the viewfinder for some time while keeping the button pressed to give your eyes time to adjust. After a while you'll be able to make out more detail in the viewfinder, so start looking around the subject to check how much of the image is in focus and whether any distractions are visible. The smaller the aperture the darker the image, so the longer you need to wait for your eyes to adjust.

The depth-of-field preview button

On many D-SLRs the depth-of-field preview button is located at the base of the lens mount. On others it can be located in the menu or near the on/off switch.

Viewfinder view

Don't be put off by the image as seen through your camera's viewfinder – it's shown at the lens' maximum aperture, hence the minimal depth-of-field.



Depth-of-field preview

Press the preview button and the image in the viewfinder will darken. This is because the view is stopped down to the aperture you've chosen.

Using depth-of-field preview

It's much easier to see the effects of this feature if the camera and subject are static, allowing you to make precise changes to the settings or subject before you take the final shot. While you can use it when handholding the camera, mounting it on a tripod will mean that you can be sure that it won't move between you checking the image and taking the shot. Once you've got used to the dark image in the viewfinder you can then use it to either ensure you've got the right amount of the image in focus or that there aren't any distractions in the shot that you need to account for before taking your shot.

FINAL IMAGE

GET MORE FROM YOUR DIGITAL SLR

Metering & assessment

There's a metering mode for every occasion and feedback at the touch of a button. You just need to know which mode to use and when and how to read a D-SLR's histogram.

Metering modes

All D-SLRs offer a range of metering modes for you to choose from, but what are the differences and when do you use them? All metering modes base the readings they give on midtones. Segment and centre-weighted systems take an average reading across the frame, and give you a setting based on the fact that most scenes contain a range of tones that will average out to a midtone. Spot-metering is also based on this method, but because it only takes a reading from a tiny part of the image it assumes that this point will be a midtone. So point the camera at a scene that's brighter or darker than this average tone and the meter will give the wrong exposure reading. Here are the options...

Multi-segment

The default mode on your D-SLR is the multi-segment option. Different manufacturers give this metering mode fancy names – Canon calls its version Evaluative and Nikon's is called Matrix – but they all operate in similar ways. They take a number of readings from different areas of the frame and combine them to produce the best exposure. As these readings are taken from different areas of the frame, this metering mode can often recognise (and take account of) bright or dark backgrounds to give a more effective exposure than the simpler centre-weighted option.

Centre-weighted

Centre-weighted metering takes an average reading from across the whole frame, but most types take more of the reading from the centre of the frame than from the edges. This is fine for average scenes, but bright or dark areas can easily fool centre-weighted metering, especially if they're close to the middle of the photograph.

Spot

Arguably the most accurate and reliable metering mode, spot-metering also takes more time and practise to use effectively. The camera only takes a reading from a tiny area of the image (around 2-3% of the frame). This is usually from the centre of the image, although some cameras allow you to link the area that the reading is taken from to the AF point selected. To use a spot meter reading to set the exposure, the area that the camera is taking a reading from needs to contain only midtones. More experienced users can employ spot-metering to assess highlight and shadow exposure, to allow them to work out the brightness range of the scene and adjust the exposure to suit. Some Canon D-SLRs, such as the EOS 350D, don't offer a spot-metering option. Instead they have a similar mode known as partial metering, which works just like spot-metering, but instead takes a reading from a larger area of the frame (around 9%), so is less precise. Many other Canon models offer both spot and partial metering modes.

Metering options

Canon EOS 350D

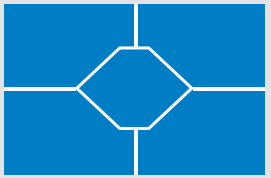
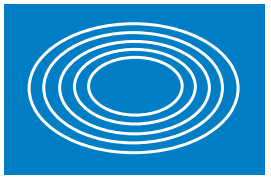
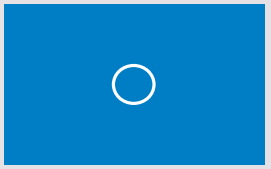
Like many budget models, the metering modes on the EOS 350D are shown on the LCD menu. These are changed by pressing the up and down buttons on the four-way selector, and the SET button to select them.

Nikon D70s

The metering modes on the D70s are accessed by pressing the metering button to the left of the shutter release. Hold this button down, then turn the rear control dial to scroll through the three metering modes available.

Metering modes

Examples of when to use the three typical metering offered by SLRs.

Mode	When to use it	Typical example
MULTI-SEGMENT 	The default metering mode is great for general photography, especially if you don't have time to think about the exposure. As the camera takes readings from different areas of the image it's able to take account of bright or dark areas in the frame.	
CENTRE-WEIGHTED 	Centre-weighted metering always takes a reading from the same area of the image, so it can produce more predictable results than the multi-segment metering mode. Because of this it's especially useful for shooting with graduated filters.	
SPOT 	For those who want precise control over the exposure, spot-metering allows you to take readings from small areas of the image. This puts you in full control over the exposure, but you need to be able to recognise suitable subjects to meter from. **Turn over for more on spot-metering**	

Metering modes

Spot-metering

Although most D-SLRs' multi-segment metering mode produces good results in most situations, it can still produce under or overexposed results when faced with light or dark scenes. In these situations you can switch to spot-metering mode for precise control over your metering and exposure. The key to using this mode is aiming the meter at an area that will give you a midtone in the final image. You can buy a grey card to take a meter reading from – simply place the card in the same lighting as the subject and spot-meter from the card. However, this isn't always practical, especially when shooting landscapes or distant subjects. Luckily there are plenty of subjects around that you can use to spot-meter from – see the panel below for some examples.

How we used spot-metering for this shot

The bright highlights produced by the cascading water of this waterfall, positioned near the middle of the frame, meant that both the multi-segment and centre-weighted metering options produced underexposed images. Switching to spot-metering and manual exposure, we pointed the camera so that the centre of the image, and therefore also the spot-metering area, was positioned over the fresh green foliage to the top left of the waterfall. A reading from this area gave an exposure of 2 seconds at f/22, which we set on the camera. Keeping this exposure we re-framed the shot.

What to meter from

Deciding what subjects are midtone takes some practise, but here are some examples to get you started...

Clear blue sky

If you're struggling to find a midtone in a landscape, a clear blue sky at around 10 or 11am is a useful subject.

Fresh green foliage

Not all foliage can be used as a midtone – make sure that you use fresh green foliage that's lit by the same light as the main subject.

Poppy red

Brightly coloured red flowers such as poppies are an ideal midtone subject for both landscapes and close-up nature shots.

Exposure lock

Both multi-segment and centre-weighted metering modes will often give poor results when shooting a subject against a light or dark background. If the background is very bright the camera will underexpose, while a dark background will cause overexposure. While you can use the spot metering mode to overcome this, it's not always the simplest or quickest method, and you need to be able to find a midtone to meter from. Two more efficient ways to compensate for this are using either the exposure lock or exposure compensation functions. Both can be used in the creative automatic exposure modes of most cameras, but not in the fully automatic subject program modes.

Meter from the main subject

This is the simpler of the two techniques for less experienced users, as you don't need to assess the effect of the background brightness. This technique works by metering from the main subject rather than from the whole scene.

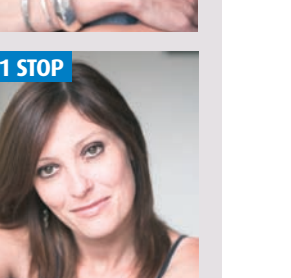
1 First set the camera to any of the creative automatic exposure modes. To make sure that the camera exposes for the main subject, aim the camera so that it fills the frame, eliminating as much of the background as possible.

2 With the camera framed as above press the auto exposure lock button (AE-L or ✱). This will set the exposure for the main subject, and lock this exposure into the memory of the camera. On Canon D-SLRs press the exposure lock button and release it to lock the exposure. On most other manufacturers' D-SLRs you need to hold the button in.

3 With the exposure locked for the main subject you can now re-frame the image and take your picture. You'll find that the background will be recorded as very dark or light, but the main subject should be correctly exposed.

Exposure compensation

You can also increase or decrease the exposure to compensate for light or dark backgrounds. This takes a little more practise than the exposure lock technique, as you need to be able to assess how much exposure compensation is needed for different situations. As a rough guide, if you're shooting a subject with a white background you need to dial in +1 stop, while for a subject against a dark background try using –1 stop. To access the exposure compensation on most cameras you have to press a button marked +/- then turn the main input dial.



The exposure compensation button is located near the shutter release button or the rear LCD screen.

Fill the frame
Using a 105mm lens we filled the frame with the model's face, pressed the auto exposure lock button and re-framed the shot. The resulting exposure was 1/30sec at f/4.

Colour settings

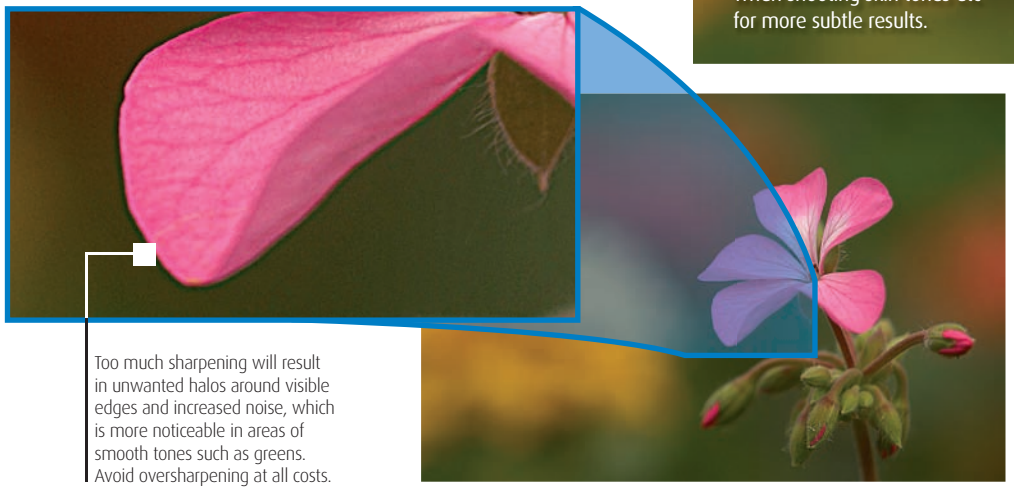
While D-SLR users who shoot RAW files have access to RAW conversion software that allows for all sorts of post-capture tweaks, those of you who still shoot JPEGs have fewer options when it comes to getting optimum results. However, if you want enhanced colours without so much as a tweak in Photoshop, all you have to do is use your D-SLR's in-camera colour settings. Here are some of the most common and more effective options...

Normal

While there's nothing fundamentally wrong with this shot of a lone pink geranium, taken at the normal colour setting, it lacks saturation and impact. The petals especially could do with an extra burst of colour.

Sharpness

This setting isn't going to make your blurred pictures sharper, but it will make already sharp shots appear even sharper. Many cameras default to an auto setting that judges how much sharpening should be applied to each image, which means that some images will occasionally appear sharper than others. Keep in mind that some labs will also apply sharpening when they print your images, so if you set the level too high you may end up with some seriously overcooked prints.



Too much sharpening will result in unwanted halos around visible edges and increased noise, which is more noticeable in areas of smooth tones such as greens. Avoid oversharpening at all costs.

Vivid

One of the most useful colour settings that D-SLRs offer is Vivid. It does exactly what its name suggests, bumping up the contrast and saturation for more vibrant results. Landscapes and macro shots can really benefit from this setting – just remember to reset the colour mode back to normal when shooting skin tones etc for more subtle results.

Mono/sepia

These two settings should be approached with caution. While being able to shoot in sepia may be a novelty to begin with, its limitations will soon become apparent. Other modes just tweak the colours slightly but the mono and sepia settings remove colour altogether, so no matter what you do at a later date you can't get the colour back. However, the mono setting has its uses – it'll help you to visualise scenes in glorious black & white.

Custom white balance

When you're working under difficult lighting conditions, such as artificial lighting or in heavy shade, your images can take on a strong colour cast. This is because ambient light is actually a different colour to direct sunlight. The naked eye will struggle to see this because the brain automatically compensates for this shift in colour, so objects always look the same colour no matter where you are. If it wasn't for this a red berry might look purple or orange depending on where it was, and this would obviously be a massive disadvantage in the wild. Your camera is not so clever though.

What is wrong with using the presets?

The preset white balance (WB) settings on your camera are designed to deal with a number of common lighting conditions to ensure that the colours look as we see them. However, they are only approximate and not every eventuality is catered for. When colour accuracy is critical you can use the custom white balance setting to precisely measure the colour temperature of the light and ensure the colours are bang on. A common trouble situation is shooting in mixed lighting conditions, such as artificial and window light, as recognisable objects like skin tones can take on an unnatural appearance.

How to use the custom white balance

With this toadstool we needed to correct for the strong green cast caused by the sunlight filtering through the leaves. As there is no 'deciduous woodland in strong sunlight' white balance setting, we can use a sheet of paper and the custom white balance mode for better colour accuracy.

1 Take a reference shot: First place a pure white object, such as an A4 sheet of card or reflector, next to your subject so it's under exactly the same lighting conditions as your subject. Frame up on the paper so it fills the viewfinder then take a shot – there's no need to use a tripod or change the white balance setting here, but you may need to switch to manual focus so you can take the shot if the AF won't lock on.

2 Select the shot: We can now use this neutral shot as a reference point for the colour temperature. To do this on a Canon 350D, go to the Custom WB option in the menu and select the shot you just took. On a Nikon D50, go to the White Balance menu, select Preset and then Use Photo. Now browse to select the paper shot. Note that some cameras can measure the white balance directly from the paper so check your manual first.

3 Take the shot: Next, select the custom white balance mode from the list of presets. On most cameras the symbol looks like a TV screen floating above two inwardly pointing right-angled triangles , but if you're using a Nikon, look for the PRE setting. Now take your shots. The only thing you need to be aware of is that you'll need to update the white balance if you move to a different location or if the light changes.

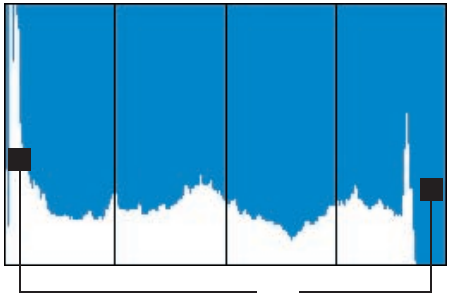
Histogram

One of the biggest mistakes you can make when shooting with a digital camera is to overexpose your shots, as vital highlight detail may be lost. This happens because only a very precise range of tones can be recorded by the camera's sensor, and if parts of the scene are too bright for the sensor using the exposure settings you've chosen, they will appear as pure white in the captured image – this is known as highlight clipping. If you're not careful, large areas of the scene can fall outside your camera's exposure latitude and block out to pure white. This can look ugly and distracting, not to mention the fact that there's no visible detail in these white areas – skin tones and skies are two things to look out for. To avoid highlight clipping we can check the histogram and the highlight warning system on the camera's LCD screen and reduce the exposure so the next picture we take is dark enough to retain the important highlight details.

How to read the histogram

This is a histogram and it can be accessed while viewing an image in playback mode and also during the preview, directly after you've taken a shot. To view it on a Nikon camera, try using the left and right directions on the D-pad with the picture on screen. If you're using a Canon, press the Info button while the image is on the screen.

The histogram shows us the distribution of tones in the image from the shadows on the left through the midtones in the middle to the highlights on the far right. The tall peaks on the histogram tell us there are a large number of pixels in your image containing the relating tone.



This tall peak on the left-hand side tells us that there are lots of very dark grey tones in the image.

The gap here shows us that there are no pure white tones, so the highlights aren't blown.

What to look for

The main thing to concentrate on, however, is the right-hand side. If the histogram shows that there are lots of white-toned pixels in the image touching the very edge of the histogram, this probably indicates that some tones in your scene have been overexposed and detail has been lost. Ideally what you want is a small gap at the right of the histogram, as you can see here. This means that no tones in your image are pure white, so you can guarantee the detail hasn't been lost. To do this, use exposure compensation to reduce the exposure by a stop and take another shot.

➲Highlight warning

In really contrasty lighting conditions, or if you have the sun in the frame, it won't be possible to avoid some highlight clipping without massively underexposing your image and compromising shadow and midtone detail. In such cases you can use the highlight warning system to tell you which areas of your image are pure white. To select this mode use the same controls as you did for accessing the histogram. When in this review mode the pure white tones will flash black to grab your attention. From here you can decide whether the clipped detail is important or not, and if vital detail is flashing, you can reduce the exposure by a stop and take another shot.

The perfect balance

To ensure every petal was well defined we needed to make sure that the highlights weren't clipped out. However, we didn't want the shot to be too dark either. To get this image we dialled in -1 stop exposure compensation.

GET MORE FROM YOUR DIGITAL SLR

Flash action

Your D-SLR's built-in pop-up flash is an often overlooked creative tool that can help to improve your portraits and action shots. Let's take a closer look at its many uses...

Perfect portraits

For great results using flash you need to be in full control of the amount of light your camera produces. The secret to success is flash exposure compensation – perfectly exposed portraits in even the darkest of conditions.

Flash compensation

With the exception of the top professional cameras, all D-SLRs feature a built-in pop-up flash so it's well worth learning a little something about this under used feature. The obvious use of flash is to illuminate a dark scene in order to capture a decent exposure, but flash has plenty more uses...

Plus or minus?

While most D-SLRs can accurately calculate the amount of flash needed, there are times when they will get it wrong and either over-power or under-power the flash. To prevent this you will need to use your camera's flash exposure compensation function. Your D-SLR will either have a ±⚡ button or a menu option, and this works pretty much the same as your camera's exposure compensation. If you select minus numbers, the flash power will be reduced and you won't lose highlight details. You can increase the flash power by dialling towards the plus side of the scale. This is useful when trying to light subjects that are a little further away or the metering is being fooled by something bright in the frame. So bear this in mind next time you're using flash.

Upgrade to a flashgun

While your camera's pop-up flash can cope with some shots, if you are planning on getting creative with flash you really need to think about investing in an external flashgun. They give you more power, extra controls and features, and produce better results.

DID YOU KNOW?

Flashguns produce strong directional light that can sometimes result in unflattering photos, especially when shooting portraits. Flash light can be softened with diffuse material such as tissue paper. While not great in the rain, it's certainly cheap and easy to use. It'll produce softer, more flattering results for just a few pence.

Creative flash techniques

How do pro photographers get stunning outdoor portraits without any shadows? How do they capture the evening sky and not just a black background? How do music snappers get those crazy light trails? The simple answer is creative use of flash. Let's take a look at some of the basic flash techniques that will allow you to expand your outdoor photography in both bright sunshine and low light conditions.

Slow sync

In order to capture sky detail with flash you will need to use a slower shutter speed. When in program or aperture-priority mode you can select slow sync, which forces the camera to use a slower shutter speed than it usually would. The slower shutter speed allows the camera to capture more background detail while still producing the correct exposure for the foreground subject. Make sure you use a tripod though.

Fill-in flash

When you take a portrait in bright conditions you'll often end up with heavy shadows on the subject's face or an overexposed background. The solution here is fill-in flash. As the name implies, rather than using the flash as the main light source, it's used to fill in the shadows and produces more flattering portraits. Most D-SLRs produce pretty good attempts at fill-in flash, but to prevent the flash blowing out highlight detail you'll probably need to dial in some flash compensation. You'll need at least -1/3 but may have to take out a little more depending on your camera model and the lighting conditions at the time.

First curtain

All D-SLRs default to first curtain flash. This simply means that the flash fires at the start of the exposure. When combined with a longer shutter speed and a moving subject, this setting will freeze the subject at the start of the exposure with the light trails leading away from it.

Rear curtain

With this setting the flash will fire at the end of the exposure rather than at the beginning. Using rear curtain flash is perfect for producing shots of moving subjects with light trails. It will freeze the subject at the end of the exposure so any light trails will lead to the subject, resulting in a more dynamic image.

GET MORE FROM YOUR DIGITAL SLR

Extra settings

It's time to explore the outer reaches of your camera – create in-camera multiple exposures, get sharper images with mirror lock-up and review images on your television.

Multiple exposures

Combining two or more exposures isn't just a technique for those into manipulating their images in Photoshop. High-end D-SLRs allow you to shoot more than one image on a single frame using the multiple exposure function. Unlike combining images on your computer, this technique is far less predictable, and once you've taken the images you can't do much to change the composition or how the images work together. The unpredictability of the end result is all part of the fun, however, so if your camera offers this facility, why not give it a go? Using this feature successfully takes a little thought and preparation, as the two images need to work together. They also need to be shot soon after each other, as the feature is only active for a limited time before it automatically reverts back to the normal shooting mode.

Combine simple subjects with textures

One of the most effective uses for multiple exposures is combining a simple main subject with a texture. You can also try shooting several images of a moving subject on a single frame for a strobe-like effect, or even producing a soft-focus effect by de-focusing the lens on different exposures on a static subject. For our example we set up a couple of simple, graphic subjects. We shot the dried seed head against a plain white backdrop, then shot the tree bark as a textured background. The subjects were positioned so that the main head of the dried plant would fall on the darkest area of the bark to create a focal point. Notice how the stalk of the plant merges with the lighter and more textured area of the bark.

Photoshop

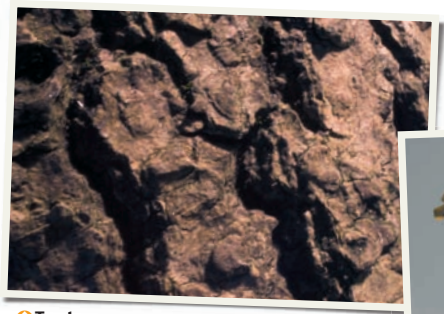
If your D-SLR doesn't feature a multiple exposure option, why not try combining two images in Photoshop to create the same effect? Use Layers and Blending modes to create a montage.

1 First select the Multiple Exposure mode. To do this activate the on-screen menu, scroll through the shooting menu and highlight Multiple Exposure.

2 Select the number of exposures that you want to combine together – the D2x can combine between two and ten frames. We chose to use two.

3 Select the Auto Gain option at the bottom of the Multiple Exposure menu so that the camera automatically adjusts the exposures for each frame.

4 Frame your two subjects so that they work well together. This can be a little hit or miss, so try to look at how the different shapes and textures work together, especially where there are areas of shadow and where one image becomes the more dominant element.



Texture

Look for graphic textures such as tree bark, stones, pebbles and fine art papers to act as a backdrop to your chosen subject.

Subject

Simple subjects, such as this dried seed head, are often the most effective. Shoot them against plain white backgrounds.

Mirror lock-up

Even using the normal measures of attaching the camera to a tripod and firing the shutter by a remote release or self-timer, the movement of the mirror can be enough to cause some camera shake. To minimise this some D-SLRs offer a feature known as mirror lock-up. This flips up the mirror used to reflect the image into the viewfinder before you take the shot. This means that the viewfinder blacks out, so you can only use this on static subjects, or at least where you can frame the image before you start shooting. Because of this you'll need to fix the camera in position on a tripod when using the mirror lock-up facility, and remote release to fire the shutter. After all, there's no point using mirror lock-up if you then move the camera when pressing the shutter. We used a Nikon D2x to show you how its done...

1 Press the mode dial lock button in front of the mode dial on the top left of the camera and turn the mode dial to the Mup setting. Mirror lock-up is found in the menu on many D-SLRs.

2 With the camera attached to a tripod, you need to frame your shot precisely before you start, as you won't be able to re-frame the shot once you lock the mirror up.

3 With a remote release press the button once to lock the mirror in the up position – at this point the viewfinder will black out completely. After waiting for a second or so to allow any movement or vibration to disappear, press the release button again to take the shot.

Self-timer

As well as using this facility to get in the picture yourself, you can also use the self-timer as an alternative to using a remote release for certain shots. When using long shutter speeds with the camera on a tripod, simply pressing the shutter can create some camera shake, so using the self-timer will minimise the movement when you take the shot. Some cameras also allow you to alter the length of the delay. If this is the case, a 2 or 5-second delay will be long enough for this use, rather than the lengthy 10 seconds that most cameras use as the default setting.

There's more...

Think we've exhausted the creative possibilities of your D-SLR? Think again. No matter how well you believe you know your way around your camera, there's always another technical marvel waiting to assist you in your quest for brilliant pictures. Want to order prints straight from your camera? No problem. Fancy viewing your pictures on a huge TV screen? Easy. Let's take a look at some of the options on offer...

LCD panel illumination

The light's on the wane and there's a shot to be had, but you're squinting at the LCD panel, trying to decide whether the camera's set to f/16 or f/22. The solution? Hit the LCD panel illumination button (well, that or carry a torch). D-SLRs with separate LCD screens for shutter speed, aperture and ISO info etc offer LCD panel illumination, which is generally symbolised by a button. Once pressed the light will stay on for a few seconds, giving you enough time to check your camera settings, and will turn off as soon as you press the shutter.

DID YOU KNOW?

Custom functions can be found on even the most basic D-SLRs. But if you've experimented and can't remember the default settings, fear not. Scroll through the menu and select the Clear Custom Functions or Menu Reset option. Simple as that.

LCD & viewfinder info

High-end D-SLRs such as the Canon EOS-1Ds Mark II and Nikon D2x allow you to tailor the camera settings shown on the top and rear LCD panels, as well as that shown in the viewfinder. The options generally include displaying the number of shots taken (or, in the EOS-1Ds Mark II's case, saved in the designated folder) rather than the number left, displaying the ISO speed instead of the number of remaining shots, and displaying the ISO speed at all times. These options can be found in your D-SLR's Custom Functions menu.

Video out

Did you know you can connect your D-SLR to a TV and scroll through your images? Beats staring at a 2.5in LCD screen! First you need to ensure that your camera is set to the correct video format – select Video System from the set-up menu and choose either PAL or NTSC. Then use the video cable to connect the camera's Video Out socket to your TV's Video In terminal (make sure both your camera and TV are switched off while you do this). Now simply switch your TV on, set its input switch to Video In/AV, switch your camera on and hit the ▶ switch. Enjoy.

Direct printing

D-SLRs that are either DPOF or PictBridge-enabled allow you to bypass PCs altogether when printing images. DPOF (Digital Print Order Format) allows you to choose which images are to be printed and how many prints you want. This info can then be saved to a CompactFlash card, which can then be inserted into a printer's CF slot or taken to a lab for instant prints. You can also connect your D-SLR directly to a DPOF-compatible printer. PictBridge works in a similar fashion. Connect a PictBridge-enabled camera to a PictBridge-enabled printer and print one or more images, print using the DPOF info and print index prints.

CREATIVE LENS TECHNIQUES

ON YOUR D-SLR

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Welcome

from Practical Photography editor Andrew James

ONCE YOU BECOME AN SLR user you inevitably start to suffer from lens envy, craving other optics for the different options they offer. This booklet is here to help you get more from whatever lenses you own and perhaps suggest a few you might choose to invest in later on. With the right lens for the job, an understanding of its capabilities, and some simple camera skills, you can start to photograph anything imaginatively. For my picture above, I simply used an object from my garden – a rusting watering can – and worked out how, with use of selective focusing, to record it so that it has some artistic merit. The lens – an 85mm f/1.8 – does all the work. A wide aperture pushes all the attention onto the rose, allowing the background of my creosoted garden fence to blur beautifully and act as the perfect dark foil for the can. Even better, the wide aperture correspondingly gives a very fast shutter speed, meaning it's easy to capture a few droplets of water falling from the rose. So now it's your turn... read the advice in this booklet and find out how you can use your lenses to greater creative effect.

CREATIVE LENS TECHNIQUES ON YOUR D-SLR

Creative essentials

Before we introduce you to the delights of selective focusing and hyperfocal distance (don't worry, they sound worse than they are), let's take a detailed look at the basics. Notebooks at the ready...

Focal length explained

Your choice of lens will dictate how much of a scene you're able to shoot. Unfortunately this useful information isn't shown on most lenses. Instead, each lens is given a number called the focal length. This number, to those in the know, tells you the all-important field-of-view of the lens. But rather than get too involved in the numbers, what you really need to know is how the different types of lenses can help your creativity. The easiest way of thinking about how focal lengths affect your images is to remember that a lens of around 30mm on a digital SLR with an APS-C sized sensor gives a similar view to your eyes. On full-frame or 35mm SLRs this focal length equates to around 50mm, often called the 'standard' focal length. A focal length shorter than this, known as a wide-angle lens, gives a wider view and a longer focal length, known as a telephoto, gives a narrower view. You've probably already come across these numbers on the lens that came with your digital SLR, which is likely to have a focal length of around 18-55mm. This means you have the option of shooting the image from a wider to a narrower view than your eyes.

Wide-angle

(Typical focal length of 10mm to 24mm)
As the name implies, these lenses allow you to include a wide view. This means you can include more of the scene than with longer focal length lenses, but objects will appear smaller in the frame.

Standard

(Typical focal length of 30mm)
This focal length gives a similar magnification to our eyes, so can give the most 'natural' looking images.

Telephoto

(Typical focal length of 50mm and over)
These lenses give a much narrower field of view than those with shorter focal lengths. The higher the focal length the greater magnification the lens will give, allowing you to pick out smaller parts of the scene to fill the frame.

Focal length explained

Perspective

Lenses allow you to fine-tune the amount of a scene that you shoot without having to move closer or further away from the subject. But your viewpoint (that's where you take the photo from in relation to the subject) also has a huge part to play in how you use your lenses creatively. This is down to perspective, which makes objects at different distances from the camera appear closer together or further away from each other.

You'll often hear people say that long focal length lenses give a flatter perspective, and wide-angle lenses give greater depth to your pictures. This is rubbish. Lenses play no part in the perspective of your shots – this is purely down to your viewpoint. What the lens allows you to do is frame the shot successfully from a viewpoint that gives you the perspective that you want. So, viewing objects at a greater distance flattens the perspective of the subject, and a telephoto lens allows you to only include these distant objects. Shoot the same scene with a wider lens and simply crop the image and you'll get the same flattened perspective.

Similarly, get close to the subject and it will appear further away from objects behind it, and the wider the lens the closer you can get to the subject, as it appears smaller in the frame than with a longer lens.

To show how perspective changes the look of your images we shot this scene from two different positions. We chose lenses so that the gateposts in the foreground remained the same size.

Wide-angle

Shooting from close to the subject with a wide-angle lens, the building appears to be a long way from the gate in the foreground. Using a wide-angle lens from this viewpoint also allows you to include much more of the surroundings behind the gate than using a longer lens from further away.

Telephoto

In this shot the building appears to be much closer to the gates than in the shot above. This foreshortening effect is simply down to the more distant viewpoint, and the lens has just allowed us to frame the gates. Because of the viewpoint you can also exclude more of the background than in the closer viewpoint shot with a wide-angle lens.

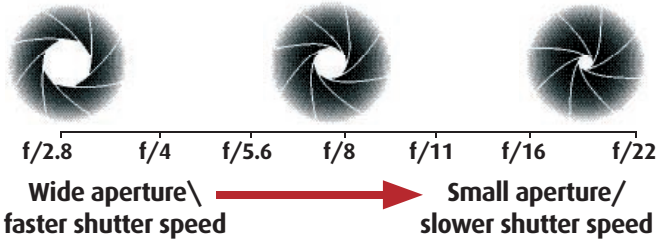
CROPPING TIP

As perspective is governed by your viewpoint, if you haven't got a lens long enough to fill the frame you can get the same effect by simply cropping your shot using a wider lens. There will be some loss of quality, but on a 10 megapixel digital SLR you can crop in the equivalent of doubling the focal length and still get an image that will print at almost A4.

Aperture explained

Although the aperture of your lens is primarily there to control the amount of light reaching the sensor, you can also use it more creatively. It plays a large part in controlling the depth-of-field, which we'll look at in more detail later on in this booklet, but your choice of aperture can also have a huge affect on the type of subjects you can shoot and the shutter speed you can use. It's all too easy to simply let the camera automatically select the aperture in Program mode or use a middle f/8 aperture for every shot. As it lets more light reach the sensor, setting a wide aperture such as f/4 or f/2.8 allows you to shoot in darker conditions than a smaller one, and still use a shutter speed fast enough to handhold your camera without having to use a very high ISO setting. In brighter conditions it also allows you to use faster shutter speeds to help you to freeze movement. The opposite is true of small apertures such as f/11 or f/32. In bright conditions these allow you to use longer shutter speeds for creative effects such as adding blur to moving subjects and for successful panning (turn the page for more).

APERTURE SETTINGS



HOW TO SET THE APERTURE

Although aperture is a lens-related setting, on most digital SLRs you change the aperture by using the controls on the camera. Here's how to take control of the aperture settings on your digital SLR...

1 Set the camera to aperture-priority mode by selecting either A or Av on the exposure mode dial. This mode allows you to set the aperture available on the lens fitted to the camera, while the camera adjusts the shutter speed according to the brightness of the scene.

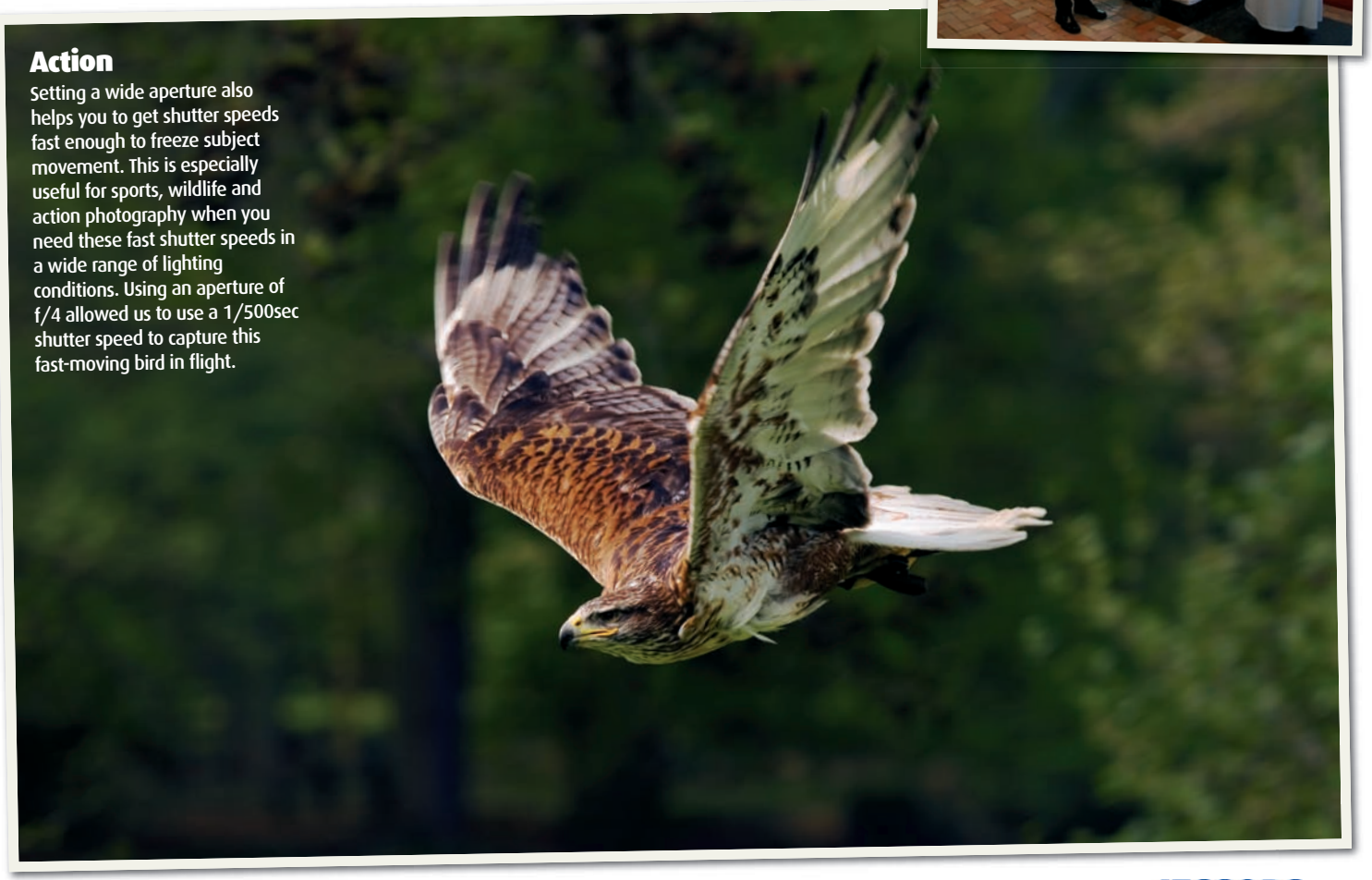
2 Using the command dial either on the front or rear of the handgrip, you can now scroll through the available apertures. Watch out for the display indicating conditions where the camera is unable to set the correct exposure because of extremely bright or dark conditions.

Wide apertures (Typically f/2.8-f/4)

The widest aperture on your lens, indicated by a small 'f' number such as f/2.8 or f/4, allows the maximum amount of light to reach the sensor. This setting allows you to use the fastest shutter speed available in the lighting conditions.

Lowlight

A wide aperture is excellent for shooting in lowlight conditions when you have to handhold the camera and can't use either flash or a tripod. Here, despite using an aperture of f/2.8, we still had to set the ISO to 640 to achieve a shutter speed fast enough to handhold. Setting a wide aperture normally gives shallow depth-of-field, but using a wide-angle lens and keeping some distance from the subject minimises this problem.



Action

Setting a wide aperture also helps you to get shutter speeds fast enough to freeze subject movement. This is especially useful for sports, wildlife and action photography when you need these fast shutter speeds in a wide range of lighting conditions. Using an aperture of f/4 allowed us to use a 1/500sec shutter speed to capture this fast-moving bird in flight.

Aperture explained

Small apertures (Typically f/11-f/32)

Setting a small aperture lets less light pass through the lens, allowing you to shoot in bright conditions or use long shutter speeds for creative effects.

Panning

To give your action shots a sense of speed and excitement you need to use a slow shutter speed and follow the movement with your camera. In bright conditions you'll need to set a very small aperture to allow you to get these shutter speeds, so experiment with different settings to get the desired effect. In this shot, setting f/16 on the camera gave a 1/125sec shutter speed that is perfect for shooting fast-moving subjects such as motor racing.

Bright conditions

During the brightest parts of the day the light levels can be so high that you need to use a small aperture to simply shoot any pictures at all. This is a rare occurrence in this country, although you'll find it's more of a problem if you take a holiday in a warmer and sunnier part of the world. To capture this sand dune we needed to use an aperture of f/16 to prevent overexposure.

Slow shutter speed effects

Blurring the movement of subjects such as water, grasses or people can add extra atmosphere to your landscape and urban shots. To achieve the very slow shutter speeds often required you'll need to set the smallest aperture in most lighting conditions. Remember that you'll need to fix the camera to a tripod to keep the rest of the scene sharp, and by using a small aperture most of the scene will be sharp due to the very wide depth-of-field.

Shooting early in the day allowed us to get a 1-second shutter speed by setting the aperture to f/22 on this shot. This allowed the movement of the reeds blowing in the breeze to be blurred. In brighter conditions you may need to set a smaller aperture, or use a polariser or neutral density filter to cut down the amount of light even more.

Depth-of-field explained

Mastering depth-of-field is one of the key techniques that will help your photography. We'll look in more detail at the more creative uses such as selective focusing and keeping every area in focus in the next section, but first you need to know how your lenses and techniques can affect this critical aspect of your images. Depth-of-field is simply the amount of the scene that appears to be sharp in your shot. Unlike our eyesight, which compensates for limited depth-of-field by quickly scanning different areas of the scene, your lens obeys some simple laws as to how much is going to be in focus. This area extends in front of and behind the point that you've focused on, but it's not distributed evenly. It extends twice as far behind the focus point as it does in front of it. The amount of depth-of-field in your shot is determined by three factors – the focal length of the lens, the aperture used and the distance from the subject. Let's take a look at each of these to see how they affect your images...

Focal length

The shorter the focal length of the lens the greater the depth-of-field, and the longer the focal length the smaller it will be. So, in general, using wide-angle lenses you'll find that most of the scene is in focus, while telephoto lenses are better for giving shallow depth-of-field.

Aperture

The wider the aperture you use the less depth-of-field you'll get. So using a small aperture such as f/16 or f/22 will keep as much of the scene in focus as possible, while using an aperture of f/4 or f/2.8 will mean that much less of the scene will be in focus.

Distance

The closer you are to the subject the less depth-of-field you'll get. You'll find it easier to get greater depth-of-field if you focus on subjects further away from the camera, and if you want shallow depth-of-field, move closer. This is most apparent when shooting close-ups, where you'll get very shallow depth-of-field.

In the field you need to use all three of these factors to get the right depth-of-field.

Let's take a look at how using a wide-angle, telephoto or macro lens will affect your shot.

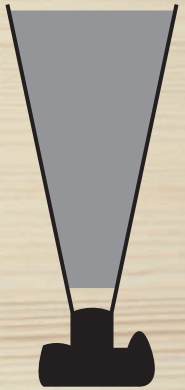
Wide-angle lenses

f/2.8 Shallow depth-of-field

Because short focal length lenses tend to give wide depth-of-field you need to focus the camera on the closest area of the scene and use the widest aperture available on your lens to get limited depth-of-field. In this shot taken with an 18mm lens, an aperture of f/2.8 and focusing on the flowers closest to the lens allowed us to throw the background out of focus.

f/22 Large depth-of-field

Setting almost any aperture below f/11 on a wide-angle lens will keep most of the scene in focus. In this shot we used f/22 on an 18mm lens and focused on the tree in the background, and almost the whole scene, from the closest flowers only a foot or so from the camera to the distant woods, is sharp.



Depth-of-field explained

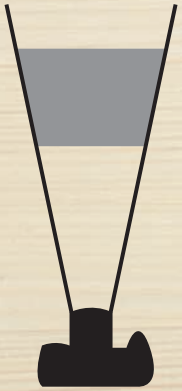
Telephoto lenses

f/5.6 Shallow depth-of-field

It's relatively easy to get shallow depth-of-field with telephoto lenses. Setting the maximum aperture of most lenses will mean that only a few inches of the subject will be sharp. The depth-of-field can still be limited at apertures such as f/8 or f/11 so you need to focus very carefully to ensure the subject is sharp.

f/32 Large depth-of-field

To get maximum depth-of-field with telephoto lenses you need to keep plenty of distance between you and your subject. Setting a small aperture such as f/22 or f/32 will also help increase the depth-of-field, but watch out for the long shutter speeds necessary at these apertures causing camera shake.



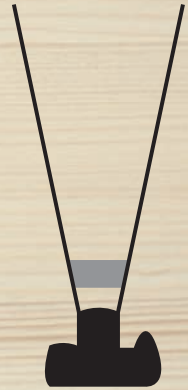
Macro lenses

f/4 Shallow depth-of-field

Because you are so close to the subject, shooting macro and close-ups means that you'll get very little depth-of-field in most shots. Using wide apertures, such as f/2.8 or f/4 there will usually only be a few millimetres of the subject in focus, so accurate focusing is critical. This effect can help you to isolate subjects by blurring the background for added impact in your macro shots.

f/22 Large depth-of-field

Large depth-of-field means a few inches or centimetres at most when shooting macro subjects. Most macro lenses offer very small minimum apertures of f/22 or f/32 to give the maximum depth-of-field, but you will still often struggle to keep the whole scene in focus. Using these apertures means that subject movement and camera shake can also be a problem.



CREATIVE LENS TECHNIQUES ON YOUR D-SLR

Creative techniques

Ever wondered how to best use extreme focal lengths for impact? Or isolate the subject by blurring the background?

Get to grips with...

Selective focusing

Getting shots with a crisp, detailed foreground and a beautifully blurred background is no mean feat but it's a technique that can transform any scene and give it a fantastic artistic style. This is what selective focusing is all about. It is the act of taking control of the depth-of-field so only the parts of your scene that you want to be sharp are sharp – everything else should be out-of-focus and nicely blurred. However, there's a lot more to it than using a wide maximum aperture. Aperture is just part of the story and will seldom create the effect you want on its own. Here we're going to look at how you can use a combination of techniques to improve a classic garden shot of a flower. We receive hundreds of flower shots every year that fail to make the grade simply because of messy and distracting backgrounds, so we're going to show you five simple ways to turn your snapshots into classy and considered flower studies.

Don't shoot flower shots like the one above. Instead use selective focusing techniques to blur the background for more impact. Turn the page to find out more...

Get to grips with...

Selective focusing

Don't shoot like this!

There's very little that's right with this camera technique but we know that a lot of photographers still do it. Probably the biggest crime here is that the picture was taken just below eye-level, a poor choice as it is unlikely to offer the best angle on the subject and the background. All you'll get from this viewpoint is a blanket of bare mud beneath the flower. Our photographer was also a long way from the subject so it will be small in the frame and lack impact. From this distance the background is in focus too, which detracts from the flower. Whatever you do, avoid taking shots like this.

Shoot like this!

1 Pick the right lens

Exactly which lens you use depends on what's in your kit bag – you need to use the best tool for the job. The ideal lens should offer a long focal length (over 50mm), an aperture of f/4 or wider, and an exceptional close focus ability. The best lens to use in this scenario is a 100mm macro lens, but you don't need a lens that has everything to get great shots. The next best option is a telephoto lens, such as a basic 70-300mm zoom, so long as it can focus on relatively close objects. With this lens you should use the long end of the zoom for the shallowest depth-of-field – this will probably mean that you need to take a few steps backwards too. If you only have a standard zoom lens, then just make sure that you're zoomed all the way in before shooting.

2 Get close

Remember, the closer you focus the shallower the depth-of-field will be, which is just what we're after. So you need to get as close to your subject as you realistically can and aim to fill the frame for maximum impact. Don't rely on autofocusing when you're this close though – always use manual focusing for more consistent results. If you're using the long end of a zoom lens, try selecting the closest focusing position first and then move backwards or forwards until your subject is in sharp focus.

3 Select a wide aperture

Using the mode selector, choose aperture-priority mode so you have full control over the aperture used. Now select the widest aperture available – that's the one with the smallest 'f' number. This is likely to be somewhere between f/2.8 and f/5.6.

4 Use a tripod

With such a shallow depth-of-field any slight movement can put your main focal point outside the area of sharp focus. For this type of image it's essential that our subject is pin-sharp. If you use a tripod your chances of getting the shot are massively increased.

5 Check the background

If the background still isn't blurry enough, try to change your position so the background is further away from your subject. One easy way to do this is to drop down so you're not looking directly onto your subject but are looking across it at an angle like this. From this lower angle the background is much further away from the camera and therefore even more out of focus.

TRY THIS...

The same techniques can be used with landscape shots, and the results can be stunning. Try focusing on a small detail in the foreground and allowing the scene in the distance to blur away into simple yet recognisable shapes.

Get to grips with...
Hyperfocal distance

When shooting landscapes in particular, there are times when you want the whole scene, from the closest foreground to the far distance, to be sharp. The great news for most digital SLR users is that because most cameras use shorter focal length lenses than 35mm (or full-frame digital SLRs) for the same angle-of-view you'll get greater depth-of-field. This means that you can get more of the scene in focus at the same aperture, but there can still be times when you might struggle to keep the whole scene sharp, particularly when the foreground is very close to the camera or you are shooting low to the ground. In addition to setting a small aperture, you can also increase the depth-of-field in your shots by using a technique known as hyperfocal focusing. Despite the scary name, it's simply a way of maximising the depth-of-field by focusing part of the way into the scene rather than simply on the far distance (infinity) or the closest object. If you've heard about this technique before you may have been scared off by the masses of detail and calculations involved. While this is true when using larger format cameras, using this technique with the wide-angle lenses you'll use for most landscapes doesn't have to be too precise, as the larger depth-of-field makes the whole process less critical, but no less effective.

HYPERFOCAL FOCUSING

To make it a little easier for you here's a table of the hyperfocal distances at different focal lengths and apertures. If you focus your lens at the hyperfocal distance with the lens set to this focal length and aperture, everything from the closest focus distance to infinity (the far distance) will be sharp.

FOCAL LENGTH – 24MM

Aperture	Hyperfocal distance (metres)	Closest focus distance (metres)
f/8	3.3	1.9
f/11	2.5	1.5
f/16	1.8	1.25
f/22	1.3	1

FOCAL LENGTH – 18MM

Aperture	Hyperfocal distance (metres)	Closest focus distance (metres)
f/8	2	1.35
f/11	1.45	1.06
f/16	1	0.8
f/22	0.73	0.6

FOCAL LENGTH – 12MM

Aperture	Hyperfocal distance (metres)	Closest focus distance (metres)
f/8	0.9	0.75
f/11	0.65	0.55
f/16	0.45	0.4
f/22	0.33	0.3

Even when setting the smallest aperture, it's often difficult to ensure the whole scene is sharp. The foreground in particular can end up blurred.

Get to grips with...

Hyperfocal distance

How to get maximum depth-of-field

To make the most of the hyperfocal distance you need to use some basic techniques in the field to accurately measure how much depth-of-field you'll need. It's easier if your lens has a focusing distance scale on it, but the standard zooms supplied with many cheaper digital SLRs don't have this. But you can still use the principle of this technique. You'll just need to make a few educated guesses when you focus the lens.

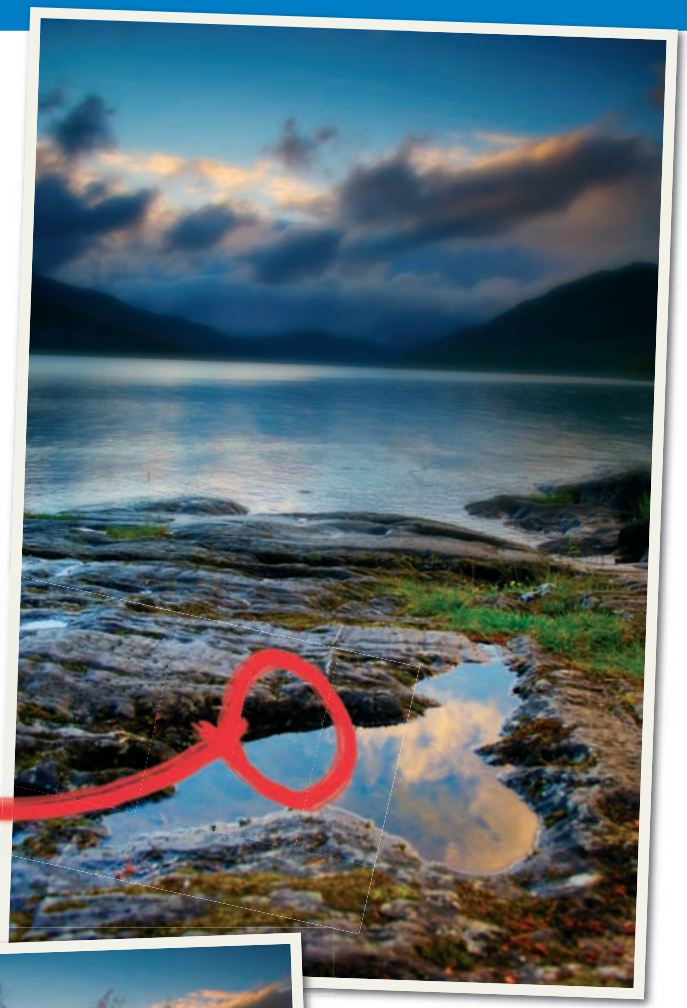
Step 1

Once you've settled on your composition, focal length and viewpoint you need to decide on the closest object that you want to be sharp. With the lens set to manual focus, carefully focus on this object and read off the measurement from the distance scale on your lens. You may find it easier to temporarily reframe so that the object is in the middle of the image, but make sure that you stay the same distance from the subject when you do this.

You need to work out the closest subject you want to be in focus. If your lens has a distance scale you can focus on the foreground and read off the distance.

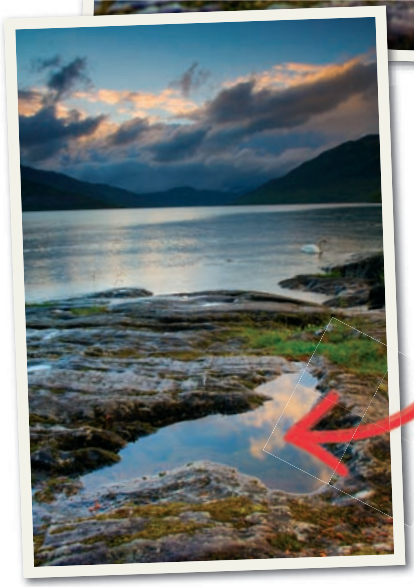
Step 2

You now need to set an aperture that will ensure there's enough depth-of-field to keep both the closest subject and the far distance sharp. For an exact aperture value you need to refer to depth-of-field tables, but as a rough guide refer to the tables on the previous page for some of the most common focal lengths you'll use for landscapes on a digital SLR. Set this aperture on the camera, and return the camera to the position you want to take your final shot.



Step 3

Refocus the lens on the hyperfocal distance using the focus scale of the lens as a reference. If your lens doesn't have a focus scale you'll need to make an educated assessment about these distances. Although not the ideal solution, with a little practise you can get good results using this technique, and as a final check you can use the depth-of-field preview to make sure everything is going to be in focus. You're now ready to shoot.



Using this technique allows you to get the maximum depth-of-field in the final shot. Using f/16 and focusing on the rocks just beyond the puddle ensured the whole of this scene is sharp.

Get to grips with...

Extreme focal lengths

Changing the lens can completely alter the look and feel of your images. We're going to show you how to pick the right lens to create the style you're after. It's a common misconception that telephoto lenses are just used for taking photos of distant objects, and wide-angle lenses to get more of a scene in shot. As a creative snapper, you should also bear in mind that telephoto and wide-angle lenses allow you to capture a subject at different viewpoints to change the style of your shots. This should be your main reason for choosing one lens over another. Here we've photographed the same tree, at the same time of day, from virtually the same angle, changing only the lens and distance from our subject. It's amazing how much difference this can make – you can hardly tell it's the same tree. Turn the page to find out how you can do the same with your camera and lenses...

Telephoto shot

By taking a 2-minute stroll from our subject and looking back at it with a 200mm lens we can create the impression that we're in a nicely wooded park.

Wide-angle shot

By standing just a couple of metres from the base of the same tree with a 12mm lens, we can reveal the tree's true environment. The rolling storm clouds are really dramatic too.

Extreme focal lengths...

Which lens should I use?

Choose telephoto if...

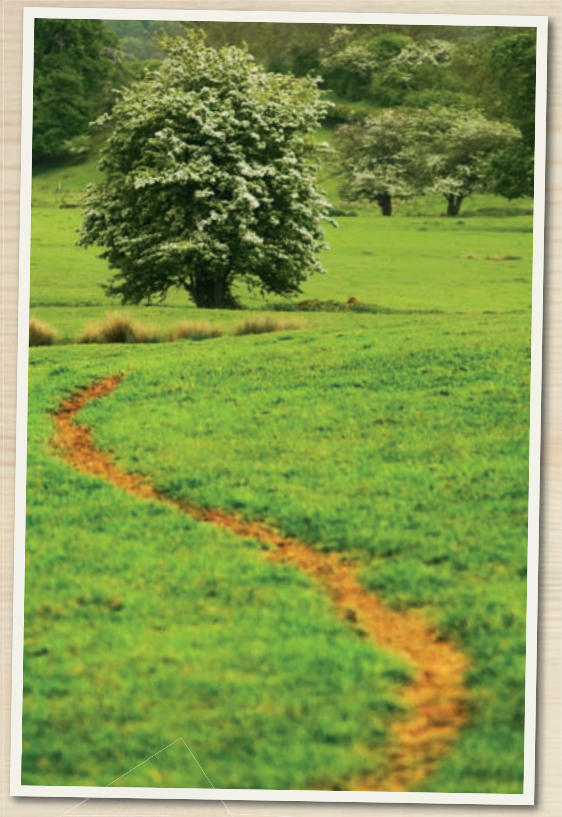
You want to isolate a single subject in a wider scene or you want objects to appear closer together.

Why is it so special?

Using a telephoto lens allows you to flatten the apparent depth in your images so everything looks closer together. All you have to do is choose a viewpoint that's a long way from your subject. The trees in the background of our shot are on the other side of a huge grassy field but it looks like a well-wooded area from this distant viewpoint.

Composition tricks

Composing with a telephoto lens can be difficult to visualise, particularly as you may have to start out by walking away from your subject to get all of it in shot. However, when you are far enough away, the simple trick is to look through the lens and change your position to isolate just a few graphic elements in the scene in front of you. Nine times out of ten you'll have much more success if you keep the shot clean, simple and clear. By moving just a few metres to either side you can bring completely different objects into your shot, and your job is to isolate the best combination of objects – here we used the gentle curve of a path and well-formed trees in the background to add interest and continuity to the shot.



Problem shot

This shot has too many objects in it so looks cluttered and messy. Few of the trees here have nice graphic shapes like our main tree either and it doesn't make for an interesting shot.

Choose wide-angle if...

You want to show your subject in its environment to give it context or make the most of a dramatic sky.

Why is it so special?

Wide-angle lenses allow you to fit more of a scene into your shot, so you can easily show off a location. This wider view also allows you to use a closer viewpoint to your subject. Doing this makes the objects in your shots appear much further apart than they really are.

Composition tricks

When composing with wide-angle lenses you run the risk of having all interest in the scene running across your image in a thin strip at the horizon. This can look incredibly dull – just imagine how bad this shot would look without the big tree in the foreground. To get good foreground like this, all you have to do is go right up close to an object so it's big in the frame. We were positioned literally a couple of meters away from the tree and as a result it gives depth and height to the shot. To compose the other elements in your scene, try to ignore the subtle details to start with and focus your attention on the most eye-grabbing and interesting elements, such as the church and tree here. Now move your feet to find an angle that gives a good spread of interest across the frame – you'll rarely want all the good bits bunched up at one end.

Problem shot

If you don't include any close objects in your shot the area of interest will sit as a thin strip at the horizon – the results will be empty and boring. Get as close as you can to your foreground subjects to avoid this.

PLAYING WITH PERSPECTIVE

Here's another example of a subject shot with wide and telephoto lenses. Here you can really see how you can alter the apparent depth of the scene by changing the lens and your viewpoint. This can be used to create entirely different images.

Wide-angle

With a wide lens we can get right up close to our subjects and still get them in the frame. This gives the effect that the trees are spaced further apart and that the row disappears off to a point in the distance. There's a fantastic feeling of space and depth to this shot.

Telephoto

Stepping back and taking a shot with a telephoto lens, the same trees look like they are bunched closely together. It's also clear that there is a thick hedge at the back of the row of trees and they don't just fade into the distance. Everything looks crammed in tightly together.

60-second lens techniques

Here are three quick and simple techniques that you can try with your lenses for more creative images. Give them a go and see if you can inject some extra sparkle and dynamism into your photography...

Star burst

What is it?

Make bright points of light in your images twinkle with star-like bursts of light. Believe it or not, you don't need any special filters to create this great effect and it works especially well with the sun or streetlamps in low light conditions.

How do I do it?

Start by selecting aperture-priority mode on your camera using the mode selector, and then choose a really small aperture such as f/22 (the smaller the aperture the more exaggerated the star effect will become). Now take some pictures containing at least one bright light. Don't forget to use a tripod because camera shake can be a problem when using such a small aperture.

Zoom burst

What is it?

You don't need Photoshop to make an image like this, just a zoom lens. All you have to do is zoom in while the picture is being taken. Zoom bursts can add an interesting abstract quality to flowers and other colourful objects, and can also add an exaggerated sense of movement to action and sports shots.

How do I do it?

First, secure your camera on a tripod – this isn't absolutely necessary but makes everything much easier. Now select aperture-priority mode and choose a small aperture between f/11 and f/22 and double-check that your ISO value is set to 100 or less. We need a slow shutter speed of around 1/2sec for this effect, so point your camera at the scene and adjust the aperture until the camera lightmeter displays a suitable shutter speed. Now take a shot while simultaneously zooming in a fast, fluid movement – a standard kit zoom lens is fine for the job. Advanced users may also want to try using flash as well to help capture more sharp detail with action shots.

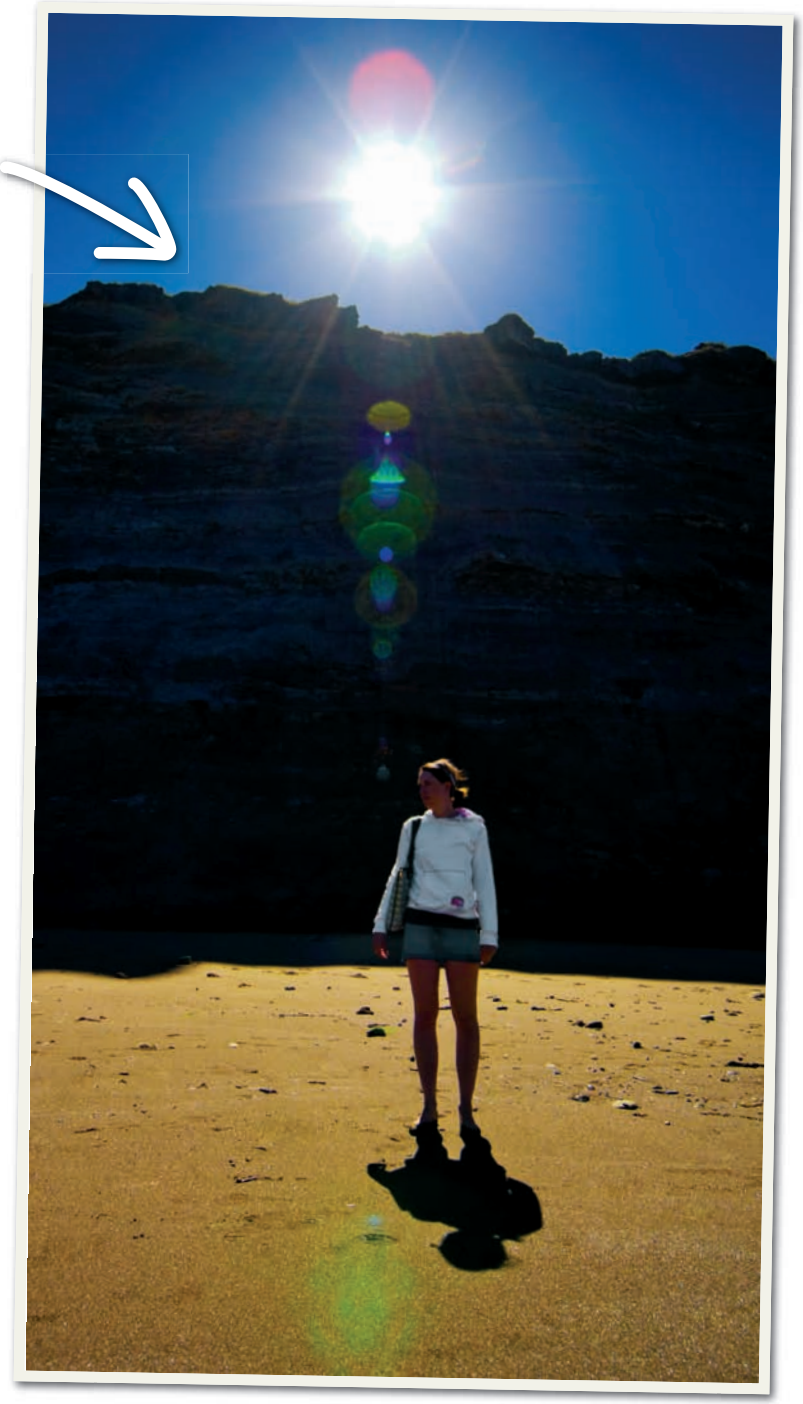
Lens flare

What is it?

Lens flare is a common problem that normally occurs when a very bright source of light is within the shot or just outside it. Normally it's an undesirable side effect, but it can be used creatively too to make an image appear much brighter and hotter.

How do I do it?

To get flare simply include a bright light source in your shot. Zoom lenses tend to be more prone to lens flare than prime lenses, so choose a zoom if you can. You'll need to position the light source towards the edge of the frame to get a good beam of 'ghosts' as we have here. If your pictures are coming out too dark, use exposure compensation and add a stop or two to the exposure – this will make the flare more prominent too. You can also use the depth-of-field preview button on your camera to gauge how the flare will look at the selected aperture.



CREATIVE LENS TECHNIQUES ON YOUR D-SLR

Creative options

From wallet-friendly gadgets such as teleconverters to wacky gizmos such as Lensbabies and fisheye lenses, there are even more creative options than you'd think...

Lens accessories

While you can get stuck in and be creative with your standard lenses, there are times when you need something extra. In this section we've put together four of the best lens accessories that will help you out. Two are adapters for lenses, while the other two are, technically, lenses in themselves. Find out if any of these are for you...

Teleconverters

Long telephoto lenses are expensive, weighty and hard to carry on location and many pros opt for teleconverters as an alternative. These are small accessories that fit between the camera and lens and increase the focal length of the lens by either 1.4x or 2x, depending on the model. The downside is that they decrease the maximum aperture of the lens too. If you use a 70-200mm f/2.8 together with a 1.4x teleconverter it becomes a 98-280mm f/4, or a 140-400mm f/5.6 if you instead use a 2x teleconverter. If you're using a D-SLR, however, you'll also have to take into consideration your sensor's focal length magnification, so you'll effectively end up with a super telephoto lens! The trouble is that most teleconverters are designed for a specific range of lenses, so make sure they're compatible with your optics before you buy them.

TELECONVERTER MATHS...

Don't forget the 1.5x sensor magnification takes us to... 210-600mm f/5.6

AND OFF YOU GO...

PROS AND CONS

- ✔ Cheap way to get longer telephoto shots with your existing lenses.
- ✔ Small and lightweight for carrying in the field.
- ✘ Only designed to work with certain lenses – usually the expensive ones.
- ✘ Can decrease the overall quality of your images.

CANON EXTENDERS

Canon users beware! Unlike all other manufacturers, Canon calls its teleconverters 'extenders'. This can cause confusion with extension tubes (see over page) if you're not careful. Don't say we didn't warn you.

Lens accessories

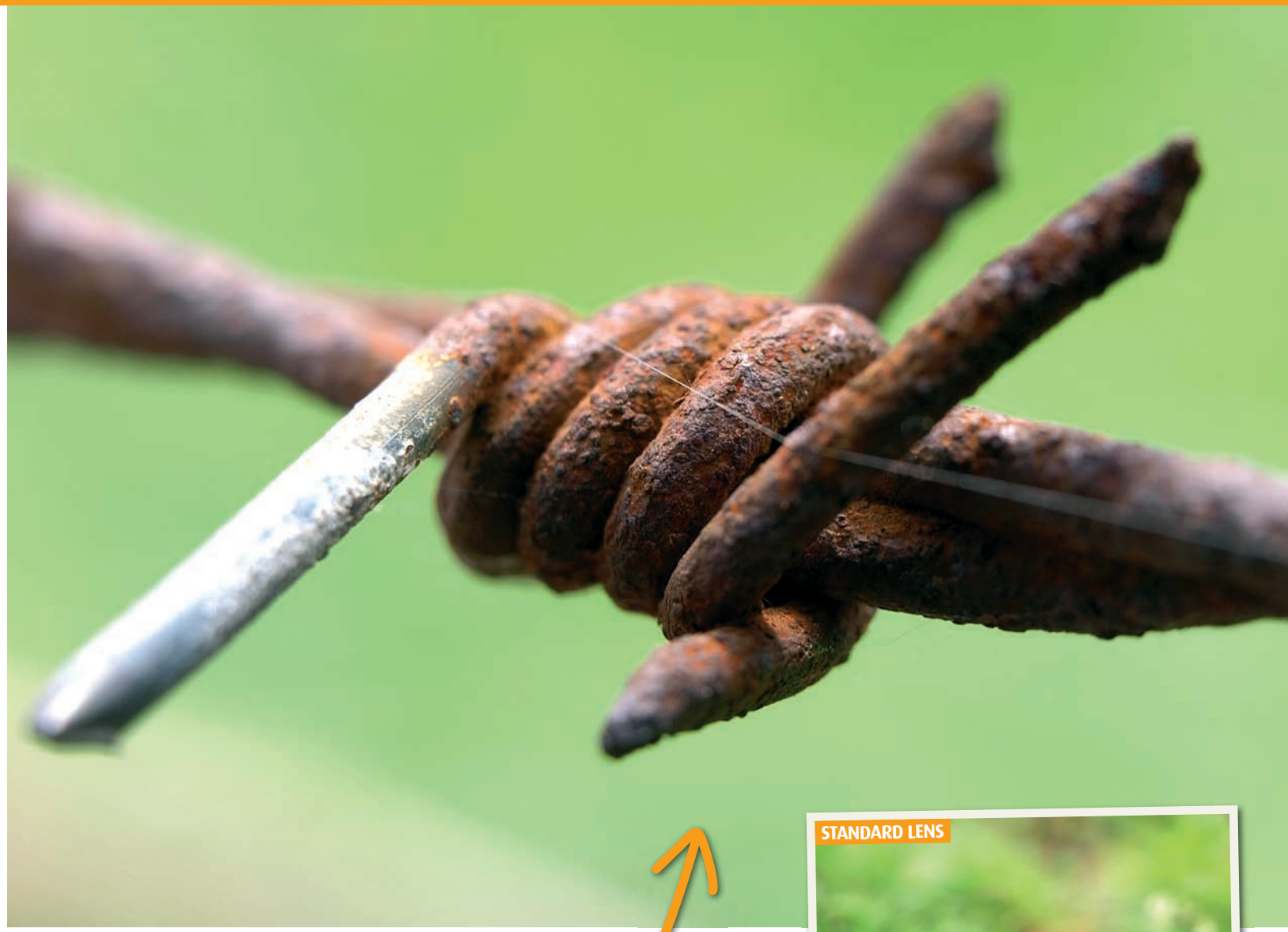
Extension tubes

You may think that you have to have a dedicated macro lens to shoot close-up photography. Well, you don't. Any lens you have can be used for amazing macro shots with a little help from an extension tube. This little ring attaches to the rear of your lens and connects to your camera's lens mount. By moving your lens further away from your camera's focal plane, it dramatically increases the close focusing of your lens, allowing you to get within centimetres of your subject for sharp macro images. Using an extension tube will usually mean that you'll need to focus manually but if you're shooting macro, you probably will be anyway. All you need to do is buy the correct one for your lens mount, so always double-check that your lenses are compatible.

HOW IT WORKS...

PROS AND CONS

- ✔ Allows you to convert any lens into a macro lens.
- ✔ You can often get shots that a macro lens couldn't.
- ✘ You may need to go fully manual depending on your model.
- ✘ Can reduce image quality.



WITH EXTENSION TUBE

The extension tube makes any lens capable of producing great close-up shots that wouldn't be possible without a macro lens.

Lens accessories

Lensbaby

One of the more recent additions to the creative lens accessory range is the Lensbaby. It's basically a lens on the end of a bellows which attaches to the camera body just as a normal lens does. You can move the lens around and create a focus 'sweet spot' on one part of the image while the rest is blurred. It is quite popular with some wedding photographers because it can give a slight dreamy effect to a photograph. The Lensbaby can really make your shots stand out but it requires a degree of experimentation and perseverance. There are three types available – the Original, the Lensbaby 2.0, which is sharper and goes down to f/2, and the Lensbaby 3G, which has a clamp for more precise results.

By applying pressure to the front of the Lensbaby you can create a 'sweet spot' of focus to great creative effect.

LENSBABY ORIGINAL
Lens mounts available – Canon, FourThirds, Nikon, Pentax, Sony **£70**

LENSBABY 2.0
Lens mounts available – Canon, FourThirds, Nikon, Pentax, Sony **£110**

LENSBABY 3G
Lens mounts available – Canon, Nikon, Pentax, Sony **£200**

PROS AND CONS

- ✔ Can create some great dream-like effects.
- ✔ Gives you an advantage over many rival photographers.
- ✘ Can be rather fiddly to set and keep in position.
- ✘ Slight reduction in overall image quality.

Fisheye lens

The last accessory we have here is actually a lens in itself but its niche place in photography means that it's more at home in this section than with other lenses. A fisheye lens is simply an extreme uncorrected wide-angle lens, which means that the edges of the frame bend around, heavily distorting everything in those areas. Fisheyes are most commonly found in the hands of extreme sports photographers but can be used to great effect in most types of photography. They're usually fairly expensive pieces of kit, especially when you consider that you won't (or at least shouldn't) be using it that often. There are plenty of fisheye attachments designed for specific compacts or SLR-style cameras available, but the range for D-SLRs is extremely limited, leaving the only real option as buying a proper fisheye.

PROS AND CONS

- ✔ Offers an extremely wide perspective of the world.
- ✔ The fisheye distortion can be used to great creative effect.
- ✘ Very expensive for what is a niche product.
- ✘ You need to be careful not to get your size nines included in the frame.

CIRCULAR OR DIAGONAL?

Fisheye lenses come in two basic types – circular and diagonal. A circular fisheye will produce a circular image in the frame, with black space around the circle. This is the most extreme type of fisheye lens but the circular image rules it out for use in general-purpose photography. A diagonal fisheye, on the other hand, will completely fill your frame with the image but the fisheye effect will be less pronounced. If you are looking to invest in a fisheye lens, we'd suggest that you look at the diagonal kind.