NSDL

THE NATIONAL SCIENCE DIGITAL LIBRARY

Building Collaborative Tools on NSDL 2.0

Dean Krafft, Cornell University
dean@cs.cornell.edu

NSDL

THE NATIONAL SCIENCE DIGITAL LIBRARY

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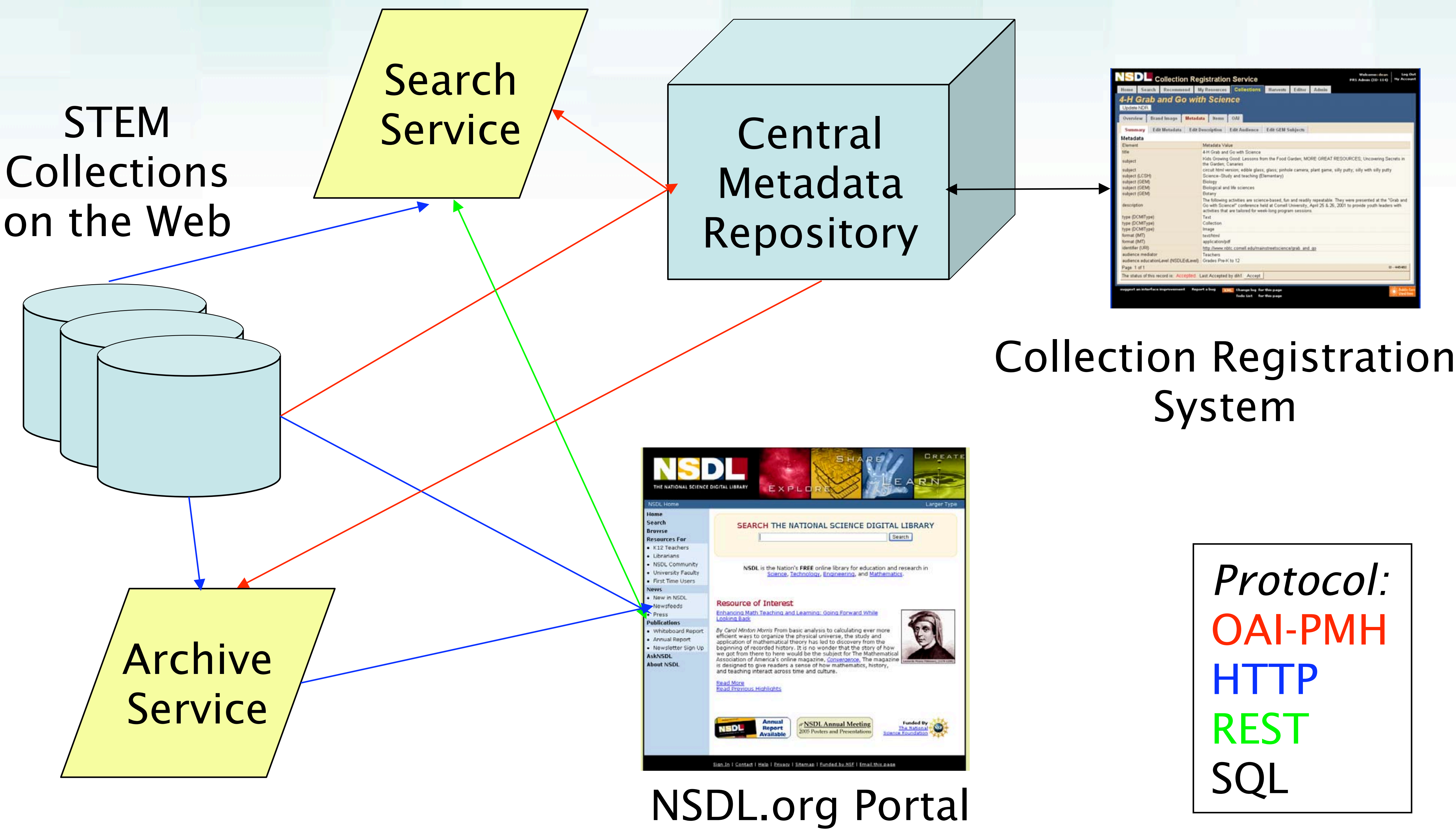
Photos: Matt Bargar, Jon Crispin, NASA


Photo by Jon Crispin

Presentation Overview

- NSDL 2.0: Infrastructure for a Collaborative Digital Library
- Planned Collaborative Tools:
  - Expert Voices
  - OurNSDL
  - MyNSDL
  - Other tools
- Collaborative Tool Challenges
- Discussion

Infrastructure overview: NSDL 1.0



NSDL 2.0

- Create an NSDL that guides not just resource discovery, but:
  - Supports creating “context” for resources
  - Presents resources in context: linked to related concepts; with user ratings; with codes and data
  - Enables community tools for selecting, organizing, evaluating, annotating, contributing, and collaborating
  - Provides two-way data flow: NSDL ↔ users
- Goal: Create a dynamic, living library

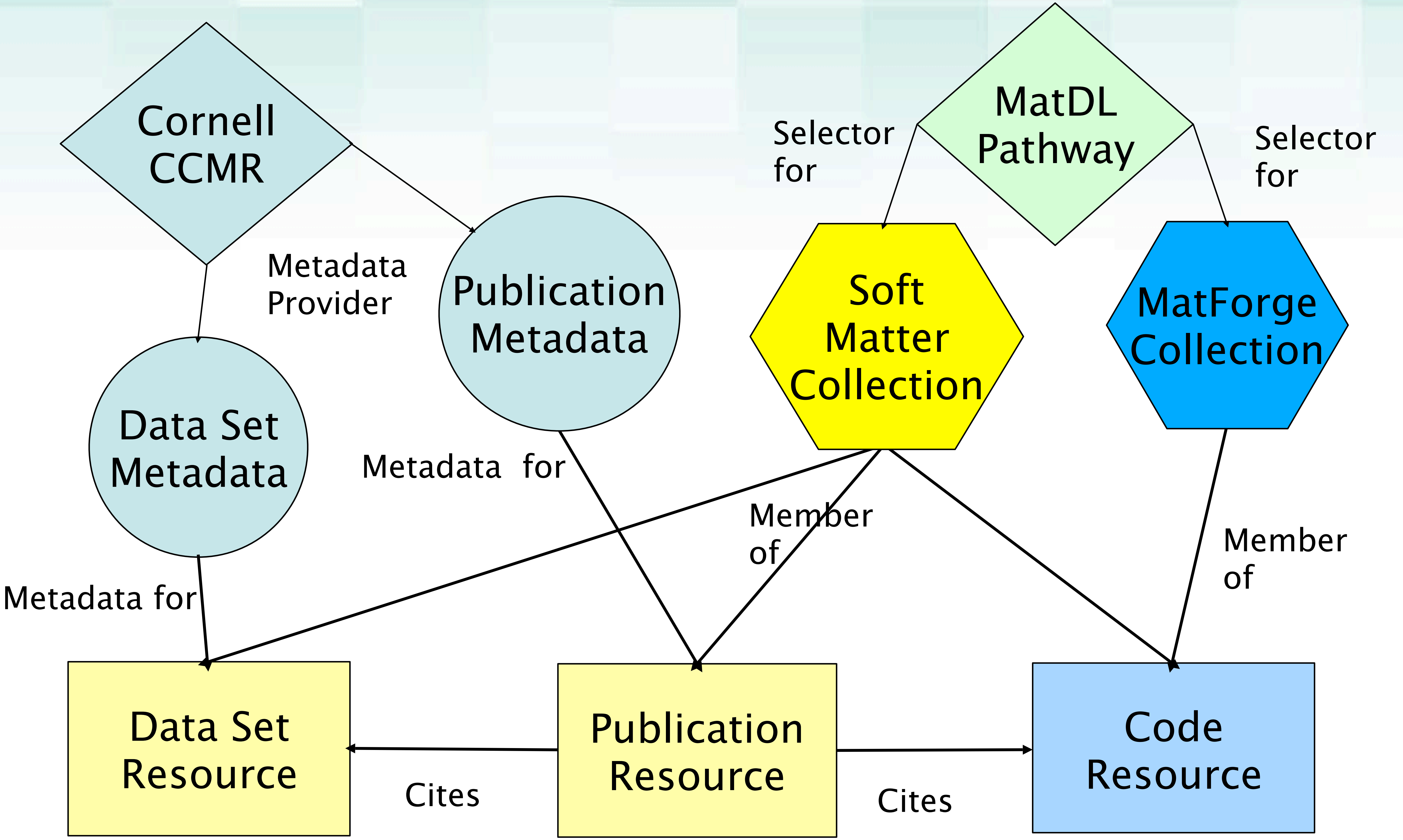
In Architectural terms, create an NSDL Data Repository that

- Supports storing both content and metadata
- Allows arbitrary relationships among resource and metadata objects: organization, annotation, citation
- Accessible through web service architecture of remixable data sources and transformations

NSDL Data Repository (NDR)

- References to roughly 2 million selected STEM resources on the web
- Sourced metadata statements about those resources
- A REST API allows authenticated access by Pathways, providers, tool builders
- Currently live on development server (nsdlib.org) and in final testing
- Production release Jan. 15 at nsdl.org

Sample NDR Objects & Relationships



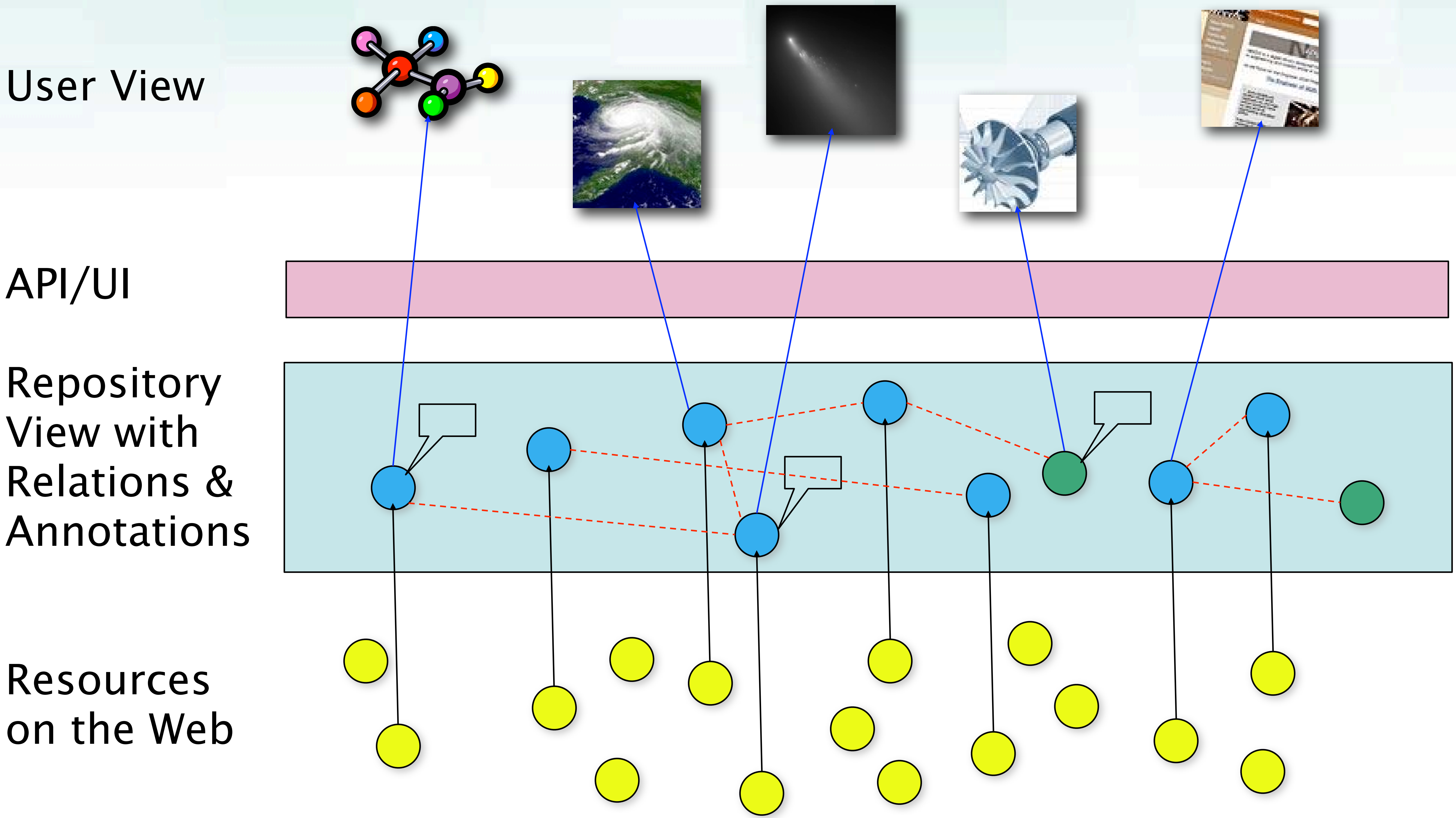
NDR API Characteristics

- Uses REST calls for all interactions; uses handles (DOIs) for all external references
- Ensures external applications can't violate the NDR model constraints
- Disseminations allow combining metadata from multiple sources, or related content
- Authentication: Requests signed with private key associated with an agent
- Authorization: Agent can become a metadata provider or aggregator; can create resources
- API/NDR instance available for development and testing (ndrtest.nsdl.org)

An Information Network Overlay

- Think of the NDR as a lens for viewing science content on the net
- Content can be:
  - Local: stored directly in the NDR
  - Remote: accessed through a URL
  - Computed: derived from a database or web service
  - Archived: an older version stored at SDSC
- It all has a repository-based URL

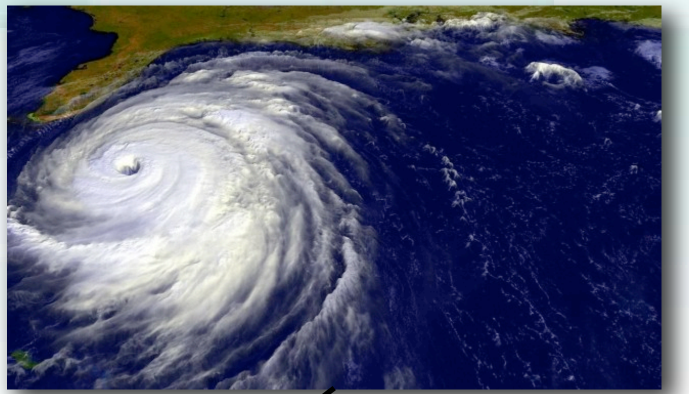
Network Overlay View

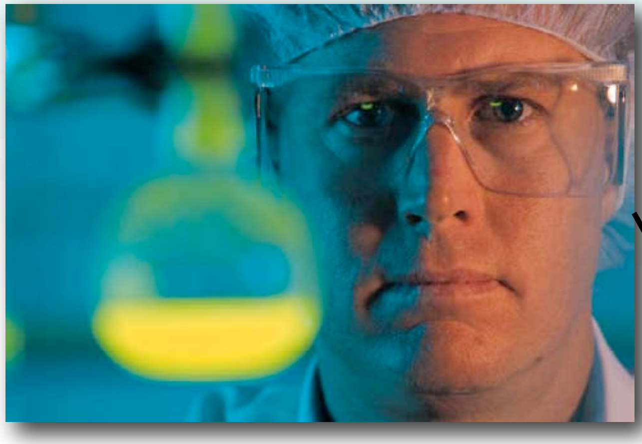


Applying the NDR

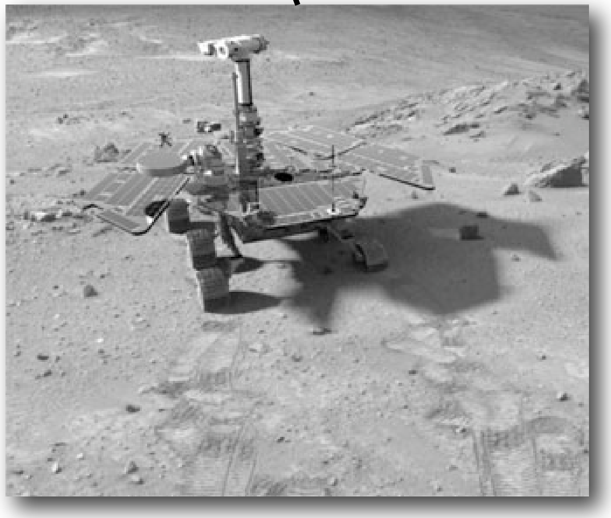
- The NDR provides powerful capabilities for:
  - Creating context around resources
  - Enabling the NSDL community to directly contribute resources and context
  - Representing a web of relationships among science resources and information about those resources
- How do we use it? Here's one specific example …

ExpertVoices





Expert Voices: Speaking of Something Interesting



What is Expert Voices?

Expert Voices: Speaking of Something Interesting

- The NSDL Blogosphere
- Topic-based discussions (e.g. forensics) with pointers to related resources
- An outreach tool to explain and document NSF-funded research
- A way for NSDL community members to become NSDL contributors: of resources, questions, reviews, annotations, metadata
- A question/answer and discussion forum: scientist ↔ teacher ↔ student ↔ librarian

What isn't EV?

Expert Voices: Speaking of Something Interesting

- Expert Voices ≠ LiveJournal
  - Contributors are carefully selected, contributions are about science, the process of science, and education

Comic by Michael Lalonde/orneryboy.com

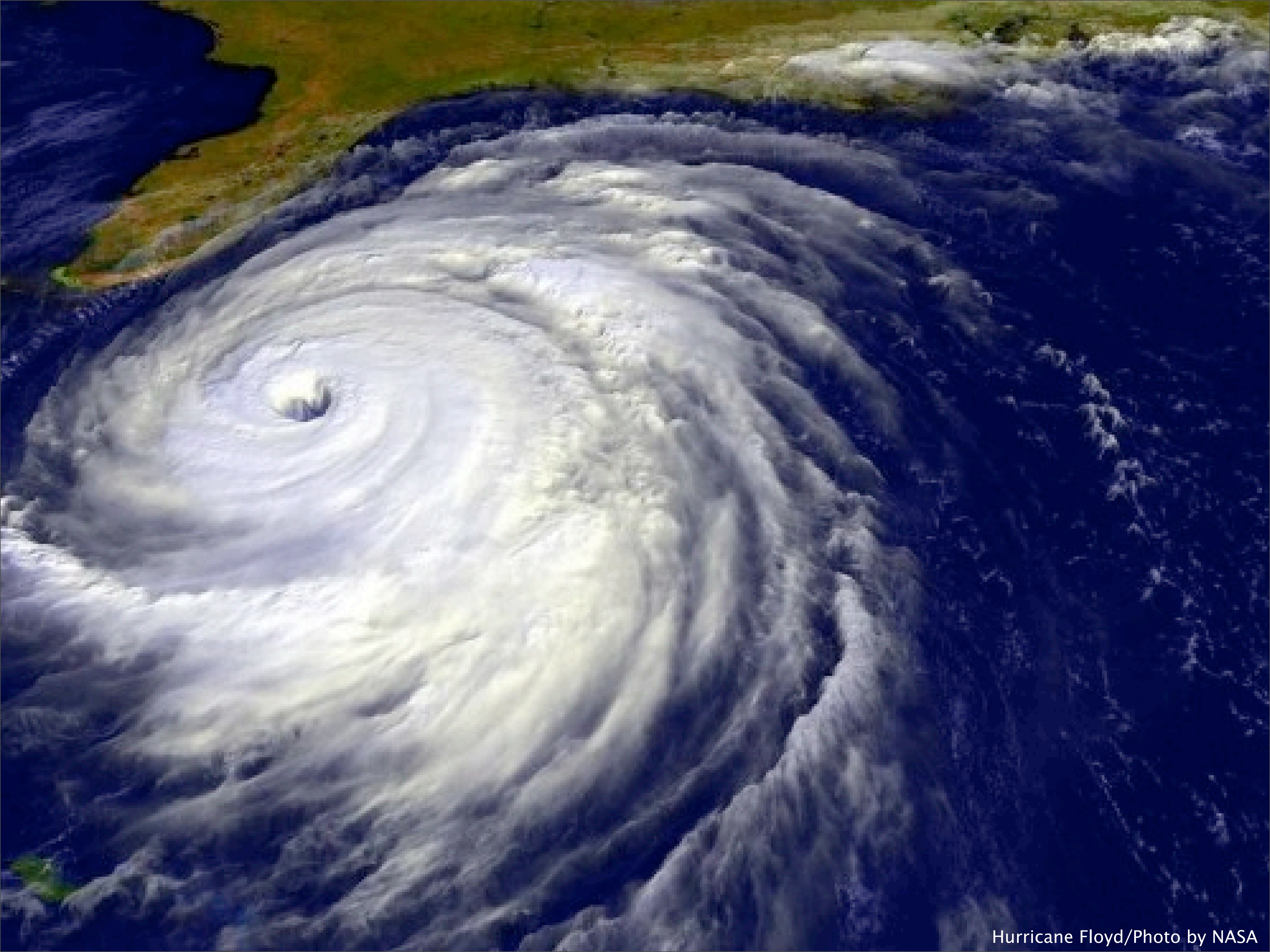
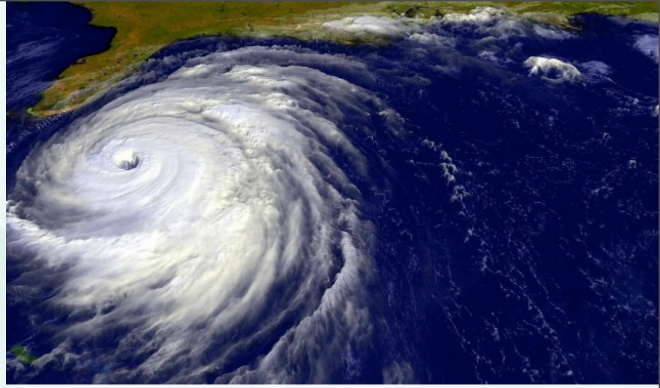

Hurricane Floyd/Photo by NASA

Photo by Jon Crispin

Broadening Participation: An Expert Voices Learning Scenario



- "Hurricane Season Blog"
  Authors: NWS hurricane expert, Earth Science teacher, and a school media specialist familiar with NSDL
- Expert: "Hurricane Gertrude is heading for Ft. Lauderdale;15 foot storm surge expected; undergoing eyewall replacement cycle"
- Media specialist: NSDL resource links
  - Hurricane Hunters site
  - Latest satellite photos
  - USGS flooding and flood plain web page
- Teacher: relevant standards and appropriate pedagogy
- Students: engaging real-time, real-world applications of science lessons

Expert Voices Implementation

- Wordpress-based multi-user multi-blog application (open source, plug-in architecture)
- Published entries become NSDL resources
- Owner controls publication of entries and visibility of comments
- Entries can contain linked references to NSDL resources, references to URLs that should become resources, and new resource metadata
- Integrated with NSDL Shibboleth-based community sign-on (Wordpress plug-in)
- Blog(s) available as RSS feed(s)

EV NSDL

Expert Voices: Speaking of Something Interesting.

Search NSDL

NSDL.org > Expert Voices >

Larger Text

WhoSays

All blogs grouped by audience category

[Change View]

K12 Teachers

Teaching Measurement at the Middle School Level *Updated: Jun 2nd, 2006*

Bringing the Field to the Classroom: Birds *Updated: Oct 4th, 2006*

Meeting web kids on their own turf *Updated: Sep 21st, 2006*

Boneyard Science: Investigating Forensics *Updated: Apr 29th, 2006*

University Faculty

Presentation of Math on the Web *Updated: Jun 20th, 2006*

How can digital education help the Gulf Coast? *Updated: Oct 3rd, 2006*

Librarians

NSDL Whiteboard Report Talk Back *Updated: Oct 5th, 2006*

How can digital education help the Gulf Coast? *Updated: Oct 3rd, 2006*

NSDL Community

NSDL News Topic Center: Current News Information About S.T.E.M. *Updated: Oct 3rd, 2006*

NSDL Whiteboard Report Talk Back *Updated: Oct 5th, 2006*

Informal Learners

Bringing the Field to the Classroom: Birds *Updated: Oct 4th, 2006*

Meeting web kids on their own turf *Updated: Sep 21st, 2006*

RecentPosts

HotTopics

General Education Health Mathematics Science Social Studies Technology Blogroll Collecting Data Seminar 2 Blog Related Links Bio

RecentPosts

ObservationTower

Logged in:

About Expert Voices

Expert Voices Help

Recommend a Blog Topic

Expert Voices User Feedback

*Expert Voices Pre-Beta Version Powered by **WordPress MU**.*

What's in the night sky? - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

jupiter | Search | Browse | New in NSDL | Text Size | Talk to Us!

Expert Voices: Speaking of Something Interesting.

Search NSDL

NSDL.org > Expert Voices > **What's in the night sky?** Larger Text

What's in the night sky?

About What's in the night sky?:

Teaching and learning about the solar system.

Contributors:

admin

Jupiter's Spots

Tuesday, October 17th, 2006 8:20 pm
Contributed by: **admin**

According to an article on the Sky and Telescope Magazine - Astronomy News NSDL, Jupiter's tiny white spot is going red.

Find out more about the storms on Jupiter.

Contribute
- Create a New Post
- Edit this Blog
- Logged in: nobody special

Information
- About

Categories
- Science
  - Astronomy

Bookmarks
- NSDL website

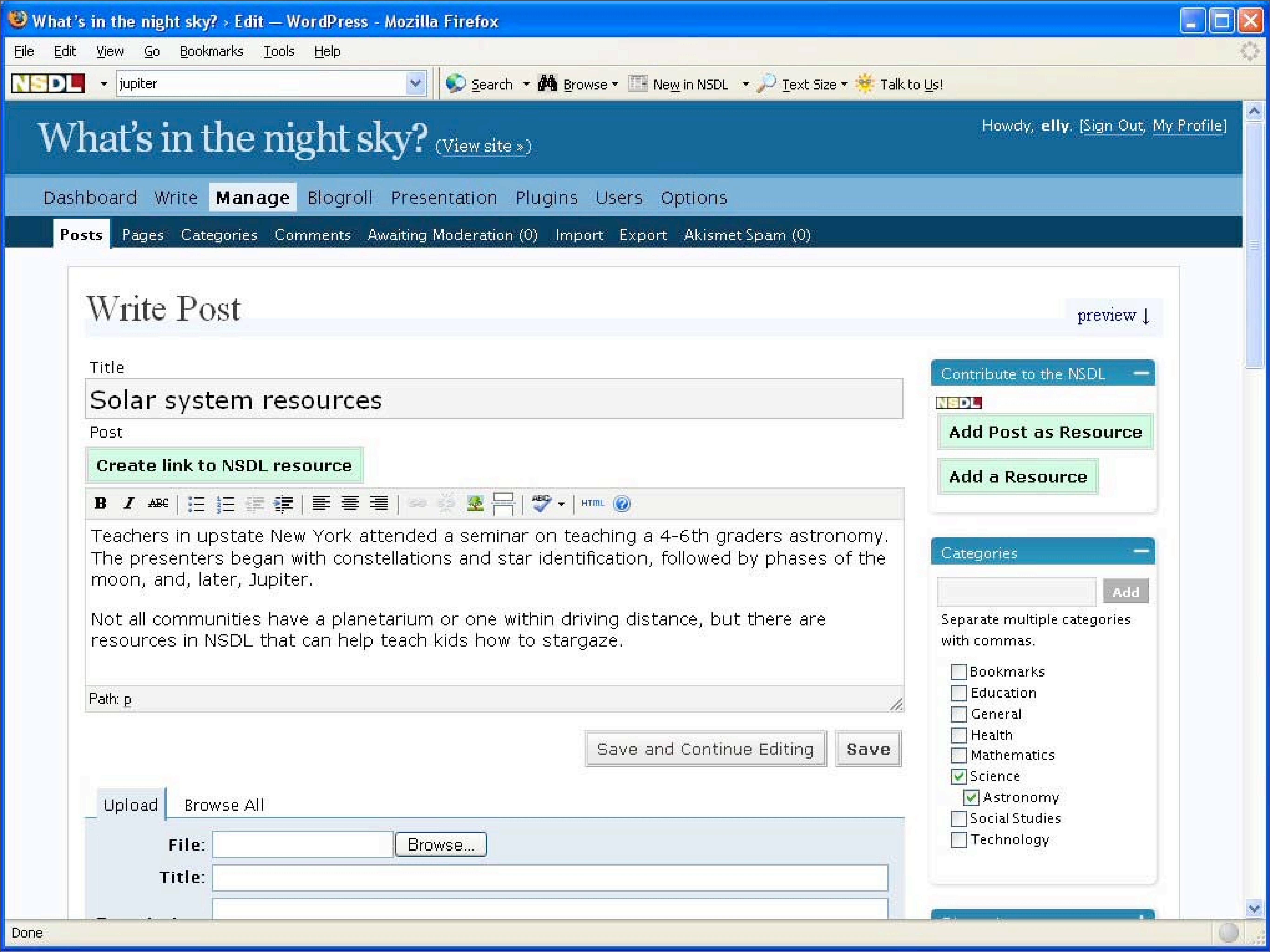
Previous Posts
- October 2006

Expert Voices Help

Expert Voices User Feedback

Expert Voices Pre-Beta Version
*Powered by **WordPress MU**.*

Done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Solar system resources
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Create link to NSDL resource
Teachers in upstate New York attended a seminar on teaching a 4-6th graders astronomy. The presenters began with constellations and star identification, followed by phases of the moon, and, later, Jupiter.
Not all communities have a planetarium or one within driving distance, but there are resources in NSDL that can help teach kids how to stargaze.
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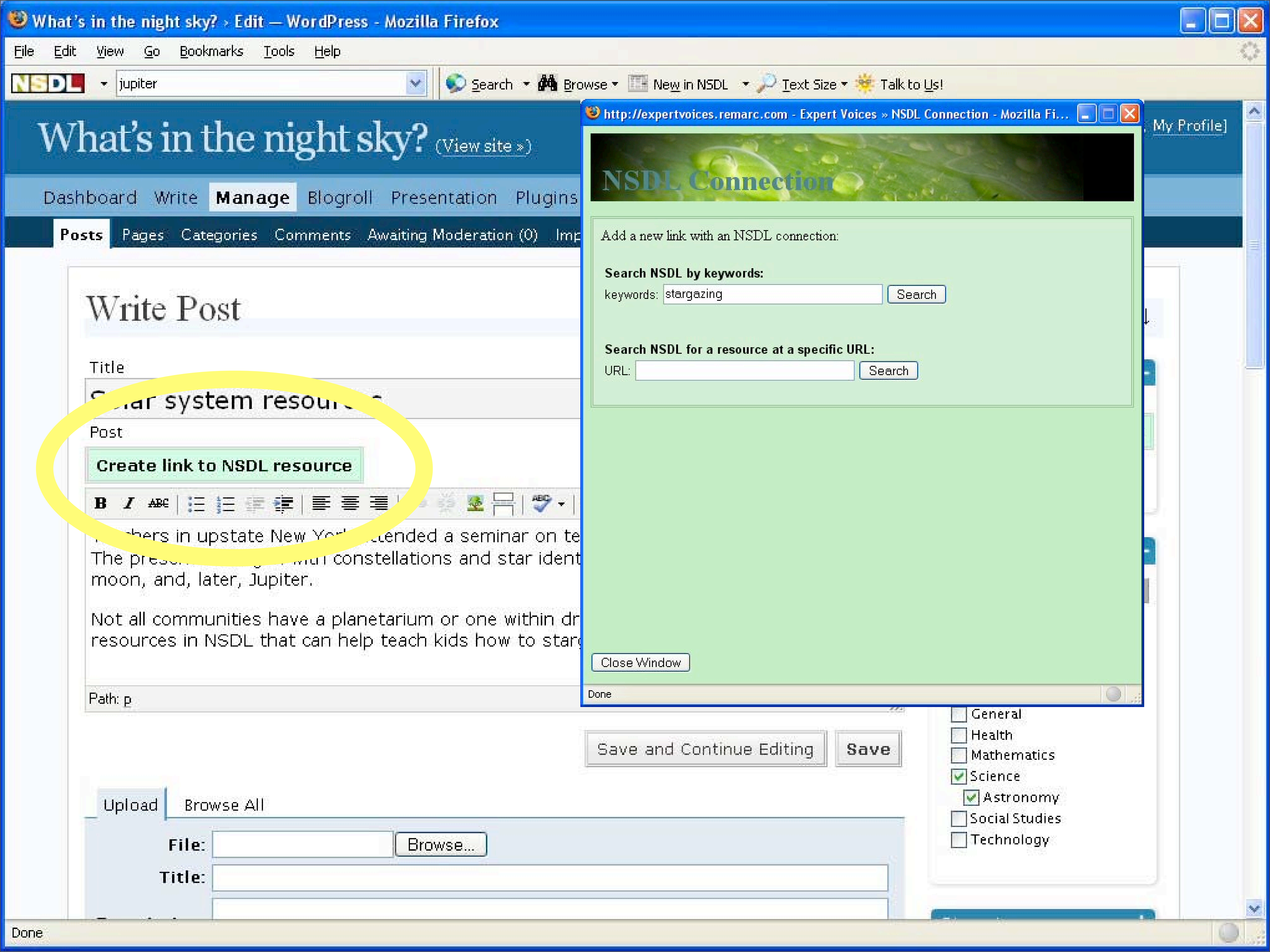
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keywords: stargazing
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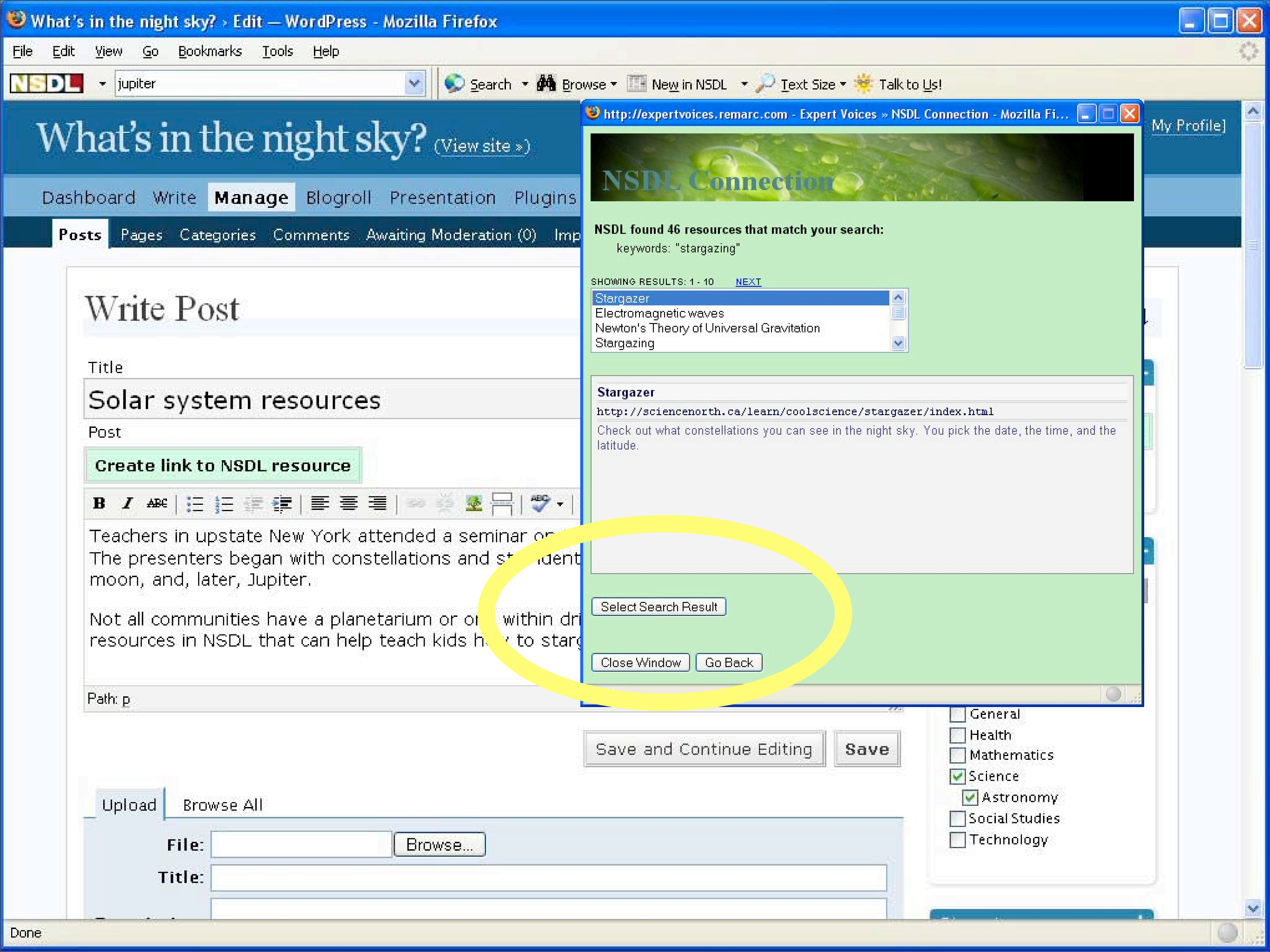
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NSDL found 46 resources that match your search:
keywords: "stargazing"
SHOWING RESULTS: 1 - 10
NEXT
Stargazer
Electromagnetic waves
Newton's Theory of Universal Gravitation
Stargazing
Stargazer
http://sciencenorth.ca/learn/coolscience/stargazer/index.html
Check out what constellations you can see in the night sky. You pick the date, the time, and the latitude.
Select Search Result
Close Window
Go Back
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Mathematics
Science
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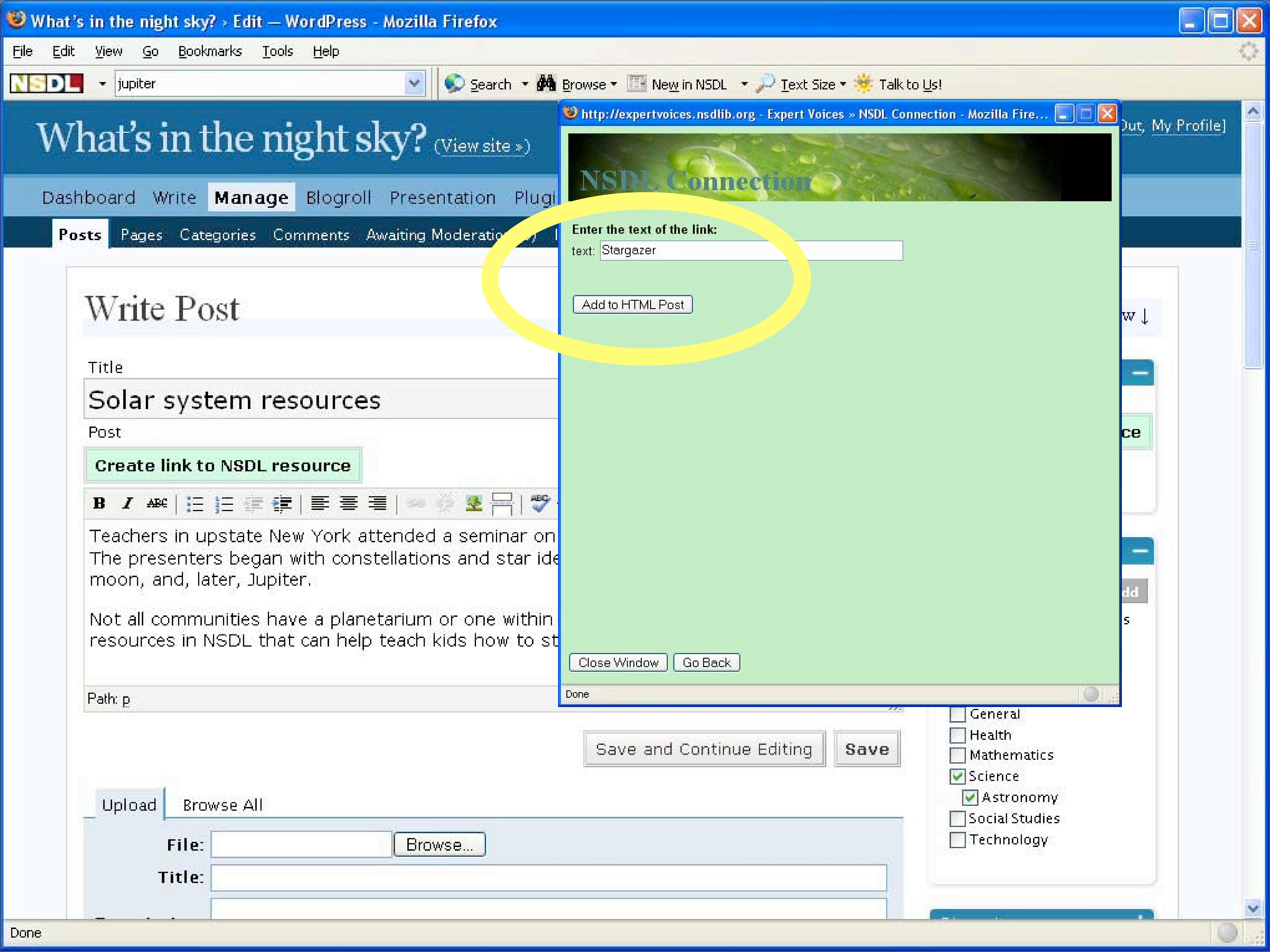
Social Studies
Technology
Done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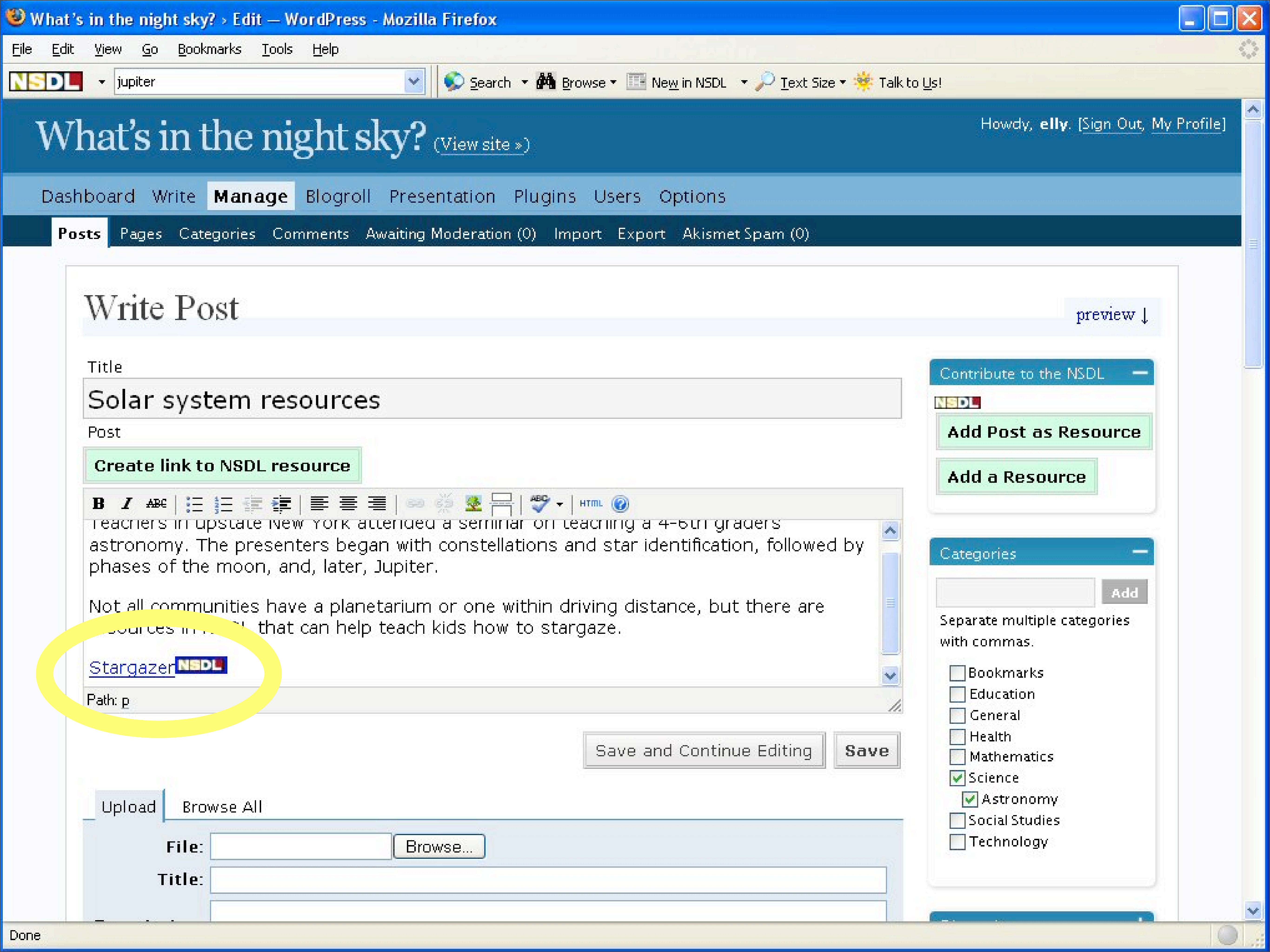
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Bookmarks
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Science
Astronomy
Social Studies
Technology
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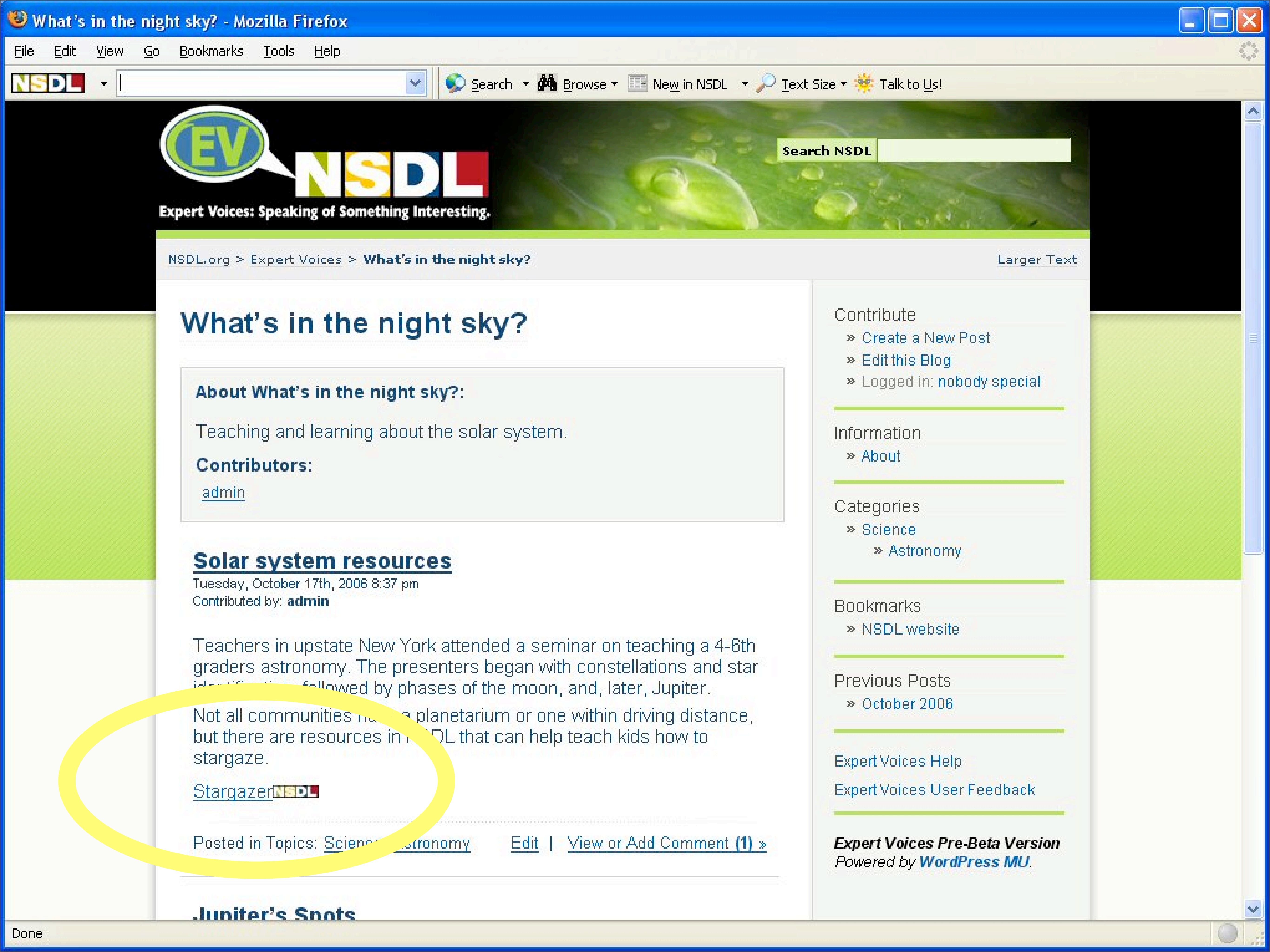
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Contributed by: admin
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Stargazer NSDL
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Jupiter's Spots
Contribute
» Create a New Post
» Edit this Blog
» Logged in: nobody special
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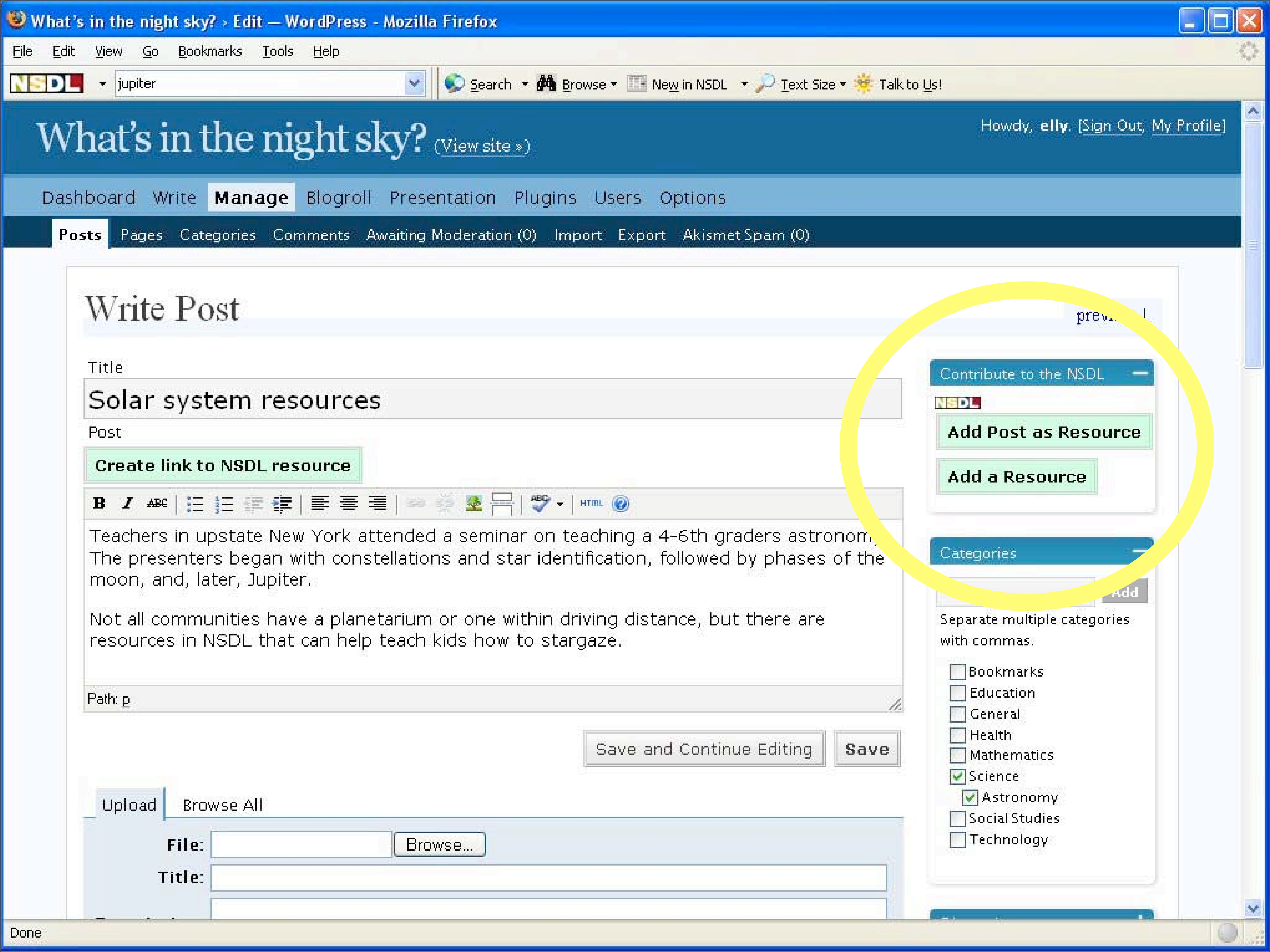
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Bookmarks
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General
Health
Mathematics
Science
Astronomy
Social Studies
Technology
Done

But Expert Voices is just the beginning…

OurNSDL: NDR-integrated Wiki

- Community of approved contributors (e.g. teachers, librarians, scientists) are granted edit access on OurNSDL wiki
- New resources and metadata are created as wiki pages and reflected into the NDR
- Non-wiki-based NDR resources and metadata are displayed as read-only wiki pages, subject to comment and linking
- User and project pages organize NDR resources
- Planned implementation in MediaWiki

Genetic Genealogy

Genetic Genealogy

[edit]

This is an OpenNSDL page describing an external digital STEM resource. Information on this page is mirrored into the NSDL Data Repository (NDR). Any changes made to the information about the resource on this page will update the corresponding NDR information.

Comments: Here's an excellent site providing an introduction, definitions, and web resources on the use of DNA Testing in Genealogy. The overall topic provides a very interesting social motivation for some deep and interesting genetic science.

Kerchner's DNA Testing & Genetic Genealogy Info and Resources Page

- **Download free copy of my Genetics & Genealogy - An Introduction - a Genetic Genealogy 101 report.**
- **Read and review online my Genetic Genealogy Glossary of Genetic Genealogy terms and definitions.**

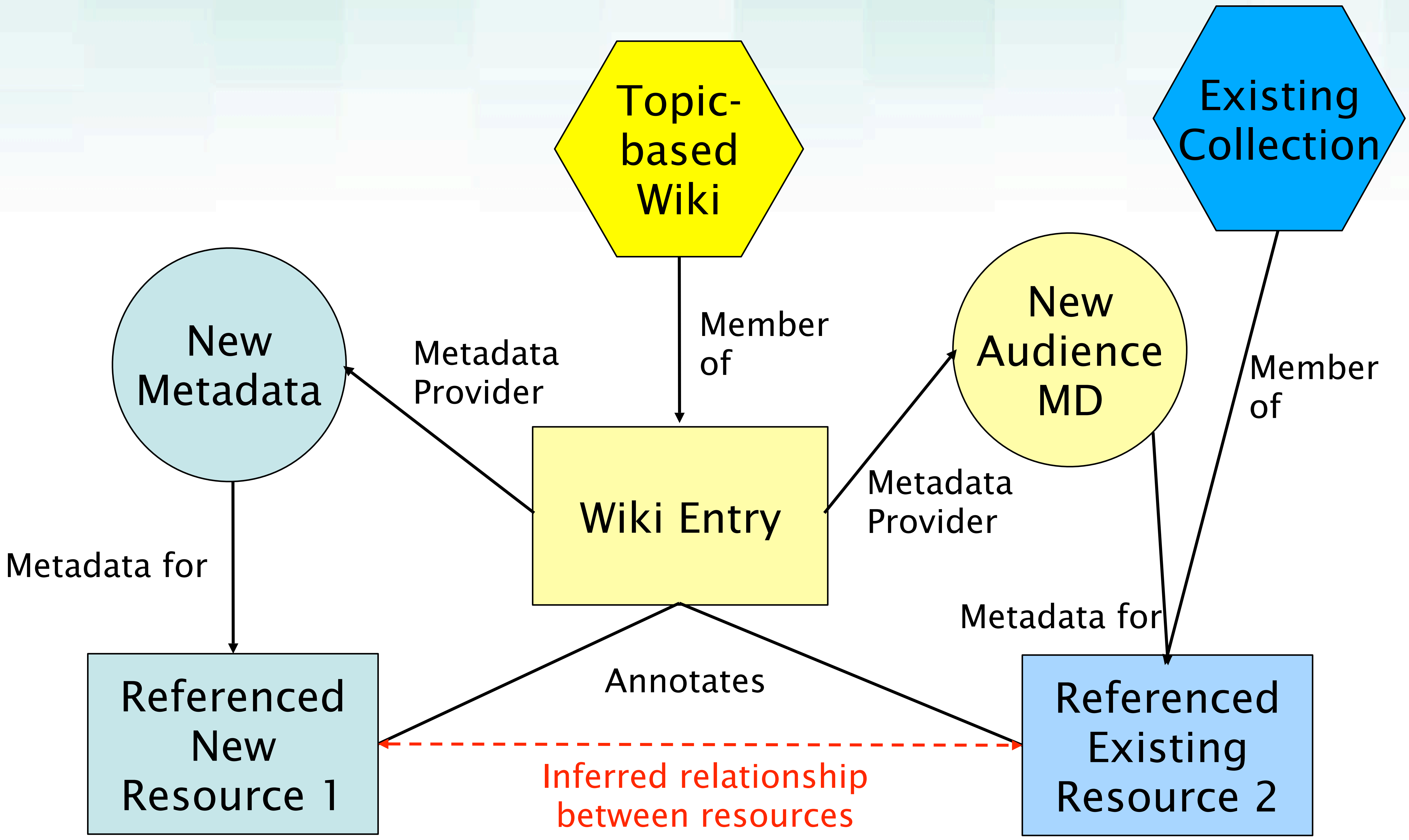
Title: Kerchner's DNA Testing & Genetic Genealogy Info and Resources Page

Description: This page provides a number of website links to resources in the intersection of genetics, DNA testing, and Genealogy.

NSDL Item Level Metadata:

- Title: Kerchner's DNA Testing & Genetic Genealogy Info and Resources Page
- Subject Keyword(s): Genetics, Genealogy, DNA Testing, Haplogroup
- Description: This page provides a number of website links to resources in the intersection of genetics, DNA testing, and Genealogy.
- Publisher / Resource Provider: Charles F. Kerchner, Jr., P.E.
- Resource type: text/html
- Link: [1]
- Language: en
- Rights Information: Copyright ©2003-2006 Charles F. Kerchner, Jr., P.E. GGP (Genetic Genealogy Pioneer) All Rights Reserved
- Grade Level: High school, Informal education, Middle school, Undergraduate lower division, Undergraduate upper division
- HTML Title: Kerchner's DNA Testing & Genetic Genealogy Info and Resources Page

NDR Entry for OurNSDL



MyNSDL: NDR-integrated tagging, bookmarking, and recommendation

- Based on Connotea open-source folksonomic tagging/bookmarking system
- Tags and bookmarking structure are reflected back into the NDR
- Authorized users can "automatically" recommend new NSDL resources simply by tagging them
- Gives user a personal view of NSDL resources

Search My library Find results

myNSDL Organize. Share. Discover.

you are logged in as **deanbkrafft** | My library | Log out

deanbkrafft's tags:

By Usage | A – Z

- digital library
- education
- frogs
- NSDL
- science education

deanbkrafft's bookmarks EXPORT LIST RSS ?

Create a Profile on the Community Pages. ?

Number of bookmarks per page: 10 | 25 | 50 | 100

edit delete

NPR - Radio Expeditions: Disppearing Frogs
www.npr.org
Posted by **deanbkrafft** to frogs NSDL on Thu Apr 27 2006 at 17:54 UTC | info

edit delete

Exploratorium: Frogs
www.exploratorium.edu
Posted by **deanbkrafft** to frogs NSDL on Thu Apr 27 2006 at 17:53 UTC | info

edit delete

Deformed Frogs in Minnesota - Minnesota Pollution Control Agency
www.pca.state.mn.us
Posted by **deanbkrafft** to frogs NSDL on Thu Apr 27 2006 at 17:53 UTC | info

edit delete

What Is a Digital Library Anyway? Beyond Search and Access in the NSDL
Carl Lagoze *et al.*
D-Lib Magazine **11** (11), (Nov 2005)
doi:10.1045/november2005-lagoze
DLib paper describing how NSDL creates context and enrichment for digital library resources
Posted by **deanbkrafft** (who is an author) and 8 others to **digital library** NSDL on Thu Apr 27 2006 at 17:31 UTC | info

edit delete

NSDL - The National Science Digital Library

Toolbox

- Add a bookmark
- Create a new group
- Create a tag note
- Rename a tag
- Import from local file
- Export my library

Report a problem

Related tags:

- digital libraries
- National Science Digital Library
- libraries
- library
- digital
- science
- metadata
- soasym2005
- engineering
- mathematics
- technology
- digital_library
- research
- BioEd
- Archives - National
- case studies

NDR Application: Content Assignment Tool

- Developed by Anne Diekema, Elizabeth Liddy, et al. at the Syracuse University Center for Natural Language Processing
- Uses text analysis and machine learning to suggest Educational Standards alignment for resources
- Content expert assigns standard, and system learns from the assignment
- Standalone tool available now; standards associated with resources in the NDR 4Q06

CAT Content Assignment Tool

New Search | Results | My Selections | Browse Standards | Learn | Help | Logout

Learning resource locations: [http://geology.er.usgs.gov/eastern/acid9.html]

Search details: Author: ALL Topic: ALL Grade levels: ANY-ANY Keywords:

My Selections

No saved selections available for current learning resource.

Suggested relevant standards:

Add selected to My Selections | More Like These

Tennesee (9-12)

Physical Science:Standard Number: 2.0 Structure and Properties of Matter:Standard: The student will examine the structure, properties, and classifications of matter.:Sample Task::"What's This in My Food?" Empty the contents of an individual cream of wheat package into a container. 2. Add just enough water to completely cover the cereal. Stir the water and cereal mixture with a bar magnet for at least ten minutes. Remove the magnet. Let the liquid on the magnet drain back into the bowl. Use a piece of white tissue paper to remove the particles attached to the magnet. Use a hand lens to observe the particles. What did you remove from the mixture? Is the cereal a heterogeneous or homogeneous mixture? Why? Point out that all mixtures can be separated because they contain two or more substances that are physically, not chemically, combined. Mixtures can be in any of the four phases. When a mixture is separated, each substance in the mixture retains its own properties.

Connecticut (9-9)

Chemical Structures and Properties:Properties of Matter - How does the structure of matter affect the properties and uses of materials?:9.4 Atoms react with each other to form new molecules.:Atoms have a positively charged nucleus surrounded by negatively charged electrons.:D 12. Explain the chemical composition of acids and bases, and explain the change of pH in neutralization reactions.

Kansas (5-8)

Standard 4: Earth and Space Science:Benchmark 2: The students will understand that past and present earth processes are similar.:1. Understand the dynamics of earth's constructive and destructive forces over time.:Examples: Construct models of rock types using food. Peanut brittle without the peanuts can illustrate a molten material crystallizing to form a solid substance similar to an igneous rock. Use an acid (vinegar or dilute HCl) to show the chemical similarity of limestone rock and fossilized shells. Students take a piece of sandstone and apply destructive forces to change it into sand. Observe the effects of weathering on various rock types.

Kentucky (5-7)

Conceptual Understandings: Physical Science:Properties and Changes of Properties in Matter:The chemical properties of a substance cause it to react in predictable ways with other substances to form compounds with different characteristic properties. In chemical reactions, the total mass is conserved. Substances are often classified into groups if they react in similar ways.

Oklahoma (8-8)

Standards for Inquiry, Physical, Life, and Earth/Space Science:Physical Science:Standard 1: Properties and Chemical Changes in Matter -- Physical characteristics of objects can be described using shape, size, and mass. The materials from which objects are made can be described using color, texture, and hardness. These properties can be used to distinguish and separate one substance from another. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives::1. Substances react chemically with other substances to form new substances with different characteristics (e.g., rusting, burning, reaction between baking soda and vinegar, etc.).

NSDL Collection System

- Developed by DLESE from DCS
- Allows creation and editing of collection and item metadata records
- Extensive guidance and help for various categories of metadata
- Syncs records using the NDR API
- First prototype developed
- Released version expected 2Q07

Collections | Search | Settings | Help

Search

Preview

Cataloging Info

User: guest (cataloger) | logout | edit user info

NSDL Collection System

Search for: (•) term ( ) id ( ) url

[Go] [Clear]

- Collection
- Last Editor
- Metadata Format
- Validity
- Status

Results per page: 10

[Clear selections]

Your selections: *Collection:* **NCS Demo Collection**

Last Editor: all + *Format:* all + *Validity:* all + *Status:* all

Your search had 8 matches.

-- Batch Operation --

Record ID	1 - 8 out of 8	Last Editor	Status	Last Touch
NSDL-000-000-000-015	[Validate Record | View XML]	Unknown	New	2006-12-12 10:28 AM

Expert Voices Test

http://expertvoices.local.net

view | edit | copy | move | delete

Status Note [edit]

Collection: NCS Demo Collection

Record format: nsdl_ncs

File location: /devel/preview/ostwald/records/nsdl_ncs/1165611334360/NSDL-000-000-000-015.xml

NSDL-000-000-000-014	[Validate Record | View XML]	Unknown	New	2006-12-12 10:11 AM

Play Record by Katy

http://www.comet.ucar.edu/index.html

view | edit | copy | move | delete

Status Note [edit]

Collection: NCS Demo Collection

Record format: nsdl_ncs

File location: /devel/preview/ostwald/records/nsdl_ncs/1165611334360/NSDL-000-000-000-014.xml

NSDL-000-000-000-012	[Validate Record | View XML]	Unknown	New	2006-12-12 10:03 AM

Stuff On My Cat

http://www.stuffonmycat.com/

view | edit | copy | move | delete

Status Note [edit]

Collection: NCS Demo Collection

Record format: nsdl_ncs

File location: /devel/preview/ostwald/records/nsdl_ncs/1165611334360/NSDL-000-000-000-012.xml

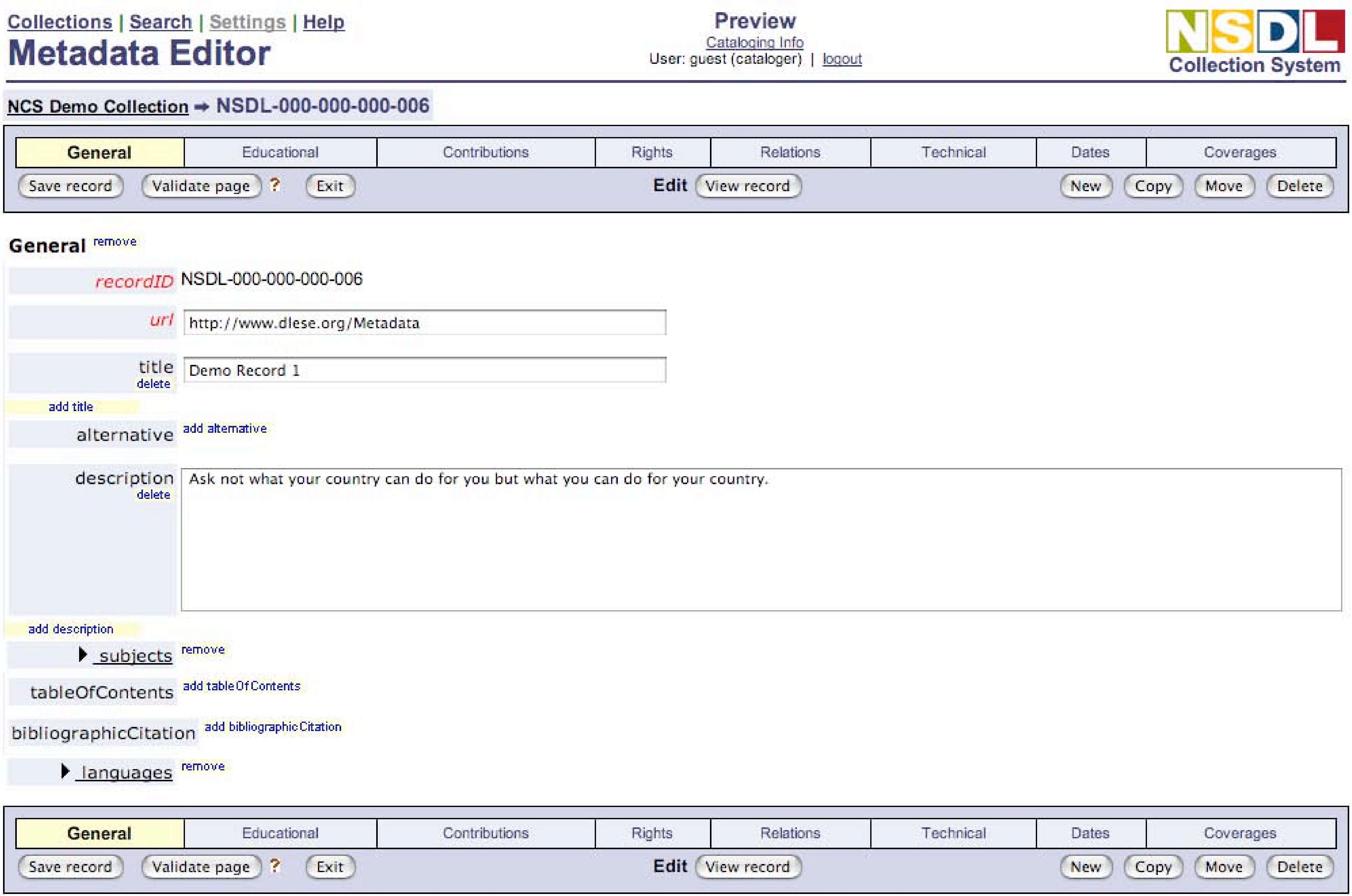
NSDL-000-000-000-007	[Record is Valid | View XML]	jonathan	Done	2006-12-08 9:11 AM

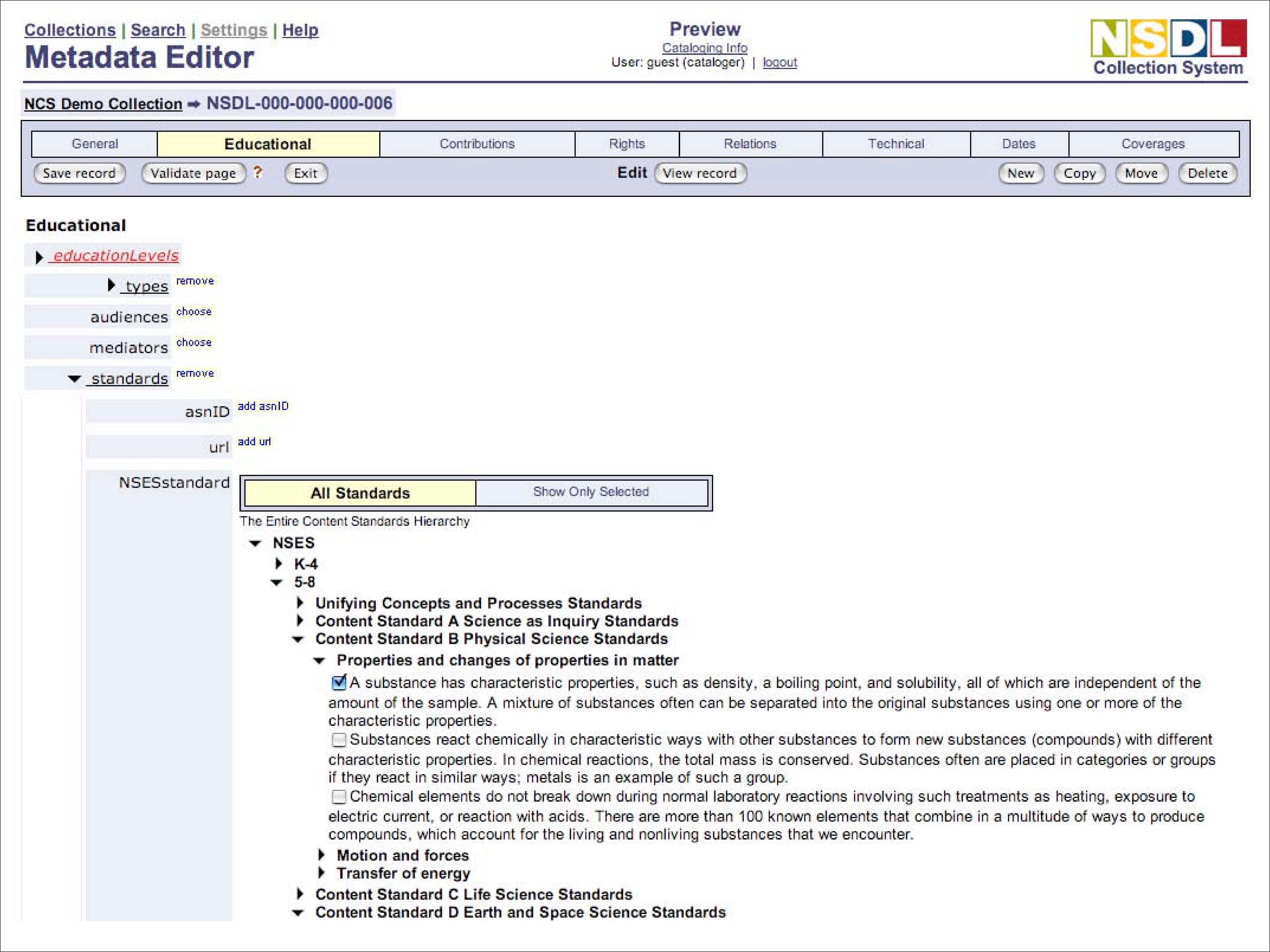
Demo Record 2

http://www.dlese.org/dds/services/index.jsp

view | edit | copy | move | delete

Status Note [edit]


Collections | Search | Settings | Help
Metadata Editor
Preview
Cataloging Info
User: guest (cataloger) | logout
NSDL
Collection System
NCS Demo Collection ➡ NSDL-000-000-000-006
General
Educational
Contributions
Rights
Relations
Technical
Dates
Coverages
Save record
Validate page
?
Exit
Edit
View record
New
Copy
Move
Delete
General
remove
recordID
NSDL-000-000-000-006
url
http://www.dlese.org/Metadata
title
delete
Demo Record 1
add title
alternative
add alternative
description
delete
Ask not what your country can do for you but what you can do for your country.
add description
subjects
remove
tableOfContents
add tableOfContents
bibliographicCitation
add bibliographicCitation
languages
remove
General
Educational
Contributions
Rights
Relations
Technical
Dates
Coverages
Save record
Validate page
?
Exit
Edit
View record
New
Copy
Move
Delete


Collections | Search | Settings | Help
Metadata Editor
Preview
Cataloging Info
User: guest (cataloger) | logout
NSDL
Collection System
NCS Demo Collection ➡ NSDL-000-000-000-006
General
Educational
Contributions
Rights
Relations
Technical
Dates
Coverages
Save record
Validate page
?
Exit
Edit
View record
New
Copy
Move
Delete
Educational
educationLevels
types
remove
audiences
choose
mediators
choose
standards
remove
asnID
add asnID
url
add url
NSESstandard
All Standards
Show Only Selected
The Entire Content Standards Hierarchy
NSES
K-4
5-8
Unifying Concepts and Processes Standards
Content Standard A Science as Inquiry Standards
Content Standard B Physical Science Standards
Properties and changes of properties in matter
A substance has characteristic properties, such as density, a boiling point, and solubility, all of which are independent of the amount of the sample. A mixture of substances often can be separated into the original substances using one or more of the characteristic properties.
Substances react chemically in characteristic ways with other substances to form new substances (compounds) with different characteristic properties. In chemical reactions, the total mass is conserved. Substances often are placed in categories or groups if they react in similar ways; metals is an example of such a group.
Chemical elements do not break down during normal laboratory reactions involving such treatments as heating, exposure to electric current, or reaction with acids. There are more than 100 known elements that combine in a multitude of ways to produce compounds, which account for the living and nonliving substances that we encounter.
Motion and forces
Transfer of energy
Content Standard C Life Science Standards
Content Standard D Earth and Space Science Standards

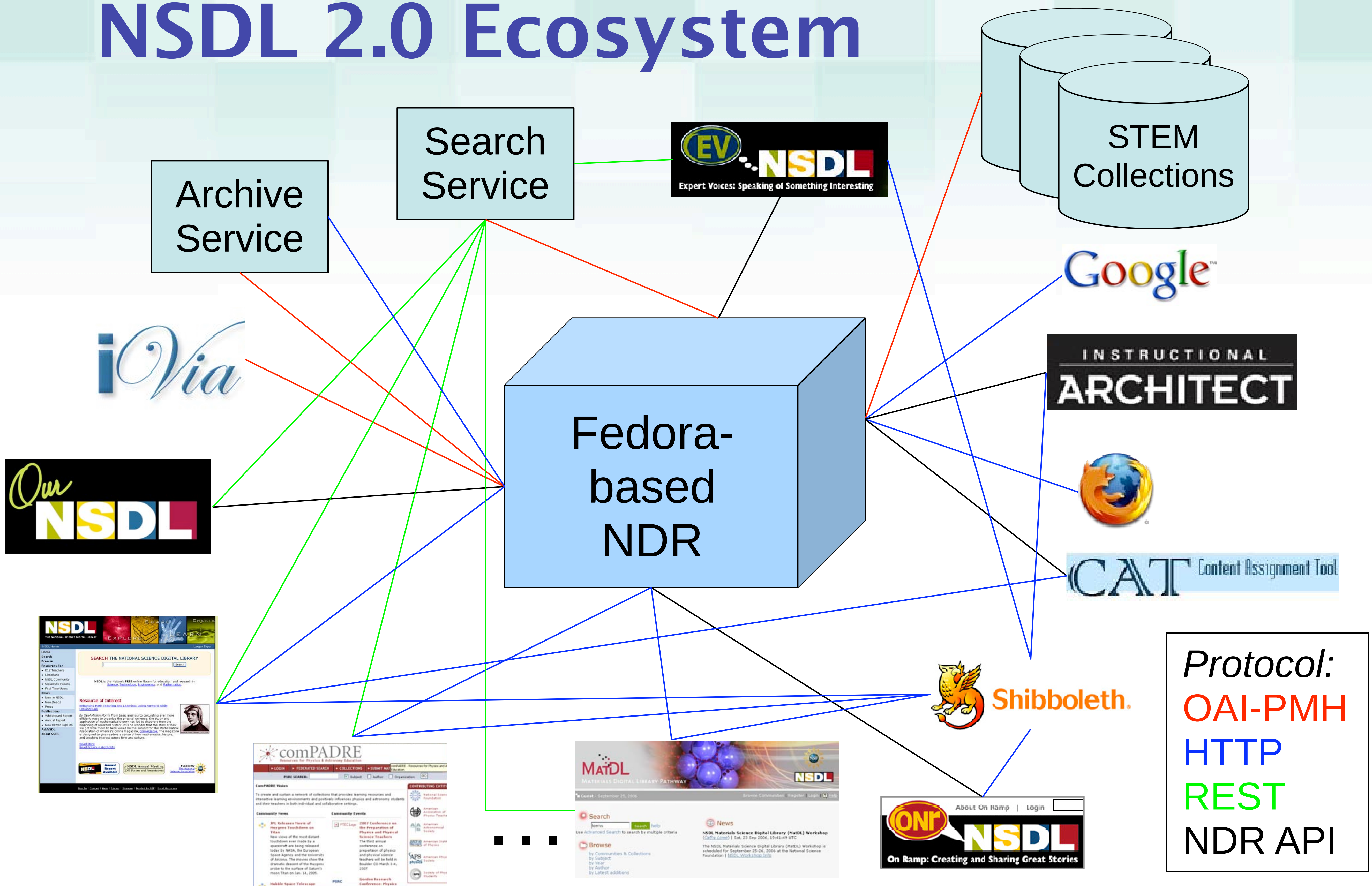
Other planned/possible collaborative tools

- OnRamp – multi-user, multi-project NDR-integrated content management system
- Instructional Architect: Lesson plan development for K12 teachers (Utah State)
- Moodle CMS – courses integrated with NSDL resources
- Electronic Lab Notebook – MatDL

NSDL 2.0 Timeline

- Jan 15, 2007: NDR release at nsdl.org, public beta of EV
- March 2007: Public beta of OurNSDL, public beta of OnRamp
- April 2007: Public beta of MyNSDL, released version of Expert Voices
- April-June 2007: Release of NSDL Collection System

NSDL 2.0 Ecosystem

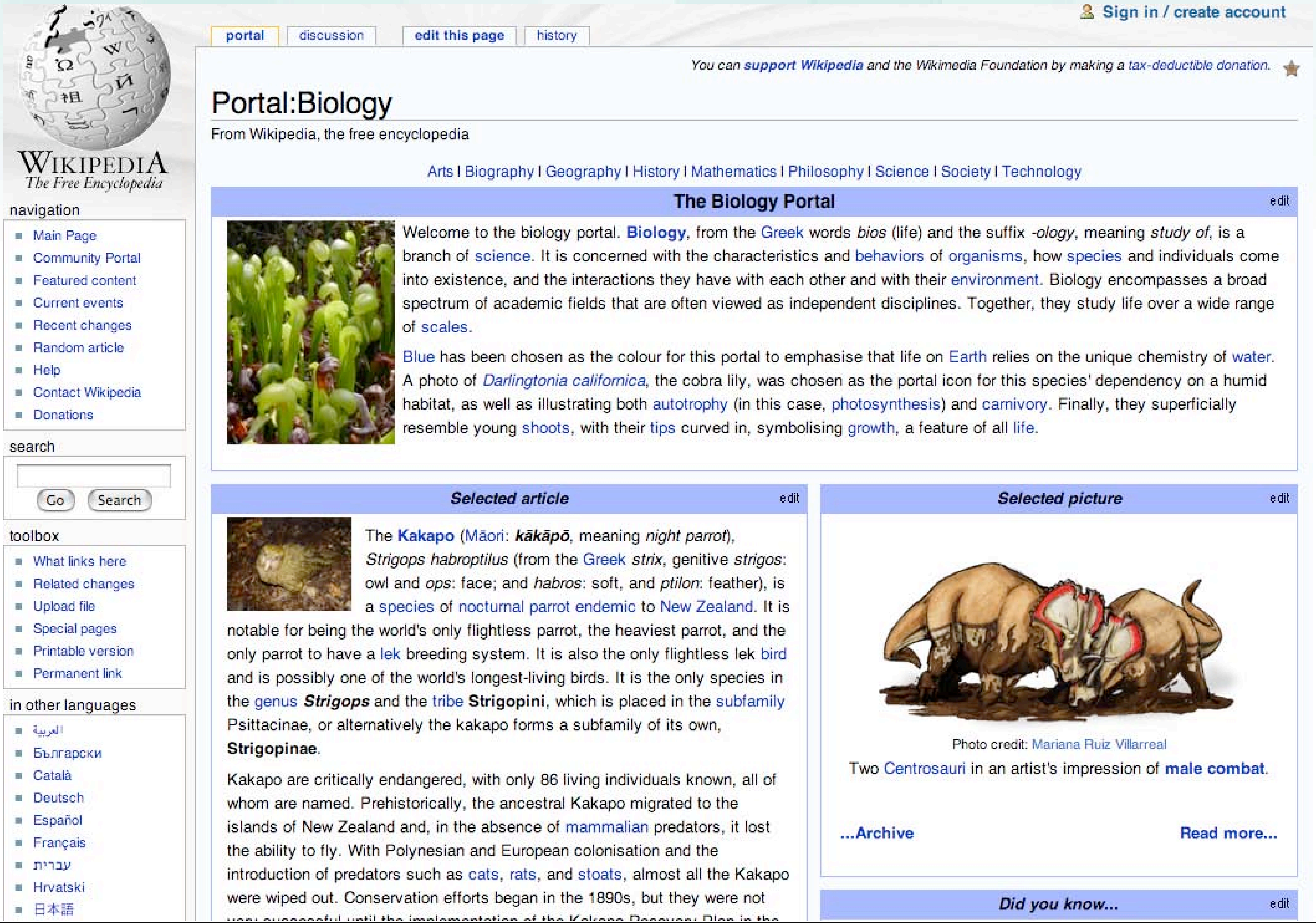


What are the challenges in creating a collaborative NSDL?

Trust

Photo © 2005 Reuters

Contribution



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Portal:Biology

From Wikipedia, the free encyclopedia

Arts | Biography | Geography | History | Mathematics | Philosophy | Science | Society | Technology

The Biology Portal edit

Welcome to the biology portal. **Biology**, from the Greek words *bios* (life) and the suffix *-ology*, meaning *study of*, is a branch of science. It is concerned with the characteristics and behaviors of organisms, how species and individuals come into existence, and the interactions they have with each other and with their environment. Biology encompasses a broad spectrum of academic fields that are often viewed as independent disciplines. Together, they study life over a wide range of scales.

Blue has been chosen as the colour for this portal to emphasise that life on Earth relies on the unique chemistry of water. A photo of *Darlingtonia californica*, the cobra lily, was chosen as the portal icon for this species' dependency on a humid habitat, as well as illustrating both autotrophy (in this case, photosynthesis) and carnivory. Finally, they superficially resemble young shoots, with their tips curved in, symbolising growth, a feature of all life.

Selected article edit

The **Kakapo** (Māori: ***kākāpō***, meaning *night parrot*), *Strigops habroptilus* (from the Greek *strix*, genitive *strigos*: owl and *ops*: face; and *habros*: soft, and *ptilon*: feather), is a species of nocturnal parrot endemic to New Zealand. It is notable for being the world's only flightless parrot, the heaviest parrot, and the only parrot to have a lek breeding system. It is also the only flightless lek bird and is possibly one of the world's longest-living birds. It is the only species in the genus ***Strigops*** and the tribe **Strigopini**, which is placed in the subfamily Psittacinae, or alternatively the kakapo forms a subfamily of its own, **Strigopinae**.

Kakapo are critically endangered, with only 86 living individuals known, all of whom are named. Prehistorically, the ancestral Kakapo migrated to the islands of New Zealand and, in the absence of mammalian predators, it lost the ability to fly. With Polynesian and European colonisation and the introduction of predators such as cats, rats, and stoats, almost all the Kakapo were wiped out. Conservation efforts began in the 1890s, but they were not

Selected picture edit

Photo credit: Mariana Ruiz Villarreal

Two Centrosauri in an artist's impression of **male combat**.

...Archive **Read more...**

Did you know... edit


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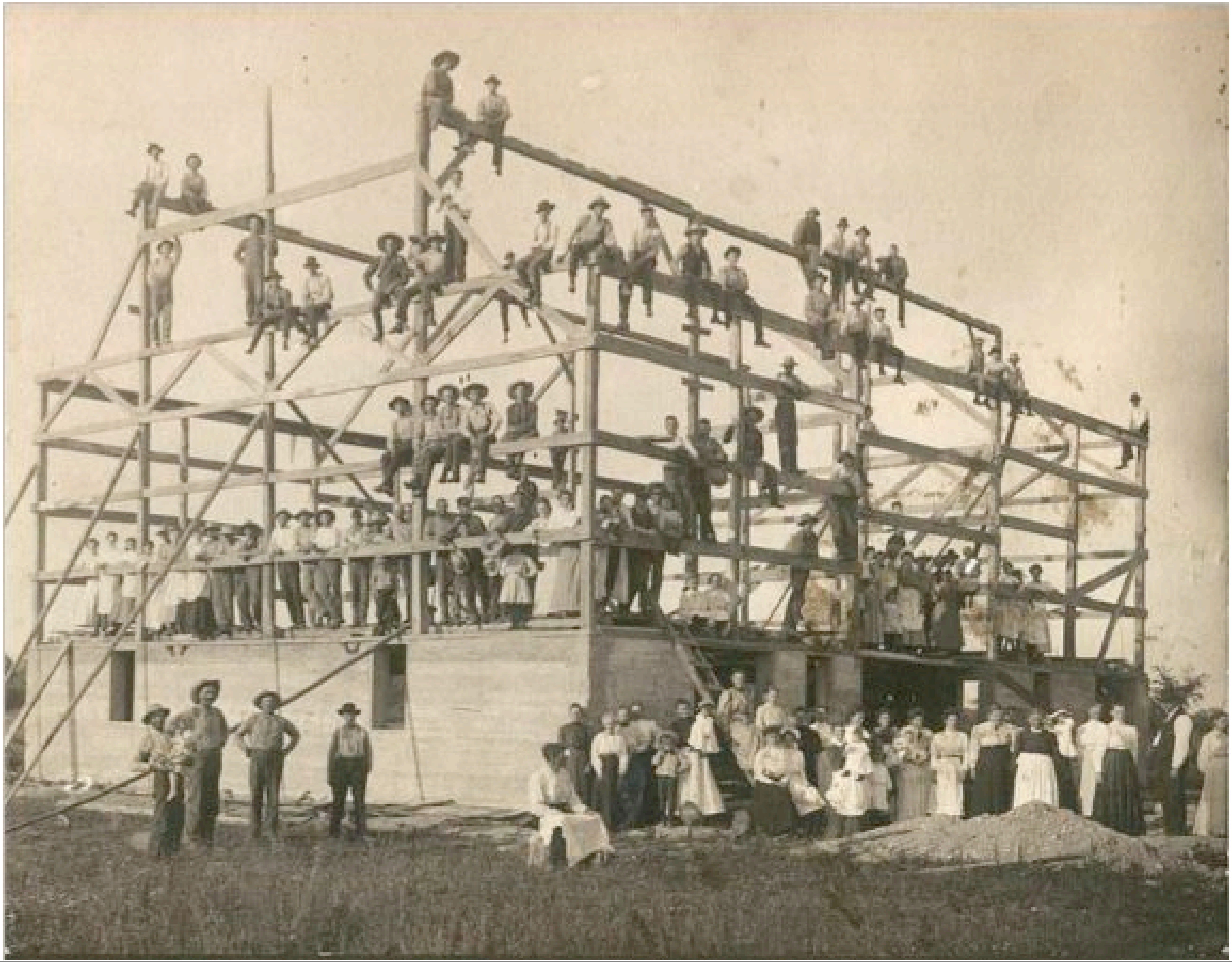
Photo by NASA/JPL

Photo by Jon Crispin

Trust and reputation in NSDL

- We brand NSDL as a source of "trusted" resources
- What is our trust mechanism?
  - Transitive trust approval
  - Community rating/filtering/reputation
- Trusted vs. complete "views"
- What is the right balance of trust vs. community contribution?



Community Formation

- Build the tools and they will come?
- What can we learn from Wikipedia, MySpace, Flickr, and YouTube?
- How do we leverage existing societies and groupings (NSTA, ACM, AAPT, AAAS)?
- Is there an NSDL community, or are there many small communities?

Photo by Jon Crispin

Photos: Jon Crispin, NASA/JPL

Summary

- NSDL 2.0 and its tools allow scientists, mathematicians, teachers, engineers, librarians, and students to create a unique web of context, contribution, and collaboration around the high-quality STEM education resources at the core of the NSDL.
- NSDL partners must work together to transform this collaborative **capability** into a collaborative **reality**.

Discussion

- Can these general tools be applied to the BEN community?
- Are there other specific collaborative tools you could use?
- What is an acceptable trust model for NSDL collaboration?
- What concrete steps can we take to build collaborative NSDL communities?

Acknowledgements

- NSDL NSF Program Officers
  - Lee Zia
  - David McArthur
- NSDL Core Integration Team
  - UCAR: Kaye Howe, PI and Executive Director
  - Cornell: Dean Krafft, PI
  - Columbia: Kate Wittenberg, PI
- Fedora Development Team
  - Cornell: Sandy Payette & Carl Lagoze
  - Univ. of Virginia: Thornton Staples

Contact Information

Dean B. Krafft
Cornell Information Science
301 College Ave.
Ithaca, NY 14850
USA
dean@cs.cornell.edu