

SDSS Scavenger Hunt

Surveys of the night sky by large telescopes have been done numerous times in the past. One of the early surveys was conducted by the 48-inch Oschin Schmidt telescope at the Palomar Observatory in California in the late 1950's: The Palomar Sky Survey (POSS). The POSS used photographic plates and imaged the sky with EVJRN spectral filters. The digitized version of that survey is still used to guide the pointing systems of the Hubble Space Telescope and is accessible online at <http://archive.stsci.edu/dss/>. In the first decade of the 21st century a more in-depth survey was made using the 2.5-meter Sloan Telescope at Apache Point in New Mexico: the Sloan Digital Sky Survey (SDSS). The SDSS used a 120-megapixel CCD camera system and, although covering only a quarter of the sky, it is much more detailed than the old POSS. In addition to the images of the sky taken with ugriz spectral filters, the SDSS has taken over a million spectra of galaxies, quasars and stars. The SDSS team has also developed extensive programs for use of their data by professionals and students in classrooms. Professionals can access the data and do "data-mining" to discover a wealth of new objects and science hidden in the data archives. This lab will access the SDSS classroom program known as SkyServer. Their website can be found at <http://cas.sdss.org/dr7/en/> and the lab can be found under the **Basics** link in the **Science Projects** section.

The SDSS Scavenger Hunt is the second lab on the Basic Projects page of SkyServer. As with any scavenger hunt, your task will be to find a variety of different things without getting lost. Before you start your scavenger hunt you should go through the **Tools** link at the top of the page (next to the **Home** link). Here you will find instructions on how to use the many tools available to you on SkyServer. Of particular importance are the Search and Navigation tools. When you feel comfortable using the tools, go back to the **Basic Science Projects** page to begin your hunt. When you click on the **Scavenger Hunt** link you will begin your journey through the SDSS data. The details of what you are looking for along with a review of the Navigation tool are laid out on the web pages that follow when you click on the **Next** box. If you missed something or want to review some point, you can go back by clicking the **Previous** box until you return to where you want to go. You can also access the **Tools** page at any time to refresh your skills at using the various tools. You should carefully read all the pages to avoid getting lost later. Once you have gone through all the introductory pages you will find the scavenger hunt list. A pdf of the list can also be found on the D2L page with these lab instructions. Two other tools that are useful but aren't explained in the scavenger hunt pages are the **Famous Places** and **Search Form**. These can be accessed from the main dr7 page under the **SkyServer Tools** column (left side of the page). The Famous Places can be used to find many of the objects. All you have to do is click on the Famous Places link on the left side of the main page under the SkyServer Tools heading then select the type of object you want to find. To get to the Search Form from the SkyServer Tools click on the Search link. There are five different methods of

doing searches and they are listed out at the top of that page. The one you want is Search Form. Click on it and you will find three links: **Read the User Guide**, **View the Tutorial** and **Launch the Search Form Tool**. You should go through the tutorial first to learn how to use the tool. After you have completed the tutorial you will be ready to use the Search Form to find many of the objects on your scavenger hunt list. Record the R.A., Dec, Type, u, g, r, i and z for each of the 18 object on the list. Some of the objects will be fairly easy while others will be a challenge. By the time you finish you will have the basic skills needed to conduct your own data-mining operation and become an explorer of the digital night sky.