

Close-up and Macro

How to shoot
with your Canon EOS



By Nina Bailey

About this book

A subject that I have always taken lots of pictures of is close up and macro photography. We live in a country that offers countless opportunities to shoot some great subjects with some of the best parks and gardens in the world to shoot in. Our climate, though we may complain about the rain, gives green lush conditions throughout the year, allowing a wide range of plants from all over the world to flourish in our gardens.

It's a area of photography that can be enjoyed with very modest equipment, without going far from home, if you have a garden, then that's as far as you need to go to get some great images. This is a subject that can be very challenging as the magnifications increase, but one of the things I hope to show in this ebook is that you can get some great results without having to use specialist or expensive equipment and so this is a subject accessible to all photographers.

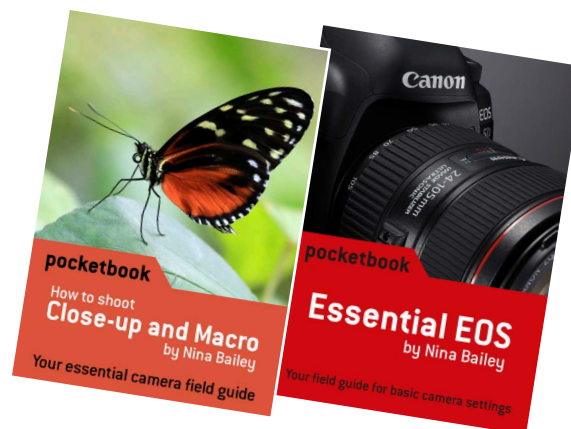
It's easy to think that this is a seasonal area of photography, yet there are opportunities for shooting all through the year. In fact a lot of the butterfly images on this book will have been taken in the butterfly houses that we run events in during the winter months. But even out in the field there are great things to photograph all year round.

My aim is to give you a good understanding of what you need to grasp to get some great close up and macro images and what settings are needed. I have also looked at the creative side of this type of photography looking at framing, lighting and seeing the best images to take in addition to the more factual approaches.

Hopefully the images and explanations will inspire you to go out and get the very best images of the subjects that are all around us. I also have the A6 Pocketbook which you can take out and about with you as a companion to the full ebook. Click on the book covers below to go to the sales pages for these guides.

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**PREVIEW
EDITION**
About Nina Bailey
Nina started her business in the retail sector, working in photographic equipment and then moving to Canon UK where she has been a successful nine years.

looking after training, exhibitions and marketing both in the UK and also within Europe. This gave Nina an unrivalled knowledge of not only the Canon EOS system but also how to develop and enhance the skills of photographers of all ability levels.

Nina started her own business in 1999, concentrating on training for amateur photographers. She is also at the forefront in developing the EOS Training Academy both online and within its practical day courses. In 2014 Nina started producing her own range of ebooks to bring photography training to an ever wider audience. In 2015 Nina became Technical Editor for EOS magazine and produces articles and images for each issue. In 2017 Nina launched the every growing range of Pocketbooks, which are small A6 pocket sized guides designed as aide-memoires to go with you when out shooting.

Nina started taking images when she was very young and is still a very keen photographer both professionally and personally. Nina loves travel, landscape and wildlife photography and still shoots occasionally commercially though most of the images she shoots these days are for her own extensive range of books.

Why a new book?

PREVIEW
EDITION

I wrote my original close up and macro book back in 2014, since that time photography has changed considerably. Mirrorless models, both APS-C and full frame have appeared and are becoming much more prominent within the market. We have also seen new macro lenses appearing with much shorter focal lengths than we have seen before. The image to the right was taken on the new RF 35mm f1.8 Macro IS STM designed for the EOS R range of cameras, though there are also M and EF-S versions of this lens available. Within the equipment section I will take a look at the changes that the mirrorless models are making to this type of shooting and a few useful options that they offer.

For those used to 100mm and 60mm macro lenses this may sound a strange development but they reflect changing trends and expectations. A lot of new photographers have come via the mobile phone route and these give excellent results when shooting close up images, but with the need to get very close to the subject. Of course if shooting flowers or static subjects this is not such a problem as with butterflies and other insects. The key benefit offered is the extra depth of field available at fairly modest apertures. So I am expanding the equipment sections to explain these new developments.

I am also adding a reference section so you can brush up on the “basics”. Unfortunately this is one area of photography where your understanding of light levels and the settings achievable at these light levels is essential to getting good results. There are also now some interesting camera options that make getting the settings you need a lot easier which I have also added into the relevant sections. I have also included in this some of the key camera features you need to understand how to use to understand the rest of the book.

Another new feature on the mirrorless models is the addition of Focus Bracketing on the EOS RP though it's rapidly spreading onto other models including some of the Powershot range, the M series, on the M6 Mark II and the new EOS 90D. This allows a technique called focus stacking to be achieved with a degree of automation. However, if your camera does not feature it I have also added a section showing how to manually shoot images to use with this technique. I am including a lot more in this book that explains the camera features in relation to this type of photography, as I am finding it is setting some of the features that causes photographers the most problems. Obviously everything has to be as generalised as possible, remember that I also do ebooks on almost all the current and some older models that will explain the features in more depth and specifically to your model.



Taken with an RF 35mm f1.8 Macro IS STM lens on an EOS R. 1/160th f11 100 ISO

Chapter index

PREVIEW
EDITION

To make the book easier to navigate I am including links to each of the main chapters in normal hyper linked contents. There are also links at the bottom of each page to take you to the chapter menu or the main index for ease of looking things up.

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Taken with an RF 35mm f1.8 Macro IS STM lens on an EOS R.
1/160th f11 125 ISO



Taken with an EF 70-300mm f4-5.6 IS II USM at 300mm on an EOS 5D Mark IV. 1/500th f11 1600 ISO

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Chapter 01

Introduction

Introduction to macro and close up

PREVIEW
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Close up photography covers a very wide range of subject types and techniques. The equipment that you need varies a lot according to the magnifications that you want to work at.

In this ebook we are going to look at three distinctly different areas. Close up, Macro and Micro. Each of these has their own shooting techniques and their own specific problems that need to be overcome, to get good results.

This can be one of the most challenging areas of photography, as the distances that we are working at between the camera and our subject, makes the required depth of field challenging to get. Yet in spite of these challenges, it can also be a very rewarding area, and one that provides the opportunity to photograph on days that would not give good results in other areas of photography.

As the magnifications that you tackle increase, you start to see into a hidden world, beyond the scope of the things that we normally see. Things we can hardly see turn into objects of beauty and provide fascinating things to photograph.

It is an area that you can do close to home, and any garden or park will provide a wealth of subjects for you to practice on. The equipment is affordable, especially at the lower magnifications and easy to carry, as it is all relatively small and light.

This makes it an area of photography that can be enjoyed by all photographers and regardless of the seasons, there is always something of interest to take.



Taken with an RF 35mm f1.8 Macro IS STM lens on an EOS R. 1/160th f9 320 ISO

About the basics

PREVIEW
EDITION

What I consider to be the basics of photography that all photographers should be fully familiar with and what a lot of photographers actually understand seems to be getting further apart as the years go by.

I spend a lot of my time out and about doing practical training with photographers who consider themselves either an intermediate or advanced level. Yet so often I see people struggling with basic things such as what ISO to use for a specific light level, or why they are getting blurred images when all it takes is setting the correct shutter speed for the lens that they are using. Knowing what the ISO, shutter speed or aperture is and vaguely what it does, is not enough, especially for this very technical area of photography. You need to understand the relationship between those three key settings and what is achievable in different light levels. You also need to know the increments that they work in and how to work out what to do to get the settings you need.

Understanding the focusing options and things such as metering modes is also important. I keep finding people working on spot metering as they think it's the same as setting a single AF point. Mode wise you should be able to choose the exposure mode that works best, not the only one you know what it does. I am seeing so many newcomers shooting on manual when they would get so much better results on Av or TV mode. It seems to be largely as the "photographer" who taught them only ever learnt to use manual. I shoot macro images mostly on AV mode as you can control the depth of field and on Auto ISO I can get the camera to provide the right light level for the image. If the images are coming out a little light or dark I can use the exposure compensation on the camera to correct the exposure, this is not a new feature as it has been on cameras since the 70's and on every EOS model that has been produced, yet every week I come across photographers that are by no means novices, who do not know it exists.

The image to the right was shot on a very overcast day. It's a good example of why understanding the basics are so important. On an overcast day the basic light level is known as EV 10 - it all relates to the weather. So at 100 ISO we can get 1/30th at f5.6, so to get the light level we need taking the ISO up to 1600 ISO will give us the same amount of light on the sensor at the smaller aperture and higher shutter speed that we need to shoot at. Advanced photographers should be able to work that out by themselves yet every week, more of the people I see, fail to understand these basics, than actually know them. Hence the addition of the reference section.



Taken with an RF 35mm f1.8 Macro IS STM lens on an EOS R. 1/125th f11 1600 ISO

Chapter 02

Reference

About the reference chapter

This chapter is designed to act as a reference section for the more experienced and to top up the knowledge for those that are new to photography or self taught where there may be gaps that need to be filled in. Macro photography is a technical topic and so it will use a number of specific photographic terms which not all photographers will be familiar with. I have aimed this book at intermediate to advanced level photographers who should be fairly familiar with most of these topics. This chapter is to help you understand some of the terms that you may not be familiar with.

Macro also has some deviations within the normal rules of photography which you need to be aware of even if you are an experienced photographer.

I lead a lot of training events and one thing that over 20 years of training photographers has taught me, is that the grasp of these basics can vary a lot. So although there will be some photographers who are fully conversant with these topics there will be many that will need this reference section to brush up the basic understanding to make the most out of the techniques explained within this book. I recommend that you take at least a glance through it, if nothing else look at the pictures and their captions as some may well challenge what you believe you know. As photography is evolving all the imaging techniques which were used 20 or more years ago may have far better ways of working today.

A case in point is the ISO settings. Today we get to choose the settings we want to shoot and use the ISO to give us the light levels we need. However, many photographers cling on to mistaken beliefs that digital works like film and the lowest possible setting needs to be used. I am always baffled as to why that is, after all one is a chemical process and one is electronic and the two processes cannot be compared in anyway.

Coming from a technical specialist background, I have always looked at every new advancement and tested it to see how well it works. I would never believe what someone else tells me, unless they were another technical specialist who is training me on the product. By experimenting with new features and understanding new technology it allows me to get good results in a much wider range of situations than ever before.

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Camera choices for macro and close up

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This is an area of photography that can be tackled with any EOS model no matter how basic the specifications. Macro photography is all about understanding the techniques and so does not rely on the camera model having specific features or controls.

The EOS range now contains a wide range of models featuring different sensor sizes, called APS-C or occasionally 1.6x crop models and the other type being the 1x or full frame sensor models. Both sensor sizes can have advantages for this type of photography. The smaller sensors make it easier to fill the frame with small subjects, I will look at why shortly. As such it makes the techniques such as getting everything sharp - or depth of field as it is correctly known easier. The full frame models on the other hand offer better scope and quality when working in lower light levels and so can make it easier to get the settings that you need whilst retaining a good quality.

The listings to the right show the range of models that have at some time been available in the EOS range up to the time of going to print (Jan 2020) split into the various camera groups. Mirrorless models allow you a better preview of the image that you are taking and can make this type of photography a bit easier as you quite literally are seeing the finished image before taking it. Over the next couple of pages I will explain where the differences in the various models in the market today exist and how it can affect the viewing and the focusing on the camera.

The brightness of the viewfinder can also be important as if using the depth of field preview feature that I will look at in depth later on, the mirrorless models that feature it allow you to preview at full brightness, whereas the DSLR models which have a pentaprism use the more traditional system where the brightness of the image dims, when the depth of field preview is being used. DSLR models can work just like mirrorless models, if the rear (Live view) screen is used when viewing, though this is really only practical when shooting on a tripod.



FULL FRAME MODELS - DSLR

6D, 6D Mark II
5D, 5D Mark II, 5D Mark III, 5D Mark IV
1DS, 1DS Mark II, 1Ds Mark III, 1DX, 1 DX Mark II

1.3 sensor models (older professional models)

1D, 1D Mark II, 1D Mark II N, 1D Mark III, 1DS Mark IV

FULL FRAME MODELS - MIRRORLESS

EOS RP, EOS R



APS-C OR 1.6 SENSOR - DSLR MODELS

1000D, 1100D, 1200D, 1300D, 4000D and 2000D

100D, 200D, 250D, 300D, 350D, 400D, 450D, 500D, 550D, 600D, 650D, 700D, 750D, 760D, 800D, 77D
D30, D60, 10D, 20D, 30D, 40D, 50D, 60D, 70D, 80D, 90D 7D and 7D Mark II

MIRRORLESS MODELS APS-C OR 1.6 SENSOR

M100, M200 and M6 M1, M2, M3 and M10, M5, M50. M6 Mark II



Camera launch dates

This may seem to be a strange thing to put in the reference section, however, it is useful to know when the model that you use came out as to avoid repeating lists of cameras many times within the book it is easier to say that the feature appeared in a specific year and has been on almost everything since.

The exception to this rule tends to be the very basic models such as the 2000D and 4000D in the current ranges. To keep the price very low on these models Canon uses older processing chips within these models and that means that some of the very latest features may not be available, as it comes in with a specific processor on the models which Canon refers to as DIGIC processors. So it is worth looking at the processing number as well, as some of the 2015 onwards features rely on having at least a DIGIC 6 processor and models such as the 2000D and 4000D are still using the 4+ processor version.

The latest processor version is DIGIC 9 though most current models are using either the 7 or 8 versions. Its only the 90D at the time of writing that has the latest 9 series processor.

The higher level cameras shoot at faster frames per second rates and have more sophisticated focusing systems and so it is normal for them to have a dual processor, which is two processors being run together to give additional processing power.

	Production dates	DIGIC Version	EOS 250D/Rebel SL3	2019 - Current	
EOS-1D	2001 - 2004	-	EOS 300D/Rebel	2003 - 2005	
EOS-1D Mark II	2004 - 2005	II	EOS 350D/Rebel XT	2005 - 2006	
EOS-1D Mark II N	2005 - 2007	II	EOS 400D/Rebel XTi	2006 - 2008	II
EOS-1D Mark III	2007 - 2010	dual III	EOS 450D/Rebel XSi	2008 - 2010	III
EOS-1D Mark IV	2009 - 2012	4	EOS 500D/Rebel T1i	2009 - 2011	4
EOS-1D X	2012 - 2016	dual 5+	EOS 550D/Rebel T2i	2010 - 2012	4
EOS-1D X Mark II	2016 - 2020	dual 6+	EOS 600D/Rebel T3i	2011 - 2015	4
EOS-1D X Mark II	2016 - Current	8 and X	EOS 650D/Rebel T4i	2012 - 2013	5
EOS-1Ds	2002 - 2004	-	EOS 700D/Rebel T5i	2013 - 2015	5
EOS-1Ds Mark II	2004 - 2007	II	EOS 750D/Rebel T6i	2015 - 2019	6
EOS-1Ds Mark III	2007 - 2012	dual III	EOS 760D/Rebel T6s	2015 - 2019	6
EOS 5D	2005 - 2008	III	EOS 800D/Rebel T7i	2017 - 2019	7
EOS 5D Mark II	2008 - 2012	4	EOS 1000D/Rebel XS	2008 - 2011	III
EOS 5D Mark III	2012 - 2016	5+	EOS 1100D/Rebel T3	2011 - 2014	4
EOS 5D Mark IV	2016 - Current	6+	EOS 1200D/Rebel T5	2014 - 2016	4
EOS 5DS	2015 - Current	dual 6	EOS 1300D/Rebel T6	2016 - 2019	4+
EOS 5DS R	2015 - Current	dual 6	EOS 2000D/Rebel T7	2018 - Current	4+
EOS 6D	2012 - 2017	5+	EOS 4000D/Rebel T100	2018 - Current	4+
EOS 6D Mark II	2017 - Current	7	EOS D30	2000 - 2002	-
EOS 7D	2009 - 2014	dual 4	EOS D60	2002 - 2003	-
EOS 7D Mark II	2014 - Current	dual 6	EOS M	2012 - 2015	5
EOS 10D	2003 - 2004	I	EOS M2	2013 - 2015	5
EOS 20D	2004 - 2006	II	EOS M3	2015 - 2018	6
EOS 30D	2006 - 2007	II	EOS M5	2016 - Current	7
EOS 40D	2007 - 2009	III	EOS M6	2017 - 2019	7
EOS 50D	2008 - 2010	4	EOS M10	2015 - 2017	6
EOS 60D	2010 - 2015	4	EOS M50	2018 - Current	8
EOS 70D	2013 - 2016	5+	EOS M100	2017 - 2019	7
EOS 77D	2017 - Current	7	EOS M200	2019 - Current	8
EOS 80D	2016 - 2019	6	EOS M6 Mark II	2019 - Current	8
EOS 90D	2019 - Current	9	EOS R	2018 - Current	8
EOS 100D/Rebel SL1	2013 - 2017	5	EOS RP	2019 - Current	8
EOS 200D/Rebel SL2	2017 - 2019	7			

PREVIEW
EDITION

Viewing difference DSLR vs Mirrorless

PREVIEW
EDITION



DSLR – LOOKING THROUGH VIEWFINDER

It is important to understand how Mirrorless cameras differ from the more traditional DSLR models that we are used to, as this does affect how they are used to a degree.

A DSLR model has a reflex mirror. When viewing, this mirror is down, allowing light to be reflected up into the camera's pentaprism and then up into the camera's optical viewfinder. This is shown on the image above. By utilising a reflex mirror we are able to see through the lens. This allows us to see the image being captured through the lens.

Of course the mirror is actually blocking where the image is going to be taken and so when the shutter



DSLR – TAKING AN IMAGE OR USING LIVE VIEW

is fired, the mirror lifts up and the picture is then taken through onto the image sensor. Although this allows us to see both framing and focusing, it does not allow us to preview exposure or white balance.

Later DSLR models are fitted with a feature called Live View. This allows the camera to be used with the mirror raised, utilising a direct feed from the imaging sensor. This allowed exposure, white balance and other image processing options to be previewed in real-time before the image was taken.

On mirrorless models both the reflex mirror and the pentaprism have been removed. On R series mirrorless the pentaprism is being replaced by an



MIRRORLESS - ALL OPERATIONS

electronic viewfinder. In addition the image can also be viewed on the rear screen just like when using Live View on the DSLR models.

However, not all mirrorless models have electronic viewfinders, relying instead on the rear screen LCD screen for viewing the image.

Regardless of viewing in an electronic viewfinder or on the rear screen, mirrorless models allow you to preview exactly how the image is going to look when taken, when shooting with ambient light. If shooting with flash this changes as you cannot preview flash light until the image is actually taken.

DSLR - Optical viewfinder

PREVIEW
EDITION

What most photographers do not realise is that as we go up through the Canon range the optical viewfinder that we normally look through to take the picture actually changes in its construction.

The image immediately to the right is a cut through image of the Canon 450D. I know that's quite an old camera but sadly Canon longer produces these lovely cut through diagrams. If you compare the pentaprism area which I've circled with the camera on the far right which is a EOS 40D you may notice a difference. The EOS 40D features a glass pentaprism, which the light is reflected through to allow us to view the image. The EOS 450D utilises a mirror box type pentaprism which is a hollow box with an interior mirrored surface that reflects the light in the same way as a glass pentaprism does.

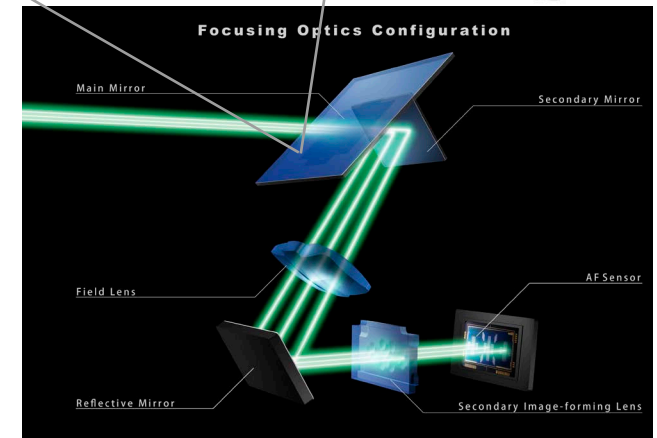
This is why there's quite a significant weight difference between the entry level, compact and introductory models in the range and the enthusiast and higher level models. Nearly all the additional weight on the higher level models is being created by the glass pentaprism. Of course the larger batteries also add a little bit of weight along with slightly more robust body construction.

A logical question therefore to ask is why not use the smaller and lighter mirror boxes on all models. Although the mirror box works well the actual amount of light that it transmits is significantly lower than the glass pentaprisms. Therefore the view that you see through the viewfinder is darker than the viewfinder would be on the higher-level models. The glass mirror box also has an effect on the size of



the viewfinder at the rear of the camera and generally the high-level models have bigger viewfinders which are significantly brighter. This is even more noticeable on the full frame models where viewfinders are once again larger and brighter.

The focusing on the DSLR models is actually located in the base of the camera and so for focusing some light passes through the main mirror onto the secondary mirror and down onto the focusing sensors. This is why the focusing system is different when using live view to when shooting with the optical viewfinder as when the mirror is raised for live view shooting the normal focusing system is unable to operate. The basics of the normal focusing system is shown in the image above. In the cut

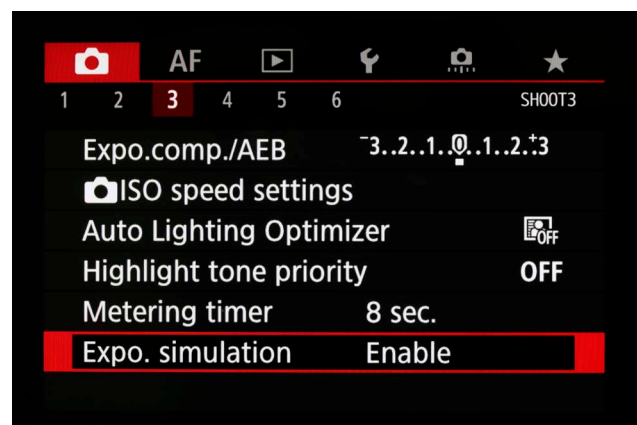


through diagrams above you can see the secondary mirror and some of the AF components.

Mirrorless - Viewing options

PREVIEW
EDITION

Some mirrorless models only allow you to view on the rear LCD screen, whilst others have an electronic viewfinder. Either way what you are seeing through the viewfinder or on the rear LCD is going to be virtually identical to what your picture is going to look like. Providing of course you have the exposure simulation switched on.



Exposure simulation is normally found within the shoot menus, if it is an option available on the camera. Most of the more advanced models will have this option. On the more basic models it is often switched on as standard and cannot be turned off, and therefore does not appear as an option. However, it is still making sure that what you see on the screen, is how the image is going to look.

What a lot of people do not realise is it isn't just the exposure that is being previewed. The items as listed to the right are all possible to preview in either the electronic viewfinder or the rear LCD screen. Obviously not all cameras have all these features.



- Picture Style – All settings such as sharpness, contrast, colour saturation, and colour tone will be reflected including monochrome options.
- White balance
- White balance correction
- Ambience-based shots
- Light/scene-based shots
- Creative filter effects
- Metering mode
- Exposure and exposure compensation
- Depth-of-field (with depth-of-field preview button ON)
- Auto Lighting Optimizer
- Peripheral illumination correction
- Distortion correction
- Chromatic aberration correction
- Highlight tone priority
- Aspect ratio (image area confirmation)

Generally if you're shooting in bright light than an electronic viewfinder is going to be the better option as it is easier to see. It is also possible to apply



dioptric adjustment, so if you wear glasses what you're seeing through the viewfinder will be sharp.

If your camera features both an electronic viewfinder and a rear LCD screen then switching between them is automatic as there is a sensor by the viewfinder that detects when your eye is close. This is highlighted on the image top left. This is operative up to about 10 cm away and so if the rear screen goes off, then it could be this causing it, if the camera has not gone to sleep. For the models that do not feature an electronic viewfinder but do have a hot shoe fitting, it is possible to buy an optional electronic viewfinder to make viewing easier in bright light.

Be aware that there will be very slight discrepancies between the colour, tone and brightness of the viewfinder and the rear screen. Canon makes them as close as possible, but with variations in manufacturing it is currently impossible to totally match them. There is normally a brightness control and this will adjust whichever you are viewing with, whilst using the adjustment.

Sensor sizes

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EOS models have two different sizes of imaging sensor today. It used to be three with the professional models offering a 1.3x sensor as well but this vanished when the EOS-1D X appeared as a full frame model and has not been on any models since then.

This is an area that some photographers get very confused about so I thought it was worth including in the reference section to understand the differences made by the sensor size.

Full frame or 1.0x sensors are found on the high end models (EOS-1D X series, EOS 5D, EOS 6D series and EOS R series only). The sensor is 36mm x 24mm in size.

APS-C or 1.6x crop sensors are found on the more affordable models and have a sensor size of approximately 22.4mm x 15mm.

This difference in size changes what a specific focal length of lens will capture. The smaller sensor effectively crops the image compared to the full frame models. The crop factor is often called a magnification factor, though a 100mm lens is always a 100mm lens regardless of the body that you use it on. But the smaller sensor effectively crops the area that is being captured by the lens, so it looks like the lens magnifies more.

The crop can be a good thing if you mostly shoot with telephoto or macro lenses as it makes filling the frame a lot easier. However, it will mean that you need to buy significantly wider lenses to give a good



wide angle than you would need on the full frame models.

This is why Canon make the EF-S range of lenses for the DSLR APS-C models and the EF-M lenses for the M series mirrorless models featuring the smaller sensor – to give a range of wide angle lenses especially designed for these models at a more affordable price point.

The image above shows the benefit of using a APS-C

or 1.6x model compared to on a 1.0x or full frame model as it is much easier to fill the frame.

However, when shooting subjects that need wide angle lenses, the benefit with the 1.0x or full frame models is that a subject fits in the frame nicely with a 24mm lens. On an APS-C or 1.6x model it will need a 15mm lens to achieve the same. This is why we have listed focal lengths from both in the table below, as with wide angle lenses it does change how the lens is described – the lenses for the smaller

Sensor sizes

PREVIEW
EDITION

sensor cameras need to be a much wider focal length to give a good field of view.

	1.0x / Full frame	APS-C / 1.6x
Wide angle	24mm - 35mm	15mm - 35mm
Standard	36mm - 60mm	36mm - 60mm
Telephoto	70mm - 300mm	70mm - 300mm

I have given a chart below that shows the focal length that is used on the 1.0x or full frame models and shown to the right of it the lens that would be needed on the 1.6x or APS-C models to give exactly the same amount in the frame. I have covered the main focal lengths that may be used for close up or macro photography. This is why when you look at specific macro lenses for the different systems they offer different focal lengths. However, the lens also controls how close you have to be to get the maximum magnification of the lens and for macro work that can be an important factor, especially if shooting insects.

1.0x or Full frame	1.6x or APS -C sensor
24mm	15mm
35mm	21mm
60mm	37mm
100mm	62mm
105mm	66mm
180mm	112mm
200mm	125 mm
300mm	188 mm



24mm lens min focus on 1.0x sensor, f11



24mm lens min focus on 1.6x sensor, f11



105mm lens min focus on 1.0x sensor, f11



105mm lens min focus on 1.6x sensor, f11

The images above were shot at the same distance to the subject using focal lengths that matched each other, but on bodies with the two different sensor sizes. They were shot at the minimum focusing distance on a 24-105mm zoom lens showing the very different areas being captured. Much of the time when working with the APS-C models you will find yourself shooting at lower magnifications and often working further away. This can result in greater depth of field as depth of field increases as you shoot at greater distances from your subject.

However, though you might think that the smaller sensors must be better for macro work due to this, there is another consideration and that is the much wider ISO range offered by the full frame models and the higher quality given at the higher ISO settings on full frame which also needs to be considered.

The ISO controls the sensitivity of the imaging sensor to light. In the days when we shot film we were limited to the ISO setting of the film. Now with digital models the ISO can be changed frame by frame, making it easier to shoot in a wide range of lighting conditions.

The other key advantage with digital models is that the quality achievable at the higher ISO settings is much better than we were used to when shooting with film. With settings up to 3200 ISO on the 1.6x sensor models and as high as 12,800 ISO on the full frame models giving excellent quality. Therefore what we think of as low, mid and high ISO have been redefined.

LOW ISO 100-400

These ISOs are used when the light is bright or if shooting on a tripod. These will give the best quality, but a lot of light is needed to successfully use these ISO settings handheld.

MID ISO 800-3200

These are the ISO settings that will need to be used when the weather is overcast and the light levels are poor. The light on an overcast day can be up to 4 or 5 stops lower than on a bright sunny day. On modern day EOS cameras the quality is still very good at these settings.

HIGH ISO 6400-51200

Used when handholding in low light levels. Although the image will have more noise, it's preferable than getting blurred images through camera shake. Make sure that the High ISO noise reduction feature is switched on when using these settings.



EOS R, 6400 ISO 1/800th second at f11 with a 300mm lens, handheld

A key problem that I see when training on macro photography on less than ideal days, is a lack of understanding as to how low the light levels can be.

The key exposures you need to know for different weather conditions are:

Bright sunshine	1/125 f11 100 ISO
Light cloud	1/125 f5.6 100 ISO
Overcast	1/125 f4 100 ISO
Heavy overcast	1/125 f2.8 100 ISO

The problem is that the settings above do not work for macro photography as 1/125 is too slow for use with a lot of macro lenses (more about that shortly) and even for close up shooting you really want to shoot at about f11 whilst for macro f22 is more appropriate for many subjects. However we can increase the ISO to get much more realistic settings with the same amount of light falling on the sensor as above.

Bright sunshine	1/250 f11 200 ISO
	1/250 f22 800 ISO
Light cloud	1/250 f11 800 ISO
	1/250 f22 3200 ISO
Overcast	1/250 f11 1600 ISO
	1/250 f22 6400 ISO
Heavy overcast	1/250 f11 3200 ISO
	1/250 f22 12800 ISO

You can see that as the weather gets worse we have to go to higher ISO settings to achieve the settings that we really need. I would normally avoid shooting on a very overcast day as it can be almost

Taken with an RF 35mm f1.8 Macro IS STM lens on an EOS R, 1/125th f22 500 ISO



impossible to get the settings that you really need without either compromising on the settings or working at a very high ISO.

I will look in more depth at how we get the settings that I have shown to the left a little later in this chapter when I look at how the ISO, shutter speed and aperture always work together and indeed always give the same options dependent on the weather prevailing at the time of shooting.

Even on a sunny day you will find that if you want the narrower apertures, as in the image above, you will need to be well above the 100 ISO that many photographers try and work at, as it is what they used in the days of film.

The result of using such a low ISO is normally blur caused by either camera movement or subject movement.

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