A small link icon appears in the timeline before the clip name. The icon signifies that this audio clip is linked to another clip. If you selected one in the timeline, the other would also be selected just as if they were recorded together.

4 Go through the timeline and link the remaining three sound effects with their respective video clips.

The linked selection button in the timeline toolbar works for these linked clips just as it does for linked clips that were recorded together.

Monitoring, Soloing, and Muting Audio

When you start to edit your audio, the first thing you need to do is sit back and listen. Just play the tracks to hear them in the context of the picture.

1 Press the Home key, and then press the Spacebar to play the timeline to its end.

> **TIP** Some Mac keyboards do not have Home and End keys. In their place, press Fn-Left Arrow to move the playhead to the start of the timeline and Fn-Right Arrow to move to the end.

2 Press the Home key to move the playhead back to the start of the timeline.

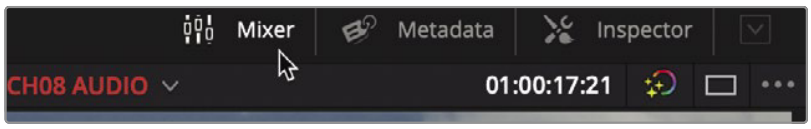
The most obvious issue you must address is that the audio levels for all the tracks are not well set. You can barely hear the speaker's voice.

Setting levels for audio clips starts with your primary audio track in the project. For us, that is our speaker's voice. To focus our attention on the audio levels for our speaker, we can solo his track and ignore the others for now.

3 On Audio 1, click the Solo (S) button to temporarily silence the other audio tracks.

To accurately monitor the levels of your audio, you can use the audio meters located on the Mixer panel.

4 In the upper-right corner of the DaVinci Resolve interface, click the Mixer button to open the audio mixer.



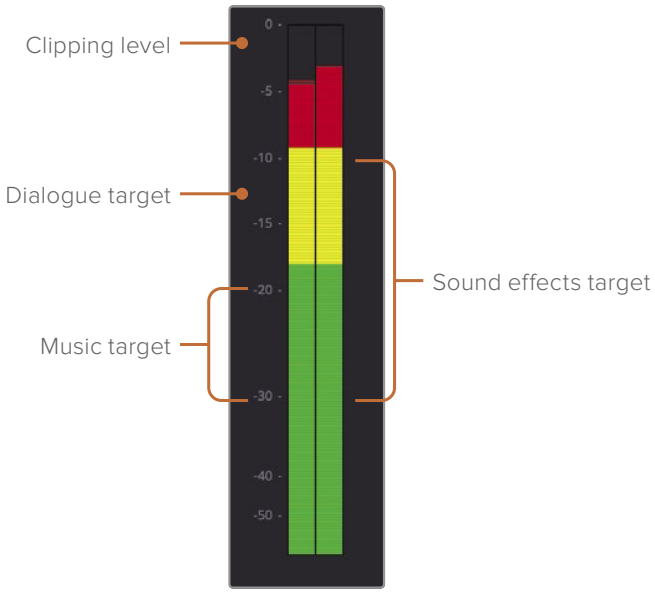
The mixer is a track-based mixer, which means any adjustments to the faders affect the entire audio track. We just want to adjust the levels of individual clips right now. However, you will use the mixer panel to monitor each track's audio level while watching the audio meters. Meters are a visual guide for making audio volume and processing adjustments. In DaVinci Resolve, the meters repeatedly generate an average (mean) level with a thin one-pixel line showing you the peak. But here in the edit page, the goal is just to create consistency among the clips on the same track, so all your narration is at the same level and all your similar sound effects are at a consistent level.

5 Play the timeline to hear the soloed track as you watch the meters.

You can see each track's audio displayed in the meters and set the appropriate level for each track.

Reading Meters and Setting Targets

Before you make any clip volume adjustments, it is a good idea to know how to read an RMS (root mean square) peak meter such as the one used in the mixer. The meters in the mixer use a decibel (dB) scale to measure the volume of your audio clips. These meters range from a maximum of 0 dB down to -50 dB. Any audio levels above 0 dB are distorted, so you must always keep audio levels below 0 dB. Although not a hard and fast rule, tracks such as dialog, sound effects, and music generally have target dB levels you can use as good starting points.



Normal spoken dialogue should average around -12 dB on the meter.

Sound effects have a wider target range because they have such a wide variety, but in general, try to target sound effects to fall between -10 and -30 dB.

Music tracks require a wide dynamic range but should fall between -20 and -30 dB.

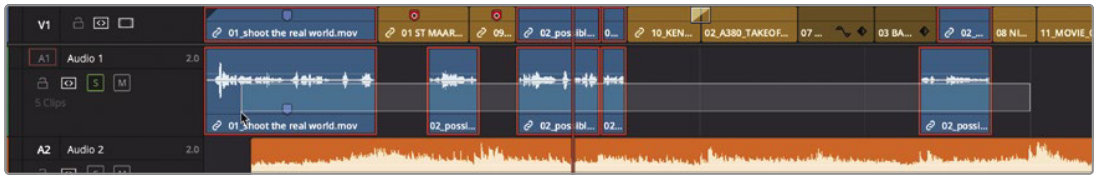
These level guidelines are good starting points, but in the end, your ears must be the final judges of what sounds right.

For this first stage of audio mixing, you will adjust each clip on audio track 1 and set its level appropriately so it maintains a consistent level across the entire track. At this stage, however, you should not be concerned with comparing the dialogue levels to the music or sound effect levels because you are just getting consistency on a clip-by-clip basis for our primary track. Later, in the Fairlight page, you'll tackle track-level mixing.

Normalizing Audio

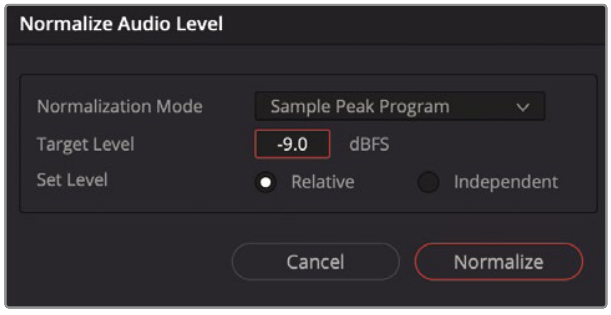
With all video and audio edited into your timeline, you're ready to set the relative audio levels for your project. You'll start by examining the clips on audio track 1 that contain the primary audio—in this case, the interview clips—and setting those clips to their maximum volume levels.

1. Position the playhead at the start of the timeline.
2. Ensure that only the Audio 1 track is solo enabled.
3. Press Shift-Z to see all the clips on Audio 1.
4. Drag a selection around the audio clips on Audio 1, or Command-click (macOS) or Ctrl-click, (Windows) to select them.



Instead of setting a level for each clip one at a time, you can quickly maximize the volume for all the selected clips at once using the Normalize function.

5. Right-click any of the selected audio clips and choose Normalize Audio Level.



The dialog that appears allows you to amplify the audio by targeting the peaks to reach a specific the dBFS (decibels relative to full scale) level. For most dialogue and voiceovers, you want the average to land around -12 dBFs on the meter, so setting the Normalize peak target can be a bit higher.

6 In the Reference Level field, type **-10**.

The lower two options in the dialog determine if the highest peak out of all the selected clips is used to set the target reference level, or if the peaks of each selected clip are amplified to reach the target reference level. Because you have a lot of variety in the levels on Audio 1, let's individually maximize each clip's peak.

7 Choose Independent.

8 Click Normalize and play over the audio on track 1 to hear what should now be a consistent audio level.

As the audio plays, watch the meters in the mixer. The average levels should be bouncing around -12 dBFS. The loudest peak on the track should never go above the target -10 dBFS.

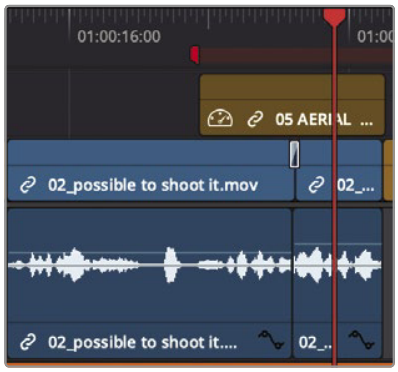
The Normalize Audio Level feature is nondestructive, which means the actual audio file on disk is not changed. You can return to the original settings at any time for any clip using the Inspector.

Setting Levels in the Inspector

As you played over the track, you may have noticed that the next to last clip (the short clip located under the "05 AERIAL ALASKA" clip) sounded considerably louder than the others. Because all clips are not identical, some need adjustments in addition to an automatic normalization.

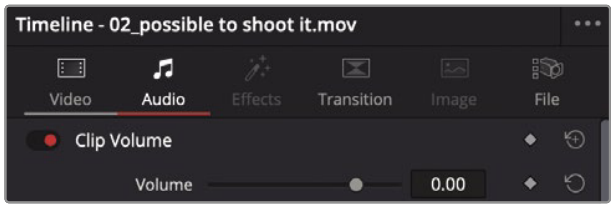
1 Click in an empty gray area of the timeline to deselect any clips that may be selected.

2 Position the playhead over the 4th audio interview clip located under the "05 AERIAL ALASKA" clip in the timeline.



3 Select the audio clip and click the Inspector button to open the Inspector.

4 Select the Audio tab at the top of the Inspector.



When an audio clip is selected in the timeline and the Audio tab is selected in the Inspector, Level, Pitch, and EQ parameters are displayed.

5 Drag the Clip Volume slider to the left until it reaches about -6.

Although the Normalize feature had adjusted the clip's volume higher, you can make corrections in the Inspector as you did here.

> **TIP** To increase or decrease the volume of a selected clip, press Command-Option-+ (plus sign) and Command-Option- - (minus sign) in macOS or Ctrl-Alt-+ (plus sign) and Ctrl-Alt- - (minus sign) in Windows.

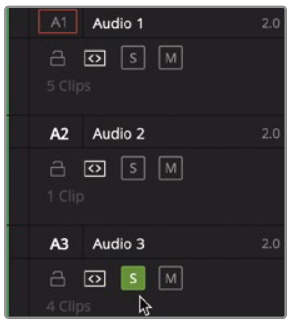
6 Play through the clip and watch the meters to ensure that they fall somewhere between -10 and -15 dB. If the meters show levels going consistently above -10 dB, drag the volume slider to the left to lower the clip level.

It's important to optimize levels around -12 dB; otherwise, you might be setting your primary clips too low and not taking advantage of the full dynamic range of digital audio recording.

Setting Levels in the Timeline

To perform quick audio level adjustments, you can graphically change a clip's audio level in the timeline using volume curves.

1 In the track header, turn off the Solo button for Audio 1, and then for Audio 3, click the Solo (S) button to play only the sound effects.



2 Position the timeline playhead at the start of the first sound effect on Audio 3.

3 If necessary, drag the scroll bar at the bottom of the timeline so you can see all four sound effects in the timeline window.

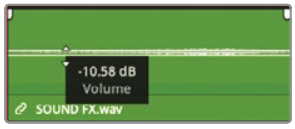
4 Play these four sound effects, and on the meters, watch A3 to monitor their levels.

All four sound effects are too loud. They are not meant to be at the same level as a direct hit from a photon torpedo! You can use the -10 to -30 dB range as a rule-of-thumb target as you set sound effect levels.

5 Place your mouse pointer over the thin white line that runs through the first sound effect (Jet) audio clip on Audio 3.

This line in the audio clip is the volume curve and represents the volume level of the clip. Dragging the volume curve (line) down will lower the level just as it would if you dragged the Volume slider to the left in the Inspector.

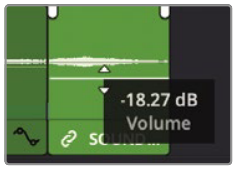
6 When your mouse pointer changes to an up and down arrow pointer, drag the volume curve down until the tooltip reads roughly -10 dB.



You have now lowered the volume by 10 dB.

TIP The tooltip displays the offset relative to the current level. It is not showing the exact dB level that the audio will reach on the meters. The term dB Full Scale, or dBFS, expresses exact meter readings, but a simple dB value expresses an offset level.

7 Play over the second sound effect (overhead plane) and adjust the volume line so the sound effect is just above -30 dBFS on the meter. This will probably be somewhere around -18db in the volume line tooltip.



8 Play over the third sound effect (prop plane) and adjust the volume line so the sound effect is just below -20 dBFS on the meter.

The fourth sound effect is an identical copy of the third. Instead of trying to adjust the volume line to match the third sound effect, you can easily copy the level of one audio clip to another using the Paste Attributes command you applied in the previous lesson.

9 Select the third sound effect clip on A3.

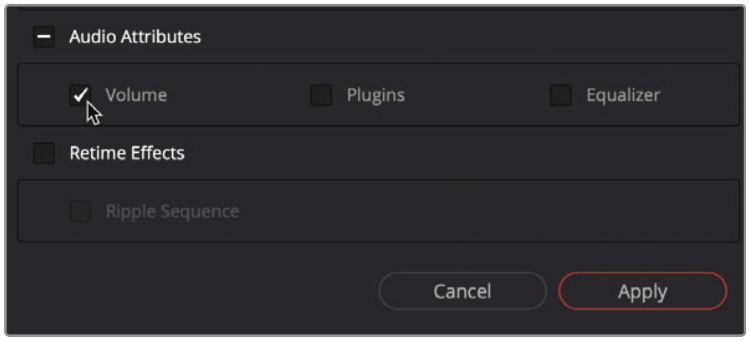
10 Choose Edit > Copy or press Command-C (macOS) or Ctrl-C (Windows).

11 Select the fourth sound effect clip on A3.

12 Choose Edit > Paste Attributes or press Option-V (macOS) or Alt-V (Windows).

The Audio Attributes window includes clip attributes that you can copy and paste from one clip to another.

13 Select the Audio Attributes Volume checkbox and click Apply.



The volume attributes from the third interview clip are pasted onto the fourth clip.

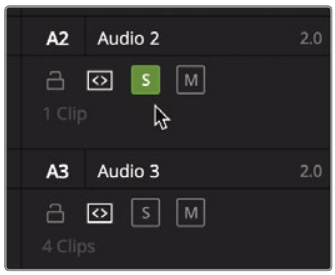
14 Play over the timeline to review the levels for the sound effects.

Copying and pasting attributes to set clips at similar levels can save you a lot of time when working with a complex timeline, but you will still need to play through the clips to ensure appropriate levels.

Changing a Level within a Clip

The music track is the final track that you'll integrate into your mix. Level setting here is slightly more involved than with the other tracks because you really want to set two different levels within this one music clip. The music should be at a quiet level as it plays under the interview portion of the timeline, and then gradually increase in volume when the interview stops. You can set multiple levels within a clip in different ways, but on the edit page you'll use keyframes.

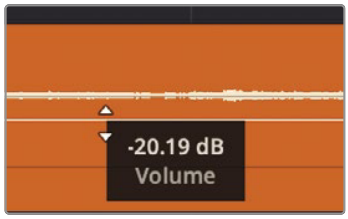
1 In the track header, disable the Solo button for Audio 3 sound effects and enable the Solo button on the Audio 2 music track.



Initially, you'll set a low volume level for the music as the interview begins.

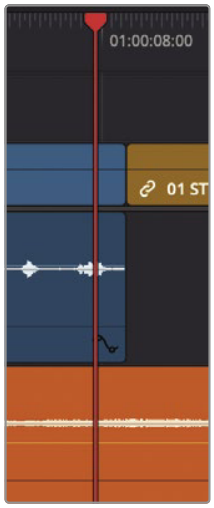
You'll want it low enough so that it doesn't interfere with the spoken words but loud enough to add atmosphere to the scene. Again, you will use a general rule of thumb that music should fall somewhere between -20 and -30 dBFS.

2 For our initial low setting, use the volume line so the music plays just above -30 dBFS on the meter. This will probably be somewhere around -20dB to -25dB on the volume line tooltip.



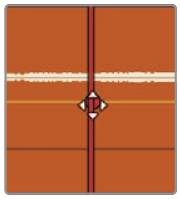
This level should suit the interview portion of the timeline, but it's much too low to underscore the plane clips. By adding keyframes to manipulate the volume line, you can change a clip's volume over time.

3 Position the playhead just before the end of the first interview clip.



Here is where you want the audio to begin getting louder, so you will add a keyframe to the music clip.

4 On the music clip, Option-click (macOS) or Alt-click (Windows) the volume line under the playhead position to add a keyframe.

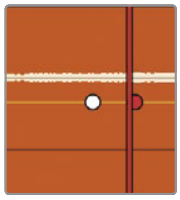


A red dot, the keyframe, is added to the curve. (You may have to move the playhead slightly to see it.) This keyframe marks the point where the music volume should begin getting louder. You now need to set a keyframe after this point to identify where the music stops getting louder.

5 Click in an empty gray area of the timeline to ensure that no clips are selected.

6 Type **+12** (plus sign, 12), and press Enter/Return to move the playhead forward half a second.

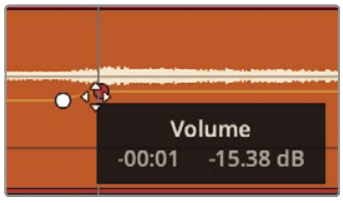
7 Option-click (macOS) or Alt-click (Windows) the level curve under the playhead position to add a keyframe.



You've now set the duration that the gradual volume change, or ramp, will occur. Changing the vertical position of the second keyframe will cause a ramp up in volume.

8 Position the pointer over the second keyframe on the music clip. The pointer changes to a move pointer to indicate that it is over a keyframe.

9 Drag the keyframe up and play the music to check the level on the meter.



You want the meter for the music to reach just below -20 dBFS. Your first adjustment probably won't be perfect so continue adjusting and checking until you get it at the right setting.

10 Play the first part of the timeline to hear the mix with the new music ramp.

You've only set the music volume levels under the first interview section. It is now too loud for the rest of the timeline. On your own, continue setting keyframes to lower the volume during the speaking section and raise the volume when the speaking stops.

Adding Audio Fades

Most audio fades are added as a corrective process to soften the incoming or outgoing audio clip. Subtle fades are often applied to narration and dialogue when plosives, particularly those that start with P and B, are too harsh to leave unchanged. You'll also find that you'll use the obvious fade-in and fade-out on music.

1 Disable the Solo button on the Audio 2 music track so all the tracks will be heard when you play.

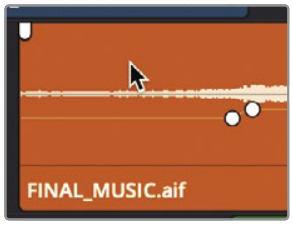
2 Play over the start of the timeline until the music begins.

No matter how low you set this music, it always comes in abruptly. It is meant to build during the interview and hit a crescendo when the first image of the plane appears.

You can achieve this slow build up with a reasonably long fade-in.

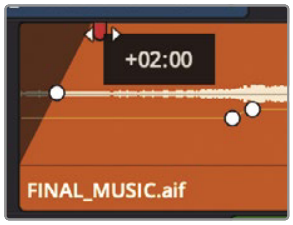
3 Press Shift-Z to see the entire timeline.

4 In the timeline, place the pointer over the music clip.



Audio fade handles appear in the upper-left and upper-right corners of the clip.

5 Drag the left handle in toward the center of the clip until the tooltip reads +2:00



TIP Instead of dragging the fade handle, you could position the playhead where you want the fade-in to stop and choose Trim > Fade In to playhead.

You added a 2-second fade-in to the start of the clip.

6 Play over the start of the timeline to hear your new fade in.

You can use any combination of fade handles, level curves, and Inspector tweaks that you feel most comfortable with to refine your audio tracks, but these tools and techniques are ultimately just a starting point. To build a true multitrack, cinematic soundtrack, in the next lesson you'll use DaVinci Resolve's Fairlight page.

Lesson Review

1 What must you select before you can add a marker to the timeline ruler?

2 Where do you find a list of all the markers on the timeline?

3 How do you add a keyframe to an audio clip's volume line in the timeline?

4 What can you do in the Normalize Audio dialog?

5 True or false? When reading an RMS/Peak meter in the edit page, audio that is around -5 dBFS is very quiet.

Answers

1. To add a marker to a clip, you must first select the clip but to add it to the timeline ruler, nothing should be selected in the timeline.
2. The Edit Index can display a list of some or all of the timeline markers.
3. Option-click (macOS) or Alt-click (Windows) the volume line.
4. In the Normalize Audio dialog, you can enter a dBFS value, and thereby set the loudest peak of a selected clip or group of clips to that value.
5. False. When reading an RMS/Peak meter in the edit page, zero is the maximum level of the system, so -5 dBFS is very loud.

An Introduction to Color Correction

Before you get into the technical side of color correction and learn how DaVinci Resolve's powerful color correction tools work, it's important to take a moment to understand color correction and the creative medium it is.

Color correction is not something you can do by learning the controls of the color corrector, and it's not something you can do well just using the scopes. It's a highly creative skill. Just as a good editor can tell a story and bring a dramatic flow to a program, the colorist evokes an emotion in a viewer via visual manipulation of the image. While it can take time to learn how to be a top-level colorist, like all creative skills, it never gets boring because you'll always have something new to learn and a new creative style to explore!

When using DaVinci Resolve, you have the advantage of over 30 years of color correction experience. DaVinci pioneered the development of color correction hardware and software specifically designed to artistically enhance visual images acquired from film, video, and digital sources. As a result, DaVinci Resolve possesses an incredibly deep, sophisticated, and efficient toolset for adjusting the look of the clips in your program and managing these adjustments over an entire timeline.

Furthermore, DaVinci Resolve has continuously evolved thanks to feedback from countless professional colorists worldwide working at all levels of the film and broadcast industry. So, the DaVinci Resolve color page has been developed to work the way colorists think. Still, for all its technological sophistication, it's important to remember that DaVinci Resolve is merely a tool that requires an artist to realize its full potential. But, of course, that's the fun part!

The following lessons cover the basics you'll need to learn to begin harnessing the power of the color page in your own projects—be they feature films, episodic television, web series, short subjects, spots, promos, or corporate videos. No matter what you work on, these formats employ the same fundamental grading techniques and the same basic tools; so, if you're new to the world of professional color grading, don't worry. All rock star colorists once had to learn these first steps for themselves, and you'll use the fundamentals you learn here for the rest of your career.

Gone are the days when high-quality color grading was unaffordable. Blackmagic Design has put the powerful color tools of DaVinci Resolve within reach of any editor who has a reasonably capable workstation or laptop. The polish you'll need to achieve world-class results is only a click away on the color page.

However, before you start getting into the specifics of color, it's important to step back and consider, what are these tools really used for?

Why Color Correct Your Work?

It's a tempting question, and one that countless producers and directors have asked: "The program looks fine the way it was shot; why spend the time to grade it?" It's a good question in an industry where time is money; if the program you've cut in the edit page looks fine, why bother grading it?

The answer is because your program won't look as good as it will after being graded.

The process of adjusting the contrast and color of every clip in a program is variously called color correction, color grading, or just grading. The difference in terminology is largely superficial, but most experienced colorists prefer "grading" because "correction" implies that you only adjust things that are wrong, whereas "grading" implies that you're holding each clip in your program up to a higher artistic standard. A colorist doesn't ask, "Does this clip look good?" A colorist asks, "Could this clip look better?"

Setting the Tone of the Visuals

Much has been said about the emotional power of color to shape audience mood, and everyone would agree that a scene lit by cool blue lighting will have a very different vibe than one that's lit by warm orange lighting. The greenish tinge of fluorescent fixtures, and the salmon-hued wash of mercury vapor streetlights each paint the scenes of a show with different atmospheric feelings that, when done right, add to the narrative and how your audience perceives it.

Cooler Warmer

Of course, what these varied illuminants mean depends on the visual palette you develop. Warm lighting that denotes romance in one film may instead portray roiling, desert-bound discomfort in another. Their impact depends on the associations that your grading makes between the visuals and the story. Should this scene seem later in the day? Should the colors be more subdued? Should the sky be an inescapable presence? You control these audience perceptions when you exercise subtle control over the picture via color grading.

The important takeaway is that the color page gives you the tools to mold these associations to suit your needs – intensifying, attenuating, or completely counteracting their effect, as necessary, to strike the right tone for each and every scene.

Portraying the World Subjectively

Narrative cinematography is rarely concerned with capturing objectively lit renditions of locations with perfectly accurate, neutral color and tonality. Instead, truckloads of lighting instruments and careful art direction manipulate the light and color of the location to make it look somber, magical, frightening, or sultry. These efforts extend to the grading suite, where your job is not to portray the world as it is, but the world that the cinematographer and director want the audience to see.

What the camera saw (left) and what you want audiences to see (right).

Documentary photography may very often be concerned with presenting a supposedly unvarnished (yet gloriously rendered) look at the world. And yet, even this "realistic" look at the world is a fabrication, as every adjustment you make to improve the visibility of a subject, enhance the glory of nature, clean up some archival footage, or push the surroundings of the frame to recede artfully into the background, can be as carefully thought out and manipulated as any music video grade.

The point is, whether you're making a horror movie, an architectural documentary, a sales video, or an automotive spot, you're using the tools and techniques of color correction to create a subjective representation of the imagery. The more control you can exercise over this representation, the larger palette of emotional response you'll have to draw from.

Evolving to Do High-End Work

If you want to learn and stay competitive, and especially if you intend to work on client projects rather than your own, it's good to make yourself aware of current styles and trends. You've no doubt heard that if you want to write, you should read (and write) as much as you can, and the same holds true for color grading. Watch movies, television, music videos, and web shorts. And if you're watching television, make yourself watch the ads. Once you've had a chance to learn the grading controls that DaVinci Resolve offers, you'll start to see how different looks correspond to adjustments you can make in your own projects.

And finally, get out into the world and look at other visuals. Flip through fashion magazines, go to art galleries, take a hike in the woods, and observe. Fill your mind with diverse images and analyze them to see what inspires you. The more aware you are of other visual disciplines, the more ideas you'll bring to your own work.

A last issue to consider is the effect that affordable color grading has had on the television industry. In most current episodic television productions, the visual style is now as good as in a feature film. This dramatic change in quality has made television programming better than ever.

An unintended benefit of this change is that top-level feature film actors now move into television work and back to film with amazing freedom because television no longer looks like an inferior medium. Also, high-level film crews and facilities can do a wider range of both television shows and feature films, while still retaining their premium status. It's an exciting time when you consider the additional increase in the number of distribution platforms for high-quality work, such as streaming services. The industry is growing more quickly than ever, which means talented editors and colorists are more in demand than ever!

The Goals of Color Grading

Color correction can be considered the process of choosing which parts of the raw image data to display to create a pleasing image for the viewer.

Developing the Image

The latest generation of digital cinema cameras are almost all capable of either shooting raw color space image data, or at the very least, recording RGB image data with a log-encoded exposure. Doing so preserves the maximum amount of image data for manipulation during the color correction process. While this is great for flexibility in workflow and for making high-quality adjustments, acquiring media in this way forces you to take the extra step of transforming it into a viewable image for editing and finishing (in much the same way that film negatives required development and printing to yield a viewable image).

DaVinci Resolve simplifies this task with built-in camera raw controls, DaVinci Resolve color management (RCM), and LUT support, so you can quickly get your media to a solid starting point upon which to build the rest of your grade.

Log encoded source (left) and the same source normalized and corrected (right).

Making Every Clip Look Its Best

While the job of the cinematographer is to light and expose the image with an artistic intent, your job as an editor and colorist is to realize this intent by adjusting the color and contrast of the image of each clip so the final result is as close to the director's and cinematographer's intentions as possible. In the process, you can overcome inconsistencies with exposure and color balance that were otherwise unavoidable. Furthermore, you can subtly adjust warmth and contrast to realize looks that were not achievable during the shoot, but that the director and cinematographer would have liked.

An underexposed image (left) and the corrected image for the audience (right).

Of course, in some situations, you may find it necessary to fix media that has more substantial problems in color and exposure. In these cases, the tools exist to make far more involved changes to the image; however, the quality of your results will depend heavily on the quality and "latitude" of your source media. For example, Blackmagic URSA Mini cameras record quite a bit of image data within raw or minimally compressed media formats, allowing you to make extreme corrections that would be impossible on consumer cameras. Happily, in either case, the color page provides the tools to process images in many ways to adjust the image to achieve a better look.

Quality Control

While you're doing all this, it's important to keep in mind that for all the creative possibilities that DaVinci Resolve affords, it's still important that the deliverables you provide to your client have appropriate signal levels relative to their distribution requirements. In particular, programs destined for cinema, broadcast, or streaming usually have very specific outer boundaries of luma, chroma, and gamut that you must not exceed, or you'll risk having a show kicked back to you for quality control violations.

DaVinci Resolve provides tools specifically designed to help you keep an eye on how the image data is affected, and to fine-tune the image. In particular, the scopes display the standard Waveform, Parade, Vectorscope, and Histogram graphs that you can use to objectively analyze image data. These scopes let you see the boundaries of what's possible, and make it easy to spot subtle problems and compare the characteristics of one image to another.

Balancing Scenes

It's rare for uncorrected shots to match one another seamlessly. Even the most carefully exposed angles of coverage can have small variances that should be evened out. For example, run-and-gun programs using available light often result in edited scenes with huge changes in lighting and color as one shot cuts into the next.

Small or large, variations between shots can call undue attention to the editing and jar the audience in ways that throw them out of the program. Balancing these differences is another fundamental task of the colorist. You know you're finished when every shot in a scene looks like the same time and the same place, and the color and contrast adjustments you've made flow unnoticeably from one clip to the next.

Adding Style or Custom "Looks"

Of course, it's not all about subtlety and correction. It's often appropriate, when grading music videos and commercials, for instance, to bring some radical visual style to a piece. Here, too, DaVinci Resolve provides an abundance of features for manipulating unexpected aspects of the image. For example, you can use custom curves to create an illusion of chemical cross-processing.

Grading an image (left) with curves to create a cross-processing effect (right).

The Tool Hollywood Uses

If all that isn't enough incentive to plunge forward into the next few lessons and exercises, keep in mind that DaVinci Resolve has become the tool of choice for some of the largest post-production facilities in the industry, worldwide. And yet, thanks to its accessibility, within the last several years, DaVinci Resolve has also become the go-to tool for a wide variety of smaller boutique post companies and individual artists. Considering only projects completed recently, DaVinci Resolve was used to grade blockbusters like *Rocketman* and *John Wick: Chapter 3 - Parabellum*, along with indie productions such as *The Big Sick* and *A Ghost Story*; not to mention television shows including HBO's *Westworld*, AMC's *The Walking Dead*, and the Amazon Prime's *The Marvelous Mrs. Maisel*.

Whether you're looking to build a foundation of skills to enter the post-production industry as a contributing artist, or you want to develop the ability to finish your personal creative work in your own way, the following exercises will usher you into a much larger world of image manipulation and artistic expression than has ever been available in the average nonlinear editing application.

Lastly, color grading is just fun! The feeling of resting your hands on the trackballs and holding the emotion of your images in your hands is exhilarating. It's like no other feeling in the world; you can make adjustments in real time, instantly see the results, and feel the emotional impact in your heart. We believe that color correction is one of those tasks that is more creative than cerebral. It's also one of those jobs that surprises you every day and has an emotional connection that reminds us why we fell in love with the film and television industry in the first place!

Enjoy the journey!