

FIGURE 1

Student instructions for video assignment. The following information is provided to students at the beginning of the video project. Instructors may customize their own instructions, for example, by selecting which among the elements listed below will be required for their student videos.

Scope and Goals

Each student will work alone or in pairs to research a topic and communicate the findings in a 4–7 minute video. The main objectives are to communicate clear and accurate information in an engaging manner for an audience of your peers.

Note. The project is evaluated on the basis of its accuracy, academic rigor, clarity, and ability to engage the viewers. The video is not assessed on the basis of its technical merits (i.e., you will not get extra points because the final product is visually impressive in a way that does not bear on effective communication). Note that sound is more important than video—if no one can hear it, no one will watch it.

Deliverables

There are two deliverables:

1. The planning tools (storyboard and script)—due a third of the way through the course
2. The final video (along with signed video release forms)—due on the penultimate day of class

Required elements for the video

1. *Length.* Your video should be 4–7 minutes in length, *plus* time for a “credit roll” to show your references.
2. *Style.* There are no restrictions on the style of the video (i.e., you may use a narrated slide show, a recorded lecture, a digital whiteboard, a stop motion animation (Claymation), a sock puppet show, animated graphics, a scripted scene, filmed artist drawings on paper, “man on the street” interviews, a combination of the above, etc.)
3. *Title slide.* Your video should begin with a descriptive title, your name(s), the name of the school, and the year in which it was created.
4. *Original content.* Aim to create your own resources. That means using your own drawings, pictures, music, animations, filmed scenes, and interviews. Where this is not possible, be sure that you only use material which falls under Creative Commons licence (that you can use and modify without breaking copyright laws).
5. *Interview.* You must conduct and include an interview with an expert. You may conduct the interview in person, on Skype, by phone, or by e-mail. Once you have identified a suitable person, contact them ahead of time to politely request an interview. Inform them that it will be recorded and request their permission to do so (it’s the law!). Remember to be courteous and respectful of their time. That means preparing at most three questions and taking less than 10 minutes of their time. The list of proposed interviewees and the three interview questions must be approved by the instructor when you submit your script and storyboard before you conduct the interview.
6. *Video release forms.* Anyone who is featured and identifiable in your video (interviewee, man on the street, actor, narrator, etc.) must sign a Video Release Form, which you can obtain from your instructor. You must submit these completed forms

when you submit your video.

7. *References*. All artifacts (images, videos, music, sound effect, etc.) used in the video which you did not create yourself must be cited at the end. You do not need to use a complete reference; simply include a brief description of the item and a web address where the item was found (e.g., Picture of kitten www.sPCA.com). Be sure that all are subject to a Creative Commons licence. Include a separate section where you credit the sources of information you used to research your video. This information should be cited using a complete reference. Your instructor will provide suggestions about how to complete this step more easily.

8. *Credits*. Acknowledge the people who contributed to the video, including yourself, your interviewees, narrators and actors, people who supported the production, and your instructor, and specify that the video was made within the context of this course (course number, institution, date).

9. *File format*. Your video must be submitted in one of the following file formats: *.mov*, *.mv4*, *mp4*, *.wmv*. Note that these are *rendered* movies, that is, files that will play on someone else's computer. Be sure to test your finished product ahead of the deadline.

How to Begin

Your project will take place in three separate stages:

1. *Planning*. This is the phase where you research your topic and envision how your video will look and sound (using planning tools such as the script and storyboard).

2. *Production*. This means creating and collecting all the artifacts (e.g., images, videos, sounds, narration) you will need for the video.

3. *Editing*. This stage is done using video-editing software such as Power Point, iMovie, or Movie Maker, where you stitch the artifacts together and synch them in time with a narration or other sounds.

Resources

The website www.desktop-documentaries.com provides a wealth of information on possible storytelling techniques, basic video structure, scriptwriting advice, and more. If you are drawing a blank, consider structuring your video as you would an essay (hook, thesis statement, arguments that support your thesis, summary).

FIGURE 2

Elements that make a video effective at communicating information.

Good quality audio

- Narration is clear.
- Music does not detract from or obscure narration (i.e., avoid music with singing, and the volume of the soundtrack should be low compared with the narration).
- If, for reasons that cannot be circumvented (e.g., wind at the time of recording), the sound is unclear, subtitles may help viewers make sense of the scene and remain engaged.

Pacing

- Slow enough to give viewers a chance to think about the information presented.
- Pause between sections of the video that present different concepts to indicate a break (it's like starting a new paragraph on paper).
- Show images for long enough that a viewer can make sense of them but change them periodically to ensure that viewers remain attentive.

Relevant visuals

- Visuals match the narration.
- The narration orients the viewer to the image (e.g., the narrator says "in the left-hand corner of the circle there is a blue dot that represents electrons . . .").
- Include subheadings or tag lines to emphasize new vocabulary or to introduce someone.
- Avoids distractors such as fancy transitions, tangents, and audio-visual overstimulation.

Appropriate for audience

- Targeted to an audience of peers; it is neither too technical nor too simplistic. It should help your peer learn something new.
- Go for depth rather than breadth.
- Video is respectful; it does not denigrate others, use offensive language or imagery, or inappropriate humor.

FIGURE 3

Sample video formats shown to students as examples of styles that could be used in the creation of their own videos. This list is not exhaustive and the videos are not necessarily engaging, but viewing these videos typically gives students ideas for their own project and generates a lot of excitement.

Acting

Students may put on a play in which they act out a script in the service of delivering their content. One example is *When and Where are Black Bears White?*

(<https://youtu.be/0Ny6Or7Mf9Y>)

Animation

These are several types of animations that students may create.

- PowerPoint may be used to illustrate biological processes. Custom animations move forms and figures around in a choreographed manner. I created the *Sample Animation of Mitosis* (https://youtu.be/kk1kcC_NESU).
- Online tools and apps also make the creation of animated characters a possibility. Examples include a cartoon animation *Where Does all Your Tax Money Go?* (<https://youtu.be/2kU4HDKkfr8>) and a *Sock Puppets Tutorial* (<https://youtu.be/1fsI2IGWNDc>).

Documentary

The documentary style is familiar to many and can mix several different formats in the telling of a narrative. The trailer for the documentary *Life According to Sam*

(<https://vimeo.com/74468499>) is particularly poignant and illustrates the power of this format.

Interviews

Interviewing an expert, whether in person, by Skype, by phone, or by e-mail, can enhance the perspectives conveyed in a video. This *Student Interview* (<https://youtu.be/2iy4i9bS9tk>) provides a taste of this format.

Man on the street

When addressing misconceptions, it may be informative or even entertaining to ask the average “man on the street” for his opinion about a topic. The YouTube Channel Veritasium uses this form particularly effectively (<https://youtu.be/vqDbMEdLiCs>)

Stop-motion animation (Claymation) and time-lapse photography

- When showing a phenomenon that takes place slowly, time-lapse photography (where pictures are taken at regular intervals and played back in rapid succession) is a striking option. See this *Fruit and Vegetable Decomposition, Time-Lapse* (https://youtu.be/c0En-_BVbGc).
- Claymation is a special form of stop-motion animation where the subject of the photos is made of plasticine. It can be an effective way to illustrate a biological process. Apps make this easy to do; my first attempt required 2 hours to produce a 2-minute video: *Example of Uses of Claymation for Biology Instructors (Mitosis)* (<https://youtu.be/YUkpMyk59PQ>).

Illustrating Words

There are times in a video where it is best to draw to illustrate words. There are several ways in which such a drawing can be incorporated in the video.

- The host may simply write on a whiteboard or chalkboard while talking to the camera. *Katie Gimbar's Flipped Classroom* video showcases this technique

(<https://youtu.be/jMfSLXluiSE>).

- The artist may draw on a whiteboard and the action may be sped up using stop-motion animation techniques. The finished product could look like this *Minute Physics* video (<https://youtu.be/IOYyCHGWJq4>). One of my students used a white poster board. She pre-drew her graphics using pencil, which was too faint to be picked up by the camera. She then used a black marker to trace the pencil drawings, which then became visible to the camera. This little trick made her drawing seem self-assured when in fact they were meticulously pre-planned.
- Several apps such as *Doceri* and *Explain Everything* allow users to use a tablet to prepare digital whiteboard presentations that can be saved as videos. The end product looks like the videos of the Khan Academy (https://youtu.be/u6gpw_Deth8).

FIGURE 4

Recreation of what the storyboard for the first three scenes of the student video *DDT: The Savior and the Destroyer* (<https://youtu.be/QHeNo48zsRE>) might have looked like. The quality of the sketches is not important; rather, students must think carefully about the nature of the image that would best illustrate their narration. The information in the storyboard may contain the script, sound effects that will be heard while showing that visual, timing, type of transition used between visuals, and so forth.

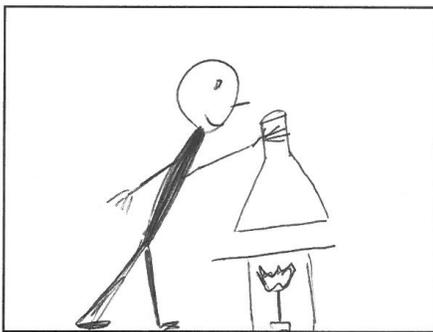
DDT
THE SAVIOR & THE DESTROYER
by Caroline

SHOW TITLE SLIDE FOR 5 seconds

NO MUSIC

NO NARRATION

FADE TO BLACK (slow)



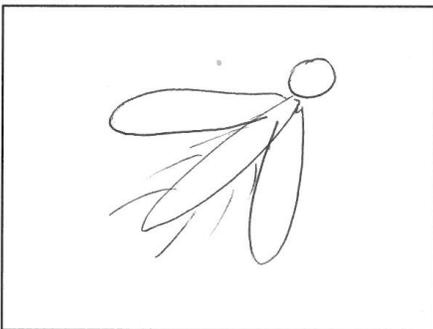
[PICTURE OF PAUL MÜLLER]

MUSIC: Something reminiscent of WWII era

SCRIPT: In 1939, PAUL HERMANN

MÜLLER DISCOVERED A MIRACLE.

FADE TO BLACK (RAPID)



[PICTURE OF A FLY]

MUSIC: CONTINUED FROM PREVIOUS, low

SCRIPT: IN THE SEARCH FOR AN

EFFECTIVE INSECTICIDE, MÜLLER

HAD DISCOVERED THE POTENTIAL OF A

SUBSTANCE CALLED DICHLORODIPHENYL-

TRICHLOROETHANE, OR DDT.

FADE TO BLACK (RAPID)

FIGURE 5

Rubric for video project. The video project has two submission deadlines. Partway through the course, students hand in their planning documents (script and storyboard). The purpose of this submission is to provide guidance and feedback to students so it is graded on a pass/fail basis. Once they have received feedback, students work on their video and submit it at the end of the course. The video is graded based on its effectiveness in communicating new content, not on its technological merits.

Planning Tools (Script and Storyboard)

(40%)

Students prepare a script and storyboard as a way to plan their video and receive feedback. These documents are evaluated on a Pass/Fail basis. A Fail translates into a grade of 0%. A Pass receives the same grade as the final video project.

To receive a “Pass,” the following requirements must be met.

- Planning documents show evidence of extensive research that give students a good grasp of the topic. If students were examined on this topic, they would pass the test.
- The storyboard and script should be coherent and logical. Haphazardly assembled ideas will not receive a Pass.
- Reading the script aloud takes roughly 3–6 minutes, indicating that there is sufficient material to support a 4–7 minute movie (adding visuals will add time to the video).

- Each part of the script is explicitly and clearly linked to a scene in the storyboard.
- The script and storyboard are described in sufficient details that if they were given to another student, this person could produce the video and achieve a product similar to the one originally envisioned.
- The documents are submitted in a professional manner. The pages are bound together, numbered, and organized; the names of the author(s) is clearly indicated; the script is either typed or hand-written in clear penmanship; and while artistic talent is not a requirement for the sketches in the storyboard, the drawings should clearly show what the author(s) envisions for the scene.

Final Video

(60%)

The videos are evaluated on the basis of the following criteria: accuracy, academic rigor, clarity, and ability to engage the viewer. These criteria are described below. Each has equal weight (i.e., each is worth a quarter of the final grade).

Once the grade is determined, another criterion, completeness, is applied to obtain the final grade. If the video is complete, then the grade remains unchanged. However, if a video lacks required elements, the final grade is adjusted. For example, if a video does not include an interview with an expert, the grade is multiplied by 0.9 (i.e., students lose 10% of their final grade). Instructors should establish a “weighing factor” for each required element, depending on the ones they choose for the assignment.

Accuracy	All of the information provided in the video is correct, as verified by trusted sources of information (these sources must be listed in the citations at the end of the video).
Academic Rigor	The authors of the video show good grasp of the information they are communicating. There is evidence of depth of research and viewers learn a reasonable amount of new information by watching the video. The information is challenging to peers but not incomprehensible.
Clarity	Information is communicated clearly and logically and is disclosed progressively to build on the previous foundation and provide a richer understanding. The organization of the video is coherent and flows from one part to the next into a seamless narrative.
Ability to Engage the Viewer	The video is interesting to watch. It elicits curiosity and a desire to know more. The video shows evidence of creative and original thinking in presenting the information.
Completeness	<p>The video meets the following submission criteria (instructors may wish to indicate the weight of each element on the final grade):</p> <ul style="list-style-type: none"> • Submitted by the deadline • Submitted in the expected file format • Complies with the 4–7 minutes length • Includes the required components for the movie (instructors may wish to list the ones required for their assignment, such as including a title, interviews, citations, original artwork,

signed Video Release Forms, etc.)

Minimal requirement. The minimal requirement for passing this assignment is the submission of a file in which there is audio (video may be missing or be of subpar quality). A coherent audio file will allow the work to be assessed and graded, though some points will be lost for completeness.