

Technology: Tools

Computers

Camcorders

Internet

Much
MORE!!!!

Scanners

Audio
recorders

Digital Camera

We were able to track down some interesting digital camera information on the Internet. We are most appreciative of Keith Lightbody (<<http://members.ozemail.com.au/~cumulus/digcam.htm>>) for letting us copy some of his material. If you like the material, visit his web page and download additional information -- there is a lot of great information to be found.

1. Quick start

How to get a photo taken and use it immediately in a document, e-mail it as an attachment, include it on a Web page, or . . . There are heaps of possible uses, so grab a digital camera and lets start!

- Find the power switch (e.g., "OFF" or "ON/OFF" or "green button"); turn it on or switch from "OFF" to position.
- Set the controls -- usually to "RECORD" or "STILL" (not "MOVIE" yet!).
- Compose an image. Use either the LCD viewer (most accurate image view) or optical view finder (easier in sunlight).
- Hold the camera steady.
- Take a photo. Press the shutter release button firmly all the way down -- button is usually in a similar spot to that on traditional cameras (there will normally be a click, beep, or message to indicate a photo has been taken).
- Immediately check your photo by setting to "PLAY" or "VIEW." Use the LCD viewer to confirm that you are happy with the result.
 - If a zoom feature is available on your digital camera, use this to enlarge the image to check the focus up close.
 - If the image is unsuitable (e.g., out of focus, badly framed, cluttered, poorly lit), then simply take another photo!
- For cameras with removable storage, get the stored photo out of the camera (on disk, memory card, or CD).
- Load the photo into your computer -- typically, insert disk or place storage media into USB card reader (or download via USB cable, possibly via a "docking" station as used on some models).
- Use the photo in your work:
 - Word document - Insert - Picture - From File - (choose location)
 - Email attachment - Attach - File - (choose location)
 - Web page - Insert image (choose location)

Good software will typically also allow "drag-and-drop," where you just point to the image, drag it onto the required place, and drop it in!

Extras:

Delete unsuitable photos using cursor, "+"/"-" controls on a menu, rubbish bin or trash icon. Choose a suitable image quality (resolution) -- you can take a few high-quality photos or lots of lower quality photos.

Problems:

No image? Press harder on the shutter release button OR be sure the lens cap is off!

No power? Check the battery life indicator; if flat, recharge or change batteries.
 No storage device present? Insert floppy disk/compact flash / other media.
 Storage device full? Insert new media or delete images.

Productivity is important -- disk based is fast and easy when there are many students in a classroom. (Sony Mavica digital cameras are very popular in schools, as they write the image to disk. Each user can take photos and then remove his or her own disk, leaving the camera free for the next student.)

E-mail option -- some camera settings allow smaller images for quick e-mail transfer. Suitable settings can also allow "instant" photos on web pages -- no need for editing! (Sony Mavica digital cameras can write two file copies of each photo, one large and one small. The small file is stored in an e-mail folder on the disk.)

2. Features

There are many positive (and some negative) features of digital cameras

Positives

- promote visual literacy
- immediate feedback (confirmation of photo, access to image -- no time waiting for processing)
- negligible running costs compared to ordinary photography (no buying of film or processing costs)
- free potential photographers of their inhibitions -- okay to take chances and photograph anything
- the ease of sharing photos with others (via printouts, networks, e-mail, Web sites, storage, etc.)
- students new to photography appreciate a learning environment where there is no "penalty" for mistakes
- many film labs now offer printing of digital images onto traditional high-quality photo paper
- it is easy to share your digital camera with other people
- photos can be quickly enhanced with software (e.g., Photoshop, Paintshop Pro)
- images can be rapidly added to e-mails, documents, Web sites; there are many possible uses
- "no cost" photos encourage creative use (students can experiment with photographic technique)
- learning is enhanced in many situations by use of images in addition to words
- freedom for taking multiple images or sequences (no additional cost for extra photos)
- series of digital photos can be "stitched together" to create panoramas
- digital cameras are able to cope with a wider temperature range than film
- no need to wait for the end of a roll of film before processing
- great photo composition training tool for people who also use film-based cameras

(I know people with quality Megapixel digital cameras who now take 1,000 photos a month because of all the advantages and the freedom of digital cameras)

Negatives

- photo quality is much lower in digital cameras than in film-based cameras of the same price
- most ink jet prints of digital photos are lower quality than film based prints
- compression of the photo images for camera storage usually causes loss of quality
- digital cameras are typically more expensive and have fewer features than traditional cameras
- some digital cameras have very slow response times -- presses release button but the photo is taken after the subject has gone!
- some digital cameras are quite complicated, with a smorgasbord of buttons and choices

3. Possible uses

There are a huge range of uses of digital cameras in the classroom or elsewhere in the education community. Whether used to enhance learning or provide motivation or as a convenient tool, digital cameras can empower both students and teachers. The freedom to experiment with photos encourages a willingness to learn. Visual literacy -- the ability to understand and produce visual messages -- can be improved. However, for maximum potential the teacher must allow creativity and variety in how students take photos. Images can be technical, evoke feelings, be abstract, or be taken from many different perspectives.

In addition to the standard still image, many digital cameras also offer a video facility -- usually highly compressed and of relatively low quality. However, it is great for a quick video clip for a slide show, Web site, or multimedia production. One caution is that some models produce .mov or .avi files that are not 100% compatible with other software on your computer. This does not seem to be a problem with .mpg files. One solution is to convert between formats with suitable software (e.g., Quicktime Pro). Another caution is the new Sony Mavica FD100 and FD200 models; they record video clips without any sound! (not as useful as the previous models in schools).

Digital cameras have many uses, including:

- enhancing lesson worksheets, teacher overheads, test items, food preparation notes, science reports, etc.
- student assignments across the curriculum
- e-mail attachments (e.g., sharing photos, global collaborative projects, e-pals)
- getting images into Web pages quickly and easily (NOTE: duty of care may require parental permission for student photos to be published on the Internet)
- self-esteem activities (merit certificates, student of the week, etc.)
- school promotional material (e.g., photos for newspaper, newsletters, pamphlets, posters)
- assisting language teaching (e.g., vocabulary) -- suitable for LOTE, ESL, NESB and other programs
- providing relevant lesson material to hearing impaired students
- taking photos or recording information on excursions or field trips

- assisting students in special education and autistic applications
- providing close-up, macro, or micro views of objects, plants, or animals
- enhancing slide shows or presentations
- encouraging effort through immediate recognition of achievement
- recording student progress (including difficult-to-record evidence for process outcomes)
- analyzing physical education activities
- taking images that capture different emotions, beauty, etc.
- recording sequences of events in science experiments (e.g., life cycles, motion)
- recording weather, types of clouds, ocean conditions, etc.
- taking photos of natural or built environments (e.g., rivers, mountains, buildings)
- preparation of photo sheets to introduce staff or students
- photographing bulky work samples or other evidence in outcomes-based education
- helping document an interview or biography
- providing photos of all the people and events for publishing in school yearbooks
- producing time-lapse movies (e.g., flowers opening, clouds forming)
- provide overview of laboratory equipment -- use digital photo with added labels or "zoomed in" images on an overhead, presentation, or worksheet; allows clear explanation of features and correct safety procedures
- record a movie showing collaboration in the preparation and progress of experiments (using digital camera, digital camcorder, or time lapse) -- students can pause or rewind the movie repeatedly to view and analyze events
- student photos in teachers markbooks or administration records
- record images of assembly of 3-D objects (e.g., for later reassembling, instructions to others)
- provide relief (substitute) teacher with a seating plan that includes a photo of each student
- adding personal photos on cards, which are then laminated (e.g., library card or student ID card)
- learning about photography concepts (e.g., lighting, depth of field, motion effects)
- providing images to print professional looking CD labels
- up-to-the-minute public relations brochures, flyers
- fashion or modeling activities
- fun class activities (e.g., guess the student from a "Dark Angel"-style, eyes-only photo)
- recording faded ink on yellowing paper or text from tightly bound or large library books that do not fit a photocopier or scanner -- best done with 2 Megapixel or higher camera and a portable copy stand to hold camera steady and square to the page and enhance image, then use OCR software
- taking images to show key stages for job progress records
- providing images for use as computer desktop, background, or wallpaper
- lesson activities involving sample business cards, letterheads, or other stationery
- preparation of actual photo business cards (print on special stationery, 10 per sheet)
- photos of items for insurance purposes (e.g., computers, cameras)
- photos of damage to school property (e.g., due to fire, graffiti, vandalism)
- documenting computer networks, sports equipment, etc.
- asset management photos for stocktake or inventory purposes
- archiving student photos over the years
- presenting images of students at work and play for Parents' Night

- creating panoramic images (with image-stitching software)
- producing 360-degree virtual reality scenes (e.g., Quicktime VR)
- compiling folios for dancing, drama, models, artists, etc.
- artwork, artistic creations, and manipulations
- preparing folios to send to prospective employers
- creation of 3D images (take two photos and view with a stereoscope)
- photos of successful architectural facilities in schools
- providing photos to make custom calendars or greeting cards
- instantly transmitting images from remote locations via a laptop computer and a satellite or mobile phone
- economical training tool for learning photo composition skills for film-based cameras
- opportunities for students to develop a photography career (e.g., photojournalism, still life, fashion)
- swapping computer files between computers (e.g., documents, spreadsheets, presentations) via the digital camera storage media

Apart from education, many people in advertising, real estate, medicine, construction, insurance, media, architecture, research, business, sports and aviation find digital cameras very useful. They are also a great help in many people's hobbies.

SOME REAL-WORLD EXAMPLES:

- helping to manage wounds. Silver Chain Nursing Association holds teleconferences whereby specialists can monitor progress on remote patients. Alternatively, a series of images can be e-mailed to specialists
- logging skin cancer lesions -- allows doctors to monitor changes in the color and shape of moles on patients for early diagnosis of skin cancer
- providing fast images of property for real estate agents -- can include standard images, panorama, or 360-degree photos
- dentists taking images of teeth inside patients' mouths -- better view, can add to records, and can show patient on-screen
- photos of items for insurance purposes (e.g., computers, jewelry)
- recording key features showing the route to a place (no map copyright issues)

A panorama can be produced with "stitching" software. A series of digital photos is taken at regular intervals along the same plane. Each image should have 20% to 40% overlap. Some available software includes PhotoSuite, Photoshop Elements, VR Toolbox, and Quicktime VR Authoring Studio. Many Canon digital cameras bundle the stitching software. Some sites with sample panoramas include the Sydney Opera House virtual tour, at <http://www.soh.nsw.gov.au/>, and work in Brisbane by Carl Gray, at <http://www.carlgray.com.au>. Geoff Jagoe in Perth has some galleries of Quicktime VR works, at <http://www.mastery.com.au/qt/qtgl.html>. For more details regarding panoramic equipment and techniques, visit Panoguide or Kaidan.

I have used digital cameras extensively in education, starting in 1994 with a Quicktake 100. Over the years students in my secondary classes have taken many thousands of photos with digital cameras. When lecturing at the University in courses involving learning technology or in teacher training for the Internet in the Curriculum Project I have required participants to make frequent use of digital cameras. I have also used digital cameras with primary students and teachers in

classes and on campus. Over the last 3 years I have also taken many photos of facilities in new schools and situations where students are making use of information and communication technology. In 2002 I also worked with preprimary and early primary students who had not had occasion to use cameras previously. In all cases, use of digital cameras has been highly motivational, contributed to greater integration of technology into the curriculum, and proved an effective way of improving communication. To gain more skills with digital cameras, I also use different models regularly with people from all ages in travel, sport, recreation, and family situations. With the larger storage now available, I can take as many photos as I see opportunities for -- sometimes up to a 1,000 photos a month! My current focus is on the use of digital cameras to enhance visual literacy.

Combined with a printer (<\$500) and special iron-on printer paper (~\$1 a page), digital cameras can be used for custom T-shirts. When the digital images are modified by Scansoft SuperGoo, PhotoSoap, Corel PhotoPaint, Adobe Photoshop, or other, similar software, spectacular effects are possible.

When using digital cameras:

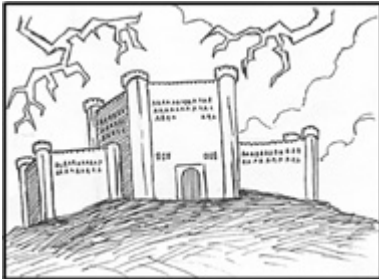
- + buy a carry case (protects camera and holds spare batteries, charger, storage media)
- + have spare battery/batteries (2-3 sets for some models)
- + insist that students loop the camera strap over their wrist or neck
- + fill image with the subject (get up close or use optical zoom)
- + hold the camera steady while taking the photo
- + attach labels to all special leads (e.g., Canon G2 AV lead, Ricoh i500 USB lead)
- + consider composition while taking the photo -- editing on the computer is an extra step
- + choose maximum resolution for best quality of print images and to allow for editing if necessary; choose minimum resolution for Web pages
- + mark batteries differently or buy different brands (so that flat and charged batteries do not get mixed)
- + be aware of shadows on the surface behind the camera when using flash; try moving the subject farther from the background, different angles, or different camera settings
- + use the optical viewfinder (if present) for framing photos rather than the colour LCD viewer (it saves batteries if you have a high battery drain model or are running out of battery power)
- + use the AC adapter when camera is near power for long periods (again, it saves the batteries)
- + care for the camera (use a strap, avoid fingerprints on LCD panel, consider insurance, etc.)
- + consider video capture cards when taking large numbers of student ID photos -- operators working for Identacard in Melbourne can photograph up to 200 students per hour!
- + use a plain or UV filter for lens protection on cameras that allow screw-in or clip-on filters
- + back up important images or software
- + set file numbering of images to sequential (each photo will have a unique number) -- do not reset so that your first photo always has the same number
- + adopt file-naming conventions if collecting photos for group work (e.g., school Web site)

+ ... add your own points

Camera Shots

There are three basic camera shots:

Wide shot (also known as Establishing Shot or Long Shot) -- This shows the whole scene. Frequently you'll see video pieces begin with this shot. It's helpful because it sets the stage; the viewer gets oriented to where she or he is. These shots are also good if there's a lot of movement because there is plenty of room to move around. This shot might show a small crowd of people. To get this shot, you may need to zoom back as far as you can.



Medium Shot -- This shot shows less of a scene than the wide shot. The camera seems closer to the subject (although it may not be, if you use your zoom lens). For example, if you were interviewing someone, this shot would show that subject from about the waist up in a medium shot. Use this when you want a closer look at your subject, or when you need to transition between wide shots and close-up shots (it is difficult for the viewer to follow what you are doing if you go straight from a wide shot to a close-up shot).

Close-Up Shot -- This shot shows an even smaller part of the subject or scene. It's great for showing detail, like a person's face or individual leaves on a tree. If you were interviewing someone, this shot would show the person from the top of the chest or shoulders up. An extreme close-up shot is even closer than a close-up (for example, it is just of the person's eyes, or of a bug gnawing on a leaf).



Other concepts for gathering video:

Over-the-Shoulder or Cutaway Shot -- A cutaway is a shot away from the main action. For instance, if you are interviewing someone, a cutaway could be a shot of the interviewer, who can

be listening, nodding, or responding to the guest. This is used a lot in interviews to show the person who's asking the questions. This particular shot is also called "over the shoulder" because the photographer is literally shooting video of you over the shoulder of the person you are interviewing. (An over-the-shoulder shot is a type of cutaway). These are very useful when editing because they give you an easy way to transition.



Two Shot/Three Shot -- A two shot has two people in the frame. A three shot has three people in the frame. Because you have to be some distance from the people to get them all in the frame, this is usually a medium or wide shot.



Sequence -- *Sequence* is a term used in gathering video and editing and it refers to a series of related shots. For example, a sequence could be a wide shot of the bay, followed by a medium shot of a few windsurfers, followed by a single windsurfer zipping through the water.

Length of Shot -- How long you show each shot depends on what's going on in the shot, and what you're trying to accomplish. If there's a lot of action or movement in a shot, you may use 20 seconds of it or more. If nothing is happening in the shot and you're showing a still scene, you may use only 3 seconds. When deciding how long to make a shot, keep in mind that your goal is to gain and hold the audience's attention and understanding.

<http://pblmm.k12.ca.us/TechHelp/VideoHelp/aGoodStuffToKnow/Camera_shots.html>

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Camera Angles

The shot angle is the level from which you look at your subject through the camera.

Eye-Level Angle -- One of the most commonly used shots is the eye-level shot. Why? Because it's the perspective most familiar to us -- we usually see things from our own eye level. This angle also causes the least discomfort because we're used to it. If you're shooting a person and you want to make it an eye-level shot, make sure you shoot at their eye level, not yours.

Low Angle -- In this shot the camera looks up at the subject, making it seem important, powerful, or perhaps larger than it is to the viewer. For example, you might be sitting on the ground looking up at someone who is standing.



High Angle -- In this shot the camera looks down on the subject, decreasing its importance. The subject looks smaller. It often gives the audience a sense of power, or makes the subject seem helpless. In this case, you'd be higher than the other person (maybe they're sitting, or maybe you're standing on a desk) looking down on that person.

<http://pblmm.k12.ca.us/TechHelp/VideoHelp/aGoodStuffToKnow/Camera_angles.html>

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Camera Movement

Pan -- A shot taken moving on a horizontal plane (from left to right or right to left). If you want to show a frisbee flying across a field, you might use this shot to follow the frisbee from one person to another.

Tilt -- Camera movement in a vertical plane (up or down). If you want to show a tall building but you can't get it all in your shot, you might start at the bottom of the building and go up to the top.

Zoom -- This shot moves you closer to the subject, into a medium shot or close shot. If you are looking at the Golden Gate Bridge and want to see individual people walking across it, you might zoom in.

Reverse Zoom -- This shot moves you farther away, into a medium shot or a wide shot. If you have a close-up shot of a flower and want to see the entire field that the flower is in, you might reverse zoom.

Three notes about shot movement:

1. Consider photographer responsibility: you owe it to your viewers not to create motion sickness in them, unless, of course, that is your goal! Rapid pans, tilts, and repeated zooms can make a person feel woozy and may also prevent him or her from clearly seeing the video you collected.
2. The standard rule with moving shots is this: Whenever possible, start your sequence stationary on a subject, then pan/tilt/zoom/reverse zoom, then hold stationary again. This helps enormously for editing purposes. For example, if you want to move your camera from one end of a mountain range to another, start focused on one side of the mountain range and hold that shot for 3 seconds (stationary position), then pan to the other side (slowly enough so the video won't be a blur), then stay focused on the other end of the mountain range for 3 seconds (stationary position). If you edit or cut away in the middle of a pan/zoom/tilt/reverse zoom, you may make your viewer disoriented.
3. In general, use shots with movement sparingly. Try to put a still shot (no pan, tilt, or zooming) in between two pans/tilts/zooms. This gives viewers a moment to get their bearings.

<http://pblmm.k12.ca.us/TechHelp/VideoHelp/aGoodStuffToKnow/Camera_movement.html>
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Tripod Use

To use a tripod, or not to use a tripod: That is the question.

And the answer depends on what you are trying to do. If you're chasing your subject or want to imitate an earthquake, you probably won't use a tripod because you need to be moving. Or if you want to give the viewer the impression of walking or running, then you may not want to use a tripod.

Basically, if you want a stable, smooth shot, use a tripod whenever possible. If you do not have a tripod, invent one. Your body is a natural tripod. You can also lean up against a tree or a wall or sit on a chair for stability.

Proper set-up -- Use a wide "footprint." You and I have two legs. Tripods have three. When our legs are several feet apart, creating a wide "footprint," you and I are more stable, harder to push over. It's the same for a tripod. The farther apart the legs are, the more stable it will be.

Tripod Motion -- When you use a tripod, you securely attach the camera to the top of it. The camera can now be moved in two ways, pan (side-to-side movement) or tilt (up-and-down). See the Camera Movement sheet for more information on pans and tilts.

<http://pblmm.k12.ca.us/TechHelp/VideoHelp/aGoodStuffToKnow/Tripod_use.html> Adapted with permission from San Mateo County Office of Education.

Advice on: Basic Lighting

It's important to have lighting that fits with your purposes. Generally, you'll want lighting that will let the viewers see what you want them to see.

What you DO want:

- adequate lighting
 - You want lighting that is bright enough to let you see what you are videotaping with the amount of detail you want. If the light is too dim or dark, you won't be able to see much on your videotape.
- light source in front of or above the subject
 - Ideally you want your light to come from where the camera is set up; this will prevent shadows on objects or people's faces. If you have a light on your camera, you might use this along with other light sources (like lights in a classroom, or natural sunlight). Be sure to check how far away an object can be and still benefit from the light on the camera.

What you DON'T want:

- inadequate lighting
 - If there isn't enough light available, try using the "gain" or "backlight" button. This will let the camera work with less light; however, the video may not look as clear.
- light source behind the subject (this could be a window)
 - In general, you don't want the source of light to come from behind your subject. If a light source is behind an object, it will seem dark and you may not be able to see details of the object or devine what is going on in the scene.
- the camera shooting directly into a light
 - If you use the overhead lights in a classroom or natural sunlight, make sure the camera is not tilted up into the light. You don't want to shoot directly into any light because you may damage the camera.

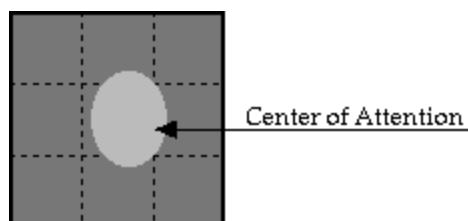
<http://pblmm.k12.ca.us/TechHelp/VideoHelp/aGoodStuffToKnow/Advice_on_lighting.html>

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Composing and Framing Your Shots

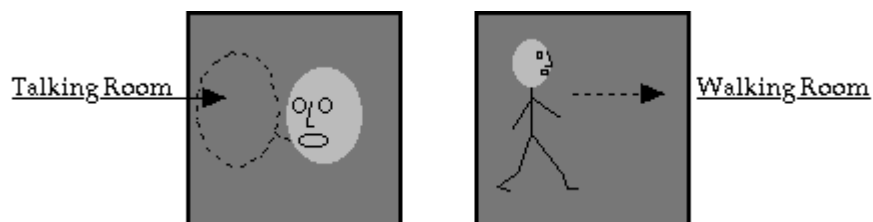
There are many ways to compose a shot, depending on your goals. You want to be aware of what is in the shot and what isn't. Ask yourself, can I clearly see what I intend for the viewer to see?

Rule of Thirds -- this classic rule holds that the center of the camera's attention should be one third of the way down from the top of the shot.



Headroom -- a term used with shots of people. This refers to the space above the subject's head. You'll see different amounts of headroom left, depending on the intent of the creator of the video. In general, if you're standing right in front of someone, you'll see that they have space all around them -- they aren't cut off by a frame. By leaving headroom, or space beside them, you are imitating what you see in real life.

Talking/Walking Room -- if you are interviewing someone or have video of someone talking, you generally do not want them looking directly at the camera (again, depends on your goals -- certain situations may call for that). Generally, you want the person to be looking off to the left or right of the camera a bit, toward where the interviewer is sitting. When you do this, frame your shot so that there is some talking room. That is, you want to leave some extra space to the side of the subject's face, as if you were going to draw a dialogue box in for him or her. This space is "talking room." If the person is talking to another person on camera, this is shown as space between them. Walking room, if the person is in motion, gives space to walk to. It leaves space in the shot for the action, whether it be words or walking.



<<http://pblmm.k12.ca.us/TechHelp/VideoHelp/aGoodStuffToKnow/ShotComposition.html>>
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