Akron-Summit County Public Library
330-643-9145
Electronic Services Division
60 South High Street, Akron, OH 44326

Introduction to Digital Cameras

How is a digital camera different from a film camera?

In a film camera, the photo is taken by exposing the film to light. The photo must be developed and printed. Once a photo is taken it cannot be deleted from the film. Photos are printed on paper and stored in albums or boxes.

With a digital camera, images are taken by using light and a silicon chip. Photos are stored in the camera's memory and can be deleted right from the camera if the picture is not good. Digital photos can be printed at home on a printer or can be taken to a store for printing. Digital photos can also be stored on a computer and shown on the computer screen or a television, or stored on a CD.

Film Camera

- Disposable batteries
- Film
- Cannot delete photo
- Print at store
- Store in albums or boxes

Digital Camera

- Disposable or rechargeable batteries
- Memory
- Can delete photo
- Print at home or store
- Store in albums, CD, or on computer

Resolution

Resolution describes how fine or detailed a photo will be. That is, how clear and sharp the photo will be, without any fuzzy edges. The higher the resolution, the sharper the photo. This is especially important for printing photos.

Resolution is measured in pixels. A pixel is one picture element (pix – el), or a single point in a graphic image. The more pixels, the sharper the image.

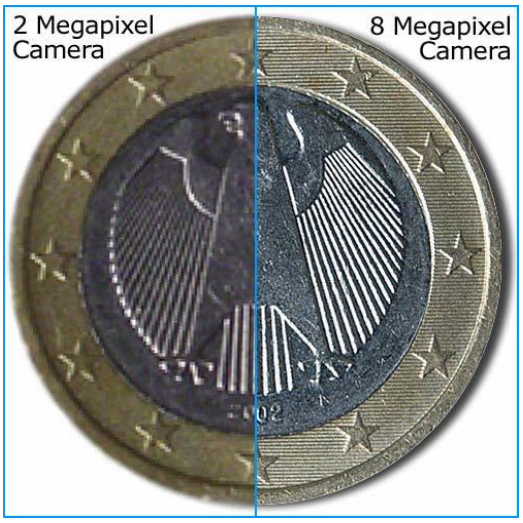
Most digital cameras are rated by the number of megapixels they have. A megapixel is one million pixels.

Basic web and e-mail photos should be fine with **2-megapixels.**

For any images you plan to print or retouch, stick to **3-megapixel** resolution and higher.

For prints 8x10 or larger, look for cameras with **4-megapixel** resolution or higher.

Here is an example of the difference in detail and resolution between 2 megapixels and 8 megapixels:



Source: http://olympusdigitalschool.com/cameras/c-series/c-7000/C-7000_Understanding_Megapixels_and_Resolution/

Digital and Optical Zoom

Zoom brings you closer to your photographic subject.

Digital zoom is electronic. The camera crops the photo and uses only the pixels in the center of the image, stretches it to fit the standard picture size, and discards the rest. The longer the digital zoom, the more distorted the image.

Optical zoom is accomplished through the lens and rated as 2X or 3X, for example, as in two times and three times as close. Optical zoom, done by the glass of the lens, results in no loss in image quality.

Digital zoom and optical zoom are rated the same way – by a number and an X. You might zoom closer with digital (if the X number is higher), but you'll lose resolution. In this case, the camera's software, not its lens, is doing the work, cropping the photo and enlarging the remaining pixels that make up the image. Those images work well for email and Web use but not as well for printing.

Some digital cameras, however, have both optical and digital zoom. You may see cameras advertised as having 12X zoom – that number is the optical zoom multiplied by the digital zoom. The optical zoom number is the one that really counts.

Optical Zoom
Zoom in to center of shot. Increases detail level. Physical zoom.

Digital Zoom
Zoom in to center of shot. Does not increase detail level. Electronic zoom.

Lens

Fixed focal lenses usually have no optical zoom (just digital). Cheaper cameras will have fixed focal lenses.

Retractable zoom lenses pop out of the camera when it is on and can provide optical zoom.

File Types and Compression

File Types

The digital images you take with your camera can be created or saved as different file types. The most common is JPEG (the files ends in .jpg). All cameras deliver images in JPEG format, which should suit most users who simply want to shoot and print or post photographs on the web.

Your camera may also shoot in other file types. The two most common are TIFF and RAW. These make very large images that take up a lot of space in your camera's memory. If you want to retouch, make collages of, or blow the pictures up, the ability to shoot TIFF or RAW images is necessary.

Compression

Compression is cleaning up extra data and making a file smaller. With lossy compression an image is slightly changed in order to make it into a smaller file. Most of the time you will not notice this change, but for professional photographs you may want a file type and software that permits lossless compression – the photo will not change or degrade each time you work with it.

File Storage and Memory

Memory is where your photos are stored and most digital cameras come with only enough space for 12 to 36 photos, depending on the model and the storage type. Adding a flash memory card will increase the number of photos you can shoot and store (see table below).

Some cameras use storage formats that are on their way out, such as SmartMedia, or proprietary formats, such as Sony Memory Stick (only works with Sony cameras).

Take that into consideration if you're making a long-term purchase. If you have a PDA or an MP3 player, you may want to choose a storage format that can work in those devices as well.

CompactFlash (a brand of memory card) is useful because it comes in the largest capacities.

SD/MMC (Secure Digital/Multi Media Card) is increasingly popular and quickly increasing its capacity.

Most cameras don't come with enough internal storage (memory) for practical uses, so budget for an additional memory card.

A good minimum goal is the ability to shoot 24 images at the maximum size, about the same as a small roll of film. To shoot 24 pictures at the highest setting with a 2-megapixel camera would require a 32MB card.

How many pictures can I store? Here is an example chart showing storage capacity in relation to file size using high resolution JPEG compression.

	3MP	4MP	5MP	6MP
128MB Memory	116	87	70	58
256MB Memory	232	174	140	116
512MB Memory	464	348	280	232

Source: http://www.bobatkins.com/photography/digital/digitalbasics.html

Shooting Modes

Many digital cameras offer special modes that optimize the camera settings for specific types of scenes and lighting types. Landscape, portrait, twilight, and pan-focus are among the most common scene modes. For lighting conditions, sunny, cloudy, incandescent, or fluorescent are common options.

Look for a camera that offers scene modes that correspond to your favorite photo subjects. If you think you'll use this feature a lot, make sure that the camera you buy gives you easy access to it through a button or a dial, instead of making you hunt through the LCD menu to find it.

Many cameras offer voice recording and movie capture, but don't expect camcorder-like results.

Sample Shooting Modes

- Auto: The camera automatically selects settings.
- M Manual: Allows you to select settings yourself, such as the exposure compensation, white balance or photo effect.
- SCN Special Scene Mode: Pre-sets for shooting in a variety of conditions.
- Movie: Press the shutter button to shoot a movie.

Battery

Rechargeable batteries, especially lithium-ion cells, tend to last the longest. Many cameras also take regular batteries, either AA or AAA sized.

If you choose a camera that supports rechargeable batteries, check to see if it also includes a charger or AC adapter. Some cameras support rechargeables, but ship with alkalines, so the charger costs extra.

Rechargeable lithium ion battery

Battery in charger (can be plugged into an electrical outlet to charge). When the battery is fully charged the light will turn green.

Design and Performance

Always try a camera before buying it. Make sure it fits comfortably in your hand and that it's not too big or heavy. Try out the LCD viewer and make sure your nose or glasses do not get in the way.

It should provide quick access to the most commonly used functions via buttons or other physical controls, and the menu system should be simple, logical, and easy to learn. A camera that takes longer than a second between shots (without the flash) makes action and candid photography very difficult.

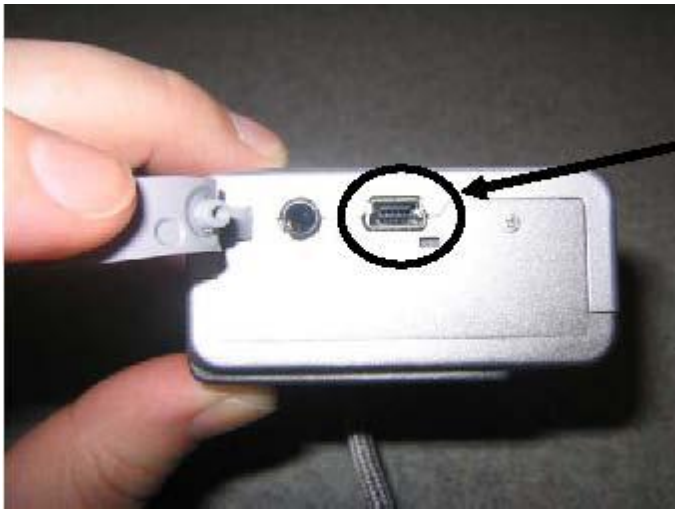
Notice the differences and similarities between these cameras – sometimes cameras from the same manufacturer can be very different in design.

Moving Digital Photographs from the Camera to the Computer

Once you've taken your digital photographs how do you get them onto the computer?

Most cameras can connect to the computer using a USB cable. One end of the cable fits into the camera and the other end fits into a USB port on the computer.

Here is a picture of the connector on the camera. It is smaller than the USB end that goes into the computer.

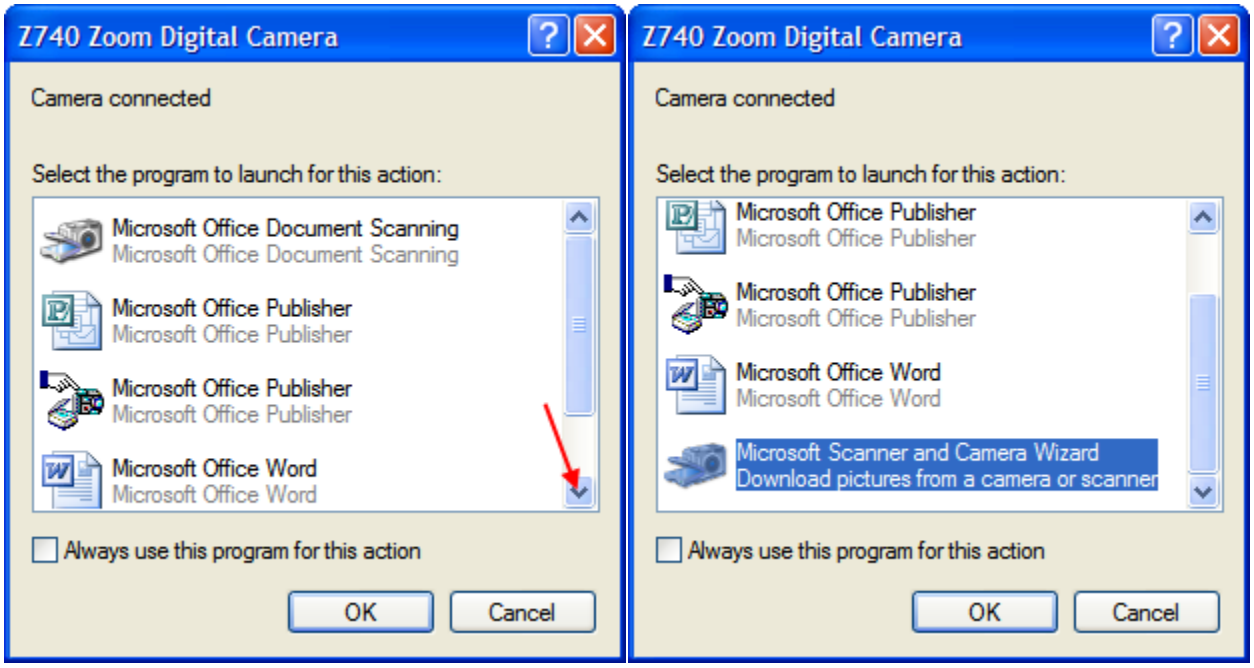


Many cameras come with software that can help you download and organize your photos. Or you can use Windows to download the photos.

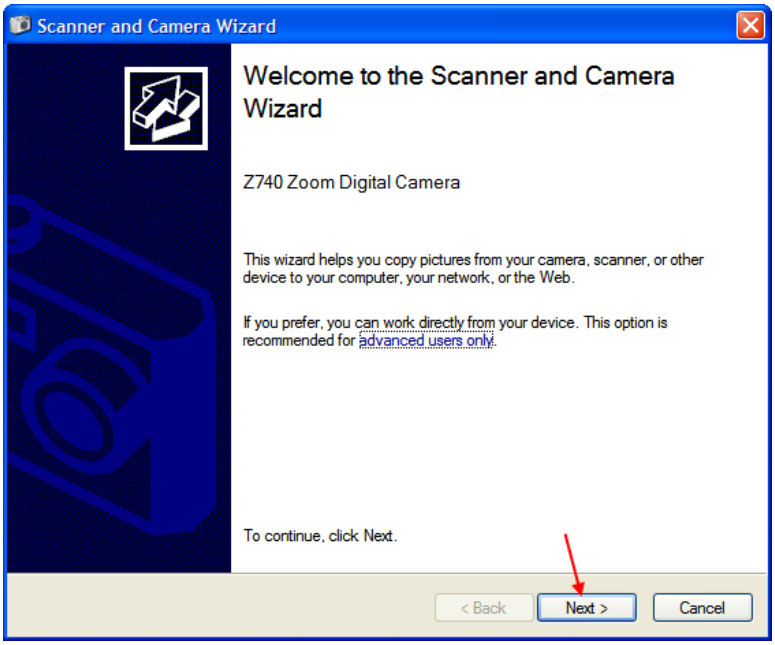
Using Windows XP

Once the cables are connected to the camera and computer, turn the camera on.

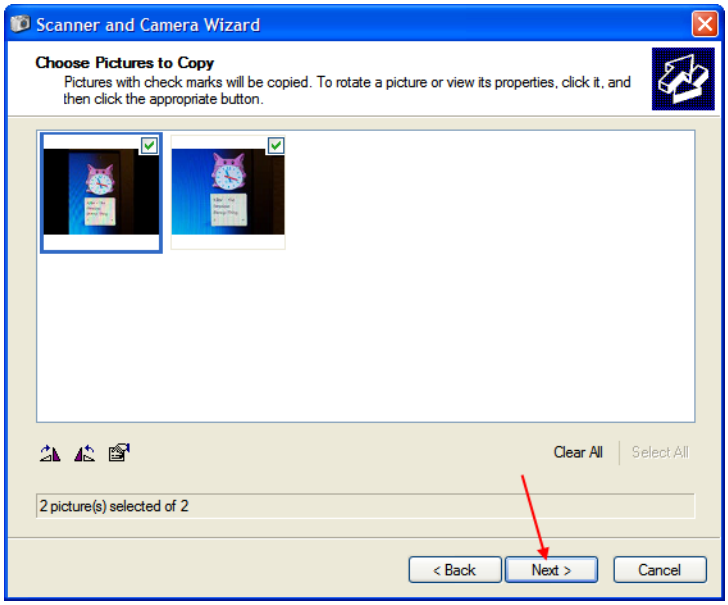
A window should come up asking you which program you would like to use with the camera. You will need to scroll down to the bottom of the list and select the Microsoft Scanner and Camera Wizard. Then click **OK.**



The Scanner and Camera Wizard will come up and walk you through the steps. Click **Next** on the first window.

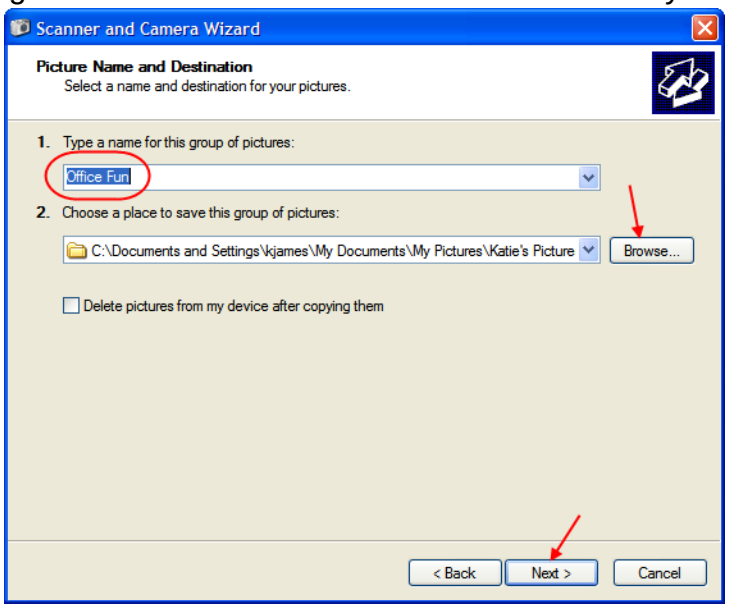


You can select which pictures you would like to import from this next window by clicking in the box next to each picture. There is a **Clear All** and a **Select All** feature in the lower right portion of the window to make your selection of large amounts of pictures easier. You can also rotate each individual picture with the buttons in the lower left. Click on the **Next** button when you have finished making your selections.

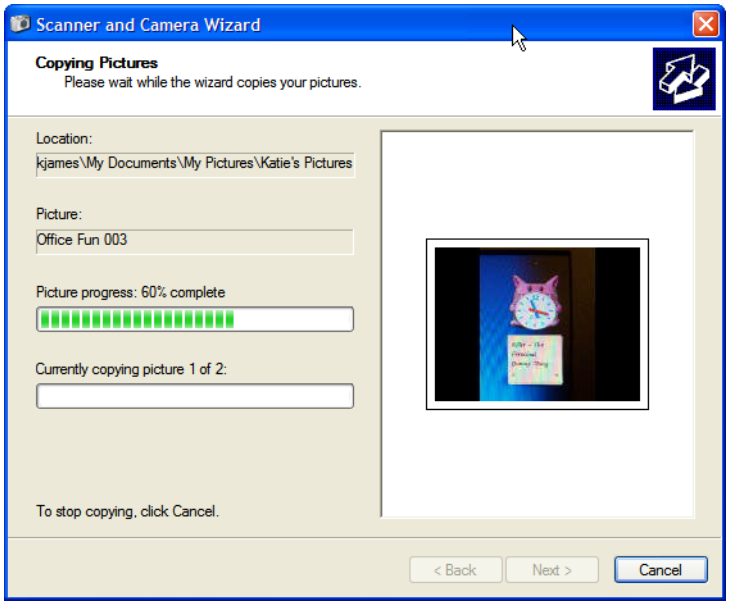


The next window will ask you to give this group of pictures a name. If they are from your summer vacation to Florida you may want to call them “Florida Vacation 2007” or something that will help you identify them.

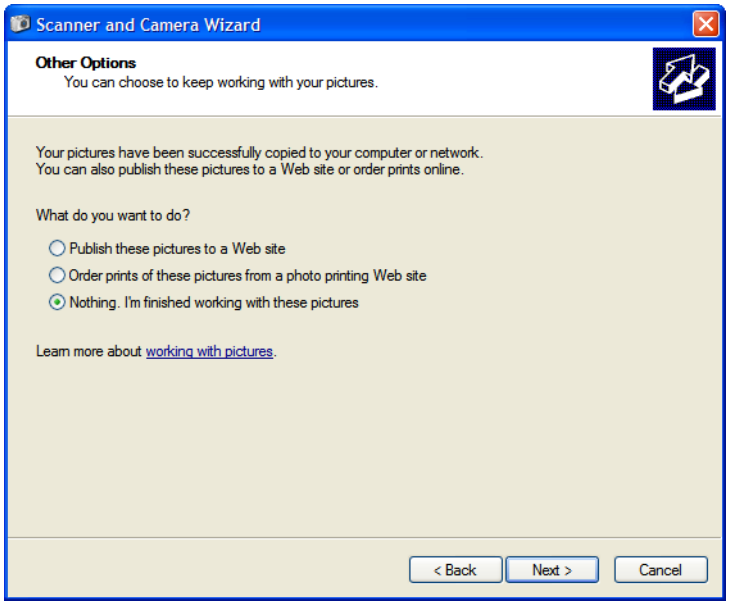
The second thing on that page is telling you where this group of pictures will be stored on your computer. You can go with the default setting which will probably place them in your My Documents folder, or you can choose a new location by clicking on the **Browse** button and selecting a new folder. Click on the **Next** button when you are done.



This next window will show you the progress as it imports your pictures. The next window will automatically come up when the import is complete.



Generally, from this window you would just click on the **Next** button to finish the wizard. You can select the **Order prints…** option if you wish to do that at this time.

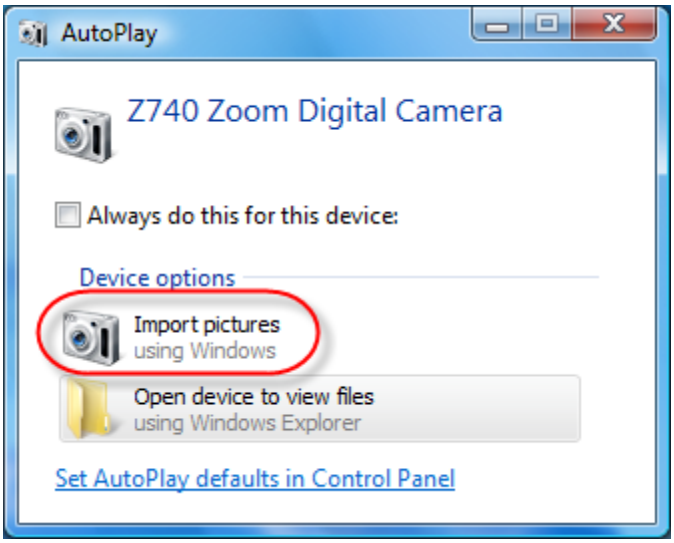


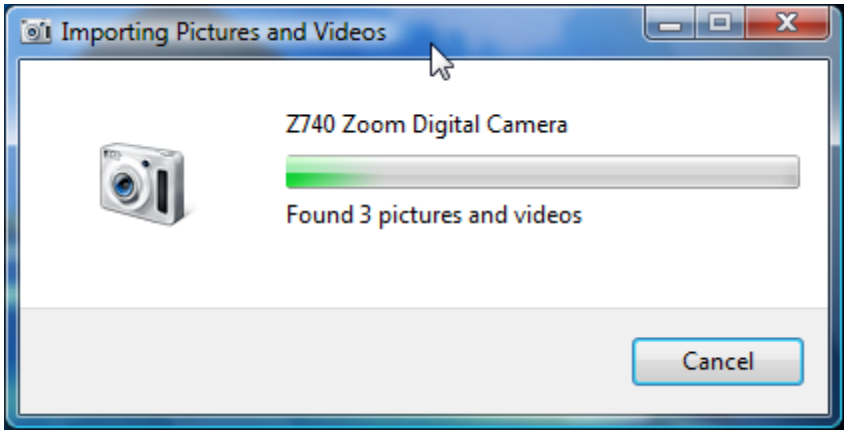
A new window will open. This is the folder in which your pictures are located. You will be able to see all of them there.

Using Windows Vista

Once the cables are connected to the camera and computer, turn the camera on.

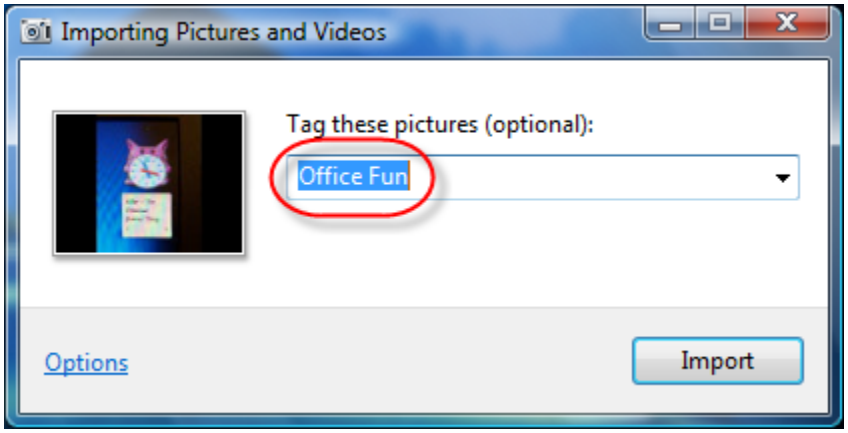
The AutoPlay window will come up and give you two options. Click on **Import pictures using Windows** to begin the process.





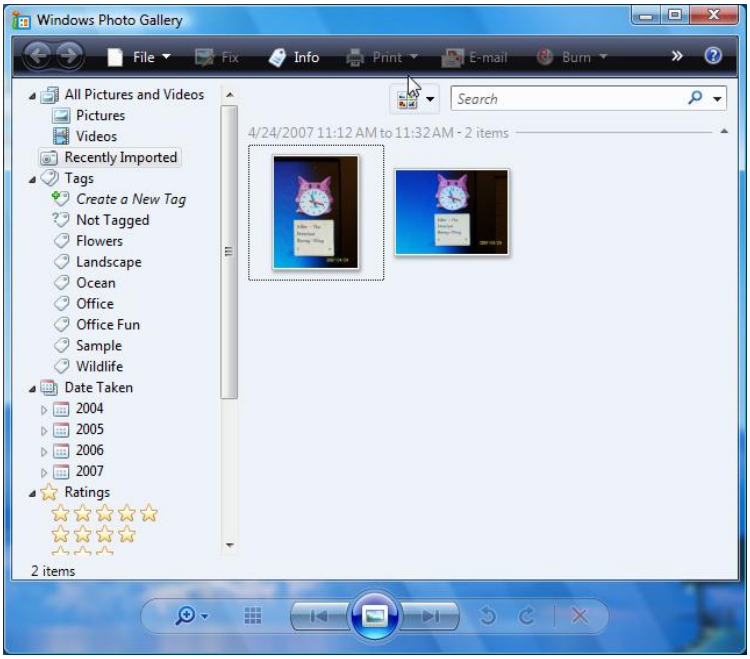
The computer will detect your pictures and automatically take you to the next screen.

The next window will ask you to tag these pictures. This merely means you are giving this group of pictures a name. If they are from your summer vacation to Florida you may want to call them “Florida Vacation 2007” or something that will help you identify them. Then click on **Import**.



The next window will show you the progress of the import.

The Windows Photo Gallery window will open when the import is complete so you can view your pictures. They are automatically placed in a folder named for your given tag and the date of upload. This folder is located in your Pictures folder, which can be located from the Windows Start menu.



Printing and Storing Digital Photographs

Printing digital photographs can be done at home with a computer and a printer. Some cameras can also connect directly to a printer. Most of the time you will want to use a computer, too, so that you can touch up your photographs with editing software before you print them.

You can print your photos on any printer – ink jet, laser or photo printer. However, if you want prints that rival traditional film prints you will want to invest in a photo printer and some high quality paper. Many companies offer digital photo printing services. The companies will print your photos and put them on a CD ROM for you.

You can store your photographs on your computer's hard drive, or burn them to a CD ROM or DVD. Of course you can always print your photographs and keep them in albums too. Many web sites allow you to upload your photos so that you can share them with friends and family. Often these web sites have a photo printing service, too (see chart on page 16.)

Picasa (www.picasa.com) is another great tool that you can use to manage your picture collection. It's a free program by Google that you can download which will allow you to edit and organize your pictures all in one place. You can print them, email them to a friend, create a collage, order prints from a variety of sites, create a CD, and upload them to your blog if you have a blogger.com account.

Name	4" x 6" Price	Delivery Charge	Free Pickup	# Free	Share	Edit Photo	Borders	Cards	Mugs	T-Shirts	Calendar	More
www.flickr.com	$0.09	Through Snapfish $0.99	Walgreens or Wal-Mart @ $0.19		With a Yahoo! ID	Minimal						
www.kodakgallery.com	$0.15	$1.99	CVS @ $0.23 or Target @ $0.20	20	X	X	Minimal	X	X	X	X	X
www.shutterfly.com	$0.15	$1.79	Target @ $0.20	15	X	Minimal	X	X	X	X	X	X
www.snapfish.com	$0.09	$0.99	Walgreens or Wal-Mart @ $0.19	20	X	Minimal	X	X	X	X	X	X
www.walgreens.com	$0.19	$0.99	Walgreens	20	X	X	X	X	X	X	X	X
www.walmart.com	$0.09 to $0.19	$1.44	Walmart @ $0.15 to $0.19	10 @ 1 Hour	X	X	Minimal	X	X	X	X	X
www.winkflash.com	$0.08 to $0.12	$0.99		50 with code	X	X		X	X	X	X	X

* All prices are current as of April 19, 2010.

Here a camera is connected directly to the printer, not using a computer:

This camera probably has PictBridge capability. When you connect a PictBridge capable camera to a compatible printer you can skip the computer and print right from the camera.

This is the PictBridge logo that will be on PictBridge compatible cameras and printers.

A photo dock will also allow you print from the camera without using a computer. A photo dock is a base unit that the camera plugs into with an attached printer.

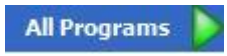
Sharing your photos

In order to send your pictures through email or upload them to a web site you will often need to resize them for easier viewing by your family and friends.

Resizing a picture using Paint in Windows XP

To open Paint:

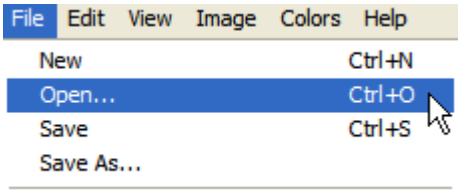
1. **Start menu** 

2. **All Programs** 

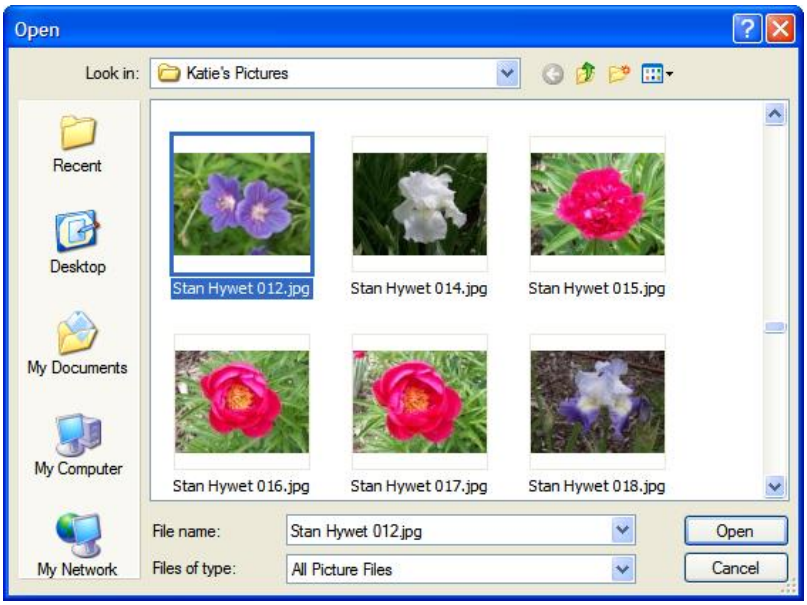
3. **Accessories** 

4. **Paint** 

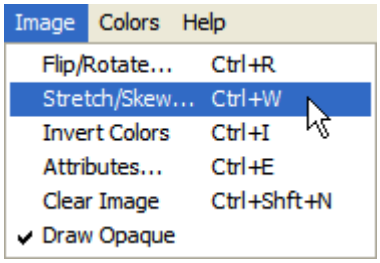
Select the picture you wish to resize by going to **File** and **Open.**



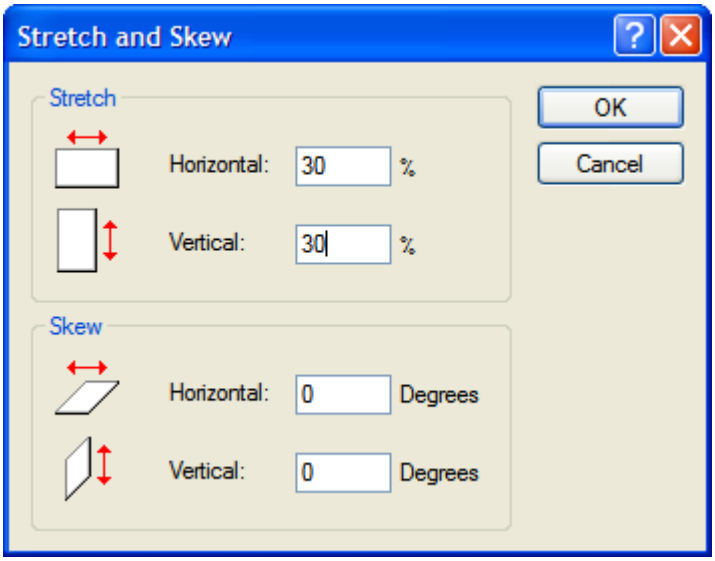
Locate the picture on your computer and click the **Open** button.



Once the picture is open, click on the **Image** menu and select **Stretch/Skew**.



Type in the same percentage number for both the Horizontal and Vertical areas. Somewhere between 20% and 30% is a good range for pictures you intend to place on the web or email to someone. (Note: You should not make prints from this smaller copy.)



Click **OK** when you are done. The image will then be resized.

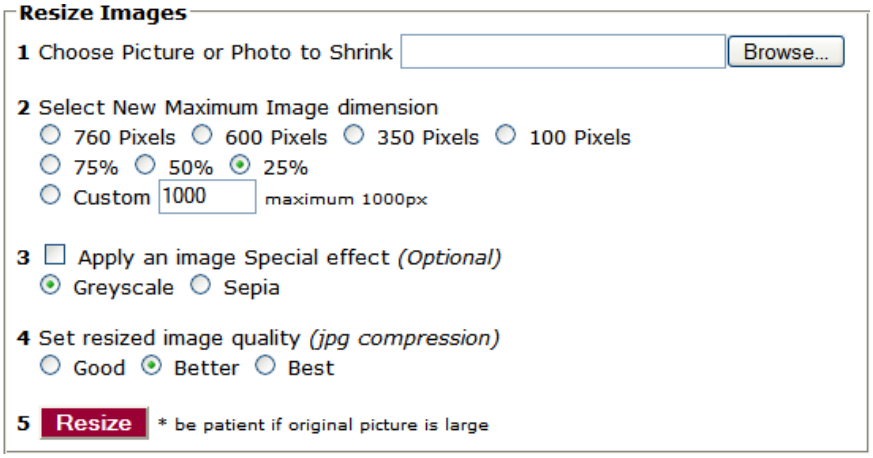
To save your changes make sure you select **File** and **Save As…** NOT **Save**! Using the plain **Save** option will overwrite the old picture, and will cause any future prints you intend to make of the image to come out blurry. It's best to select the **Save As…** option and give your picture another name. That way you have the original image and a smaller version on your PC.

Resizing a picture online

Shrink Pictures

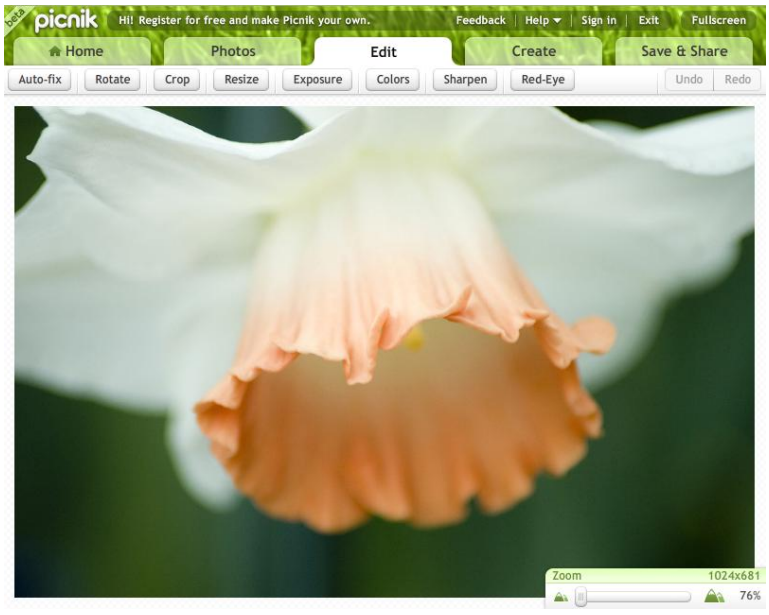
An easy alternative to using paint is a website called **Shrink Pictures**. (www.shrinkpictures.com)

Just follow the five easy steps and the directions after it is resized to complete the process.



Picnik

www.picnik.com is another site which will allow you to quickly upload and edit individual pictures. The **Edit** and **Create** tabs have a variety of options for enhancing your photos.



Uploading pictures for friends and family

Google has a free photo service (www.picasaweb.google.com) where you can upload up to 1GB worth of photos. You don't need to resize them first for this site, either. Google automatically places a smaller image on the page and the larger image is only loaded if someone clicks on that particular picture.

Many of the other sites listed on page 16 will also allow you to upload and share digital photos with other people, but the images on their sites usually expire after a few months. Google does not automatically delete your images.

Shopping

Buying a digital camera can be a confusing experience. Once you have a grasp of the basics and know how much you want to spend watch the ads in the paper for sales.

Use the internet to help figure out what is a fair price for a camera. Check web sites like:

	Amazon	www.amazon.com
	Best Buy	www.bestbuy.com
	Circuit City	www.circuitcity.com
	CompUsa	www.compusa.com
	Target	www.target.com

Even if you don't buy your camera from a regular store, go in and ask to see and handle a camera you are considering to make sure you are comfortable with it before you buy it.

Glossary

CompactFlash: The most widely used digital memory format, CompactFlash cards are used by many current cameras. CompactFlash cards are available in sizes up to 2 Gigabytes.

JPEG: Stands for Joint Photographic Experts Group. A JPEG is the most commonly used type of digital image format. JPEG images are compressed so that they can save faster and use less space. Because JPEG format actually alters an image, its compression is said to be "lossy," meaning that a certain amount of data is lost every time a JPEG is edited, saved, and compressed again.

Digital zoom: Unlike optical zoom, which uses the optics of the lens to magnify the size of an image, digital zoom discards pixels around the edge of an image, fitting the remaining pixels into the same space to give the appearance of zoom. Since digital zoom comes at the expense of resolution, you should always choose a camera based on its optical zoom, not the digital or combined figure.

Macro mode: Macro mode allows a digital camera to take close-up pictures of small objects like flowers, insects, coins, etc.

Megabyte: A megabyte (MB) is a unit of data used to describe the size of digital images and the capacity of a digital memory card. Memory cards are available in sizes ranging from 8MB to 2 Gigabytes (a Gigabyte is the equivalent of 1,024MB).

Megapixel: A measure of resolution that reflects the ability of a digital camera to record detail. One million pixels. The more megapixels a camera has, the more detail its images can contain and the more they can be enlarged without losing clarity. More megapixels aren't always necessary, however.

Memory stick: Memory Stick is a memory format used primarily by Sony.

Optical zoom: Optical zoom magnifies the size of an image by adjusting the lens. Unlike digital zoom, optical zoom enlarges the subject without sacrificing resolution.

PictBridge: A universal direct-print standard adopted by most digital camera manufacturers. It allows digital camera users to connect directly to printers which have this feature to print without the use of a computer.

TIFF: Short for Tagged Image File Format. TIFF is an image file format that does not lose any quality when it is saved and compressed. Many advanced cameras offer a TIFF format option.

Bibliography

The library offers many books to help you use and enjoy your digital camera.

202 digital photography solutions. George H. Wallace. McGraw Hill. 2003. Call Number: **778.3 W188t**

Digital photo magic. Alan Buckingham. Doring Kindersley. 2005. Call Number: **775 B923d**

Digital photography 1, 2, 3: taking and printing great pictures. Rob Sheppard. Lark Books. 2005. Call Number: **775 Sh549d**

Digital photography all in one desk reference for dummies. David D. Busch. Wiley Publishing. 2003. Call Number: **778.3 B977d**

Digital photography quick steps. Doug Sahlin. McGraw Hill/Osborne. 2005. Call Number: **771.33 Sa131d**

Step by step digital photography: a guide for beginners. Jack Drafahl. Amherst Media. 2005. Call Number: **775 D758s**

The first week with my new digital camera. Pamela R. Lessing. Capital Books. 2003. Call Number: **778.3 L639fi**

Many web sites offer excellent up-to-date information about digital cameras.

About.com	www.cameras.about.com
Consumer Reports	www.consumerreports.org
CNET	www.cnet.com
Howstuffworks	http://electronics.howstuffworks.com/digital-camera.htm
PC Magazine	www.pcmag.com
PC World	www.pcworld.com