

TIME LAPSE PHOTOGRAPHY

Click here for an [easy funky version](#)
(for students)



Information below is
detailed text version
(for teachers)



Using Digital Cameras

by Keith Lightbody - last updated 3 November 2007

Definition: **time lapse photography** is where a camera, typically in a fixed position, automatically records a sequence or series of photos with a set time interval between each image. Individual images may then be analysed or all of the images can be combined to produce a movie that shows the action faster (or slower) than in real life. A digital camera is ideal since there are no film costs, the multiple digital images can quickly and easily be assembled, the result can be saved into a variety of digital movie formats and distribution can be electronic - unfortunately not all models support time lapse.

1. Quick Start

Do a trial run (for 1-2 hours) with an easy subject. Some examples include a fast opening flower (e.g. hibiscus in the early morning - save some flower buds in the fridge if you want to setup the camera later in the day), clouds (but avoid looking in the direction of the sun), a caterpillar or a snail (from above or from below looking through a sheet of glass). Take care to compose the image so that all parts of the subject show clearly and there is no distracting background. Note: possibly avoid roses for your first attempt as they can take 2 or 3 days to open, may wilt under lights and the buds change direction if other sources of light are available.

For the digital camera you will need a model that includes a time lapse, interval setting or similar feature. It is best to connect the digital camera to a mains power adapter (batteries may run out during a long sequence), set it up rigidly on a tripod with the subject well within the field of view and check the lighting is suitable. It is worth taking a few test shots and reviewing them in the LCD viewfinder. Once you have verified the image quality then adjust the interval setting to a suitable time between shots (typically ranging from a few seconds to many hours). Press the shutter release for the first photo and then wait your chosen time to check that the second photo is taken on schedule. Finally relax while the camera does all the work! For more detailed instructions see [time lapse tips](#).

NOTE: To capture high speed events without expensive specialist camera equipment there are a number of options available

e.g.1 - use a digital camera with a burst or continuous shooting mode

e.g.2 - film the action with a digital camcorder and play the movie back in slow motion or frame by frame

e.g.3 - record a single long duration exposure in a darkroom with the action illuminated by a strobe light

2. Benefits

Students can use time lapse techniques to assist learning and create interest in a range of curriculum areas.

The viewing of time lapse movies can be controlled by students for individualised learning.

Stimulating time lapse learning resources can now be created by teachers or students relatively easily and cheaply.

Digital time lapse movie resources can be shared widely via the Internet or school networks.

3. Recent Advances

Not all digital cameras have time lapse features - some [models](#) are listed below. Increased image storage capacity and cheaper prices have allowed a greater number of images to be stored - this produces better quality movies. Finally modern software that allows all the images to be assembled into a movie easily and quickly has made time lapse photography much simpler. In fact some Nikons (e.g. Coolpix 8700) have a time lapse feature where the still images (30 sec to 60 min apart) are joined by the camera into a Quicktime movie!

4. Possible Uses

Many projects can be completed within a day:

- monitor movement of animals in a paddock
- observe how people use public spaces
- record changes in clouds
- observe the chemical dissolution of different metals in acids over time
- watch living cells in time-lapse movies (attach camera to a microscope)
- observe a piece of art as it is being created (e.g. painting, sculpture)
- record erosion of soil in stream flow experiments
- verify that stars rotate around the celestial pole
- observe ants feeding or tunnelling in an ant farm

Some longer term projects include:

- compare mould growing on damp versus dry bread
- observe the growth of plants or germination of seeds
- monitor revegetation after a bushfire
- observe fungi or fruiting bodies growth and decay
- record seasonal changes in water levels or plant life
- observe the growth of crystals under different conditions
- photo sequences of construction (e.g. a building)
- taking a sequence of photos from a flying kite
- ...
- (please email me suggestions to add to this list)

5. Suitable Models

(Note: a camera may have a time lapse feature but it may be referred to as interval shooting, intervalometer or other terms, some offer time lapse features within movie mode)

Some digital cameras available with time lapse include:

Canon Powershot S3 IS, S2 IS, S1 IS

Canon Powershot G3, G5, G6, Pro1, EOS-D30 (intervalometer)

Canon PowerShot S80, S70, S60, S40, S30

Casio QV-2000UX, 2900, Casio QV-7000SX, Casio QV-8000SX

Epson PhotoPC 3100Z, Epson PhotoPC 800, Epson PhotoPC 850Z

FujiFilm FinePix S1 Pro

PhotoSmart 618

Kodak DC265, Kodak DC290

Minolta DiMAGE 5, Minolta DiMAGE 7, 7i, 7Hi

Minolta DiMAGE EX 1500

Nikon Coolpix 3700, Coolpix 5400, Coolpix 8700, D2H

Nikon Coolpix P1, Coolpix P2 (within movie mode, select from intervals of 30 seconds or 1- 60 minutes)

Olympus SP-510 UZ
Olympus E-10 (time lapse sequence of 3 fps up to 4 sec)
Olympus E-20
Panasonic ipalm
Pentax Optio 430RS, 450, Optio 550, Optio S4
Ricoh R3, R4, R5, R6, R30, R40
Ricoh Gx100, GX8, GR Digital, RR1
Ricoh i500, Ricoh i700, RDC-5000, Ricoh RDC-5300
Toshiba PDR-M60

Can you please email me any other models with useful time lapse features?

Some models have a remote (cord/cable) but no automatic feature for user selected intervals. Other models (e.g. Canon PowerShot G1/G2, Canon EOS-350D Rebel) provide time lapse features while the digital camera is attached to a computer. Additional remote control software for Canon digital cameras is available from <http://www.breezesys.com/html/products.htm> (e.g. G2Remote, PSRemote). There are also a number of models (e.g. Nikon Coolpix 995) that offer a 'burst' or 'continuous mode' that permits rapid recording of a series of images - handy for fast action. Software is available for using a Casio QV-3000 connected to a computer in AutoCam mode - free 30 day download at <http://www.beausoft.com/qv3000-webcam.html>

Alternatively it is possible to buy a controller so that you can create time lapse photos on your existing digital camera:

e.g. 1 **Pclix LT100** portable time-lapse solution - can trigger the shutter of a digital camera every second or every hundred hours plus anywhere in between all in one second increments, for intervals below 10 seconds Split Second Mode allows you to trigger your camera in tenths of a second - available for very popular Nikon D50, D70, D70s and Canon Rebel XT (EOS 350D) - for more details visit <http://www.pclix.com/>

e.g. 2 the **Zigview** - motion sensor shutter release, interval and exposure timer on unique rotating angled TFT colour display (shows viewfinder image on a screen) <http://www.intro2020.co.uk/pages/zigview3.htm>

e.g. 3 the **Mumford Time Machine** - a programmable controller and intervalometer for cameras and electronic flashes - for more details visit <http://www.bmumford.com/photo/camctrl.html>

e.g. 4 **DigiSnap 2000** series - a small credit card sized portable device that connects via a serial cable - to check your model camera for compatibility and see more details visit <http://www.harbortronics.com/>

On models with infrared (IR) it is also possible to create a time lapse feature if you have some technical skills. This can be done by programming a Palm Pilot or similar device to send the appropriate shutter codes to the infrared (IR) remote sensor on the digital camera. An automatic time lapse effect is created by sending the shutter release codes at regular intervals.

(please email me additions or corrections of suitable digital camera models for this list)

There are some good review articles on specific digital camera models at <http://www.dpreview.com> Another helpful site site for comparing models is <http://www.imaging-resource.com>

For general information on using digital cameras in education visit <http://members.ozemail.com.au/~cumulus/digcam.htm>

6. Time Lapse Equipment

Digital camera with a time lapse feature
or digital camera plus intervalometer/remote cotroller.
Sufficient image storage capacity.

Tripod with lockable swivel head.
 Simple lighting (e.g. fluorescent desk lamps or low power incandescent bulbs) or suitable flash equipment with reflectors as required
 Background cloths or sheets.
 Mains power adapter (allows unlimited time and greater reliability).
 [batteries are usually not sufficient except for short duration sequences]
 A remote release (infrared or cable) is handy to avoid bumping the camera.

One scenario I am often asked about is recording activity over many days at a remote site without electrical power. One innovative solution tested for a project in Mildura consisted of "a Sony DVCAM PD100P Video Camera with a time lapse function where you can choose the record duration and length between record intervals. The power supply was from two 12 volt batteries connected via an inverter that was purpose designed and built for the job at a cost of \$250. One battery was recharged at a time daily off site and able to be replaced without power interruption as the inverter had two sets of power leads. As the subject was to be filmed over a large area over 10 days I set the record intervals at 0.5 of a second every 10 mins on a 40 minutes tape which gave me 16 days of recording. I practiced on a flower and it was magic".

7. Time Lapse Tips

Choose a safe location that does not interfere with other people's rights or property
Keep the environment consistent - this includes temperature, humidity and lighting
Plan to avoid or prevent vibration or wind. Set up the equipment out of any wind or drafts (e.g. from weather outdoors, from nearby windows or air conditioning indoors). It should be in a rigid location free from vibration (e.g. due to machines, traffic, student activities)
Be careful to maintain humidity where it affects the subject (e.g. young plants) without affecting the camera equipment
Protect the equipment from theft, rain, lightning, snail slime, animal licks, etc.
Keep the lighting uniform and consistent - can use flash or lamps but do not generate too much heat or intensity with fixed lamps - consider fluorescent desk lamps, low power incandescent bulbs or maybe microscope lamps
If using a flash, consider a softer setting for any close-up work. Flash alone may not be suitable for flowers that change at night
Make sure that the digital camera is rigidly clamped on a suitable size tripod. In some circumstances it can be taped very securely in unusual positions with duct tape (but only via the legs of a miniature tripod or on parts of the camera that will not be affected by the sticky gum on the back of the tape)
In areas used by other people put up a sign explaining the equipments purpose. Ask people not to touch, bump, block the view, steal the camera, etc
Take care to compose the image so that all parts of the subject show clearly and there is no distracting background. Composition is critical if the images are going to be assembled into a movie. Clear images are essential if a movie is viewed at quarter screen size or a movie file is saved in a highly compressed format
Estimate a suitable time interval between each photo (e.g. use a trial run or observation of the rate of change). Calculate how many photos will be

taken from start to finish. Check the capacity of the digital camera storage and then set a resolution that will allow up to 10% more photos than anticipated. (e.g. if it takes 3 hours for hibiscus flower to open and you have a 64 MB Compact Flash card which can fit 200 photos at 1024 pixels by 768 pixels then it is okay to choose a 1 minute time interval)

Set the time interval, flash setting, date and time imprint or any other necessary controls

Consider whether automatic or manual exposure is most suitable (AUTO: the camera will vary the exposure as light changes and this will show in the movie, MANUAL: constant exposure can be set e.g. for a sunset - but large changes in lighting may result in some over or under exposed images)

Do not place the digital camera too close to the subject. Otherwise after expansion or change the subject may not still be completely in the field of view (e.g. as a flower bud opens it becomes much larger). It is possible to batch process all images later if necessary to crop to a closer view

Take a few test shots and review them in the LCD viewfinder. Make any necessary adjustments. Carry out final checks of the power, camera settings and subject composition

Start the sequence before any activity happens and leave the camera taking photos for a short while after the main event (this allows more scope for editing and assembling the sequence)

Press the shutter release to start recording the image sequence. The first photo is usually taken immediately, then wait your chosen time to check that the second photo is taken on schedule

For action that takes place over a long time check the equipment and subject at regular intervals

When the action has clearly finished turn off the digital camera and transfer the images to a computer

Other points to consider:

* With some science experiments it may be possible to place 'control' and multiple 'test' samples side by side so that each photo shows all samples. Measurement and analysis can be based on individual photos or the assembled movie. Data logged concurrently from probes (e.g. temperature, pH) can be used as the information can be correlated via the date and time stamp imprinted on each photo.

* Many plants follow any changes in the direction of the light source so an opening bud will swivel to follow the sun if it is outside (or near a window inside with limited artificial light). Plant stems can require support (e.g. copper wire or a plastic straw) to stay rigid if they are responding to a stimulus or losing water from being cut.

8. Time Lapse Processing Software

Analysis of individual frames can be very useful. Measurements can be made on screen or via printouts. Alternatively all the photos can be combined into time lapse movies that can be powerful learning tools. Choose the best set of images that clearly show the change over time (occasionally a few images in a sequence can be poorly lit or out of focus so these should not be used). Place all the good images in a folder on the hard drive of your computer. **DO NOT RENAME ANY TIME LAPSE FILES - THEY MUST ALL REMAIN SEQUENTIALLY NUMBERED.**

QUICKTIME PRO (Mac and Windows)

One easy way of assembling the series of photos into a movie (e.g.

lapse.mov) is to use Quicktime Pro software. Load Quicktime **Pro** (the free Quicktime **Player** software does not have the feature to create a movie from a series of photos). Choose **File - Open Image Sequence...**, select the appropriate folder, select the first image in the series, click on **Open**, choose a suitable number of frames per second (or seconds per frame), click **Okay**, adjust the movie window size if necessary (e.g. **Movie - Fill Screen**) and click on the **Play** button.

Voila - a time lapse movie! The final step is to save it in a file format suitable for your friends. Choose **File - Save - Make movie self-contained** to make a Quicktime movie file (mov) or **File - Export** and select a suitable format (e.g. avi). Detailed help for Quicktime Player and Pro is only available online but it is very useful to learn more about the software.

MOVIE MAKER (Windows XP)

Another method to assemble a series of images into a movie (e.g. lapse.wmv) is to use Movie Maker software that is included with Windows XP. Load Movie Maker, choose **File - New - Project** (if there are existing files in the collection area you may also need to choose **File - New - Collection**), next choose **View - Options...** and adjust **Default imported photo duration (seconds)**: to 1 (even one can be a bit a long but this is the minimum available setting), choose **File - Import...**, open the required folder and select ALL of the time lapse photo files, click on **Open**, wait while the clips are created, then drag ALL the clips into the **Timeline** or **Storyboard** view.

The **Storyboard** view is ideal for changing the position of a clip in the movie project. In the **Timeline** view you can adjust the play time of each clip - for fine adjustments use **+** (Zoom In) and drag the trim handles - this way the play time can be reduced to as short as 0.1 of a second. Use **-** (Zoom Out) to see more of the clips.

Audio clips can only be added to the **Timeline** view. If you attach a microphone one option is **Record Narration...** - you can add your own voice overs. Another option is to **Record** from Audio CD. Title screens need to be created in another program, saved as a graphics file and then imported. As you assemble the movie use **Play** to review your progress. The final step is to save it in a file format suitable for your friends. Choose **File - Save** and select suitable settings. For more detailed information about how to use the software choose **Help - Help topics** - excellent content, index and search features are provided.

MAGIC PIC2ANI (Windows 98/2000/NT/ME/XP)

Pic2Ani takes a sequence of bitmap images (gif, jpg, png, ico, tif, tiff, tga, pcx, wbmp, wmf, emf) and can output the sequence as a movie file (avi, gif, swf).

It is available from <http://www.effectmatrix.com/download.htm>

PHOTOLAPSE 3 (Windows)

It will only take jpg images, but it's still pretty darn good - especially as it's free.

It is available from <http://home.hccnet.nl/s.vd.palen/>

...

(please email me details of any other free or cheap software that can easily assemble time lapse images into a movie)

No matter what software you use the final file size will depend on your choices when saving but remember that large file sizes are slower to email to others. Your friends need only a suitable media viewer or player to watch the movie -

these are freely available for download from the Internet.
(for detailed information about creating video clips using mini DV digital camcorders visit <http://www.zardec.net.au/keith/digvideo.htm>)

9. Time Lapse Samples (some samples very large - best on a fast connection)

Assorted samples - great variety of topics plus notes on timing

**** <http://www.haworth-village.org.uk/nature/time-lapse/thumbs.asp>

Plants-In-Motion - online source of time-lapse plant movies

**** <http://sunflower.bio.indiana.edu/~rhangart/plantmotion/PlantsInMotion.html>

Cicada hatching, crystal growth

<http://www.microscopy-uk.org.uk/mag/artsep00/tlgallery.html>

Aging bananas, eclipses, baking cookies, clouds, ... (can be slow to load)

*** http://www.xtmedia.net/eng/e_ivideo.html

Clouds, people, cars, setting sun, boats, ants, ...

*** <http://www.quenchstudios.com.au/tlapse1.htm>

Ferris wheel, clouds, car ferry, ...

*** <http://www.pclix.com/pages/gallery.html>

Marine life - fish eye view (slow to load - click on link for time lapse movie)

*** <http://www.fisheyeview.com/Movies.html>

Brain tissue loss in Alzheimer's disease

*** http://www.loni.ucla.edu/~thompson/AD_4D/dynamic.html

Young stars belch fiery gas in Hubble space telescope time-lapse movies.

** <http://www.cnn.com/2000/TECH/space/09/21/hubble.stars/>

Approach to Jupiter (lower part of page)

** <http://voyager.jpl.nasa.gov/science/jupiter.html>

Spots, Flares and Coronal Mass Ejections

** http://sohowww.nascom.nasa.gov/hotshots/2001_03_29/

Commercial Samples (view in MOVIE THEATRE section)

**** <http://www.timelapse.com/content.php?name=stock>

Auroras, ...

http://www.timelapse.nl/s1page.php?p=pag&mn_id=10

Recording construction activity

<http://www.kinns.org.uk/professional/timelapse.html>

<http://www.inetarch.com/index.html>

http://www.sciencephotography.com/faq_chap7.shtml

Cambridge web cams ...

<http://gimel.esc.cam.ac.uk/chris/camcam/>

Animated cartoons

<http://www.sci.fi/~animato/homepg/home.html>

Clouds

<http://www.eddiem.com/photo/>

Artistic film - Le Chant du Styrene, 1958 - "... the images of animated, time-lapse photography of boldly colored plastic objects sprouting like inorganic seeds that have germinated from the artificial bounds of a framing mat ..."

<http://www.filmref.com/directors/dirpages/resnais.html>

Plain, canal, clouds

<http://www.persuasive-images.co.uk/html/timelapse-photography.htm>

Time lapse photography using a cheap webcam

<http://www.ex-parrot.com/~chris/random/time-lapse/>

10. Helpful Resources

(*** recommended resources - more stars is better)

How To Do Time Lapse

<http://www.sciencephotography.com/how2do2.shtml>

<http://msn.pcworld.com/howto/article/0,aid,123232,00.asp>

Stop motion software

** <http://www.istopmotion.com/>

A Time Lapse Primer

** http://www.soc.org/opcam/09_fw9697/mg09_timelaps.html

Advanced

<http://www.rit.edu/~andpph/ipt/des-hispeed.html>

11. Site Credits

This site is to help the 80% of people who just want information and communication technology to be easy to use and reliable. To maintain fast access I have only included a low resolution animated gif (30 k) made from just 5 images out of a series of over 80 original photos. Please email me if you would like the full 1 MB hibiscus movie. Art, graphics and site layout for both the student and teacher versions was produced by Jade Lightbody. Feedback from Craig Blair, Neil Harvey, Ian Gaynor, Bryn Jones and my family has been included on this site. Peter Spicer-Wensley, David Alibon, Eddie Matejowsky, Darryl Luscombe, Paul Cormack, Jennifer Douglas, Chris Scerbo, Neil Matthews, Hartmut Gruenhagen and Brad Emerson have provided assistance and information. My mother-in-law supplied many roses while I developed better time lapse techniques. First published online in January 2002. Please take the trouble to offer ideas or suggestions - you will be acknowledged and others can benefit. Currently up to 300 people per week visit the time lapse section of my site. Visitor statistics now provided by Google Analytics or Chillitech web stats. You may use portions of this work under the fair dealing provisions of the Copyright Act. The complete site should not be included on another website or in email. Please hyperlink to the current version at <http://www.zardec.net.au/keith/lapse2.htm> or request permission for other situations via email.

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