Data Management and Access Plan
I.   Products of the Research

(a) Observational data may include images, spectra and/or photometric time series of astronomical objects, calibration data (e.g., flat fields, observations of reference stars) and associated metadata necessary for the proposed research.
(b) Results of data/statistical analyses (e.g., parameter estimates and associated uncertainties) are derived from observations/simulations and summarize the results relevant to the proposed research.
(c) Simulated data used for publications is compared to observations to aid in the interpretation of results.
(d) Software used for publications will be developed to reduce observations, model observations of astronomical objects and/or perform statistical analyses.
(e) Curriculum materials may contain web pages, handouts, PowerPoint/KeyNote /OpenOffice slides, multimedia presentations and assessment materials associated with the proposed broader impact activities.

Preliminary data, drafts of scientific papers, plans for future research, peer reviews, communications with colleagues and physical samples are not included in this plan as set forth by the US Office of Management and Budget.

II.   Data Formats

(a) We plan to store both raw and final reduced observational data in standard FITS files, with standard metadata (e.g., time, position, instrument settings) in FITS headers and supplemental metadata in plain ASCII (e.g., observing logs with observing conditions and other notes).
(b) Results of statistical analyses are typically recorded in standard ASCII based formats (e.g., plain ASCII, LaTeX table). Large results (e.g., posterior parameter distributions) may be compressed using standard open-source compression software (e.g., gzip) and/or stored in a binary format, provided that software is provided to extract binary data into ASCII form.
(c) Simulated data will be stored in either plain ASCII formats or in a binary format, provided that software is provided to extract data into ASCII form. Visualizations of simulated data may be stored in standard graphics formats (e.g., eps, jpg, mov, .mpg, and/or .wmv). The [Institutional Repository at UF (IR@UF)](#) "will migrate items to new formats as necessary."
(d) Software source code and associated documentation will be stored in plain ASCII files and may be packaged using standard open-source tools (e.g., tar, gzip). A version control system (i.e., cvs, git, or subversion) will be used to support collaboration, version control and recovery of previous versions. Documentation will be embedded in source code, in separate ASCII files (e.g., plain ASCII, Asciidoc, html, LaTeX) and/or in formatted files (e.g., html generated via Doxygen and/or pdf generated from LaTeX source).
(e) Curriculum materials will be stored in standard formats (e.g, html, pdf, swf, ppt, odp) for which [IR@UF](#) provides at least basic level of preservation support.

III. Access to Data and Data Sharing Practices and Policies

The primary results of the proposed research, including the results of associated statistical analyses, will be disseminated primarily through publication in journals

(including online-only supplements for extended tables, animations, etc.), the arXiv preprint server, conference presentations and student theses (long-term open-access via IR@UF). We will work to provide electronic data derived from this project upon request, in a timely fashion and on a nondiscriminatory basis. Depending on the size of the request, data may be provided via email, the UF Astronomy web/FTP servers, IR@UF or the cloud (e.g., dropbox.com). Data will be preserved for at least three years beyond the award period, as required by NSF guidelines. We note details specific to certain types of data below:

(a) Observatories generally provide access to raw observational data via web/ftp after the observatory proprietary period (e.g., 1 year for GTC, 18 month default for Keck).

(a-d) The raw observational data, final reduced observational data, results of statistical analyses, simulated data used for publications and software used for publications will be available for data sharing upon request. We reserve the right to maintain a propriety period for observational data we collect as part of the proposed research, but voluntarily limit that period to the lesser of the time until publication or 12 months after the data become available to us. We will respect the restrictions imposed by data owners for any data obtained by unfunded collaborators or as part of collaborations (e.g., SDSS-III).

(e) Curriculum materials will be made available via the UF Astronomy department web site, IR@UF and/or the national Multimedia Educational Resource for Learning and Online Teaching (MERLOT) repository where they will be peer-reviewed. To increase visibility, we will request a link to these materials on the Science Information for Florida Teachers Guide to Everything website.

IV. Policies for Re-Use, Re-Distribution, and Production of Derivatives

Published data will be available in print or electronically from publishers, subject to subscription/printing charges and copyrights. We will work to provide other data with as few restrictions as possible. For example, preprints will be posted to arXiv, so as to ensure results are generally accessible without regard to journal subscriptions. Source code will be made available under the GNU General Public License (GPL). Other data provided via UF websites will include a request to cite the most relevant publication(s) and notice of any copyright restrictions (e.g., how to obtain permission to reuse figures published in ApJ).

As the proposed research does not involve the acquisition of either animal or human subjects data, we do anticipate any privacy or ethical issues associated with the data. We do not anticipate that there will be any significant intellectual property issues involved with the acquisition of the data. In the event that discoveries or inventions are made in direct connection with these data, access to the data will be granted upon request once appropriate invention disclosures and/or provisional patent filings are made.

V. Archiving of Data

Electronic data will be preserved using multiple on-site copies, with all servers using RAID hard drive arrays. Final versions of software source code and curriculum materials will be stored in home directories for which UF astronomy system administrators provide secure off-site backup.

Notes to PIs:

The above example needs to be customized for your project.
See http://www.nsf.gov/bfa/dias/policy/dmpdocs/ast.pdf for NSF AST-specific suggestions.

Others general suggestions are below.

- Provide a description of the data, identifying what will be measured, computed, or modeled. Include some description of how these tasks are to be performed.

- Provide an explanation as to why the data are important and necessary for the work

- Provide an explanation regarding the nature of the data. Data includes laboratory notebooks, survey reports, computer files created by data acquisition systems, images, etc. Include an estimate on the quantity of data. Include metadata (laboratory notebook entries, software codes, etc.) that will be needed in translating the data within the context of the project

- Provide a description of how the data will be preserved, including data storage and backup.

- Provide instructions on how others may access the data if a request is submitted.

- Provide affirmation that the data will be preserved for at least three years after the award ends as is required by NSF.

- If there are privacy / ethical issues associated with the data, describe how these will be addressed.

- If there are intellectual property/patent issues associated with the data, describe how these will be addressed.

In case these might be useful, these are examples of data management plans from other universities for their recent NSF grant applications:
- Rice University (samples begin on page 2): http://osr.rice.edu/forms/datamanagementPlans.pdf
- Yale: http://odai.research.yale.edu/sites/default/files/file/RajasekaranDataManagementPlan.pdf
- University of Virginia:
http://www.odum.unc.edu/odum/content/pdf/Data%20Management%20Sample%20Plan.pdf
- University of New Mexico (examples linked on the left):
http://libguides.unm.edu/content.php?pid=137795&sid=1422879
- University of Minnesota: http://www.lib.umn.edu/datamanagement/DMP/example
- University of California San Diego: http://rci.ucsd.edu/dmp/examples.html
- University of North Carolina, Odum Institute:
http://www.odum.unc.edu/odum/content/pdf/Data%20Management%20Sample%20Plan.pdf