Narrated Jmol Tutorials:

A Jmol tutorial is a useful tool to guide someone through the salient features of a model...even when you aren't present. You may recall a lecture in which an image of a macromolecule was projected on the screen — and then spun around at a dizzying speed! It is far better for you to be able to rotate the image at your pace. A Jmol tutorial is the perfect solution.

Jmol tutorials may or may not be narrated. The advantage of narration is that the viewer can focus on observing the structure. On the other hand, some folks prefer to quickly scan the material for what they need. Even in a narrated Jmol tutorial, written text should be provided for those who want to see everything at a glance.

GETTING STARTED:

Creating a Jmol tutorial requires thoroughly planning out your project, recording the sound, creating the content, and then producing the actual website files needed to run a live tutorial on any web browser.

1. Setting Goals

2. The Script

3. The Storyboard and Creating the Jmol Files

4. Recording Audio

5. Coding the HTML (Covered in the second document "how to_start_HTML")

1. SETTING GOALS

Whether you want your tutorial to act as an overview or introduction to a topic or as a detailed explanation of a narrow concept, you need to start by setting your learning goals. These goals represent what your project is supposed to teach. Simply put, it is the reason you are making the narrated Jmol!

Write these goals down. Put them somewhere where the team will see them and be reminded of them. One of the quickest ways to lose control of a project is to forget the reason you started making it in the first place! As you work through the project, you may need to reshape and revise your learning objectives. You should only have a few learning objectives – if you have more, you should consider splitting the project into sections.

2. The Script

It is very tempting to immediately grab that microphone and start having fun recording all sorts of things. But nine times out of ten, that unplanned footage - while fun and spontaneous - really doesn't work as well in the final project as you may have expected. The best way to create a quality piece of media is to plan it out thoroughly.

The most widely utilized way to start planning is by writing a script. Writing a script forces you to solidify your ideas and consider all the options you have for achieving your main goals before ever spending the time recording.

In the case of Jmol tutorials, you will have three scripts: the Jmol script (how the model is displayed on the screen), the written text and buttons that walk the viewer through the structure, and a script (similar but not identical to the written script) for the audio that accompanies the tutorial.

Scripts can vary significantly. As you start, consider whether you will be more serious or casual. Practice the script to estimate the time your each section will be. You may be surprised how quickly a short script becomes a 10 minute lecture - so be careful how much information you try to pack into each sound clip. It is generally considered better to have several very short audio clips (with a max of maybe 30 seconds each) than one really long clip. This keeps the user active and engaged with the content.

Writing a script will force you to narrow down your content and focus the purpose of your tutorial.

3. The Storyboard and Creating the Jmol Files

Once your script is complete, you can consider what will actually be displayed in the Jmol Window throughout the different sections of your project.

The most common way to start this process is by adding images of your model to what, in essence, is a comic strip of your tutorial. Break down the text from your script into smaller chunks - each of which will be paired with an exported image from Jmol. The image should be what you imagine will be displayed in the Jmol Window for that section of the script.

The ATP Molecule is now
released from the protein
and moves towards the
cell wall
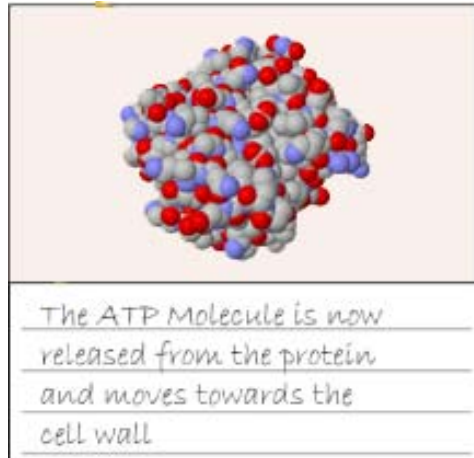
You may also want to annotate your storyboard to convey movement and action. For example, if you have a portion of your script in which a molecule will need to rotate in the Jmol Window, you may use something like the annotated image below to convey it in your storyboard.

The ATP Molecule is now
released from the protein
and moves towards the
cell wall
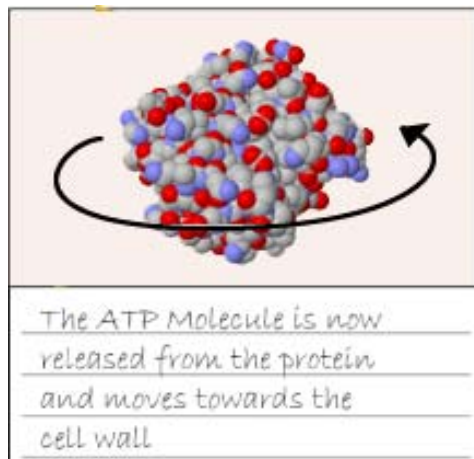
There are two main purposes to a storyboard. First and foremost, they force you, as the creator, to hone in your ideas. As you envision the images that will compliment the script, you may need to go back and alter the script a bit. This could be to make the content better match what you have in mind for on the screen or to adjust the timing of a specific section of the tutorial. Second, storyboards help streamline future work on the project. Instead of having to remember every detail and convey those details to the entire group, every team member can have a solid copy of the overall plan for tutorial. This makes work quicker and communication easier.

The follow page contains a sample storyboard design to use as a template.

Because Jmol can use .jpg files as a way to save your current state, the storyboard process can also help prepare a set of Jmol states that you will then reference to create the final active Jmol tutorial online. These saved states will also be necessary if the CBM helps to produce the final audio or HTML files.

Your Jmol .jpg images should be clearly named and organized to fit with the storyboard. For example, if you have a five frame storyboard that matches five .jpg images you have saved from Jmol, they should somehow be labeled or named so that the CBM can easily decipher which image compliments each section of your script. (You might include as part of the name, the number corresponding to the sequential order of the images. Audio files can be numbered to match these files.)

4. Recording Audio

While it is very common to edit and fine-tune a script throughout the storyboarding process, the script needs to be completely finalized before the final recording. While possible, it is not always easy to re-record a section of audio to replace a previous recording that has errors.

For this reason, you may want to spend time making sure your storyboard and script flow exactly how you envision them. Review the storyboard to ensure that it meets the goal(s) you set for the project. If you find that any section does not help achieve your learning goal, now is the time to correct it! You should also get input from your research mentor, instructor and others to ensure that the material is both accurate and clear, and that it accomplishes the goals.

Once confident in your script and storyboard, you can begin recording. There are countless ways to create audio files today, from high end recording studios to the microphone in a smart phone. Inexpensive computer microphones are also easily available; the MSOE Center for BioMolecular Modeling is also prepared to facilitate recording.

Audio can be recorded, cleaned up and edited using any number of freeware audio programs. The most useful one we have found is Audacity Audio Recording. For simple tasks such as importing sound files, removing sections of the audio, adding pauses and exporting .mp3 or .wav files, Audacity is excellent.

Audacity is available at: http://audacity.sourceforge.net/

Additional tutorials and information for the program can also be explored at: http://wiki.audacityteam.org/wiki/

Your final audio clips should be saved as either .mp3 or .wav files. .mp3 files are ideal because they have the smallest file size. .wav files are usually not condensed so may download slowly on some computer systems. The difference in sound quality between the two file types is not usually noticeable in voice recordings.

Keep in mind that not everyone will be able to hear your audio files while using the tutorial. Some users may have trouble hearing or lack speakers on their computer, while others may just not like listening and would prefer reading. For these reasons, you should make sure to have your audio recording saved as written text as well.

5. Coding the HTML

You now have your script, your storyboard, all of your complimentary Jmol states saved as .jpg files, and your recorded sound clips. How do you put it all together?

An HTML document will have to be created (along with some supplementary files) to properly display your narrated Jmol tutorial in a web browser. This process can become pretty complex, so we propose two options:

1. Your group can collect all the audio files, saved Jmol states as .jpg files, text and script files, .pdb files, your storyboard and any other images or content you have produced into a single folder. Zip this folder and send it to the CBM. We can add it to our standard template HTML file for you. Make sure that your storyboard is extremely clear as we will make most of the design choices based on it.

2. Your group can explore and edit our HTML template directly. This process is a bit more advanced, but the second document of our narrated Jmol tutorial resources will cover the basics of editing an HTML file to run your narrated Jmol tutorial on a web browser.

See "Basic HTML"

A Note on Active Learning:

You can create a very useful learning tool in which the user goes directly through your tutorial by clicking on one audio button after the other. However, pushing your Jmol tutorial further through the concept of "active learning" can drastically improve its teaching power.

For example, instead of simply having a user click a link and then listen to an audio clip, ask them a question and have several different audio clips play depending on their answer. Or propose a task they have to accomplish before they can continue. (You may have them click on a particular portion of a jpg image of the protein. Or, make them identify something correctly before you show them more detail.

In other words, get the users involved with the experience. Do not view them as spectators who simply observe the show you have put together. Think of them as active participants who are engaged in the tasks.