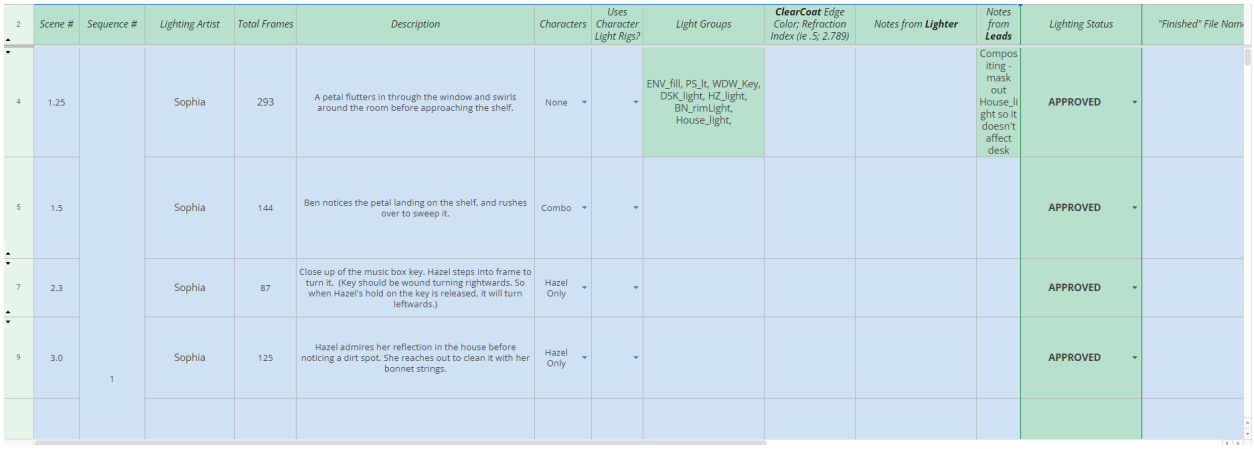
When I volunteered to be lighting lead for Ceramic Rabbit, I didn't have much direction as to what was expected of me or how to approach the task. I had plenty of knowledge on the process and adequate resources to find answers when I didn't, but I had never done anything like it before and I could have benefited from some advice. Throughout the process, I learned what things worked and what things didn't. My goal is to be able to pass my discoveries to the next set of students and the next cohort.

The first thing I did and would suggest you do as a lighting lead is to get all of the information for each scene and collect it all into a spreadsheet. A spreadsheet had already been made for the film with some information on it and I was able to adapt it to our specific needs.



	Scene #	Sequence #	Lighting Artist	Total Frames	Description	Characters	Uses Character Light Rigs?	Light Groups	ClearCoat Edge Color; Refraction Index (ie .5; 2.789)	Notes from Lighter	Notes from Leads	Lighting Status	"Finished" File Nam
4	1.25		Sophia	293	A petal flutters in through the window and swirls around the room before approaching the shelf.	None		ENV_fill, PS_lt, WDW_Key, DSK_light, HZ_light, BN_rimLight, House_light,			Compositing - mask out House_light so it doesn't affect desk	APPROVED	
5	1.5		Sophia	144	Ben notices the petal landing on the shelf, and rushes over to sweep it.	Combo						APPROVED	
7	2.3		Sophia	87	Close up of the music box key. Hazel steps into frame to turn it. (Key should be wound turning rightwards. So when Hazel's hold on the key is released, it will turn leftwards.)	Hazel Only						APPROVED	
9	3.0	1	Sophia	125	Hazel admires her reflection in the house before noticing a dirt spot. She reaches out to clean it with her bonnet strings.	Hazel Only						APPROVED	

You can see in the image above, I've listed each shot number (marked as Scene #) and included which sequence it's in. Column C is the name of the artist responsible for lighting the shot. The total frames and description columns are useful for the artist so they can verify they are lighting the right shot and if anyone else is confused what the shot is, they can reference this information as well. The characters column tells us if none, one or two of the characters are in it which is a good indicator to the complexity of

the shot since more characters means more specialized lights. We developed a lighting rig for the characters that could be turned on or off so it is indicated by the “Uses Character Light Rigs?” column. The point is, if the information may be useful to the artist, you as a lead, or the render team, then it’s probably a good idea to have that information listed in a location that anyone can access.

I made this spreadsheet early on and it became a tool I had open at almost any time during the day towards the end. The last two columns tracked the progress of each shot and once one was finished, listed the file name on the server so it could be found. Having all of this information readily available resulted in each artist being responsible for keeping up with their work at all times.

The next thing I would do is figure out the most common Light Groups you’re going to be using. This isn’t a paper on light groups but, in case you are unfamiliar, light groups are groupings assigned to as many or as few lights as you want and a pass can be rendered out that contains only their lighting information and effects on the environment (ie: I put a pxrRect light on an object and give it a light group name of “Key” and I can solo in on JUST the lighting effects of any lights with “Key” as their light group name ALL IN POST). This is particularly useful if you sort out your lights in a way that is most beneficial to the composite team.

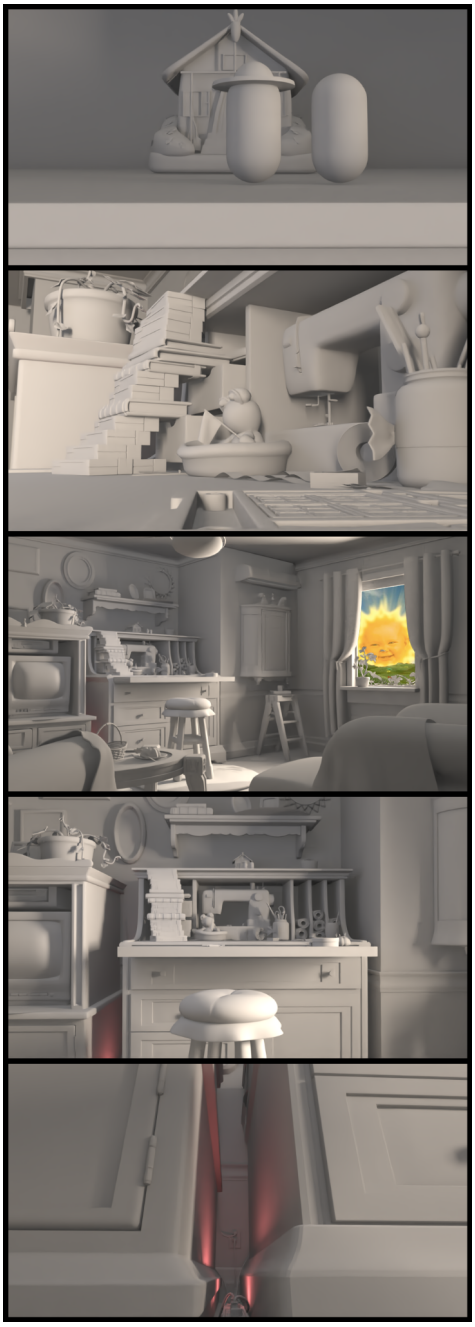
On Ceramic Rabbit, we had a separate light group for key, rim, and fill lighting for each of the bunnies, environment fill lighting, environment highlight lighting, powerstrip

fill lighting, and powerstrip highlight lighting. This meant that we could change how bright any of these things were in post without having to completely re-render. **The issue** that I encountered was that I did not determine all the light groups we would potentially use for the film and define them to the team so, when the time for render and composite came around, every artist had their own names for their light groups even though everyone's light groups were doing the same thing. It is easier for your composite and render team if everyone is using EXACTLY the same words (spelling, capitalization, etc) for their light groups so that every shot that is rendered can be plugged into the Nuke tree and the compositer knows what each light group layer is without having to toggle through them all. **Moral of the story: choose your light group names for every possible need for your film early on.**

The previous seniors suggested to us that we use character light rigs for our characters. I did some searching online for exactly how to create those but I mostly came across very high-tech examples but it can be as simple as 3 lights (Key, Fill, and Rim) that you group together and insert that group into the character rig so that it follows the center of gravity. Be sure to give each light its proper light group (ie: for Ben, his key light was BN_key, rim light was BN_rim, and fill light was BN_fill). **The benefit** is that now, your character can move throughout the scene and you do not have to key lights to follow him through his animation, since the lights follow wherever his center of gravity goes. Our lighting artist, Victoria, was responsible for setting up this for our team and she even made it adjustable so you could make it follow the character's head OR body. I would suggest getting this done as early as possible because there was a period of

time where we were lighting BEFORE the light rig was complete which resulted in some shots not utilizing the light rig because they were lit before it was done.

On the topic of light rigs, I set up a light rig for our environment that provided a jump point for the lighting artists. Our main source of light was the light coming in through the window so I started there and would do test renders and keep making adjustments and adding fill lights where needed until the scene was lit how we wanted it. The story involved clouds moving in front of the window so I also set up the lighting to reflect this and created a keyable curve in the scene that could be keyed to 0 for no clouds all the way up to 10 for complete cloud coverage. This allowed the artists a lighting setup that was flexible enough to work as a base for most of the shots and helped accelerate our workflow. A couple of the shots never even got any extra lights and were rendered out with just the environment lighting rig. The key is to make it flexible enough that people are able to use it; if you set it up for only one type of lighting scenario, it may be unusable to anyone not lighting a shot exactly like you imagined.



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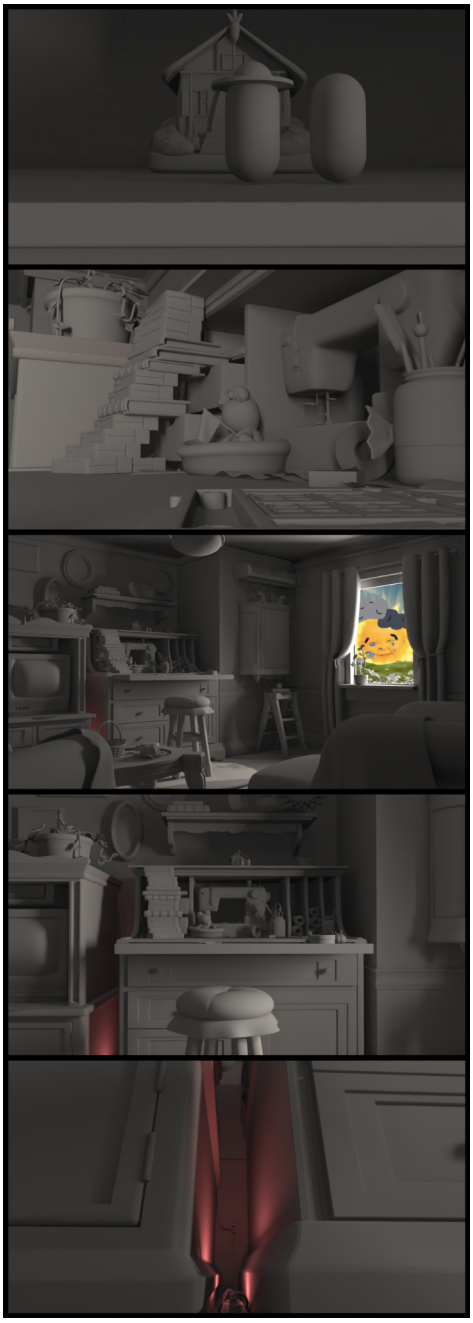

<Cloudy

For **lighting check-ins**, we would use google slides and have everyone submit ipr's of their work for each shot, in order of the shot number. Each week I would create a new, blank slideshow for artists to submit their work for feedback so we could talk about

adjustments and changes needed. I would have them label each slide with the shot number, the frame number in that shot, and their name. I would discuss what I liked and thought needed change with the other lighting lead and then we would take each image and **paint over it** the changes we wanted to see. For example, if we wanted to see more highlight coming from the window across the desk top, instead of just saying that, we would paint it on in photoshop. The same goes for highlights on edges, shadows from pieces and characters, and simple arrows to describe changes in direction of lighting. This was a fantastic tool that really helped the artists visualize what we were describing in their feedback and gave them a “target” to shoot for and compare their lighting to.

If I were to do the process again, I would have a second lighting spreadsheet that contains the most recent ipr renders for each shot and, everytime a change was made, it would be updated with the new ipr. I would be adamant about the artists keeping this slide updated with the most recent ipr because one of the biggest issues to overcome is different artists light scenes differently. If you have artist A lighting shot 47 and artist B lighting shot 48, you want 47 and 48 to look like they’re in the same world and you don’t want the lighting to change drastically which can happen if two different people are working on them. Having everyone’s current work available to be seen will give them the opportunity to make sure their lighting matches everyone’s around them. This is something I never got to try because I didn’t think about it until the last two weeks of production.

In order to stay on schedule, we began lighting scenes LONG before animation was complete. We were able to get rough ideas of how lighting needed to look because we had the camera movements finalized from Layout and we were able to rough out the animation using the character rigs that were being worked on. We would rough out the scene and light it accordingly, based on the concept art to match look and feel. Once we were happy with the lighting, we imported the finalized animations, as they were completed, into the lighting file (it's important to do it this way rather than importing lights because this allowed us to maintain our light linking without risking issues) and we adjusted the lighting we had if it needed it to accommodate the new, more articulated animation.

One issue we encountered once we started kicking rendering into high gear was that the materials were not applied properly for our characters which caused some dark shadows on the characters. We didn't know, when lighting, that the materials were causing an issue and we lit the bunnies so they looked normal, essentially compensating for the shadows with extra lighting. **Our issue was the normal map's color space was not linearized.** We discovered this because the bunnies were not looking very glossy, despite having a clear coat in their materials. By linearizing the normal map, it gave us that perfect gloss and eliminated those shadows but suddenly the materials were far more reactive to light so a lot of our shots that had been lit were suddenly too bright and blew out the characters. This is a simple mistake that we didn't even realize was a mistake until we started rendering and I don't blame anyone but this is a word of caution that, unless you want to end up like us, you, as the lighting lead for

your team, may want to just double check that the color space for the normal map for your character is set to ACEScg.

The last piece of advice I want to share from what I learned is good advice for everything and not just being a lighting lead. Some people work differently than others and some just need a little more attention. I had said I would create a new lighting slideshow each week for people to submit their work to for feedback and most people would put their stuff up there and wait for feedback but some people would not. This didn't mean they weren't doing the work, because I know they were. I just found that some people need that more direct approach or for you to remind them. Don't be afraid to get up and walk over to the person you're still waiting on lighting from and just ask them to pull it up right quick and just talk with them in person about what you're seeing and what improvements you'd suggest. Like I said, most people were fine with getting their feedback through the paint overs and the slideshows but some people just need that personal, human touch. If someone IS falling behind, encourage them to focus on a few shots rather than all of them and get those shots really good because chances are, someone else will finish their work early and be able to pick up those extra shots.

I hope this wasn't too long and contained some useful information in it. Like I had said before, I would have loved it if someone had left me a sort of roadmap for what to do and that is my goal with this for the next leads to come. Lighting is very technical but it is so rewarding to see all your hard work modeling and texturing come to life. Lighting is what makes that work look awesome!