

# Handbook of iPhone Photography

*A User Guide to Models 6 and 6s  
iOS 9.3*

*Capture — View — Store — Organize — Edit — Share*

Dennis P. Curtin

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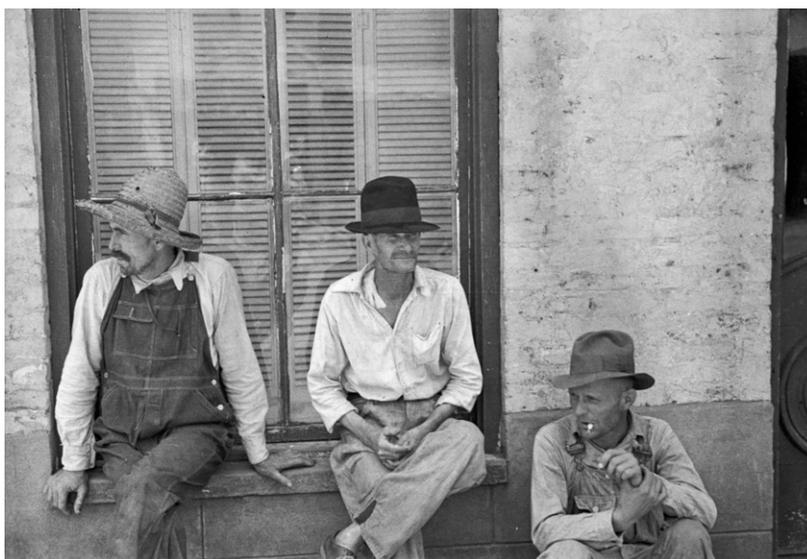
## Important: Knowing Your iOS Version

This book is based on iOS 9.3 and may not accurately describe other versions of this operating system. To see what version you are using on your iPhone tap *Settings > General > About*. The displayed screen will also indicate how many photos and videos are on your system and how much storage remains for new ones. To exit the screen press the iPhone's Home button. To update your version tap *Settings > General > Software Update* and follow the instructions on the screen.

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## Preface

Huge changes are sweeping through photography and they have appeared suddenly, forcing all of us to adjust. Think about this. In just a few years the camera has gone from film to digital while the Internet has tied us all together and provided many places to display and share photographs. Finally, to generate the photographic and video content for all of these activities the iPhone and its rivals have put a high quality camera in nearly everyone's pocket. As a result, sales of point and shoot cameras have collapsed and the sales of high end SLRs are threatened. The root cause of this turmoil is the availability of increasingly higher-quality camera phones such as the iPhone. We have been through dramatic changes like this before, especially with the introduction of the 35mm Leica way back in the roaring twenties. This small camera made it much easier to capture images on the fly and changed people's ideas about what made photography interesting. Image quality was not as good as larger cameras but mobility more than compensated. Sound familiar? The stiff formality of posed images gave way to informality and the capture of images without affecting the flow of action. We are in a similar situation today with the iPhone. The images being captured may not be as technically perfect as SLR images, but they have their own merits. To see just one of the impacts these camera are having on the field of photography search the Internet for "camera phones in photojournalism."



*The introduction of the 35 mm Leica revolutionized our concept of photography. With its introduction formality was out, as shown in this 1936 photo of Frank Tenge, Bud Fields, and Floyd Burroughs, cotton sharecroppers, in Hale County, Alabama by Walker Evans one of America's greatest photographers.*

Camera phones have great advantages, especially when it comes to sharing photos. With the tap of a button your work is shared with family and friends or published to a worldwide audience. In addition, these cameras are small, light and easy to carry, don't intimidate people when you point your camera at them, and best of all, you almost always have yours with you. As a result instead of millions of people taking pictures and videos there are now billions taking a trillion photos a year.

Admittedly, cell phone cameras currently have a few drawbacks, most of which will be solved as technology advances. However, it has rarely been the technical aspects that make great photos. For example, Popular Photography once reviewed a book of images they described as "meaningless blur, grain, muddy exposures, drunken horizons and general sloppiness." The book they were referring to was Robert Franks's "The Americans," perhaps the most influential book of photographs since photography was invented. Because it was shot with a 35mm camera on the fly it was a completely different style from what people had seen before. However, because of the 83 photos in that book, photography has not been the same since.

This handbook focuses on the iPhone and the photographic and video system of which it is a part. It assumes it is one of your most important, if not your only, photographic device. It also assumes

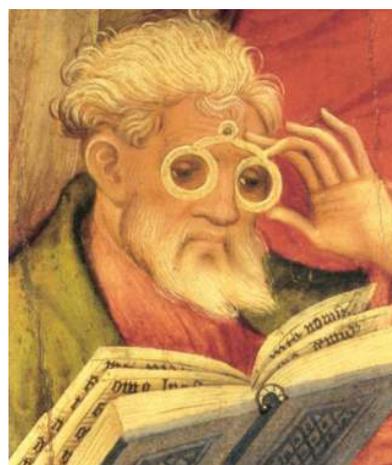
you may want to master all of the iPhone's photographic features that let you capture, view, store, organize, edit and share images and high definition videos directly from your iPhone using Internet connected on-line services such as Instagram, FaceBook, SmugMug and Apple's iCloud.

The iPhone is already very, very good and getting better. Any shortcomings it has will be fixed in time as technology advances so it will get even better. Until then we revel in the fact that we can capture, edit and publish high-quality images with a device in the palm of our hand.

If you are thinking of shedding that bulky and heavy SLR, at least part of the time, this may be the book that lures you into a more mobile and connected world of photography.



*There has always been mobile photography, sometimes even using mules to carry the equipment as William Henry Jackson did while exploring the American West. Here is the 19th century equivalent of the iPhone.*



*Throughout this book you will find "See for Yourself" tutorials that help you put to work the things you have learned. Take the time to do these—they don't take more than a few minutes.*

### SEE FOR YOURSELF TUTORIAL—IPHONE AT WORK

- For inspiration and to get an idea of the iPhone's capabilities click to check out Apple's 6s gallery at <http://www.apple.com/iphone-6s/cameras/photos/>
- To see the work of 19 photojournalists click to visit <http://digitalsilverimaging.com/VII>

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## Introduction

The iPhone is changing photography. With monthly sales of over 15 million iPhones with built-in cameras, it swamps the sale of other cameras. In so doing it opens up new opportunities for capturing and sharing photographs. In this guide we explore the iPhone 6 and 6s which have a number of very useful but not widely known features. iSight is the name Apple has given to their rear facing camera that you use to capture most photos and videos. The iPhone also has a front facing camera called the FaceTime that is used for selfies and FaceTime video calls. The iSight camera captures 12 megapixel JPEG still images on the 6s and 8 megapixel images on the iPhone 6. It can also capture 4K Ultra High Definition videos.

CAMERA	RESOLUTIONS	DESCRIPTION
iSight	12 Megapixels (6s) or 8 (6)	Rear camera faces forward to capture images
FaceTime	1.2 Megapixels	Front camera faces toward you for selfies and FaceTime

❑ **To operate the iPhone** you often tap a series of settings, indicated with text or icons. In this guide we show such sequences in the format *Settings > Wallpaper > Choose a New Wallpaper*. Just tap each setting in turn to drill down to the setting you want to change. In most cases we assume the Home page is displayed.

❑ **Many screens display a < symbol** followed by a name such as *Settings*. This symbol is a back button you tap to back up to the previous screen identified following the symbol. For more on this see “There is No Place Like Home” on page 24.

There are a few important settings that you have no control over but which have a bearing on your images. These include the following:

❑ **Noise**. In dim light the camera uses a high ISO or slow shutter speed and this creates noise in the image. To reduce noise, take photos in brighter settings or use flash.

### SEE FOR YOURSELF TUTORIAL—NOISE

To see noise take a photo in very dim light then tap the thumbnail to enlarge it. Double tap it and then pinch out to enlarge it as much as possible. You should see noise in the shadows, highlights and elsewhere. Notice how it obscures details and makes images look soft. To reduce the image back to a thumbnail, swipe it down once or twice.

❑ **Image stabilization**—digital for 6 and 6s, and a higher quality optical for the 6 Plus—helps you get sharper stills and videos by reducing camera shake and the blur it causes in your images.

❑ **High-quality prints** can be made from images by printing them at 200 pixels per inch. Since images captured in Photo shooting mode contain 4032 x 3024 pixels you should be able to make quality prints up to 20 x 15 inches in size.



*All apps have icons displayed on the Home page so you can tap them to open the app. Here, from left to right are the icons for the Camera, Photos, Settings, Messages, iPhone and e-mail apps.*

❑ **To check your iPhone's storage** tap *Settings > General > About*. The displayed screen indicates how many photos and videos are on your system and how much storage remains for new ones. To exit the screen press the Home button.

❑ **You can keep the camera from locking** too soon when you are out shooting by selecting a

longer Auto-lock interval. You can then turn the camera off with the Sleep/Wake button to conserve battery power. To change the interval tap *Settings > General > Auto-Lock* and pick a time up to 5 minutes or set it to *Never*.

## Anatomy of the Camera

Note that although this guide is about the iPhone 6 and 6s many of the features it discusses are available on earlier models, although names and button locations may be different.



The iPhone has physical buttons on the front and sides that you use when taking photos.

- ❑ **Home** button returns you to the Home page that displays your app icons.
- ❑ **Volume** buttons adjust sound levels during video playback, and capture still images and videos in shooting modes.
- ❑ **On/Off** button turns the iPhone on and off when held down and toggles the iPhone between sleep and wake when pressed and released. When held down together with the Home button you capture an image of the screen. The image can be found in the Screenshots folder on the Albums tab. (See “The Albums Tab” on page 30.)

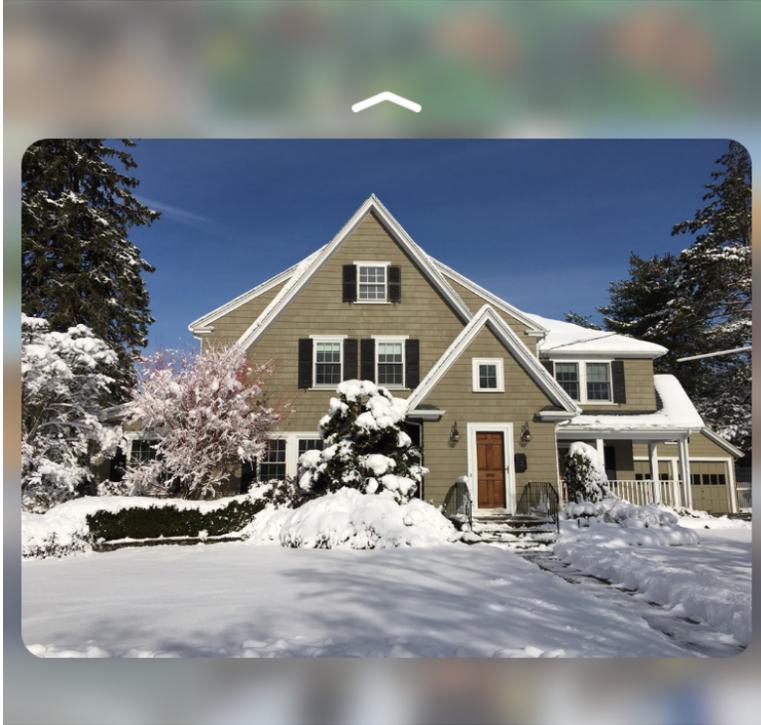
## Using 3D Touch & Quick Action Menus

The iPhone’s multi-touch screen has always allowed you to tap, swipe, drag and pinch in and out. The screen on this iPhone is also pressure sensitive so you can press it lightly to display one screen, and press it harder to display another. Think of the first as a preview of the second. Be patient, it takes practice to get the pressure right. This multi-layer approach is referred to as *3D touch* and in this guide you will use it mainly to enlarge thumbnails for review, or to open them for editing and sharing. As you use 3D touch the iPhone also gives you haptic feedback (what Apple calls “taptic” feedback) that varies depending on how hard you press the display. The effect is like a little thump.

3D Touch is also used to display Quick Action menus. For example,

- Pressing the Photos app icon on the home page displays a menu listing the choices *Most Recent*, *Favorites* and *Search*.
- Pressing the Camera app icon on the home page displays a menu listing *Take Selfie*, *Record Video*, *Record Slo-mo* and *Take Photo*.

You can close the menus by tapping a choice or tapping elsewhere on the screen.



To display this up-pointing arrow symbol above an enlarged image, press on a thumbnail. When it's displayed you can then:

- Press harder to open the image for editing or sharing, or
- Swipe upward to display a Quick Actions menu, or
- Release pressure to return the image to a thumbnail.

### SEE FOR YOURSELF TUTORIAL—3D TOUCH AND QUICK ACTIONS

1. With the Camera app open press down on the thumbnail of the last image you captured in the lower-left corner of the screen, to display the image full-size. Release the pressure and the image returns to a thumbnail.
2. Press the thumbnail again, this time harder. You should feel haptic feedback and this time the photo opens in the Photos app.
3. Press the Camera app icon on the home page to display a Quick Action menu. Tap *Take Photo* to display the camera, ready to take pictures.

## Where the Hell Have My Pictures Gone?

One of the great fears people have is losing their photographs because they have lost or damaged their iPhone or have inadvertently deleted images or videos. Here are some things you can do to ensure you know where they are at all times, don't worry about them being deleted and preserve them for posterity.

❑ **If you turn on iCloud Photo Library** (page 53), the first album listed on the Albums tab on the Photos app (page 23) is *All Photos*. If you turn iCloud Photo Library off, and turn My Photo Stream on the All Photos album is replaced by a Camera Roll album and iCloud Photo Library is replaced by a My Photo Stream album.

❑ **All of your original photos and videos** are initially on the iPhone and can be seen in the Moments view (page 26) and the All Photos or Camera Roll album (page 30). Years and Collections views normally summarize photos (page 27), so you won't see all of your images.

❑ **If you delete one or more photos or videos by mistake** or change your mind, the images are stored for 30 days in the *Recently Deleted* album on the Albums tab (page 30). They can be recovered at any time during that period.

- ❑ **Use iCloud** to store your images and videos and turn on iCloud Photo Library on all devices, including your computer and iPads, so the images can be seen there too. This way, if one device has problems or is lost or stolen, all other device will still have access to the images in the cloud. You can even access them from any computer, anywhere, with a WiFi connection. This is one of the most secure forms of storage, however if you delete photos on one device they are deleted on all of them, including in iCloud. If you delete iCloud be sure you have saved all of its images and videos first.
- ❑ **If you don't use iCloud Photo Library**, back up your iPhone periodically as described on page 56. You can also use My Photo Stream to make images available from other devices.
- ❑ **Copy or move photos and videos to a computer** so they are outside of the iPhone ecosystem. You can do this by connecting the iPhone and your computer with a USB cable that has a Lightning connector on the iPhone's end. Once connected, your iPhone will show up as a hard drive so you can drag and drop photos and videos to and from it just as you do other files. For more on this see "Moving Photos & Videos to a Computer" on page 45.
- ❑ **Backup the computer**, especially when there are important images you have moved to it which are no longer on your iPhone.
- ❑ **Make a copy of the computer's backup** and store it in a place where the same accident, such as a flood or tornado, can't affect both backups. Depending on how often you shoot, you might do this weekly or monthly.

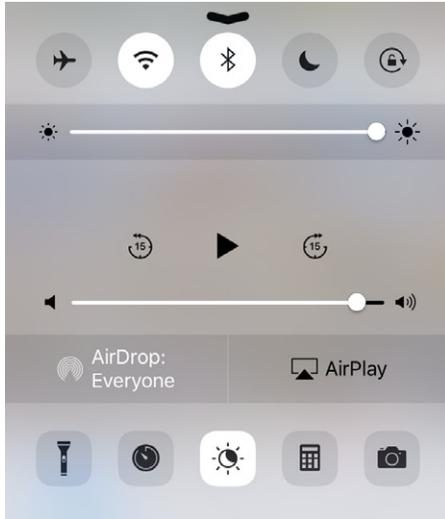
## Getting Ready

Before taking a photo or video you need to select a shooting mode and perhaps consider a few other settings discussed in this section.

- ❑ **Open the Camera app** used to capture still images and videos as follows:
  - When the iPhone's Lock Screen is displayed, swipe the small camera icon in the lower right corner of the screen upward. This is the fastest way to access the camera when you see a fleeting photo opportunity because it takes you straight to the camera without having to first unlock the iPhone and tap the Camera app icon. One you take photos you can tap the small thumbnail in the camera app to display the images you have taken in this session. To see others you have to unlock the iPhone.
  - When the Camera app icon is displayed on the Home page, tap it.
  - When the Lock or Home page is displayed or another app is open, swipe up from the bottom edge of the screen to display the Control Center and tap the Camera app icon. (To close the Control Center without making a choice, tap the downward pointing chevron.)

### SEE FOR YOURSELF TUTORIAL—OPENING THE CAMERA APP

- With the iPhone unlocked press the sleep/wake button once or twice to display the lock screen. Drag the camera icon in the lower-right corner of the screen up to open the camera app without unlocking the camera. Press the Home button to return to the lock screen.
- When working on another app swipe up from the bottom of the screen to display the Control Center and tap the camera icon.



You will occasionally encounter the Control Center while using your iPhone. You open it by swiping up from the bottom of the screen. You close it by pressing the chevron at the top or by swiping it down. It is used, among other things to turn WiFi and Bluetooth on and off, adjust screen brightness, use AirDrop and AirPlay, turn on a flashlight and display the Camera app.

To display or hide the Control Center in some situations tap *Settings* > *Control Center* and then tap *Access on Lock Screen* and/or *Access Within Apps*.

- **Ask Siri.** Hold down the Home button until the screen reads “What can I help you with” and instruct Siri to “Open Camera” or “Take a picture.” For this to work Siri must be on. To check that it is tap *Settings* > *General* > *Siri*. While there consider turning on *Hey Siri* so you can use Siri just by saying “Hey Siri” instead of pressing the Home button.
- ❑ **When you open the camera from the Lock Screen** you can edit the last photo or video you took without unlocking the iPhone by tapping the thumbnail in the lower left corner of the Camera app.
- ❑ **Adjust screen brightness,** especially in bright sunlight where it is hard to read the screen. To do so tap *Settings* > *Display & Brightness*. Tap the switch to turn off *Auto-Brightness* and drag the slider to the right to manually set maximum brightness. (This will shorten your battery life.) You can also use Siri by asking it to “adjust brightness” to display an adjustment slider. If all else fails you can look for a shady spot to shoot from.
- ❑ **Conserve power.** Tapping *Settings* > *Battery* shows you how much power each of your apps, such as Camera and Photos, is using, let’s you display remaining power as a percentage at the top of screens, and extend battery life by turning on *Low Power Mode*. (You can do the same by pressing down on *Settings* to display a Quick Actions menu.) Two very useful accessories you may want to consider are a car charger and an external battery pack that will run your iPhone and charge its battery.
- ❑ **Clean the lens** periodically using a lens cleaner such as a microfiber lens cloth. The front facing lens is behind glass that can be cleaned with any monitor cleaner.
- ❑ **Zoom the lens** up to 3x by pinching in and out on the screen in all shooting modes other than Time-lapse and Pano. Because the camera’s zoom is digital and not optical, using it may not give you better results than shooting without zooming and then cropping the image. The one place where this isn’t true is when capturing video which cannot be cropped.

#### SEE FOR YOURSELF TUTORIAL—ZOOMING & CROPPING

If you want to blow up a section of a scene you have two ways to do it: using the camera’s zoom or cropping the image later in editing. The camera’s zoom is a digital zoom which has lower quality than an optical zoom so you may be better off cropping later. In this tutorial take two pictures of a scene from the same distance, one with the camera zoomed to 3x and the other unzoomed. Crop the unzoomed image (page 38) and compare the sharpness of both images. Which is better?

- ❑ **Adjust the shutter sound** volume by tapping *Settings > Sounds* and dragging the *Ringer and Alerts* slider. You can also turn *Change With Buttons* on or off. To mute the sound, use the ring/silent switch.
- ❑ **Check “Video Settings”** on page 34 to see what options, if any, are available for the video mode you have selected.
- ❑ **To switch between the Camera and Photos apps** press the Home button twice quickly and tap the app you want to use.
- ❑ **Decide on a video’s orientation.** You can capture videos in both portrait (vertical) and landscape (horizontal) orientations. The vertical plays back well on the iPhone because you can rotate the camera to match the playback orientation. However, you will have problems when displaying images on a larger screen that is horizontal and can’t be rotated. You will have basically a narrow vertical band leaving most of the screen unused.

## Selecting a Shooting Mode

Select a shooting mode by swiping the Camera app’s mode selector right or left, or by tapping one of the following modes to select it and turn it yellow.

- ❑ **Time-Lapse** captures a series of photos and assembles them into a video that appears to speed things up like an opening flower blossom. It’s the opposite of Slo-mo videos where time appears to be moving more slowly. For more on how this mode works see “Video Settings” on page 34.
- ❑ **Slo-mo** records video frames at a much faster than normal speed so when played back at the normal 30 fps, actions unfold in slow motion. When you play back a Slo-mo movie it starts at normal speed, then slows down, then returns to normal. To adjust when it changes speeds see “Editing Videos” on page 35.
- ❑ **Video** records standard videos and when doing so the camera uses autofocuses and autexposure.
  - Video can be shot in four formats including 4K with a resolution of 3840 x 2160. For more on selecting these formats see “Video Settings” on page 34.
  - While videoing, you can capture a still image by tapping the camera’s white shutter button displayed where the thumbnail is displayed in other shooting modes. Unlike normal still images, one captured this way will have a 16:9 aspect ratio of 2364 x 1330 pixels. (To learn more about aspect ratios and cropping see the section on “Editing Still Images” on page 38.)
- ❑ **Photo** captures 12 Megapixel JPEG images on the 6s and 8 Megapixels on the 6. If you hold down the button you capture a burst of 10 pictures per second. The images captured in the Photo shooting mode are up to 4032 x 3024 pixels in size depending on what aspect ratio you are using. For more on aspect ratios see the section on cropping in “Editing Still Images” on page 38. For more on bursts see “Shooting in Bursts” on page 19.
- ❑ **Square** is exactly like Photo but with a 2448 x 2448 pixel square aspect ratio reminiscent of old medium format film cameras.
- ❑ **Pano** captures a series of images and stitches them together into a seamless horizontal or vertical panorama containing up to 63 Megapixels and a field of view of 240 degrees.
  - You can take horizontal or vertical panoramas by holding the camera and sweeping an arc as described in the following table.

PANO ORIENTATION	CAMERA ORIENTATION	DIRECTION OF SWEEP
Horizontal	Vertical (portrait)	left or right
Vertical	Horizontal (landscape)	up or down

- To get someone into a shot twice, start the pano with the subject standing just inside where the pano will start. After you sweep past the subject, he or she runs to the other end of the sweep and stands just inside where the pano will end. Try having the subject run in front of and behind the camera to see if it has an effect. For this to work the subject must run from one position to the other in the same direction the camera is panning but get ahead of it, so pan slowly.
- To create a pano from the passenger seat of a moving car set the Pano arrow to point toward the direction of travel and then take the pano while holding the camera steady as the moving car provides the sweep.

❑ **Select a shooting mode using Quick Action.** To jump directly to some popular shooting modes press hard on the Camera app’s icon on the Home page to display a Quick Action menu of choices—*Take Selfie*, *Record Video*, *Record Slo-mo* and *Take Photo*. (If all icons wiggle, press the Home button to stop them and try again.) Tap the shooting mode you want to use and the camera opens ready for you to capture the scene using that mode.

❑ **To add light to a scene**, in all shooting modes other than Pano and Slo-mo tap the Flash icon (indicated with a lightning bolt) and then tap *Auto* or *On*. When finished shooting, repeat the steps but tap *Off*.

SEE FOR YOURSELF TUTORIAL—SELECTING A SHOOTING MODE
<ul style="list-style-type: none"> <li>• With the Home page displayed press down on the Camera app icon to display a Quick Action menu. Tap the mode you want to use.</li> <li>• When working on another app swipe up from the bottom of the screen to display the Control Center and tap the camera icon.</li> </ul>

## Taking Photos & Videos

How you capture images depends on which shooting mode you have selected. (See the section “Getting Ready” on page 9). As you shoot be sure your fingers are not in front of the lens and tap lightly so you don’t jiggle the camera.

❑ **When you photograph or video people**, in all modes other than pano, face detection identifies up to 10 faces and uses them to set the focus and exposure that is best for all of them. A yellow frame usually, but not always, highlights each detected face. Even when a frame is not displayed the camera may still use the face when calculating focus and exposure.

❑ **To see the still images and videos** you have captured, open the Photos app and then do one of the following:

- Tap the Photos tab and images are arranged in years, collections and moments as described in The Photos tab on page 26.
- Tap the *Albums* tab to display existing albums. Images captured in Photo or Square shooting modes are stored in the All Photos/Camera Roll album, as are all other photos. Copies of photos and videos taken in other shooting modes are also stored in shooting mode-specific albums identified with the name of the shooting mode used. To open an album, tap it. To close it, tap <*Albums*. For more on albums see “The Albums Tab” on page 30.

SHOOTING MODE	WHERE FOUND ON PHOTOS TAB	WHERE FOUND ON ALBUMS TAB
Photo	Moments, Collections & Years	All Photos/Camera Roll
Square	Moments, Collections & Years	All Photos/Camera Roll
Video	Moments, Collections & Years	All Photos/Camera Roll, Videos
Slow-Mo	Moments, Collections & Years	All Photos/Camera Roll, Slo-mo
Time-lapse	Moments, Collections & Years	All Photos/Camera Roll, Time-lapse

SHOOTING MODE	WHERE FOUND ON PHOTOS TAB	WHERE FOUND ON ALBUMS TAB
Pano	Moments, Collections & Years	All Photos/Camera Roll, Panoramas
Selfie	Moments, Collections & Years	All Photos/Camera Roll, Selfies
Screenshots	Moments, Collections & Years	All Photos/Camera Roll, Screenshots

❑ **The last photo or video you captured** is displayed as a small thumbnail in the lower left corner of the camera's screen. To enlarge a still image or play a video, press its thumbnail down and then release the pressure to return it to its thumbnail size. If you press it harder the image or video will open in the Photos app where you can edit or share it. You may need to try this a few times to get the feel for it. For more on this see "Using 3D Touch & Quick Action Menus" on page 7.

### SEE FOR YOURSELF TUTORIAL—FACE DETECTION

Find a newspaper or magazine photo showing the faces of 5 or 6 people. Frame the photo on the iPhone's monitor so the group fills the screen. Are the faces framed? How many have frames around them? Change shooting modes to see which supports face detection.

❑ **Take still photos** in Photo or Square shooting modes as follows:

- Tap the white shutter button smoothly so as not to jiggle the camera. Capture bursts at 10 photos per second by holding the button down. To learn more see the section "Shooting in Bursts" on page 19.
- Press either volume button on the side of your iPhone if you like the tactile feedback you get from pressing a real button.
- Press either of your Apple ear pod's volume buttons. This allows you to shoot from unusual angles and with the camera propped up so you don't inadvertently move it when you take the picture.
- Use the built-in timer to delay the shutter opening by 3 or 10 seconds and you will capture a burst of 10 pictures. For more on the timer see "Using the Camera App" on page 20.

❑ **Take Videos, Slow-Mo and Time-Lapse videos** by pressing the red record button to start and stop recording.

- When stopped, the red dot on the record button is round and when recording, it is square.
- Videos and Slo-mo shooting modes display the elapsed time when you record videos.
- When taking videos both autoexposure and autofocus adjust as you recompose the image.
- To capture a still image while recording a Video or Slo-mo video, press the white shutter button that appears in these modes where a thumbnail of the last photo you took is normally displayed in other shooting modes.

❑ **Take Panos** by tapping the arrow to specify the direction of your sweep. Just as a golfer takes trial swings to get into the groove, pan the camera a few times to get a feeling for the sweep you will use to capture the image. When ready, tap the white record button to start recording and then continuously sweep the camera, tilting it forward and back as necessary so the arrowhead closely tracks the guideline on the screen.

- Images may have distortion if there are any moving subjects in the frame. If they are small and distant it's worth a try.
- Too much up and down motion during the sweep will distort the image.
- If you are sweeping too fast, a "Slow Down" message is displayed. You almost can't pan too slowly.

- The camera will stop on its own accord when the arrowhead reaches the opposite side of the screen or you can press the white record button to stop at any point. (When stopped, the white dot on the shutter button is round. When recording, it is square.)
- Pano has autoexposure and autofocus so it should adjust as you pan the scene.
- Pano thumbnails in the Photos app are marked with a panoramic icon.
- To view a pano image in its entirety as large as possible, hold the camera in its horizontal landscape orientation. To enlarge it even more double-tap it or pinch it out, then drag or swipe it to scroll along it.

❑ **Take selfies.** When the Camera app is open, and the shooting mode is set to any other than Slo-mo or Pano, tap the FaceTime camera icon to toggle between the two cameras. (Also see “Select a Shooting Mode Using Quick Action” on page 12). After switching to the FaceTime camera and composing a selfie press the white shutter button to capture a still image or the red record button to start and stop video recording.

❑ **Capture an image of the screen**, called a *screenshot*, by pressing and holding down the iPhone’s On/Off button while you press the Home button. You will hear a shutter-like sound when the image is captured. Be patient because it may take practice to get the timing right.

### Adjusting Focus, Exposure & Depth of Field

Two of the most important settings in photography are focus which determines the sharpest part of the image and exposure which determines how light or dark an image is. The camera automatically adjusts these settings but there are times when you need to override the automation.

When you press the shutter button here is what happens:

- The camera automatically measures the average brightnesses of a scene, or of faces it detects, but at times the result is too light (overexposed) or dark (underexposed).
- The camera focuses on the closest subject in the center of the screen, or on a face it detects, and you may want it to focus elsewhere. The area you or the Camera app selects to focus on can also affect the exposure.

To manually override the camera’s automatic settings for exposure and focus the following tap and swipe techniques work in all shooting modes. Note that when you tap the screen to set focus and exposure as described in this section, face detection is temporarily turned off.

❑ **Set focus and exposure together or separately.** These temporary settings are not locked and autoexposure, autofocus and face detection automatically resume if you recompose the image.

- **To adjust both focus and exposure** tap the screen where you want them set and a yellow square indicates where you tapped.
- **To lighten or darken an image**, tap a dark area to make it lighter or a light area to make it darker. Tap various areas of the scene until you get the results you want, keeping in mind that you are also setting focus.
- **To set focus and exposure separately**, tap the screen where you want to set focus and then swipe up or down to adjust the image’s brightness.

**SEE FOR YOURSELF TUTORIAL—EXPOSURE**

- Compose an image of a bright lamp in a dark room and watch as the image on the screen changes as you pan toward and away from the lamp so it's fully in and out of the image area. Notice how the image brightness changes.
- Frame the image so both the background and lamp are in the image area. Tap the bright source then tap the background. See how the image's brightness changes. Swipe up and down to see how brightness can be changed. Pan the camera to see how the brightness changes as you frame dark and light areas.
- Frame the image so both the background and lamp are in the image area. Press hard on the lamp to lock focus and exposure. Watch as a larger yellow square appears along with an AE/AF LOCK indicator. Swipe up and down to see how brightness can be changed. Point the camera at dark and bright areas of your scene to see how the exposure remains locked. Point the camera at near and far subjects to see how focus doesn't change.

❑ **Lock focus and exposure** by pressing the screen hard where you want to set and lock them until a larger yellow square pulses and a yellow *AE/AF LOCK* indicator is displayed. To adjust brightness, release the pressure then swipe up or down. Basically pressing the screen locks focus and the swipe manually adjusts image brightness. After finished with these settings tap anywhere on the screen to turn off AE/AF Lock and return to autofocus, autoexposure and face detection.

❑ **Depth of Field.** Focus specifies the sharpest part of the image, called the *plane of critical focus*. However, it's a related characteristic, called depth of field that determines how sharp an image is from foreground to background. It is affected by the lens focal length, the aperture and the camera-subject distance. On the iPhone you only have control over the distance. To get a sharp foreground subject in front of a soft, out-of-focus background the camera has to be very close to the main subject and the background somewhat distant. For an entire scene to be sharp from front to back the subjects are best at a distance, with the subjects close together, or on the same plane parallel to the camera.

❑ **Checking Results.** To check the focus and exposure of the last photo or video you captured, tap it's thumbnail on the Camera app open it in the Photos app. Double-tap it to enlarge it and pinch out to enlarge it as much as possible. Check exposure in highlight and shadow areas. To return to the camera app tap *Done*. For more on viewing images see "Introduction to the Photos app" on page 23.

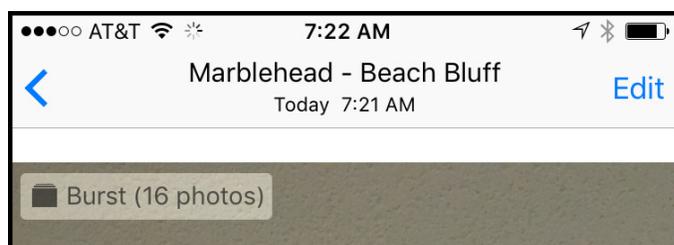
**SEE FOR YOURSELF TUTORIAL—FOCUS & DEPTH OF FIELD**

- To capture out of focus background lights—called Bokeh—focus on something very near and use AE/AF Lock to lock in the focus and exposure settings. Compose an image of distant lights and adjust the image brightness, if necessary, but not the focus.
- To see how camera-subject distance affects depth of field find a background 10–20 feet away. Hold out your hand about 4 inches in front of the camera so it focuses on the hand. Is the background in the image soft? Try moving your hand back and forth. Does the background get softer as you reduce the camera-subject distance?
- To see depth of field, set up 2 or 3 cans at an angle so all three can be in the image when the camera is close to the nearest can. Take an image to see if the cans farther way get softer. To see how sharpness fades into blur, double tap the image to enlarge it and pinch out to enlarge it even further. Scroll around it to check sharpness toward and away from the camera position. The effect will be more obvious if the cans have small print on their labels.

## Shooting in Bursts

When using the Photo or Square shooting mode you can hold down the shutter button to capture 10 photos per second. As you do so, a counter indicates how many shots you've taken. If you use the timer to take pictures the camera captures a burst of 10 images. These bursts are a great way to be sure you get the best possible photo, capture the peak of action or capture a group with everyone's eyes open. Just take a sequence of images and then look through them for the best. You can also use some of all of them to create animated GIFs that can be posted almost anywhere. (See [giphy.com](http://giphy.com).)

❑ **Images captured in this mode** are saved together in a stack in *Moments* on the Photos tab and in the *Burst* and *All Photos/Camera Roll* albums on the Albums tab. When the stack is closed, the image that the Photos app thinks is best is displayed on top of the stack. As you scroll through images, those taken in a burst are indicated by an icon in the upper left corner of the image area that tells you how many images are in the stack.



The burst icon in the Photos app indicates how many images are in the stack.

❑ **To open a stack to see its individual images** tap the stack to select it then tap *Select* that appears below the scrub bar when a burst photo is selected. This displays thumbnails of all of the images in the burst so you can scroll through them by swiping the large image or the scrub bar.

- An arrowhead symbol above the strip points to the image that is enlarged above.
- A gray dot under the scrub bar indicates the image that the camera judges to be the best.
- To save just some of the photos in the burst, scroll through the full-size images and tap those you want to keep. When you do so, a check mark is displayed in the lower right corner of the large image and on the scrub bar thumbnail. (Favorites here are not marked by tapping a heart-shaped icon as they are elsewhere.)

When finished selecting favorites, tap *Done* to display the choices *Keep Everything* and *Keep Only Favorites*. (These choices do not appear if you select all of the images.) Tap your choice and the images are saved to *Moments* on the Photos tab and to the *All Photos/Camera Roll* album on the Albums tab. The stack itself is deleted.

- If you select *Keep Everything* the original burst will be in the *Bursts* album, and the original burst plus the favorite images will be in the *Moments* view on the Photos tab and in the *All Photos/Camera Roll* album on the Albums tab,
- If you select *Keep Only Favorites* the original stack is deleted in the *Bursts* album and the images you marked as favorites are found in the *Moments* view on the Photos tab and *All Photos/Camera Roll* album on the albums tab.

In the table that follows you see an example of what happens when you have a stack of 8 photos, mark 2 of them as favorites, then tap *Done* to display these two choices.

	KEEP EVERYTHING	KEEP ONLY FAVORITES
Original stack	8 image stack	8 Image stack
Images Marked as Favorites	2 images	2 images

	KEEP EVERYTHING	KEEP ONLY FAVORITES
Images In Bursts Album	8 (original stack)	0 images
Images In Moments View	Stack + 2 images	2 images
Images In All Photos/Camera Roll Album	Stack + 2 images	2 images

❑ **If you want all burst-mode photos uploaded** to Moments and All Photos/Camera Roll tap *Settings > Photos & Camera*, then turn on *Upload Burst Photos*.

- When *On* all photos in a burst are uploaded without any prompts.
- When *Off*, you have the choice of uploading all images in the burst or only those you have marked as *Favorites*.

In either case the stack remains on your iPhone in the Bursts album on the Albums tab.

## There is No Place Like Home

When using the Photos app it is easy to get disoriented in the various screens. To reorient yourself it helps to return to the iPhone's or apps Home pages and proceed from there.

- If you are totally lost press the Home button to return to the iPhone's Home page.
- To return to the Photos app's home pages for the Photos and Albums tabs tap the back symbol (<) until there isn't another one to tap. Along the way, you may also have to tap *Cancel* or *Done* one or more times.

DRILLING DOWN	LEVEL	PHOTOS TAB	ALBUMS TAB	BACKING UP
	1	Years—Thumbnails	Albums	
	2	Collections —Thumbnails	Thumbnails	
	3	Moments —Thumbnails	Full-size	
	4	Full-size		

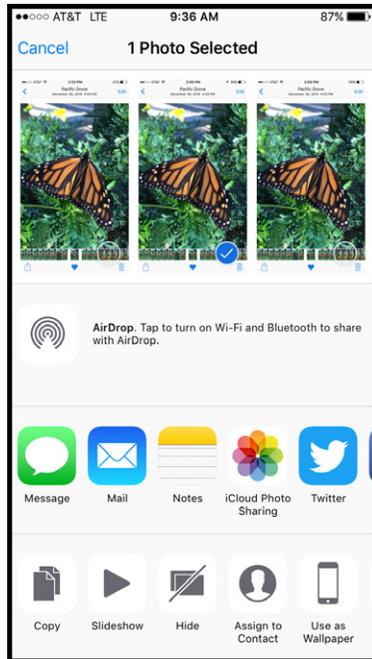
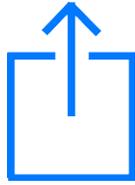
To drill down through various levels you tap thumbnails or albums and to back up you tap the < symbol. The Photos tab has four levels and Albums tab has three.

### SEE FOR YOURSELF TUTORIAL—NAVIGATING THE PHOTOS APP

Open the photos app and check that you see three tabs along the bottom of the screen—Photos, Shared and Albums. If they are not displayed tap <, *Cancel* or *Done* until you do see them. This is the app's home page. Tap each tab and then tap thumbnails or albums to see what happens. Feel free to explore until you get a feel for how to navigate this app. If you get lost use the procedure you learned to return to the app's home page.

## Understanding the Share Sheet

The Share sheet, accessible with a single tap throughout the Photos app, makes it easy to share and edit photos (and other files) using third-party applications. Whenever you tap *Select* on a page of thumbnails and then tap a thumbnail to select it, or display an image full-size, a Share-sheet icon is displayed, looking like a square box with an upward-pointing arrow. Tapping this icon displays your iPhone's Share sheet that is divided into four rows or sections.



When you tap the Share-sheet icon (left) it displays the Share sheet (right). It is divided roughly into four rows.

- Top row displays images you selected before displaying the Share sheet. You can scroll through them by swiping and tap images to select or deselect them.
- Middle top row displays information about AirDrop (page 48) and AirPlay (page 50) when they are being used.
- Middle bottom row displays full-color icons for Sharing extensions, such as Message, Mail, and FaceBook, that allow you to share content.
- Bottom row displays grayscale icons for Action extensions that can be performed on selected photos, such as Copy, Slideshow, Hide, Assign to Contact, Use as Wallpaper and Print.

Both bottom rows scroll horizontally and have a More button at their far right end.

❑ **Apple loves the idea of sharing** so much that they have used the term repeatedly to refer to different things. Here are most, if not all, of them so you can keep them straight:

SHARING	
TERM	MEANING
Shared	Refers to the Shared tab on the home page of the Photos app.
Share	Displays a menu in Moments used to share the moment or display a slideshow
Share	A verb referring to dividing or using something with others
Share-sheet icon	A term I have added to refer to the icon you tap to display the share sheet.
Share sheet	A page listing numerous sharing options when you tap the Share-sheet icon

❑ **To turn extensions on or off** scroll to display the right most icon on the full-color or grayscale icons row and tap *More* to display the Activities panel for that row. Tap switches to toggle extensions on and off. (Not all can be turned off.) When on, an extension's icon is displayed on the Share sheet. If there are extensions you never use, or use very rarely, turning them off reduces clutter and saves resources.

❑ **To rearrange extension icons**, perhaps to better highlight frequently used icons, use either or these techniques:

## Wirelessly Connecting to an HDTV—AirPlay

There is no better way to view or share your images than on a large HDTV screen or an even larger digital projector screen. AirPlay wirelessly streams photos, videos and sounds from your iPhone to other devices such as Apple TV that supports the standard. None of the devices need to be connected to the Internet because, using AirPlay they can make direct connections with each other. This allows you to present or share your work even if you're offline or your business or school has a complex network.

1. Connect Apple TV to an HDTV, turn the TV on and select the Apple TV as the input device.



The WiFi and Bluetooth icons here show that both are on.

2. Check the Apple TV's settings to be sure Bluetooth and AirPlay are turned on.
3. On your iPhone swipe up from the bottom of your screen to open the Control Center. Make sure that WiFi and Bluetooth are turned on.
4. To select the Apple TV, tap the AirPlay icon (if previously selected, it may read *Apple TV*) to display the AirPlay screen, then tap the *Apple TV* name to select it as the device you want to stream content to. Tap the *Mirroring* switch to toggle it on if you want the entire iPhone screen displayed on the TV. (Slideshows and videos are displayed full screen).
5. Tap *Done* to return to the Control Center and then close it.
6. If giving a slideshow, refer to page 49 on creating and displaying one.
7. To turn off AirPlay or Apple TV do one of the following:
  - Tap the AirPlay icon in the upper right corner of your iPhone's screen to display the choices *Turn off AirPlay* and *Apple TV*. If you tap either, the slide show or video plays on your iPhone.
  - You can also turn off AirPlay by swiping up from the bottom of the screen to open the Control Center, tap *AirPlay* and then tap your *iPhone*.

### Wired Connection to an HDTV—Adapter

To connect your iPhone to a TV set with an HDMI connection you use a Lightning Digital AV Adaptor and an HDMI Cable. To make the connection:

1. Begin by plugging one end of the HDMI cable into the Lightning adapter and the other end into the TV. Plug the Lightning connector on the adapter into your iPhone.
2. Once connected, turn on the TV and select the HDMI input you plugged into and the iPhone's Home page appears.
3. Swipe up from the bottom of the iPhone's screen to display the Control Center and choose *Video Output* to send specified content to the TV or select *Mirroring* so the TV and iPhone displays are identical.