



Copy and Paste Your Universe: Creating and Implementing Modular 3D Environments

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DG1382

In this class, we present tried and tested methods for creating large-scale environments out of modular pieces. These tricks can help you populate your scenes with geometry and dress your shots quickly. Our case study is a 4-minute short film that used a single 12 foot x 12 foot modular set to bring an entire story to life.

Learning Objectives

At the end of this class, you will be able to:

- Create set pieces with an understanding of modular design
- Prepare assets for use in a modular setup
- Create a scene that uses modular assets and assemble an environment quickly
- Dress the set with more modular assets to give areas a unique quality

About the Speaker

Kenny Roy started in the animation industry in 1997 as a dustbuster on a children's animated feature. Since then, he's gone on to animate some of the most memorable characters on screen, from Scooby Doo to King Kong. In 2007 he founded Arconyx Animation Studios in Los Angeles, CA where he directs projects ranging from TV commercials to short films to visual FX. An animation teacher for almost 8 years, Kenny is also a multiple-published author in animation and a world-traveling lecturer and runs an animation training portal through www.kennyroy.com. kennyroy@gmail.com

Creating Set Pieces

Modeling

Use shortcuts to make sure pieces will align correctly.

Snapping and moving object pivot points makes for fast alignment.

Take advantage of the grid to quickly match polygons.

Grid snapping and measuring along the grid takes guess work out of matching object sizes.

“Block” your environment with large shapes and fill in with details later.

The overall modular piece is what you are going to replicate, so internal details can always be added later.

Delete history to speed up performance.

Whatever package you use, much copying and pasting will be done in this process so keep your scene overhead under control by deleting object creation history frequently or turn it off altogether

Assess the over-arching design and model with progression of the story in mind.

Visual cues keep the audience’s eye interested, so bear in mind elements you can use to tip off the audience to progression in the story.

Texturing

Reuse UVs wherever you can to create new permutations quickly

The cardinal rules of UV’ing need not apply when you are trying to create fast permutations.

UV before you copy and paste, or make sure you have a good UV transfer script.

Maya’s built in transfer utility keeps history, so use a 3rd party script to avoid issues.

3D and Procedural Textures are fantastic for modular environment creation.

Strike a balance between uniqueness and repetitiveness.

The eye is trained to find patterns. Too much uniqueness in your texturing will give away your modularity, while not enough looks boring.

Preparing Your Assets

Rigging

Zero and Freeze all of your models so that everything can be returned to place quickly.

At the very least, create groups for your objects.

Groups should represent units that can be interchanged for permutations, and their pivot should be planned for quick snapping.

Setting Up Permutations

Creating Locators for your groups is the quickest way to make sure there is a visible pivot for copying/moving.

Copy essential geometry into each modular group rather than have complex groups.

It is better to have a little bit of overlap in terms of geometry than to spend the time it takes to make sure each group includes/excludes just the elements it needs.

Adding Extra Functionality to Create Uniqueness

Think of ways you can create even more uniqueness to the modular environment using color, light, geometry, etc.

Color can be used to show progression in the story.

Lighting can be preset to give you easy to access functionality to distinguish your set pieces from one another.

More choices of modular geometry only mean great flexibility down the road.

Just make sure your groups include all of the geometry they need to in order to be useful when creating unique sets from your modular pieces.

Creating A Scene

Reference

We use a referencing pipeline so that all changes to the master asset will propagate through to all of our scenes.

The downside is that you must be careful after scenes are assembled not to change a part of an asset that could break a setup.

Applying Customizations

Test and apply unique permutations of all of your modular pieces.

Rather than try to create all unique permutations (which can get out of hand) trust your eye. The audience will!

Think about story to apply your customizations.

Use your major functionality like color and lighting to progress the story using your environment.

UVs for Modularity

Tweak the modular UV's to give even more flexibility.

Tweak the 3D textures to take advantage of the procedural results.

Dressing Your Scene

Bringing in More Modular Assets

The locator points you've determined in your scene will come in handy.

Reference assets and position them according to the locator work you've already done.

Follow story when placing set dressings.

Do not lose sight of the progression of the story when using props and set dressings.

Applying Further Customizations

References apply edits to the assets within the scene, so you are safe making final tweaks to your scene to create truly unique shots.

Bringing in over-arching visual cues for uniqueness.

A final pass to make sure that the over-arching visual progression of the story is represented on screen.