



If you're just starting out making mods, you may be wondering how to approach Morrowind's Construction Set. While it's a reasonably easy editor to learn, there definitely are some traps waiting to surprise the unwary. I suggest taking advantage of other folks' hard-earned knowledge to avoid common problems, both through tutorials and the advice listed below. Much of this has appeared in the TES Forums as modders encountered problems and worked out solutions or rules of thumb to follow. I have tried to bring together the parts that would most benefit those of you who are just starting out. If you visit the TES Forums ([www.elderscrolls.com/forums](http://www.elderscrolls.com/forums)) you will find much more advanced information and links to specialized tutorials.

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## **Play Before Modding**

Play Morrowind quite a bit before even looking at the Construction Set. At least finish the main quest, and try advancing through a few of the many guilds/factions. There are three main reasons why I recommend this:

1. The Construction Set is addictive! Once you start modding, you may never find enough time to go back and actually play the game itself.
2. You'll have a better feeling for the 'Morrowind Universe'. When you release your mod, other players will initially expect it to fit into the world of Morrowind as they have experienced it. If your mod runs counter to the internal logic of the game world, it will be jarring and puzzling. That doesn't mean you shouldn't try doing new and original things, but be prepared to explain why all the Khajiits are now 32 feet tall and breathe fire. By playing Morrowind extensively, you'll have experienced the same things as other users and can predict their expectations and reactions to the mini-world you've created.
3. You won't 'break' the game for other players. If you know what's involved in many of the quests, you won't accidentally do something that disrupts them. It doesn't have to be a literal 'break', e.g. interfering with some dialogue so the player can't advance in a quest, but other aspects of the adventure too. For example, late in the main quest the player comes across some very unique tools. It would seem strange to have a bunch of those suddenly turn up on some shopkeeper's counter, that would steal something away from the main quest.

## **What Can You Do With The Construction Set?**

An amazing variety of things. It's the tool Bethesda themselves used to assemble the game. You can create your own little house or a whole city. You can create new NPCs to populate that city and give them dialogue to speak. Arrange quests for the player to undertake, as complex as you can dream up. Sculpt the landscape with mountains and rivers, grasslands and forests. Create special enchantments and combinations of magic effects. Establish new social groups or 'factions' the player can interact with or even join. And just when you run into something that doesn't seem possible, you can probably use the scripting language to find a way to pull it off. Anything you have experienced while playing Morrowind, you can create.

## **Where To Begin?**

When you first open the Construction Set, there's a whole pile of windows and buttons, but not much indication about how to proceed. And with all due respect to Bethesda, many people find the tutorials in the Help file are, ahhh, rather confusing. Rather than fighting with the Editor and getting frustrated, take advantage of other modders' experience. There are a number of good beginners tutorials out there. Although it's an older one, I still recommend Dragonsong's "My First Room". To find this tutorial, see the Links section at the end of this guide.

The "My First Room" tutorial starts right at the beginning, describing how to load the master ESM files so you can see the existing Morrowind world and its objects, and continues from there. It's great for explaining not just the 'how' of using the Construction Set, but the 'why' as well.

Two cautions: Dragonsong's tutorial was written back before the Tribunal and Bloodmoon expansions were released for Morrowind. As a result, it doesn't mention one issue that often puzzles new modders - a ton of error messages that appear when loading all three master ESM files. Or if

only the Morrowind ESM master file is checkmarked, a bunch of weird 'GMST' entries appear in the mod's Details list. Please refer to the “Common Problems” section for details about these problems. Secondly, I feel that Dragonsong did not emphasize the importance using grid snap to assemble interiors quickly and accurately. There's another section below addressing that aspect.



## **Start Small**

Everybody wants to start modding by re-creating The Lord of the Rings in its entirety. Enthusiasm is great, but channel it into something you'll finish before the sun goes nova. Sure it's been done before, but there's nothing wrong with creating your own little house in Balmora, or re-skinning a claymore and adding enchantments, or scripting a teleport ring. Jump in and get an idea of what's involved in making plug-ins before embarking on the mod to end all mods.



## **Making Clean Mods**

What's a 'dirty mod'? The term refers to a mod that accidentally changes unrelated objects, often through the entire Morrowind universe. Dragonsong's tutorial discusses this problem, so I'll just hit the highlights here. The objects you see in the Editor's lists are 'master objects'. When you drag, say, a crate from the Containers list and drop it in a cell, you are creating a 'reference' to that master object. Now suppose you decide that you want to reward the player who looks in that crate by adding some more gold. You open up the crate's Properties by double-clicking on it and drag'n'drop some Gold\_001 objects into the crate's list of contents. Oops. You'll probably be surprised to discover that you've accidentally added gold to every single crate of that type across all of Morrowind, even ones nowhere close to your mod! The problem is that you have modified the master object, not just the particular reference in a certain cell.

Unfortunately, you can't just take that extra gold out of the crate. The Editor doesn't know that you are undoing a change. It will still mark the crate as modified. Experienced users of mods will check for signs that they are 'dirty' since they know the problems they can cause. If a particular type of crate is marked as changed, but the mod is just supposed to be about creating a new magic potion, they will know that something is up. So if you want your efforts to be appreciated, be sure to keep it clean. As you work, save your mod frequently. Then if you touch something accidentally, you can always quit and reload the last good save. There are some tools that can help patch up a dirty mod, but it's better to develop the working habits that avoid the problem in the first place.

So what things will affect the master object? When you look at the Properties of an object reference, e.g. the crate you've dropped in a cell, you'll see a bar through the middle labeled 'Reference Data'. Anything below that you can change freely and it will only affect that specific crate. Anything above it is part of the master object. One important note: even if you're only changing the reference data **DO NOT CLICK 'SAVE'!** This will mark the master object as changed, even if you didn't modify it. Note that the Save button is above the bar through the middle and remember that we don't want to touch anything up there. Just use the Close box [X] when you're finished with the Properties window.

But suppose you do want a crate with extra gold in it? How can you do that without accidentally making a dirty mod? The secret is to create a new 'master object'. There are few ways, but here's a simple one: Find a crate in the Editor's Containers list that has the appearance you want. Maybe the one called “crate\_01\_empty”. Double-click on it to bring up the crate's Properties. Since we're looking at the master object, you should only see those ‘master properties’. There's no Reference

Data below the bar since it's not a reference. Change the ID code to something different, e.g. 'My\_Crate\_With\_Gold'. Click the 'Save' button. Yes, it's safe this time, because we're deliberately making a new master object. In fact, the Editor will ask if you are trying to create a new master or renaming the existing master. Be sure to click the 'Yes' button to create your own new unique master object.

Now that you have a new master object of your own, you can modify it freely without worrying about accidentally changing the original. Add gold or fancy glass armor to its contents, increase its capacity so it will hold more, whatever you like.



## **Free Intermediate to Advanced Tutorials!**

You've been through some of the beginning tutorials. Now you're bursting with cool ideas but can't quite figure out how to make them work. Well, you've got an absolutely excellent set of intermediate to advanced tutorials already installed on your system. They're called "Morrowind".

Browse through the existing material that makes up the game. See how they arranged Bitter Coast cells so they look swampy and where they used vertex painting. Check how they made it possible for you to tag along after a galloping white guar. You want to have the player bring your NPC five jewels in exchange for something? Hmmm, remember the early quest where you gathered flower samples for Ajira in the Mages' Guild? Check out Ajira's dialogue ("flowers" topic mostly) to see how it can be done. This is also where having played the game a lot helps - you'll remember similar situations in the game that can help you with your mod.

If you're not sure how various pieces of the interiors are used together, open up one of the existing cells and see how Bethesda did it. Don't be shy about copying at first, it's a great way to learn.



## **Test Mods In-Game Frequently** – by Polycrates

Go in-game and look around - a lot. The render window is good, but you don't really get a proper feel for how it's actually going to look to someone in the game. This is especially true for lighting levels, which are very different in render window. You're also more likely to see where things haven't lined up properly, or if they're floating in the air, etc. If textures seem to be 'tearing', like there's two textures fighting over which one is going to be seen, you've probably got two items right on top of each other. This usually happens if you snap a couple of interior room pieces together and the edges are overlapping. And there's no harm in 'cheating' to get there when you're testing. Open the console and type: coc "the name of the cell" to get yourself there quick and easy.

Second, get Srikandi's Item List. There's a link to it at the end of this guide. It's a categorized list of just about every item in the construction set and it's beyond invaluable. Seriously, this will be your best friend. (*Klinn's shameless self-promotion: You can also pick up a few Item Thumbnail Catalogs I created – link at the end of this guide.*)

Third, and this is for when you're starting to get the hang of the CS, most people are trying to make mods that are supposed to "fit in" to the Morrowind world. (If you're making a Final Fantasy mod, etc, ignore this.) So have a look at how Bethesda has done things to try and make your places fit with that. The hallmark of a good mod is that you can't tell that you're not playing part of the original game. Look at the 'unimportant items' - bookshelves full of random items, items on tables, tapestries etc are placed and try to emulate that. Hell, you can even copy and paste whole shelves worth of stuff over from other cells. But this sort of background clutter really contributes to how well something fits in.

Fourth, be really careful with your dialogue. It sounds really petty (and it is), but a lot of people will notice if you've made lots of spelling mistakes in your mod, and it does make it look a little unprofessional.

Finally, good luck! The CS does look daunting at first, but you WILL get the hang of it in no time.



### Kranas' Quick Quotes

1. If you're planning to release this mod for others, not just create it for yourself, then think about your audience. Just because you found Kwama Cuttle fascinating doesn't mean everyone is going to find Kwama Cuttle City an amazing experience.
2. The landscape sensitivity multiplier in the Editor's Preferences can save you a lot of time when raising big landmasses. Set it higher to raise land more quickly.
3. As much as possible, raise the landscape to where you want it before putting stuff on it. Once you're satisfied with it, texture it, then put the statics like flora and rocks on first. Things like NPCs and creatures should come last. Remember to always use the wireframe view (W key) and the A key (lighting) to have a different view.
4. Use the scale function but don't overuse it. Remember, if you're scaling up something like a creature, they may end up looking like they're attacking something above your character.
5. Alternate between doing interiors and exteriors. Working on one of them for too long can cause lapses in what might have been a nice landscape. (*Or do some dialogue for a while. – Klinn*)
6. Learn to create nice slopes. That is: minimize the jagged, unclimbable cliffs. Feel free to restrict accessibility somewhat, but don't overdo it.
7. Scripting and quests should be saved for last. Maybe place a creature or an item somewhere as a reminder to come back and create some scripts for objects in the area.
8. I'd say by this point in time to almost overdo landscape detail. Morrowind is quite a few years old now, and most people should have the computers to keep up with demanding landscape. However, you should always test and see for yourself, especially with a weather effect like the blizzards from Bloodmoon. (*Try to ensure your mod doesn't run slower than Balmora. – Klinn*)
9. Make backups of your mod frequently, especially before and after cleaning with utilities like TESAME (TES Advanced Editor) and TESTool.
10. Reward the player frequently, but don't overdo it.
11. Keep them interested. A well placed scripted event or even a simple reading of a journal entry or a well-done quest can help a lot.
12. Try to avoid clichés, unless you think it's to your advantage. It's nice to have some originality, but you don't have to be completely different. That doesn't mean you have to go retexture some items (though it is fun) or create some new animations or models. It simply means you could make a quest with a new approach or perhaps baby 0.5 scale cliff racers. (one hopes not)
13. Don't get too clogged down with other mods. Some people recommend it. I say, STAY AWAY. If you must, try to get the model or item or whatever, and integrate it into your own mod, so it doesn't require the parent mod, and then give credit where it's due if you release. Of course, you should contact the original modder to ask permission before doing this.



14. You may think creating an unavoidable encounter with your mighty Khajiit of Doom will be great since you know his secret weakness. But if players don't learn about the weakness, they are going to be SICK of trying to deal with that stupid creature.
15. This goes for things like dialogue in quests. Where's this cave? Your NPC says northwest of here...Really? Gee thanks for the vague directions! You might know where everything is, but the player knows nothing. Hey, that's part of the whole excitement for them, right? Don't mistake frustration for challenge. You might want to make something challenging, but there can be an extremely fine line between challenging and frustrating.
16. I must stress planning! It's soooooo important! Don't flail helplessly in the dark. The results usually aren't good. If you want to test something, make a separate plug-in.
17. Don't expect everyone to like your mod. That's the simple fact. *(Very wise advice. Create mods to please yourself, not because you want to be showered with compliments. – Klinn)*
18. Expanding on the point above, see what's "on the market" already. There are plenty of "my first house" type of mods out there. If that's what you want to do, great, but don't expect everyone to choose your mod over theirs.



### **Iudas' Words of Wisdom**

You do not have to make your mod compatible with anything beyond Morrowind, but if you want the hurrahs and accolades and the big \$\$\$, you should try to guarantee that you don't screw up the most popular mods with your creation.

Do include a proper "ReadMe.txt" file with a unique name with your mod when you release it. *(Very true! I suggest describing the purpose of your mod, any dependencies, how to install it and which files go where, a summary of what the mod changes, especially if it modifies existing game areas/objects/settings, how to un-install the mod, and how people can contact you if they have questions. – Klinn)*

Do not waste your time trying to find the maximum compression utility. Folks with flat rate, always on connections could really care not at all what you compress with or how many MB you squeeze out of the download, and if your download is that big to begin with, folks on pay per minute dialup are not going to download it anyway. Yes, it is really GeekBadge to use 7Zip or some other esoteric program and if that is the route you are planning to go, then pack it with a self extractor because most folks will not have 7Zip or WinAce. But they *will* have built in free Zip extraction courtesy of their operating system.

Dialogue: Do not place your dialogue at the top of the dialog lists in any of the nine Greetings sections. Do not place your dialogue at the very bottom of the dialogue lists of any Greetings section either. Insert it somewhere in-between existing lines in the Greetings section you decide to modify. *(This allows the game to 'link' dialogue properly, even when the user runs multiple mods. – Klinn)*

Allow as many spelling errors in your dialogue as you allow in your scripts - 1.

"GameSettings" are your friend if your intent is to change the overall way MW functions, and to have that change affect every mod the player loads. The "Morrowind Scripting for Dummies" guide has a partially completed list of the GMSTs in the appendices.

Any global variable in any loaded mod can be accessed by any other loaded mod. With a little planning, mods can be written to be aware of and use other mods if they are present and to make their own presence known should any other modder want to interface with them.

The editor is not consistent in how it handles rotations about the various axes. In some functions it uses degrees, in others it appears to use some fraction of radians or thousandths of a degree.



## **Be Cautious When Changing Existing Items In The Game**

Be *very* careful about changing existing objects or NPCs in the game. Over in the TES Forums, DinkumThinkum has some excellent advice about this, but until you get a chance to read it, here's my brief take on the issue:

1. If a player has already interacted with the existing object you are modifying, the information in their save game could supercede your changes in the mod. There's all sorts of data stashed away in a save game. From things you might expect, like the contents of a chest the player opened, to others as unexpected as the types of weather in a region. Since save games are loaded after any mods, that stored info will take precedence over anything in your mod. The result is that the player won't see the changes your mod may be depending on. This is similar to the 'dirty save' issue described in the "Common Problems" section.
2. You might accidentally break an existing quest, script, or dialogue that depends on the object or NPC.
3. Somebody else may change the same object in the mod they make, leading to conflicts between the two versions. For example, before Tribunal was released, a number of people edited the Main startup script to establish conditions needed by their mod. This caused trouble if another mod was loaded after theirs and it also modified the Main script, since that was the version of the script which was used. The first mod was toast since its version of the Main script never ran. *(Tribunal introduced the ability to have multiple startup scripts, so fortunately this particular practice is no longer needed.)*

It is much safer to add new objects to Morrowind rather than to modify existing ones. For example, rather than modifying an existing merchant directly by adding new items to his inventory, put the items in a new unique crate, drop that crate into the cell and assign ownership to the NPC. You've only added something new, the crate, not modified the existing merchant.



## **Hints For Creating Quests – by Patrograd**

Before you start, plan. Then, plan some more. Draw maps, characterize your NPCs, think about the scripts you will require to do the things you want and how you will implement them. Draw dialogue trees, think about how you will be introducing topics to the player. This plan doesn't have to be set in stone, the odds are that you'll change it as you go along, but its difficult to create a cohesive quest without it. Think about NPC motivations, their back-story, why they are there, why they are asking you to do things, what are their hopes, their fears, their concerns. Write out a quick storyboard that you intend to follow.

The first thing I always do in the Construction Set is write the journal entries for the various quests, which I take from the storyboard I've written earlier. I have always viewed quest mods as guiding the player from journal entry A to journal entry B, and then onto C and so on. The journal is the most powerful tool at the disposal of the quest modder.

Speaking personally, I then build the mod in quest order, although I leave the details (furniture, trees and the like) until last, placing NPCs, creatures, quest-related objects and scripted events as I go along through the story. If I get stuck on a script then I move on and come back to it later.

Testing. You can't do too much testing. Test everything, in every way you can think of. When testing, think not 'what will the player do here', instead think 'what are the possible things that the player can do', and account for them accordingly. Test dialogue under every condition you can think of. I have three test characters: a mage, a warrior, and a thief. I make sure that all of these can get through.

Lastly, uber items. No-one wants them. Keep them out of your quest mod. It is better to under-reward the player than over-reward them. It is very, very easy to unbalance the game. Far too many otherwise perfectly good mods are ruined by giving the player the uber Sword of Kill-All at the end. Also be careful not to place any unique main quest items in your mod. I've seen Guards equipped with Trueflame before... killing those guards and taking the sword breaks the entire Tribunal quest series.

*(As Patrograd mentions, quests are largely controlled through dialogue and journal entries. To get a good understanding of the dialogue system as a whole, try Srikandi's excellent tutorial, then move on to Skydiver's quest-specific tutorial. Links are at the end of this guide – Klinn)*



### **The Importance Of Details** – by SirLuthor

First, just as a side note I guess, in Task Manager I've seen the Construction Set use over 400 MB of my RAM, which is a hell of a lot. And when it starts using that much memory, it starts getting buggy. Landscapes get holes in them for no good reason, and bad things start happening.

*(Restarting the Editor or rebooting should clear this up. – Klinn)*

And now for one or two hard earned pieces of advice: If you come upon a problem, visit the TES Forums and use the search function. Odds are, it's been answered at least once by someone, at some point, so if you do a search that answer will come up and you'll have your solution immediately without taking anyone else's time. However, if you can't find an answer after searching, by all means, post your problem. Not only will it get an answer for you from all the great minds gathered together there, it will also provide something for other people with the same problem to come upon when they search.

Secondly, and this is related to modding; clutter, path grids, creative dialogue, and lighting! I can not over-emphasize how much better it will make your mod if you add those four things. Without them it will be dull and lifeless. Clutter covers all the small things in life, which much of the time people fail to add to interiors and exteriors. Bottles, plates, silverware, candles, you name it.

Path grids, those are the paths that NPCs will walk if they are left to idle, give your mod so much more life. Perhaps the innkeeper goes and checks the cellar occasionally, instead of just standing behind the counter looking dull. Just be careful to test your pathing time and time again, as NPCs have the habit of mucking up even the simplest of paths. Specifically, avoid corners, static objects, or other things with collision.

Creative dialogue. Do you know how annoying it is to load up a mod, and have the first modded NPC you meet say some recycled greeting? For goodness sake, if you can take the time to make a mod, then you can take the time to make greetings and dialogue for your NPCs. Unless of course there is a specific reason for the NPC to be just like everyone else.



And last but not least, lighting. If you simply leave the light sliders at their defaults, more often than not it will result in a boring flood-filled interior with no life. Mess with the settings, make it darker, and add some candles yourself. Makes for loads of character in an otherwise boring interior.



### **Things You *Can't* Do With The Editor** – by Iudas

You cannot make new magic effects, new skills, new specializations, new gamesettings, new subwindows (like the spell-making, repair, alchemy, or enchanting windows), new skill use actions, or new attributes. Some of these can be worked around with scripting, others appear so far to be untouchable.

The editor and the Game engine are string variable "challenged". Dialog can access specific preset string variables in a very limited way, but the scripting engine does not understand nor parse user-created string variables.

Many of the most useful game variables are not accessible by the scripting engine. BarterGold is only the most infamous of the inaccessible variables. The game does keep track of it, but does not let the modder near.

*(I've added a couple more points concerning this topic below. – Klinn)*

Making new objects. While you can make your own unique copies of existing objects in the Editor, perhaps with modified attributes or properties, it is more difficult to make them look different. You need to use additional programs to do this. You can change the color or texture of an existing object by 're-skinning' it. This will require a paint program to edit the texture and a free utility such as NIFTexture to actually apply it to the object. The TES Forums have more information about this process, or pick up Srikandi's re-skinning tutorial. (Link at the end of this guide) Changing the actual shape of an object, not just its texture, is another step up the complexity ladder. You'll need a 3D modeling program and a way of getting the model into the proper 'NIF' format needed by Morrowind. A popular, inexpensive, option these days is a program called Milkshape combined with a plug-in for it that can export NIF files. Again, the TES Forums has much more information about this, and there are links at the end of this guide.

But don't feel that you need to do these things to produce a great mod. Many, many excellent plug-ins have been created with nothing more than the Construction Set. Ingenious modders have found ways of combining existing objects to produce novel effects. When you're starting out, concentrate on the Editor and learn what it can do before worrying about the rest.

## Using The Editor

### Basic Commands

While the Help file that comes with the Construction Set may be lacking in other ways, it does have a good list of basic commands. Look under the “Render Window” topic and you’ll find out how to move and rotate both objects and your viewpoint. Below is a bit of additional information:

Certain objects may not “Fall” when you press the “F” key. Often lights will not fall, and sometimes NPCs are stubborn too. No object will fall unless there is something underneath it to land on. So if there’s a table floating outside of an interior and you press “F”, it will not move since there is no floor beneath it. Any time that “Fall” doesn’t work, you’ll have to move the object manually.

If you can’t see the North Marker or pink Door Teleport Markers, you probably have accidentally pressed the “M” key. Press it again to turn them back on.

While working in the exterior, press the “B” key if you want to see the boundaries of the cells.

The Help file implies that when you use Ctrl-D to “Duplicate” objects, you can then immediately move the duplicates to a new location. But after using Ctrl-D, it’s the original objects that are still selected, not the new duplicates. So if you do a move, it will be the original objects that will end up in the new location, not the duplicates. For most objects, this doesn’t make any difference. But if you were to copy a building, including its entrance door, the original door ends up in the spot you moved the supposedly “duplicate” building. The door will still be set to teleport back to the original interior cell, while the door left behind has no teleport target yet so it looks like it doesn’t work any more. It’s a mess to clean up. My advice: don’t include doors when you are selecting objects to duplicate.

### Searching For Items

When you first look at the huge lists of all the objects in the Editor, it appears impossible to find the particular one you need. Eventually you’ll become familiar with Bethesda’s naming conventions, but in the meantime here are a couple of helpful guides. Srikandi has compiled a terrific Item Index, categorizing objects so they are easier to find. There’s a link to it at the end of this guide. I’ve assembled a couple of Thumbnail Catalogs, one for clothing and two for certain regions’ terrain statics. Links to these are also at the end of this guide.

The Editor itself has a practically hidden function that is good for finding objects. Under the Edit menu, select the “Find Text” command. In the box that pops up, enter some text that describes what you’re looking for, e.g. “fire”. It will list all objects that have the word “fire” within their names, as well as books that have the word in their text, NPCs’ dialogue that happen to mention fire, and so on. You can click on the column headers to sort the results, e.g. so all the objects are sorted by type.

Another interesting search option is handy when you want to find out where a particular object or NPC appears in the game. Select it in the Editor’s lists, then press the F1 key. If it’s listed as being used in certain cells, you can even go directly to that cell by double-clicking on the name. Pretty slick.

## Making Rooms & Walls Line Up - Grid Snap

The interiors of buildings and caves are primarily composed of main sections or 'tiles' that are assembled together, e.g. a corner followed by a straight piece followed by an entranceway, etc. Many people have problems getting these to line up. Either there are some small gaps, or the pieces overlap and the surfaces flicker in the game. To avoid this, it's important to line up the sections precisely. It's possible to manually enter the X,Y,Z coordinates of each piece, but that takes forever. Instead, try using the Grid Snap and Angle Snap features built into the Editor.

First thing to do is to go into the Editor's Preferences and set the Grid Snap to a useful value. What value? Well, notice that almost every one the main sections or tiles is 256 units long by 256 units wide. There are some half-length pieces and double-wide ones, but most of them are that size. So to get one piece to line up with another, you could set the grid snap to 256 units. You *could* do this, but you'll probably find it difficult to move pieces around the Render window. Try something that divides evenly into 256. This is the 'power of two' rule of thumb you'll probably hear about. For the large room and cave sections, I recommend a value of 64, which is the Editor's default setting. It's small enough to see pieces moving as you drag them with the mouse, but large enough that you can be sure they're snapped together properly, even if you are zoomed quite far back.

OK, the Grid Snap is set to 64. Now make sure it's actually activated by clicking the little grid button on the toolbar. In addition, you must also turn on 'Angle Snap' by clicking the red pie-shaped button that is next to it. Snapping room tiles together only works properly if you are building things 'square', that is, orthographically. I'll talk about building on an angle later.

Finally you can now drop the first piece of your room or cave into the Render window. At this point, the Editor throws you a curve ball. Even with grid snap turned on, simply dropping a room piece into the Render window does not make it snap to the grid! After dropping it, be sure to grab the section and move it slightly. You should see it jump to the nearest invisible grid point. Once that first section is in place, any others you bring in will line up perfectly.

That takes care of snapping the main room tiles. Once you begin to add other objects, e.g. doors or windows, you may find they won't snap to the right place. In Preferences, reduce the grid snap setting to 8 or 4 or even smaller. Remember, always use a power of two, i.e. 1, 2, 4, 8, 16, 32, 64, or 128.

Once you start adding all the 'clutter' that goes into a room or cave, e.g. furniture, dishes, rocks, posts, etc, then feel free to turn off the grid snap entirely. Angle snap too. Real world interiors are not so neatly arranged, at least my place sure isn't, so try to introduce some randomness into the layout.

As I mentioned above, grid snap only works if the angle snap is on too. But what if you want to build something on an angle? If it's an interior, build it 'square' and leave it that way. Rotate the interior cell's North Arrow marker the other way instead. The direction it points will be 'up' on the player's Local Map, so it will appear as if you built the interior on an angle. For exterior cells, e.g. if you're building some Imperial Fort walls or Hlaalu canal sections, assemble them 'square' with grid and angle snap turned on, then select all of the pieces and rotate them as a unit. Better make sure you won't want to make any changes or you'll have to rotate them back. It's a pain, believe me.

One final bit of advice about snapping. Suppose you want to move part of an interior you're working on over a bit, or maybe copy parts of an existing cell into your own and make it line up. If you select a whole bunch of stuff, i.e. not just the main room tiles but furnishings too, you'll probably discover that it doesn't end up in the right place, even with grid snap turned on. The

problem is that the Editor is snapping to the origin of some random item within the group you've selected. Here's the trick: first select one of the main room tiles, then hold down the Ctrl key and select all the other items you want to move. This will force the Editor to snap that first item to the grid. Since the first item is a main room section, it will line up with any others already snapped in place.

Whew! This may seem like a lot to deal with just to position objects, but it becomes second nature once you're used to it. And it pays off by being able to quickly and easily assemble interiors that you know are precisely aligned.



## **Adding Large Quantities of Items to NPCs Or Containers**

Suppose you want to add a large number of arrows to a new crate you've made, or to an NPC bandit you've created. You drag and drop an arrow from the Weapons list onto the crate's or the NPC's inventory list. Surely you don't have to do that 40 times to get 40 arrows? Nope, just click on the "1" in the count column, pause, then click again. It should turn into an edit box and you can type in the number of arrows needed. If it's difficult to get the right timing of the two mouse clicks, you can press the F2 key instead.



## **Landscaping Tips – by Miles\_Acraeus**

Q: How can I “mass” raise terrain from the ocean?

A: Change the “Edit Radius” to 30 so the red editing circle is as large as possible. Raise a bit of land at least 500 game units in elevation in one cell. Now check the box named “Flatten Vertices”. Move the cursor to the top of that raised land, left-click, hold, and drag. And drag and drag some more. You can quickly establish the basic shape of your territory.

Q: Why the hell does my computer lag so badly when I edit exteriors?

A: A lot depends on available RAM, both for memory and video memory. Try lowering the Clipping Distance as much as tolerable. To set this, go to Preferences on the menu bar (or click on the toolbar button with the hand holding a note - next to the save icon) and look at the bottom of the window that pops up. You'll see a slider - move that to the left. It should help speed things up.

Q: How do I erase vertex painting? (those dark “shadows” you'll find around rocks and under trees)

A: Keep one color, normally the one assigned to the right mouse button, as just plain white. The color white in the editor doesn't register, but instead acts as an eraser.

Q: How do I go to an extreme coordinate off the map to begin my editing without having to scroll through 200 cells?

A: Edit your “Morrowind.ini” file under the [General] section, finding the part that looks like this:

```
Editor Starting Cell=wilderness
Editor Starting Pos=3076.085449,5801.512207,16321.179688
Editor Starting Dir 0=-0.970524,0.230054,0.071845
Editor Starting Dir 1=-0.241012,-0.926398,-0.289310
Editor Starting Dir 2=0.000000,-0.298097,0.954534
```

Edit those first two lines to the coordinates you wish to start at. Remember that the map is quadratic. That is, the center X,Y intersection = 0,0 ; lower-left = -x,-y; upper-left = -x,y; upper-right = x,y; and lower-right = x,-y. Given that a game cell is roughly 8000 game units across, use

that as a coordinate multiplier. Let's say you want to start landscaping in the furthest reaches of the lower left quadrant at the -100,-100 cell. Set the starting cell as wilderness, and change the second line to read:

```
Editor Starting Pos=-800000,-800000, 0
```

Save that change to your Morrowind.ini file. (Don't worry about "damaging" the file, the Editor will record the last cell you worked on anyway.) Load up the Construction Set, and there you are!



## **Debugging Scripts - by Srikandi**

The key to debugging: incremental testing. You think you've figured out the scripting language, and you're ready to script your long sword that leaps out of your hand and tap dances when an enemy is in sight, but only if the player has had a bit too much skooma and the moons are full. You pull out Scripting for Dummies, read it end to end, and then produce 200 lines of timeless code. You save your mod, start the game, give the sword to your character, wait for the right time of month, chug a few bottles and... nothing happens. Whoops! Where on earth did you slip up?

Don't ask us! Best thing to do is to avoid being in this situation in the first place. At the beginning, you should test your script at every point along the way where something should have happened that could be detectable in-game. First, get the long sword to drop to the ground when an enemy appears. Then get it to hop when dropped. Then choreograph the tap dance. Then add the condition about skooma. Then check the moon phase. Make sure each phase works flawlessly before proceeding to the next.

Your testing can get even more fine-grained than this. For instance, if a variable X is supposed to get set, you can make sure that happened by starting the game, setting up the conditions for the script to run, opening the console, clicking the object the script is tied to, and typing "sv". Or, put a message-box in your script: `MessageBox "X is set to %g", X`. You'll see a message in-game when the script runs. This will let you know not only the value of the variable, but whether that part of the code executed.

Don't be afraid to use the console while testing, to set the conditions for your script to execute... get your clean character to the right location, set the game day or the time, give yourself the items you need, spawn some enemies to test on, and avoid dying before you found out if your script worked. This can save a huge amount of testing time. You don't get any medals for feats of valor performed while testing mods.

Many more useful hints along these lines can be found in the Morrowind Scripting for Dummies "Troubleshooting" section.

Incremental testing is tedious and time-consuming, but it is much better than the frustration of staring at a screenful of code and scratching your head... and when something doesn't work, you'll know exactly what it was, and it will be much more likely that you'll quickly find a solution, or get useful help on the forum. As you gain more experience, you'll be able to write longer sections between tests, and things will start to go faster.



## **Naming Your Unique New Objects or NPCs**

Way back in the General Advice section, under 'Making Clean Mods', I mentioned the importance of creating your own unique-ID objects before modifying them. So what ID code should you call them? Here are a couple of things to watch out for:



1. Names with leading underscores can cause problems. Some modders add a leading underscore, e.g. "\_My\_Uber\_Armor", so the object appears at the top of the Editor's lists and is easier to find. But there are some cases when this will cause bugs, and the error messages you get won't clearly indicate the problem. I recommend avoiding the practice.
2. Names with embedded spaces, e.g. "My Uber Armor". Referring to an object name with embedded spaces requires enclosing it in quotes, which in turn requires very specific syntax when using that name as a reference in a script. Again, when the bug pops up, it's hard to track down. Try using capitals to distinguish the words, e.g. "MyUberArmor" or underscores within the name (but *not* a leading one!) such as "My\_Uber\_Armor".
3. Common names. If you create a global variable called something simple like "State", the odds are that somebody else might use the same name in their mod. Then when a user tries to play with both mods enabled at the same time, confusion reigns. Both mods will be trying to change the same variable. Use something distinctive, something unlikely to be duplicated. Many modders put their initials at the front, e.g. "KLN\_Uber\_Armor". (I seem to have a thing about armor, hmmm?)

Personally, I go even further than that and use an extension of a scheme suggested by Dragonsong years ago. It may be overkill for small mods, but for what it's worth, here's what I do: The first couple of letters are my initials, followed by the initials of the mod, then the class of object, and finally its name. Using armor as an example again, in a mod called "Berjon's Blade" I would call it "KLNBB\_ARM\_UberShield". Why put the object class in the middle of the name? Suppose I need a special script to be attached to the armor. I can name the script "KLNBB\_SCR\_UberShield". The pattern of the names makes it very clear how things I've created are related to one another. And having the mod's initials in the name means I can create an uber shield in some other mod, and the names won't conflict. As I said, this may seem excessive for simple mods, but it has helped me.



### **Creating Paths For NPCs** – by Iudas & Miles\_Acraeus

Iudas: When creating path grids for your exteriors, the granularity number represents the number of “game units” between two points on the grid. So a 128 granularity has many more points than a 4096 granularity. As a mental reference, a game unit is .564 of an inch. An exterior cell is 385 feet on each side or 8192 game units.

Critters as well as NPC's use path grids but they use them differently, experiment. If you want to restrict an NPC's movements, manually disconnect his path grid from the rest of that cell's path grid.

Miles\_Acraeus: How could I forget the importance of path grids. Even when an actor's AI is set to zero wander, they may have a tendency to turn to the nearest face of a static object oriented north... And just s-t-a-r-e... Welcome to the sanatorium.

Setting a path grid is very important to an actor's AI, even if it's only a few way points, and critical if an actor has to negotiate a tricky dungeon when in pursuit of the player. Set pathing and way points strategically ...not in door ways... but in areas where the actor can get himself around troublesome static objects, activators, and any other item that would interfere with collision.

## Common Problems

### Your Render Window Is All Grey

If you can't see anything in the Render window, here are some things to try:

1. First, make sure you are actually loading a cell to look at. When starting the Editor, be sure to select (checkmark) at least one of the master ESM files such as Morrowind.esm by double-clicking on the filename. Once that is loaded, you'll see the game's cells listed in the 'Cell Name' list. Double-click on one of those to load it. Hopefully it will show up and the items in the cell will appear in the 'Cell Contents' list just to the right. If you still can't see anything, try double-clicking on an item in the cell contents list. This will position the camera very close to the object. If this fixes the problem, you have the Editor's viewing distance set too close. Under the Editor's Preferences, change the 'Clipping Distance' to so it's farther away. When first loading a cell, you start out quite far overhead. So you may need to adjust the clipping distance to see all the way down to the ground.
2. Still have a grey Render window? Check the Windows Desktop Properties and make sure it's set for 32-bit color. Sometimes when you update video drivers, this can be changed without you knowing about it.
3. If you have an nVidia TNT-based video card, there is known problem with recent Detonator drivers. You'll have to revert to earlier ones. Some people have reported success with the 30.82 version (thanks Shiva7663) while others made it work with 45.23 or 40.xx versions. (thanks Chia) Be sure to use a 'driver cleaner' type of utility to get rid of all traces of the previous driver before installing a different one.

### Multiple Warnings When Using All Three Master ESMs

If you select (checkmark) and load all three master files, Morrowind.esm, Tribunal.esm, and Bloodmoon.esm, the Construction Set will spit out a huge number of error messages concerning dialogue. This is perfectly normal. The two expansion ESMs were designed so they could work just with Morrowind, i.e. you wouldn't need Tribunal to run Bloodmoon. By including all three, the Editor has to figure out how to link all the unexpected dialogue into the right spot. This happens automatically, but it provides a warning about what it is doing.

However, it is a royal pain to have to click through all those messages. Here's a work-around. In your Morrowind.ini file, in the [General] section, add the line "AllowYesToAll=1". This is what my file looks like at that point:

```
Show FPS=1
Max FPS=240
AllowYesToAll=1
AllowMultipleEditors=1
```

This will add a "Cancel" button to the warning message. Clicking it will skip through all the messages. Of course, you could end up skipping right through real error messages describing problems with your mod. Get in the habit of reviewing the "Warnings.txt" file every once in a while. Skim through the normal dialogue warnings and keep an eye out for anything else which could be related to your mod. Often these will be at the bottom.

## What Are These 'GMST' Things In My Mod?

This is kind of the compliment of the problem described above. If you have Morrowind plus either or both of the expansions installed (Tribunal and/or Bloodmoon) then you are using an updated version of the Editor as supplied with those expansions. But if you decide to create a mod with only the Morrowind.esm master file selected (checkmarked), then when you look through the Details window listing what's in the mod you'll see a number of "GMST" entries. This often happens to people who are faithfully following Dragonsong's excellent tutorial "My First Room". Since it was written before the expansions were released, of course it does not address the issue.

The entries are "GameSettings". Look through them and you'll see that they deal with things like the werewolves that were added via the Bloodmoon expansion. It is very important to remove these from your mod, especially if you intend to release it for public use. Leaving them in will break several features of the game. There are three approaches you can take:

1. Be sure to select (checkmark) all three ESM master files while working on your mod. This will make the mod dependent on all three. That is, anyone using your mod must own Morrowind plus both expansions. Fortunately, with the GOTY Edition having been released quite a while ago, this is often the case. You will also get all those warning messages described in the topic above, but that's normal.
2. Select all three ESM master files while working on your mod but be very, very careful to not use any of the objects, scripting functions, or new features that came with the expansions. Then once your mod is ready for release, use Argent's utility called TESDTK to remove the dependencies on the two expansion ESM master files. Sometimes it can be difficult to remember not to use any of the new items in the expansions, but this really depends on the complexity of the mod and what it does.
3. Select just the Morrowind.esm while working on your mod and accept the GMSTs temporarily. But you *must* remember to clean them out once the mod is finished, especially if it's for public release. Argent produced a great utility to clean these entries from a mod.

You can read more about GMSTs, what causes them, and find handy tools to deal with the problem at Argent's web site. There's a link to it at the end of this guide.

## Your Objects or NPCs Are Missing or Duplicated

This is almost always caused by something called a 'dirty save'. Not to be confused with the 'dirty mod' issue discussed above. DinkumThinkum has written an excellent explanation of this common problem in the TES Forums, and much of that information has been captured on one of Argent's Tech Pages. There's a link at end of this guide. Until you get a chance to read that, here's my brief take on it.

When you save a game, all sorts of information about the Morrowind world is stored in it. Besides obvious things like the contents of a chest you've opened or the stock owned by an NPC merchant you've bartered with, there are things like the state of that door you opened, or the weather of a region you've passed through, or current values of script variables, etc, etc. Tons of stuff.

When Morrowind starts, it first loads the master ESM file(s), then any ESP mod files (in file date order), and finally you can load a save game. Since it is loaded last, the information about an object stored in a save game supercedes anything in a mod. Normally this is OK, but suppose you are testing a mod, decide to save your game right in the middle of it, then go back to the Editor and

make changes. The data in the mod may have changed, but if the save game has different (earlier) information about the same object, the poor Morrowind game engine gets confused. So you end up with missing objects or NPCs, or often duplicates appear.

The rule of thumb to remember is "Never save while testing". Even more to the point, be sure the character you are using to test the mod has never been in the area, or interacted with NPCs there, and so on. Nothing that would result in data about those items being stored in the save game. Most modders create a special 'Test' character, fresh off the boat. Use that character to test a mod, but remember to *never* save over top of him or her. This way, you'll be sure that you're testing with a 'clean save'. If you need to pump up the character for testing purposes, use the Console to increase attributes, add equipment, teleport to the mod's cells, and so on.



### **Your New Cell Is Jerky or Stutters**

You may create a new interior cell and discover that when you test it in-game, it's really jerky or 'stutters'. Other cells play smoothly. The problem: you probably have the music turned off. Yeah, it's a weird bug, but there yah go. Just turn the music up a touch, it doesn't even have to be audible, and the cell should work fine. (Sorry, I don't recall who discovered this fix in the Forums, but thanks and trophies to you!)



### **The Dialogue Window Is Too Big**

You need to see the entire Dialogue window in order to use it effectively, especially the "Filter For" box in the bottom-left. This requires a screen resolution of at least 1024 x 768. If you're using larger font sizes, it may even have to be bigger. Sorry, there's no way of shrinking the Dialogue window.



### **Dialogue – Keeps Asking Your Question Over And Over**

If you are setting up some dialogue for an NPC so she will ask a question and the player will select a response (the "Choice" function), remember to put the possible answers *above* the question. Yes, it sounds backwards, but it works. Dialogue tutorials such as Srikandi's explain why this happens in detail. To save you some re-typing, you can move Info/Responses up or down in the list with the left- and right-arrow keys. But use them carefully. Any other Info/Responses you move past are marked as changed, even if they are part of the original dialogue that came with the game. Oops, instant 'dirty mod'. But it's safe to use when rearranging your own dialogue.



### **Object Jumps When Trying To Drag It**

Yes, if grid snap is on, an object may jump a bit when you drag it. But the situation I'm referring to is when it suddenly jumps a huge amount, often up the Z-axis. This frequently happens when you are first starting an interior cell and have dropped a North Marker into it. Since the marker starts out way up in the air, it is common practice to double-click on it to open its Properties window and type in coordinates of 0,0,0 manually. It goes to the correct spot, but if you ever try to drag it with the mouse, the North Marker will jump back up the Z-axis, the last "0" you entered.

That's the key: after typing in the coordinates, move the cursor to another box or click on a button. This is referred to as 'moving the focus to another control' by programmers. I usually click the little up-arrow button next to the Z-coordinate to move the object up, then click the down-arrow button immediately to move it back. This forces the Editor to remember what you typed.

## Landscaping – Can't Raise Terrain Contours

If you can't raise or lower the terrain using the red landscape editing circle, check these things:

1. Make sure the boxes labeled “Flatten Vertices”, “Soften Vertices”, and “Edit Colors” are all unchecked.
2. Look in the Editor's Preferences and make sure the “Land Sensitivity Multiplier” has not somehow been set to zero. The default value is 1.0 .

## Summary of Links

Official Elder Scrolls Forums: <http://www.elderscrolls.com/forums>

Dragonsong's “My First Room” Tutorial: [http://66.106.110.151/Morrowind/Thanos\\_Tower/tutorials.html](http://66.106.110.151/Morrowind/Thanos_Tower/tutorials.html) (near bottom)

Scott Fisher's Landscaping Tutorial: <http://www.rpgplanet.com/morrowind/tamriel/tutorials/s%20fisher/tespart3.html>

Srikandi's Item Index: [http://members.cox.net/srikandi/item\\_index/index.htm](http://members.cox.net/srikandi/item_index/index.htm)

Klinn's Thumbnail Catalogs: <http://www.designamatic.com/MW-ClothingCatalog.html>

Morrowind Scripting for Dummies: <http://www.euro-morrowind.com/index.php?section=plugin&code=05&id=4657>

Srikandi's Dialogue and ReSkinning Tutorials: <http://members.cox.net/srikandi/>

Skydiver's Quest Tutorial: <http://www.themcnews.com/morrowind.htm>

DinkumThinkum's Dirty Save Info: <http://members.optusnet.com.au/argent2/mw/tech/dirt.html>

Argent's GMST Info and Tools: <http://members.optusnet.com.au/argent2/mw/tech/gmst.html>

Indigo's Morrowind Tutorials: <http://www.rpgplanet.com/morrowind/vault/> (click Tutorials menu item)

RedwoodTreeSprite's Modding on a \$0 Budget: <http://www.zyworld.com/redwoodtreesprite/FreeGraphicPrograms.htm>

Milkshape (cheap 3D modeling app) home page: <http://www.swissquake.ch/chumbalum-soft/>

NIF plug-in for Milkshape: <http://games.groups.yahoo.com/group/NIFLA/>

Detritus' Milkshape Tutorial: [http://detritus.silgrad.com/mstut\\_modeling.html](http://detritus.silgrad.com/mstut_modeling.html)

Blender (free open source 3D modeling app): <http://www.blender.org/>

NIF Tools for Blender and Maya: <http://niftools.sourceforge.net/>

## Afterword

Although this guide is called “*Klinn's Advice For New Morrowind Modders*”, you can see that it wouldn't have been possible without all the experience and knowledge provided by many regulars from the TES Forums. My thanks to all of you for making the modding experience easier and more enjoyable.

I hope this guide has presented some useful advice to those of you just starting out on the modding adventure. All these words of caution may make it sound like the Construction Set is absolutely horrible. Not at all. In fact, it's amazing what you can produce with it. And it seems every week some dedicated and talented modder finds a way to do something previously considered 'impossible'. So jump in and give it a shot.

Most important, have fun!

...Klinn