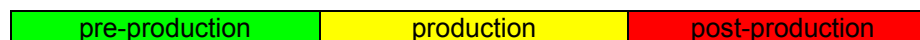


Animated 3D Feature Film Production Schedule (85 minutes)

24-month schedule

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Storyboard/Animatic	Green	Green	Green	Green	Green	Green							Green							Green				
Reading/Recording		Green		Green		Green							Green							Green				
Art Direction/Design	Green	Green	Green	Green	Green	Green							Green							Green				
Art Packet				Green	Green	Green							Green							Green				
Pre-viz/Workbook				Green	Green	Green							Green							Green				
Software				Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow			
Modeling/Articulation				Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow			
Surfacing/Illumination				Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow			
Layout				Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow			
Animation				Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow			
EFX				Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow			
Lighting/Compositing				Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow			
Workreel				Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow			
Test Screening				Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow			
Post-Production				Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow			
DCI				Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow			



The animated 3D feature film production schedule above presumes an initial screenplay draft and encompasses 24 months from the first storyboard panel to the final digital master. The following notes pertain to the schedule as a whole, and the line item tasks in particular. This is only a generic framework and must naturally be fitted and expanded to the particulars of any given animated feature film production. It also does not represent the gradual roll-on and roll-off of the production crew, which typically begins and ends with department leads and supervisors.

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TIMETABLE

The complete timetable indicated above for pre-production, production and post-production of the film is an aggressive 24-month schedule. This is consistent with current trends in 3D animated feature film production at both major and minor studios, which seek to reduce material creation time from previous cycles of 3+ years down to 2 years (or less). The aggregate time compression is now possible due to advances in non-linear production techniques, but must be based upon thorough production planning, tracking and follow-up in order to achieve sufficient quality. Obviously, major story changes can wreak havoc on tight schedules. In situations where both story notes and delivery dates are non-negotiable, the result is a bulge in production personnel/resources and activity, with an associated increase in management complexity.

PHASES

Filmmaking, whether live-action or animated, is typically characterized by the phases of *pre-production*, *production* and *post-production*. In live-action, *pre-production* refers to the phase before the shoot – in which production is planned, shots are storyboarded, a final shooting script is created, and some digital pre-visualization (pre-viz) may be done. The *production* phase in live-action refers to the actual on-set physical shoot (and is relatively short compared to animation production). The live-action *post-production* phase is where the shots are assembled by the director and editor into a *workreel* (a rough cut of the movie, formerly on film but now usually on an Avid system). Visual effects (VFX) shots are created in post, sound and score are added, vocal pick-ups are recorded, and color timing is applied. Today's digital film industry has seen a decrease in physical shooting schedules, but an increase in footage and special effects. The latter two factors have consequently expanded live-action post-production schedules.

In animation, *pre-production* typically encompasses storyboarding & *animatic* creation (the boards arranged sequentially in time to the movie and slugged against temp voice, music and sound), vocal recording, temp score & sound, production design and art direction, *art packet* creation (instructions to the production artists on every character, environment & element in the film), 3D pre-viz of complex scenes, and a *workbook* of camera instructions for every scene (the latter is sometimes omitted in favor of direct planning of the 3D environment in the Layout department).

Animation *production* is comprised of two general categories: *asset* production and *shot* production. Simply put, asset production is the creation of the “stuff” that is used in the film (characters, sets, props) and shot production is the creation of

finished scenes – assembled from those assets in the Layout department and then passed through the successive stages of Animation, EFX, Lighting & Compositing.

Post-production in animation encompasses many of the same tasks as are found in live-action production, although the general absence of live-action photography means that many of these tasks are more tightly integrated with production, to the benefit of an organic filmmaking process. In fact, as the lines between “animated” films and “live-action” films continue to blur, we have seen more live-action filmmakers employ production paradigms familiar to animation producers and directors.

Naturally, there are semantic variations from production to production. In the schedule above, *development* is presumed to have taken place as a run-up to the initial screenplay draft. While the development phase may include some storyboarding and design in part, the *pre-production* phase is understood to encompass storyboarding and design in whole. However, some producers may choose to categorize this activity in its entirety as *development*. Likewise, asset creation (CG models, rigs, shaders, etc...) which are categorized as *production* in the schedule above will sometimes be classified as *pre-production* activity. Regardless of the terminology employed, it is crucial that everyone on the film has a common understanding of what needs to be done and uses a shared nomenclature within the production environment (especially when the production environment may be leveraged across multiple studios in an outsourcing situation).

Regarding the order of these phases, we are accustomed to thinking of pre-production, production and post-production *sequentially*, with one phase ending before the other begins. The reality of feature animation filmmaking is that these phases are *conceptual* and *non-linear*: practical realities necessitate that “pre-production” activities such as storyboarding and design may continue at some level well into the production cycle (especially in response to audience test screenings), and it is also recommended to begin some “post-production” work as early as possible (especially where the workreel is concerned). These realities are reflected in the schedule above.

TEST SCREENINGS

This animated feature production schedule includes three test screenings: one after the first 5 months, another mid-way through production, and a third with a few months to go before release. It is in the independent animation producer’s direct interest to obtain *objective* feedback from neutral audiences comprised of the film’s target demographic (which for animated feature films is usually the broad “family” demo). Screenings for family & friends, cast & crew and investors & distributors can provide useful feedback, but by themselves are not enough: the unfinished film *must* be taken out of the garage for a “test drive”, with production leadership present in the audience to assess the “squirm factor” firsthand (the level of emotional engagement or

disengagement throughout the movie). While “filmmaking by focus group” is ill-advised, cautionary tales abound of producers who conversely turned a blind eye to observable audience feedback during the production, and suffered the consequences upon release (provided they could even obtain distribution). Confidentiality concerns must be weighed against the equally significant risks associated with creating a film in isolation – especially if that film is intended for mass markets. Well-spaced, well-executed and well-digested test screenings are the tentpoles that support the fabric of production.

DEPARTMENT TASKS

Following are notes related to the specific departments and line item tasks contained within the above schedule.

Storyboard/Animatic

Starting with a complete draft of the screenplay, a team of story artists boards the film in its entirety over the course of 6 months. Animation is a uniquely visual medium, and the storyboarding process can inform changes to the shooting script that add enormous entertainment value. Therefore, the ideal relationship between writing and boarding is a synergistic cycle that ultimately reflects itself in the animation. An animatic is created from the storyboards, and is given an *objective* test screening after 5 months of storyboarding. Audience notes are addressed in the 6th month of story work.

With a satisfactory animatic in place as the foundation of the film’s workreel, the story team rolls onto another production. Six months later, some or all of the story team returns to address notes resulting from the mid-production test screening. This process is repeated after another six months, following the final test screening. If the budget permits, the production may choose to keep the story supervisor on board during the entire production.

Reading/Recording

Time for vocal recording, foley and temp score is initially allocated on this schedule in the 2nd, 4th and 6th months, and then again in response to each test screening (final scoring is contained within the “Post-Production” line item in the second-to-last row). The staggering of recording studio time gives the story team time to work out material that will drive performance, but recording time can obviously be scheduled whenever the producer likes.

In Hollywood, it is typical for vocal recording to be done *prior* to animation, with the performances also filmed as visual reference. However, in Japan and throughout Asia, it is not uncommon for vocal recording to be done *following* animation. This practice may be more acceptable on low-budget 2D productions than it would on 3D productions of any budget, since resulting lip sync issues are more noticeable on 3D characters, and Western audiences are less forgiving of poor sync in general.

Occasionally, independent animation producers may find it necessary to begin production with vocal performances by relatively unknown actors (or even production crew members), in the hopes of dubbing the lines later with “name brand” talent. It is important to keep in mind that well-known actors are loathe to “restrict” themselves to matching the performances of unknown counterparts. In fact, faithfully doing so may constrain the entertainment value that the producer is paying for from the more famous actor. Therefore, if the producer is not able to engage their final actors from the start, the schedule & budget should contain a contingency for the re-animation (and subsequent re-lighting, re-compositing and re-rendering) of the scenes being dubbed... for they *will* need to be reanimated, at least in part.

Art Direction/Design

The schedule for production design, art direction and character design (collectively known as *visual development*) synchronizes with story development: the bulk of the work takes place within the first 6 months, and then some or all of the vis dev crew returns to address notes from test screenings. If the budget permits, the independent producer may choose to keep the production designer and/or art director on board during the entire production. This is generally recommended in order to maintain faithful, consistent design during production (the director may attempt to handle this on their own during production of lower-budget films, but is usually preoccupied with story concerns).

It is a good idea to have the director on board during visual development and story development, and also to involve the character animation leads in the character design process – unless you have the time and money to revise these things, or are prepared to tell your creative leadership that they can’t have the changes they want. 😊

Art Packet

The art packet is the interface between the Art department and the asset production departments. Guided by the production designer and the character designer, the art team creates illustrated specifications for every character, prop and environment in the animated film – from structure to surface quality. The production designer and character designer will compile a *visual style guide* related to the design philosophy of the film, in order to ensure that everything “lives within the same world”. Work on the

art packet can usually begin after a few months of design work and approvals. The visual style guide and art packet are usually housed online in the production asset database, where they are easily accessed by artists in the asset creation departments. The art packet is also used during *element turn-overs* in which character, prop and environment designs are issued to CG artists for construction (not to be confused with *element roll-outs*, in which assets are released into shot production. The art packet is by nature modular, and continues to be updated throughout production as elements are added and/or modified. The work of CG production artists is often added into the packet for the benefit of subsequent departments.

Pre-viz/Workbook

Pre-viz & workbook are to the shot production artists what the art packet is to the asset production artists, and are typically developed concurrent with the art packet. As story sequences are approved in the animatic, they are sent to workbook for specific camera instructions and to pre-viz for 3D visualization of complex scenes. As mentioned earlier, the workbook task is sometimes omitted in favor of direct planning of the 3D environment in the Layout department, but this work is still often done more efficiently in two dimensions – especially where 3D assets or stand-ins have not yet been created.

The workbook and animatic serve an important function in *sequence braintrusts*: meetings between the director and production leadership to discuss technical aspects of sequences that have been approved for 3D production.

Software

Production software development includes code required for the database, network, render farm, production management & asset tracking, custom plug-ins to off-the-shelf software, and translation code for the export/import of assets from one software package to another. Complexity ranges from simple shell scripts to extensive programs written in C++ and/or using vendor-supplied *software developer kits* (SDKs). Software creation can begin on Day One if desired, but the recommendation here is to wait a few months for story and vis dev to shape up (at least where the roll-on of an entire software team is concerned – supervisors can never be brought on too early). The rule of thumb with software development is: “Never write what you can buy, and never buy what you can get for free.” ☺ Even so, software development in some form is a necessary aspect of quality animated feature film production.

Modeling/Articulation

Modeling refers to the construction of 3D surface models for characters, sets and props. Modeling work also encompasses the creation of special *blendshapes* for facial and body animation, and clean-up work on imperfect surfaces coming out of animation (often referred to as *character finaling* or *shot sculpting*). *Articulation* is the process of rigging the model surfaces for animation, and in this schedule includes character skeleton construction, muscle & skin deformation, facial expression, clothing & hair simulation, as well as mechanical animation set-ups for 3D props and environments. Modeling & articulation work begins in earnest a few months into the schedule, and one month before the Layout department is scheduled to receive assets for shot creation. Although modeling & articulation ends a couple of months prior to the completion of animation, some modeling & articulation artists may transition into the Animation department to assist with character finaling as described above, to assist with problematic surfaces and errant simulations.

Surfacing/Illumination

Surfacing is the creation of painted textures and procedural shaders that are used to describe the material quality of model surfaces, from skin to wood to clouds. *Illumination* refers to the creation of lighting rigs and techniques (such as *sub-surface scattering*) that are subsequently applied in production during shot lighting. Surfacing is tightly related to modeling, and is therefore scheduled concurrent with that work on the schedule. In fact, the Modeling and Surfacing department leads will regularly meet during element turn-overs to discuss what level of detail should be built into the models, and what level of detail should be addressed in the textures and shaders. The surfacing and illumination artists also work closely with the EFX, Lighting & Compositing departments, and on smaller crews these may actually be the same people.

Layout

The *Layout* department is “where the rubber meets the road” between the animatic/workbook and the Animation department. On the above schedule, layout work begins one month after modeling (to provide time for the Modeling department to prepare assets) and one month before animation (to provide time for the Layout department to prepare scenes).

It is important to manage and integrate the work of the Layout department so temporary models are not created that are incompatible with the production pipeline, and time is not wasted on animation that is subsequently discarded by the Animation department.

Animation

The *Animation* department is the heart of the production, where the characters and the story are brought to life. While the other production departments essentially exist to support animation, the Animation department must also be structured in such a way as to “play nice” with production as a whole. Production efficiencies can be gained or lost in animation.

In this schedule, animation takes place over the course of 16 months, following the initial 6-month story and vis dev phase. Budget and schedule permitting, it is strongly recommended to bring the Animation department supervisors on board as soon as possible, to advise the Modeling and Articulation departments and test assets. As with the rest of production, the Animation department crew size ramps up and down, running at full capacity for 9-12 months depending upon production demands. An animator or two may be kept on until the very end as part of a production “skeleton crew” to handle special requests for P&A materials.

EFX

The *EFX* department typically handles the animation of “everything that is not a character” on the film. Of course, characters themselves feature hair and clothing effects (among others), and the line between “character” and “prop” can become very blurry. (The Animation department will often handle the animation of props that the characters interact with.) Therefore, the work of the EFX department is tightly related to the Animation department and also to the Lighting & Compositing department, where there can be much crossover. The concurrent scheduling of the EFX department’s work against the others reflects this.

It is important that the work of the EFX department be integrated as fully as possible with the production at large, especially with respect to the downstream department of Lighting & Compositing. If the EFX department is permitted to take a “black box” approach to certain shots or sequences, this should be called out and approved in the sequence braintrust (see above).

Lighting/Compositing

Lighting and *Compositing* are sometimes configured as separate departments on 3D productions, but experience has led most to the conventional wisdom that these two tasks are best integrated into a single Lighting & Compositing department to reduce redundancies and increase efficiencies. The management of lighting & compositing work can make or break a production,

especially when it comes to the systematic organization of layers and file sizes, which have significant creative and technical consequences.

On the above schedule, the work of the Lighting & Compositing department is synchronized with the work of the Animation and EFX departments, but in a more refined schedule can be seen to lag by a couple of weeks. Some lighting & compositing work is usually required through the end of production for P&A requests or shot tweaks. The production's *paint fix artist* (an artist assigned to correct minor visual errors by hand in the final rendered frames) may reside in the Lighting & Compositing department.

Workreel

The digital *workreel* is an ongoing, “work-in-progress” cut of the animated feature film. The workreel begins its life as the animatic, and grows up to become the final, high-resolution movie. As each shot production department contributes their work, the editor cuts the latest temporary or final rendered images into the workreel. The workreel is usually accessible in parts online by the production crew, and in whole in the digital review room. Access permissions may apply to the crew for security reasons, but it is recommended that all production supervisors be able to view any part of the workreel at any time. New animatic sequences (such as those resulting from test screenings) are not added to the workreel until they have been approved for production.

On this schedule the workreel line appears active from month 7 through month 22, but this is because the workreel comes from the animatic (months 1 through 6) and then goes into post-production proper (months 23 & 24).

Test Screening

(see page 3)

Post-Production

On the above schedule, this two-month line item refers to *post-production* proper, in which final color timing is applied, final sound and score are recorded & mixed, vocal pick-ups are recorded, etc. A post-production supervisor is usually assigned to

oversee this crucial work, which is the “final bite at the apple” for onscreen entertainment value. Good post can make an average movie sing, while bad post can sink a great film.

DCI

The visual aspects of post-production relate closely to DCI (*digital cut-in*), which is the complete digital master of the animated feature film. In today’s animation market, the digital master will be subject to an array of outputs including pure digital delivery, film transfer, DVD and broadcast. Since the dynamic ranges and color spaces of these output media vary widely, it is in the producer’s interest to test rendered scenes in the various output formats during production (perhaps concurrent with the test screenings). While certain visual problems can be addressed in post, others are best handled during production, where a broader set of options are available. Particular attention should be paid to DVD output quality, since this is the format in which the animated feature film will have its most pervasive and persistent “shelf life”. The Golden Rule is: “Know your output.”

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