

Equipment & Software Guide

This document is broken up into two parts: *Equipment for Filming* and *Equipment for Post-Production*. This is a list of equipment we used, and it is not meant to be an exhaustive list of equipment for any filming project. Rather, we hope that it gives you some idea of the equipment you may need to procure before filming and producing your own videos.

Equipment for Filming

- **Main Camera**

We used a **Canon Vixia HF G30** Camcorder



- **Tripod**

Any will do, but the sturdier and more stable the better.

- **Memory cards** (high capacity/speed for cameras)

We purchased several **Lexar 128GB SDXC 600X** memory cards. However, you can probably get faster cards now for the same price we paid when we began the project, and we recommend faster cards for filming in HD.

- **Overhead camcorder**

We used a **Canon Vixia HFR500**

This is used when you want to capture work the talent is doing off the Cintiq (see below for information on the Cintiq capture device). If the talent will be working only on the Cintiq, this is probably unnecessary.



You may also need overhead mounting equipment and lighting if you use an overhead camcorder:

- **Mounting hardware for overhead camera:**

- **Manfrotto 244RC** variable friction arm with quick release plate
<https://www.manfrotto.us/variable-friction-magic-arm-quick-release>



- **5/8 Scissor Clamp Receiver** to attach to drop ceiling (you may need something else, depending on your studio space) https://www.bhphotovideo.com/c/product/840837-REG/Kupo_KD302012_Baby_Drop_Ceiling_Mount.html



- **Overhead light & mounting hardware**

The purpose of this was to light the work area for the students when we used the overhead camera. If you do not plan to use an overhead camera, you can probably omit this.

- **Impact Qualite 300w Continuous Tungsten Light** https://www.bhphotovideo.com/c/product/888366-REG/impact_v_2012_qualite_300_continuous_flood.html



- **Scissor clamp stud** to mount to a drop ceiling (again, we needed this for our drop ceilings; your needs may vary) https://www.bhphotovideo.com/c/product/3569-REG/Avenger_C1000_C1000_Drop_Ceiling_Scissor_Clamp.html



- **Green screen kit**

Impact 4 Light Green Screen Kit

https://www.bhphotovideo.com/c/product/920066-REG/impact_4_light_green_screen.html

Includes a screen, frame, four lights, stands, umbrellas, and softboxes. We purchased this one, and it was excellent for our needs.



- **Wireless microphones**

We used three, one for each student and one for the teacher.

https://www.bhphotovideo.com/c/product/618739-REG/Sennheiser_EW_112P_G3_A_EW112_p_G3_Camera_Mount.html



- **Sound/Mixing board**

We used a **Mackie 1202-VLZ3**



- **Screen capture device and software**

We decided we wanted to digitally capture the talents' work so that we could display it in real time in our videos. Here is what we used.

- **Wacom Cintiq 13HD and extra pen**

A description of how and why we used this device can be found in our Filming & Audio guide.

<http://www.wacom.com/en-us/products/cintiq-13-hd>



Note: We initially thought we would have two Cintiqs, one for each talent. However, when we filmed a lesson with each person having his or her own Cintiq, there was very little dialogue, very little collaboration, and in general it was awkward, both filming and in post-production. The talent did not like working on separate Cintiqs either, so we scrapped the idea and only used one shared Cintiq for the rest of the lessons.

- **Camtasia Screen Capture software**

<https://www.techsmith.com/camtasia.html>



- **Macbook Air**

The teacher used this during filming to run the Cintiq and Camtasia.

Note: This project was powered by Macs and Mac-compatible software. If you plan to use PCs and Windows, you'll need to do research on compatibility.

- **Paintbrush** (or other image-editing software, but Paintbrush is free and it got the job done!)

- **Geogebra**
We used this to create applets that the students explored. See www.geogebra.org.
- **Gaffers tape**
This is an all-around all-star. We used it to tape down cords (safety first!), mark out guidelines for where to place equipment for easy set-up, and various other purposes.
- **Velcro strips with adhesive backing**
We used this to stick our microphone packs under the table and out of the way.
- **Surge protectors**
- **Headphones**
For monitoring audio during filming

Equipment for Post-production

- **Memory cards**
We suggest keeping separate memory cards for exporting files from Camtasia and for filming. We purchased several **Lexar 128GB SDXC 600X** memory cards. However, you can probably get faster cards now for the same price we paid when we began the project, and we recommend faster cards for quicker exporting.
- **Mac Pro**
We bought essentially the base model, but in hindsight, we recommend increasing processor and memory as much as your budget will allow.
- **Video editing software**
We used **Final Cut Pro X**.
Note: We do not believe iMovie is sufficient to produce videos with the quality of animations, voiceovers, and annotations in the MathTalk.org videos.



Final Cut Pro X

- **SD Card reader**

We purchased a **Transcend Multi Card USB 3.0** reader, but any should do.

[https://www.bhphotovideo.com/c/product/815153-REG/Transcend TS RDF8K USB 3 0 Multi Card.html](https://www.bhphotovideo.com/c/product/815153-REG/Transcend_TS_RDF8K_USB_3_0_Multi_Card.html)



- **Apple Magic Mouse**

- **Apple Wireless Keyboard**

- **Apple 27-inch Thunderbolt Display**

- **External HD storage.**

We recommend that you get as much storage as you can afford. HD footage is large, and Final Cut Pro X files are extremely large. If you do not want to delete your files as you process them (so you can possibly go back and edit at a later date), you should get as much storage as you can. We started with one 6TB HD, which was effectively 3TB of storage, as we use a RAID 1 configuration.

See https://en.wikipedia.org/wiki/Standard_RAID_levels#RAID_1 for more info on RAID configurations.

Midway through the post production of our first unit we realized we needed more storage, so we purchased an 8TB (effectively 4TB with RAID 1) hard drive. Once we began our second unit we purchased a 16TB (effectively 8TB with RAID 1) for even more storage.

We recommend that at least one HD is Thunderbolt. Thunderbolt drives are recommended for editing because they are faster than USB. Our first two drives were Thunderbolt, but in hindsight we probably could have saved some money by purchasing USB drives after our first one. This is because you can use USB drives to store your Final Cut Pro files once you are done with a lesson/unit.

Ultimately, we ended up with a total of 30TB of storage (effectively 15B with RAID 1), of which 14TB (effectively 7TB with RAID 1) that is Thunderbolt.

We purchased the following drives:

- **G-Tech 6TB G-RAID Studio Thunderbolt 2 Hard Drive**
- **G-Tech 8TB G-RAID Studio Thunderbolt 2 Hard Drive**
- **Western Digital 16TB My Book Duo Desktop RAID External Hard Drive**

