

# DIG ART!

CULTIVATING CREATIVITY  
IN THE GARDEN



## Photography in the Garden: Time-Lapse Video

- Overview** Students engage in a real time travel experience in the garden, through creating a time-lapse video.
- Objectives** Students will:
- create a time-lapse video from digital photo stills, including elements of planning, production, and post-production
  - observe plant life cycles and movements, including concepts such as germination, tropism, and nastic movements
  - use a time-lapse video as a creative source of inspiration for other garden-based activities, i.e. dance performances, garden video stories, etc.
- Time**
- 2-hour session for planning
  - 2-hour session for production
  - 2-hour session for post-production
- Materials**
- computer with webcam and internet connection
  - software with time-lapse video capabilities (QuickTime Pro is recommended, cost \$30)
  - seeds, plants, a garden, or other relevant time-lapse movie subject
  - a location with adequate light and space to film the time-lapse video
- Background**
- Plants provide us with oxygen, food, fiber, and fuel, yet despite being the basis of human survival, their lives tend to remain a secret to us. They live on such a different time scale from us that we often regard them as unchanging and tend to forget that they too, like humans, are in constant motion as they grow and develop, search for energy and nutrients, avoid predators, and reproduce.
- A time-lapse video is a great way to capture the movements of plants. A simple video can be created by taking a series of images, ranging from seconds to hours apart, and then viewing them in rapid succession, similar to a flip book. In this way, plant movements are shown at a more rapid speed, to reflect a pace at which we are more accustomed to as human beings. The real beauty of time-lapse is that it lets you see the natural progression of growth, while not having to wait through the actual length of it.
- Youth may be disconnected from the lives of plants and are so technologically-focused these days, that it seems pertinent to use a technological medium to engage them in plant-based learning. Time-lapse is a great way for children and youth to view the world of plants around them, literally through a lens of

technology. Watching the germination of a seed, or the blooming of a flower are simple yet powerful testaments to the miracle of life. We hope this project will awe-inspire youth to discover the magic, beauty, and inspiration that can come from plants and gardens.

## Instructions

### Introduce time-lapse

1. Ask the group:
  - Have you seen a time-lapse movie before?
  - Invite students to share examples, such as clouds moving quickly across the sky or traffic zooming down a highway.
  - What do you like about time-lapse movies?
  - What is the difference between regular movies and time-lapse movies?
  - How do you think time-lapse videos could be used to learn about plants or in a garden setting?

### Introduce plant movements

2. Ask the group:
  - Have you ever noticed a plant changing? What kind of plant? When did it change? Where? Do you know why? How did it change?
  - What are a plant's life stages (i.e. from germination through to decay)?
  - What external influences affect a plant's movement (i.e. sun, wind, night/day, predators, gravity, etc)?

Discuss how plants change over their lifetime, as well as how they move on a daily basis. Introduce concepts such as germination, tropism, blooming, and nastic movements (see Resources for a glossary). Emphasize that plants are a lot like humans, they just move a lot more slowly than we do.



### Watch time-lapse movie clips

3. Show the group these two time-lapse video clips.

[Lily Blooming](#)  
[Gardener Planting](#)

Ask the group to react to the videos and highlight what they liked or didn't like about them. Invite the group to watch more garden-based time-lapse videos on [YouTube](#). They can search for specific videos by typing keywords into the search box such as "time lapse seed germinating", "time lapse flower blooming", "time lapse vine climbing", etc.

## Choose a subject & location

4. Ask the group to collectively decide on a subject for their time-lapse video. The subject could be related to any aspect of their gardening program, such as seeds germinating, a flower blooming, radish seedlings growing, a gardener planting bulbs, an entire garden season, sunflowers rotating with the sun, etc.

Ask the group to decide on an appropriate location for photographing the time-lapse. Keep in mind:

- Find a location that can be left alone for the duration of the shoot (i.e. no people walking in the background, no change in lights or shadows, etc).
- Make sure there is sufficient lighting for the shoot at night. You may need to set up grow lights that stay on all night, and are turned off for part of the day, to give the plants a rest (i.e. 18 hours on, 6 hours off).



## Plan the shoot

5. Once you've chosen your time-lapse subject and location, you will need to plan the actual photo shoot. To plan the shoot, you'll need to calculate how many photos need to be taken and at what intervals. To calculate these numbers, first consider:

- the length of the event
- the desired length of the time-lapse movie

The actual length of the event will help you to determine how long you can go between photos, while still documenting the main actions of the event.

### Long-term projects (i.e. a 9-month time period):

For longer projects, such as capturing the seasonal changes of a garden over a 9-month time period, you might only need to get a new shot of the garden every day or two. You can do that with a simple point-and-shoot camera and a tripod. However, be sure to mark the place where the tripod and camera should be positioned so that the same photo is taken at the same level and perspective every day. Also, for consistency's sake, it's important to take the photo at the same time of day, every day.

### Short-term projects (i.e. a minute to a few days or weeks):

For shorter projects, such as capturing a blossoming flower over a 5 day period, you might need to take a photo every 5 minutes.

## Calculate

Here's how you can calculate the total number of frames needed and the interval between frames, for your time-lapse:

1. Determine how many frames you'll need to take, using the following equation:

$$\text{___ frames per second} \times \text{___ seconds} = \text{___ frames}$$

Most movies operate at a rate of 24 frames per second (fps). Decide on how long you want your movie to be. For example, if you want to film a lily flower blooming and you want the film to last 30 seconds, put that number into the equation to calculate how many frames you'll need, in order to capture a 30 second film:

$$\underline{24} \text{ frames per second} \times \underline{30} \text{ seconds} = \underline{720} \text{ frames}$$

2. Determine the time interval between each photo of the lily flower blooming, using the following equation:

$$\text{___ seconds (length of actual event)} \div \text{___ frames (\# needed for final movie)} \\ = \text{___ second intervals between shots/frames}$$

Estimate how long the actual event lasts (i.e. the lily will bloom in 5 days). Convert the time from days into hours and from hours into seconds (i.e. 5 days = 120 hours = 432,000 seconds). Plug the time into the equation to get the interval between frames:

$$\underline{432,000} \text{ seconds (length of actual event)} \div \underline{720} \text{ frames (frames needed for final movie)} \\ = \underline{600} \text{-second intervals between shots/frames}$$

In conclusion, to capture a 30 second time-lapse video of a lily blooming over a 5-day period, you would need to take 720 photos, with a 600-second (10 minute) interval between each shot.

## Install time-lapse software

6. For Macs:  
[Gawker](#) is a freeware program with time-lapse capabilities. It immediately recognizes any iSight or web-cam hooked up to your computer. After specifying an interval for it to take new shots at, it gives you one-button time-lapse recording from that iSight.

[EvoCam](#) by Evological is a \$30 shareware program that makes it easy to set up a webcam and create time-lapse movies.

For PCs:

[Webcam Timershot](#) (part of Microsoft's PowerToys package of free add-on software) will take pictures from your webcam, at the interval you specify, and will save them to a location you choose.

[Flix](#) is a \$10 shareware program that can merge stills into a time-lapse video. It can be used with either a digital camera or a webcam. It captures stills every few seconds, minutes, or hours depending on the interval you decide.

## **Production**

7. Once you have chosen your subject and location, planned the shoot, and have all the necessary technology, it is time to set things up for production.

Set up your computer, webcam, and any extra lighting you'll need at the location where your subject will be photographed. Check the light and positioning of your subject to make sure it is how you want it on the screen.

Test out the compatibility of the time-lapse software with your webcam, by setting your computer's time-lapse settings to an interval of 5 seconds for a total of 2 minutes. Check out the 24 photos that this test produces. Are you happy with the quality? Is there anything you need to adjust? It's important to take the time to make minor adjustments until you are 100% satisfied with the quality of your shot.

Note: Your computer needs to be fully powered during the entire period of the time-lapse shoot. Most computers have energy-saving screen savers that are configured to turn on after a certain amount of time. Others are configured to go to sleep after detecting a period of no activity. Make sure that you disable these features on your computer so that it can stay on and running non-stop during the shoot.

Enter the data you calculated for the number of frames and time between intervals, into your time-lapse system. Happy photographing!

## **Post-production**

### **8. Post-Production**

After your subject has been photographed, you are ready to assemble them into your time-lapse movie. The quickest and easiest way to do this is to use Apple's [QuickTime Pro](#) available for both Macs and PCs for \$30.

Once you have QuickTime Pro:

- Go to File > Open Image Sequence > the folder with your photos > select the first photo > click Okay.
- QuickTime will ask you how many frames-per-second you want your movie to have. Type in "24" fps if that is what you used in your calculations.
- QuickTime will do the rest for you, and your basic time-lapse movie is now ready.
- You can then export it for the web or save it so that you can add titles, music, and other effects to it in a movie editing program.
- If you want to add music and titles to the time-lapse video, import the movie from QuickTime into iMovie or Final Cut Pro (for Macs), or into Windows Movie Maker or Adobe Premiere for (PCs).

## Taking it Further

### Screen the movie

Arrange for a public screening of the time-lapse video at your school, library, or community center. Consider screening the movie outdoors, perhaps even in the garden where it was shot. Borrow a screen and projector from a school or local organization. If it's not possible to show the film outdoors, then why not show it in a local greenhouse? The presence of thriving, growing plants all around will surely enhance the cinematic experience for the audience.

### Flip Book

Print out or make a flip book out of your time-lapse photos. At [Flip Clips](#) you can upload short time-lapse video clips and order them to be printed out and sent to you as flip book.

Students can also illustrate the plant's movements through creating a flipbook of their own illustrations.

To create a homemade flipbook, simply:

- Divide regular sheets of paper into 9 squares, by folding into 3 sections in both directions.
- Cut the 9 squares up and bind together with staples along one side.
- Draw a series of plant movements, one on each page. Ensure a natural progression from page to page.
- Flip through the pages quickly and enjoy!

### Photo Montage

Take 5 photos of the same subject that were taken at different times. The 5 photos should represent a gradual but even progression of the sequence of events, from start to finish. Using a ruler and pencil, divide each photo vertically into 5 equal columns.

1	2	3	4	5
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For the first photo of the series, cut out the first column. For the second photo in the series, cut out the second column, and so on.

Mount the five columns, in order, onto a mounting board. Frame it if you like. Here is an example of a photo montage of a [city skyline at night](#).

### Performance Piece

Create an interpretive dance piece that is inspired from observations of plant movements in the time-lapse video. You can then project the time-lapse video onto a large white screen or a wall in back of the stage, and perform your piece in front.

**Resources:**  
**Glossary**

Germination

- The first part of a seed to come out is the root. The second part is the shoot.
- If a seed germinates in the dark, roots will grow more slowly once the shoot emerges from the seed. This is because a shoot is trying to reach the light where it can get energy from the sun for photosynthesis. When it reaches the light, it starts to produce leaves.

Photomorphogenesis

- Plant development is dependent on light for energy.
- Plants have developed highly sensitive mechanisms for perceiving light and using that information for regulating development changes.

Tropism

- Phototropism is when plant stems grow toward light.
- Plants tend to lean toward the window where the light is usually stronger than inside the room.
- Gravitropism is when a plant will grow according to gravity, with roots growing in the direction of gravitational pull (down) and stems growing in the opposite direction (up).

Nastic Movements

- Plant movements that occur in response to environmental stimuli, i.e. the closing of the carnivorous Venus Flytrap leaf when it captures prey or the folding of the mimosa leaf when it is disturbed.

Circadian Responses

- Plants have biological clocks that allow them to respond to changes in time.
- Plants have "sleep movements" such as the closing of flowers and changes in leaf position that many plants display at night.
- The growth rate of most plants also differs according to time of the day in a clock-dependent fashion.
- Light and temperature are two of the most important environmental stimuli since they usually change between night and day.

Flower Development

- The last stages of flower development are flower opening and flower senescence. Once a flower bud is fully formed and conditions are right, flower opening can occur.
- The process of flower opening involves differential expansion of cells and tissues in the different flower parts. The most extreme changes in cell and tissue expansion usually occur in the petals of flowers.

