



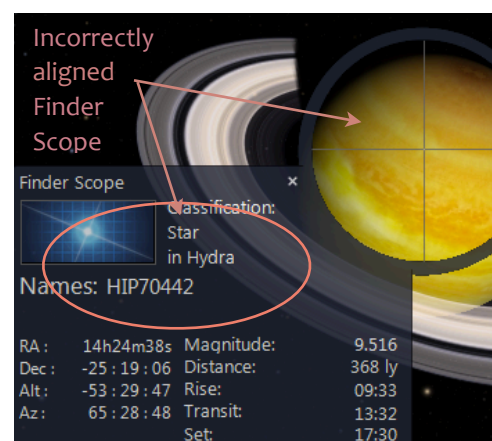
WWT Tips for Ambassadors

Using WWT in Astronomy public presentations and classes

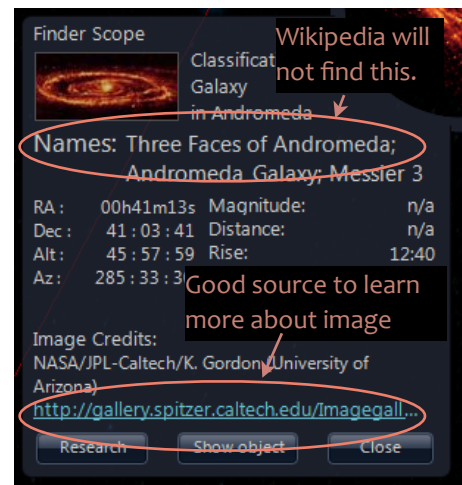
- WWT naturally inspires curiosity and good questions. Build a bank of your favorite views in WWT to show, but also give students/visitors the time and freedom to explore WWT on their own.
- Remind your audience that WWT is much more than just pretty pictures
 - they can view iconic astronomy images in context in their position on the night sky.
 - they can control time to see how things change.
 - they can look at objects across a range of wavelengths and learn something different from each part of the electromagnetic spectrum.
- Steer audience toward interesting stories, not just facts. (Examples - How does a star form? Where do planetary nebulae come from? What happens when two galaxies collide? What is the evidence for black holes? Why is Neptune blue while Saturn is orange?)
- Especially in a classroom setting, don't feel like you have to tell them all the answers. Teach them to fish instead of giving them fish. "That's a good question. What do you think?" or "Hmm. I'm not sure about that. Let's see if we can find some more information about it."
- Resources for learning more.
 - WWT Tours made by astronomy experts and educators!
 - WWT Finder Scope & Research menu
 - Other resources on the internet - model how to judge a source's reliability. Who is the author? What are the credentials of the source?

Tips for using WWT's Research Tools to learn more

- You can right-click on any object in WWT to access the "Finder Scope" and various research options.
- When using the Finder Scope for research, make sure it is lined up with the correct object.
 - The name of the desired object should be listed in the Finder Scope
 - (for example, the planet a student is researching, and not a background star)
 - The thumbnail image in the Finder Scope should match the image students are trying to research.
 - (for example, the infrared image of a galaxy that a student is looking at, not an x-ray image of the same galaxy at a similar location.)
- If someone is having trouble getting the Finder Scope to line up with the right object, use this alternate method:
 - Find the image thumbnail of the desired object in the bottom context bar.



- Right click the thumbnail -> select “Properties.”
- To get information on Wikipedia, the Finder Scope needs to be aligned with an image that lists only the name of the object, not a title from a press release.
 - For example, if the students are researching “Andromeda,” they should access the Finder Scope from an image that’s named “Andromeda” (not the Spitzer image called “Three Faces of Andromeda.”)
- To learn more about which telescope took a specific image, and what you can learn about the object at that wavelength (like “Three Faces of Andromeda”), click on the hyperlink in the Finder Scope that points to the image source.
- Not every object in WWT has a Wikipedia entry. For those, you’ll need to help students find alternate reliable resources, such as
 - NASA websites
 - sites affiliated with Universities
 - science bloggers with relevant scientific backgrounds.

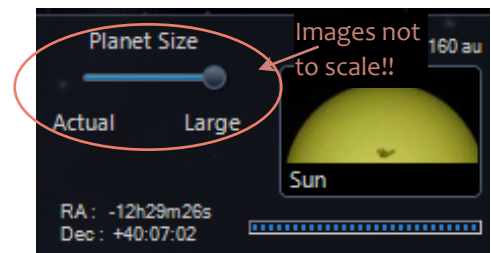


These are good things to point students to anyway, and it’s crucial for them to learn how to distinguish between reliable and unreliable sources of information on the web.

- Sometimes, not every object that a student is interested in will be curated in WWT. (If you “Search” for the object, WWT might not find it.) In that case, you can enter specific coordinates to see the object as observed in the all-sky surveys, but there will not be additional images from other telescopes included yet.

Misconceptions to help students avoid

- In 3-D Solar System View, we usually look at the planets when they are enlarged - otherwise they are too small to see. Make sure the students understand that the Sun/planets in this mode are not correctly scaled relative to orbit sizes. For example, the Sun does not really occupy such a large part of Mercury’s orbit as appears in the enlarged view.
- Our location in the Milky Way (represented by a yellow blob of stars from the Hipparcos catalog) is not special, and our location would appear smooth like the rest of the galaxy when viewed from far away.
- The “Shape” of the Cosmos.
 - The universe is not shaped like a bowtie, and it does not have an edge! It is uniformly populated everywhere with this web-like structure of galaxies.
 - Help students understand that this map only includes regions chosen by this specific survey.
 - Show that the “missing” wedges overlap with the Milky Way. (You can zoom back in to see the alignment with our Galaxy.) SDSS chose not to map there because dust makes it hard to see clearly.



- The outer “edge” of the map is not the edge of the universe, or even the observed universe. It’s where we have “complete” enough data to make a map. (Redshift limit is 0.1 -> ~1.5 Gly).
- One side of the map is more “complete” because it’s easier for the telescope to observe that part of the sky from its location in New Mexico.



General Troubleshooting

- If the sky/universe starts spinning out of control:
 - Click on any of the image thumbnails in the bottom context bar to reset location.
- If overlaid images are blinking, type “b”.
- If the program is in a really unusual state:
 - Restore defaults
 - Click the ▼ under the “Settings” tab -> “Restore Defaults”
 - If that doesn’t help, close down WWT and restart it.
- Please let Pat Udomprasert know if you encounter unusual problems. The WWT team can’t fix bugs if they don’t know about them.