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Education of Youth

The Achievement Standard Network (ASN) Overview  
The Role of ASN Data in Resource Creation, Discovery, and Use  
Addressing the Needs of a Global Society of Life-long Learners

## The Achievement Standards Network Overview

The Achievement Standards Network (ASN) provides an RDF-based framework for the description of achievement standards promulgated by governments and other organizations to prescribe what students should know and be able to do as a result of specific educational experiences. The achievement standards of interest are frequently called 'curriculum objectives' in the cataloging literature as well as 'academic standards', 'curriculum standards', 'learning indicators', 'benchmarks' and an array of other names peculiar to each promulgator. For our purposes, we shall refer to these variously named achievement standards as 'learning objectives'. The correlation or mapping of learning resources such as lesson plans, curriculum units, learning objects as well as student achievement through portfolios and standards-based assessments (e.g., report cards) to these formally promulgated learning objectives is a growing imperative in the education environment. International interest is high in sharing access to learning resources using learning objectives described systematically.

The ASN framework is based on the Dublin Core Metadata Initiative's (DCMI) syntax-independent abstract information model (DCAM). The DCAM is intended to support development of Dublin Core Application Profiles (DCAP) of which the ASN DCAP is an example.

The ASN has **five distinct components**:

1. A repository of academic standards, each with its own unique, web-addressable Uniform Resource Identifier (URI)
2. A data input tool, enabling direct input of standards documents into the repository
3. Viewers and web services to access the standards
4. A resolution service that resolves each URI into machine readable text
5. A network of organizations that share, use, develop tools and leverage the technical advantages of the ASN in improving education

The ASN web services enable a developer to view the collection of documents included in the ASN database, view the hierarchy of statements within a standards document, retrieve a list of documents based on jurisdiction and subject, export the standards data in RDF/XML for use in a local application, and resolve the Uniform Resource Identifier assigned to each statement in the collection.

Learning objectives published through the ASN, are richly described with metadata that facilitates correlating teaching and learning resources to individual, or collections of, statements. A full list of ASN properties can be found at <http://www.achievementstandards.org/documentation.htm>.

ASN data is open source and made publically available for unrestricted use through a Creative Commons Attribution 3.0 license.





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## The Role of ASN Data in Resource Creation, Discovery, and Use

The Achievement Standards Network was initially funded by the National Science Foundation to improve the usefulness of the millions of resources developed and published through the National Science Digital Library (NSDL). With the advent of No Child Left Behind and mandates regarding state standards, NSF clearly saw the need to standardize on the way learning objectives were declared within the resource metadata. Teachers desperately needed to find STEM (Science, Technology, Engineering, and Mathematics) resources that met their localized goals for student achievement. Systems — learning management systems, instructional management systems, and library systems — needed to have the learning objectives presented in a machine-readable format.

After several years of research, in cooperation with technical standards groups that focused on educational resources, the ASN framework emerged. The ASN answers the educational community's need for:

- A free centralized repository of richly described learning objectives covering all subjects, and published by all 50 states and DC as well as learning objectives by professional organizations such as AAAS, College Board, etc.;
- The assignment of unique identifiers (URI) for each learning objective so that they can: (1) be resolvable over the web without the need for a specialized application; and (2) support identification of highly specific relationships between objectives and precise correlations of learning objectives with learning objects;
- Rich RDF metadata that describes the learning objective (subject, parent statement, grade, etc.) using a community-developed, freely available, locally extensible schema;
- Web-addressable, human-readable text and metadata describing the learning objective and its relationship to other learning objects; and
- Web-addressable, machine-readable RDF/XML data that can be effectively integrated into existing information systems, while looking forward to future integration into the global web of Linked Data.

Many national and international organizations that create and maintain learning resources used in diverse educational processes (professional development, content delivery, assessment and reporting) have endorsed the use of the ASN to identify learning objectives and correlate their resources to those objectives, including the a long list of US and international libraries, the Library of Congress, National Science Foundation, the National Education Association, PBS, Curriculum Corporation and the Learning Federation in Australia. Organizations that use ASN data can confidently associate learning resources with learning objectives without restricting commercial vendor choices (added value).

A number of technical standards bodies addressing resource creation, discovery and use have defined metadata standards for learning resources that provide methods that can be used with the ASN to correlate learning objects with learning objectives. These include the Dublin Core Metadata Initiative (DC), the IMS Global Learning Consortium (IMS), Advanced Distributed Learning (SCORM), Schools Interoperability Framework Association (SIF) and IEEE Learning Object Metadata Standard (LOM).

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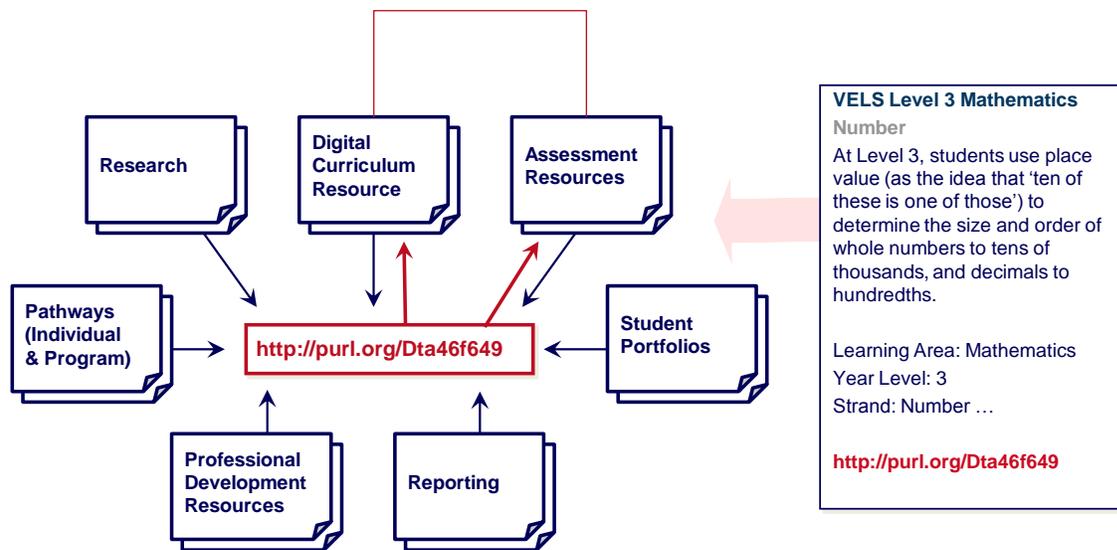


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## Addressing the Needs of a Global Society of Life-long Learners

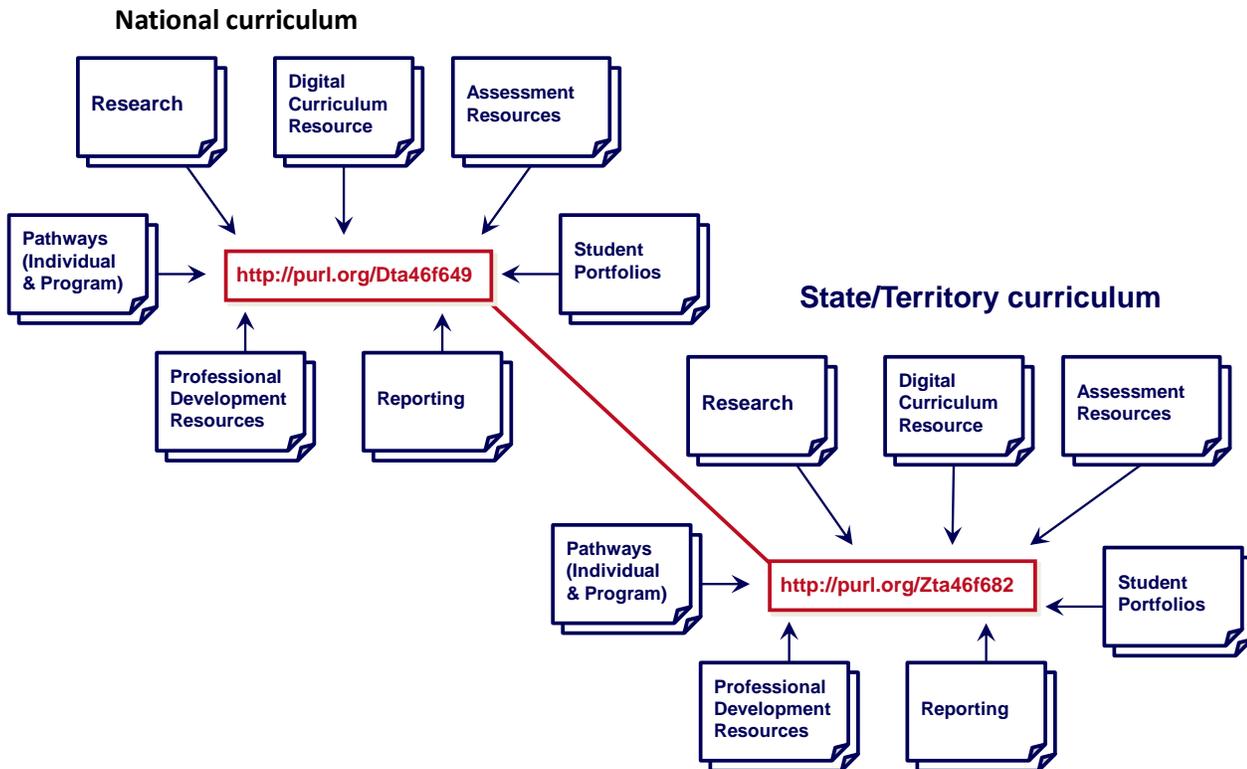
The following diagrams were provided by the Australian federal department of education as an expression of Australia's goal of connecting all teaching -learning processes together through the use of Australian ASN data.

# National Curriculum





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The national goals of Australia are very similar to those of the United States. Australia is currently writing a set of National Standards, an effort somewhat akin to the upcoming Common Standards effort in the US led by state education and governance leaders (CCSSO and the NGA). The Common Standards effort is working to be as inclusive as possible of the international commercial publishers and assessment companies through adherence to international technical standards such as IMS, SCORM, IEEE LOM and DCMI.





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### **To Infinity and Beyond...**

In its CyberLearning report of 2008,[1] the NSF identified the critical need to invest in preK-12 education as the beginning of life-long learning, and emphasized the ASN's role in this effort. Just as the interstate highway system was designed to both facilitate future interstate commerce as well as support the immediate strategic goals of the day, so should we develop the United States' education systems to support both our immediate education goals and the future needs of a populace that must continuously learn in order to stay competitive in a continuously changing world. By clearly defining learning goals in machine and web friendly formats that support existing and future technical standards body efforts, we can begin to construct robust and portable learning plans, with closely aligned and cost effective ancillary services, that will enable all of our citizens to effectively participate in the educational world of the future.

The Achievement Standards Network is ready, today, to make that future a reality.

[1] Fostering Learning in the Networked World: The Cyberlearning Opportunity and Challenge. Available: [http://www.life-slc.org/wp-content/uploads/nsf\\_cyberlearning\\_report\\_2008.pdf](http://www.life-slc.org/wp-content/uploads/nsf_cyberlearning_report_2008.pdf)

