

DRAFT
Digital Learning Object
Metadata Standard

Guidelines

Amendment History

Date	Version	Comment	Author/Editor
August 22, 2005	1.0	Created	D. S. Margel
August 31, 2005	1.1	Identification of acronyms, small fixes	D. S. Margel

CONTENTS

Introduction.....	1
Purpose and Scope	1
Background.....	1
Mandatory and Recommended Element List.....	3
Implementation Guidelines	5
Appendix 1: Additional Resources	26
Appendix 2: Glossary of Terms.....	27
Appendix 3: Sample XML Record	28

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Introduction

Purpose and Scope

This document supports Alberta Education's Digital Learning Object Metadata Standard by providing implementation guidelines for the metadata elements summarized in the Standard.

This Standard defines a set of elements for describing learning objects in Alberta. The elements represent a subset of the elements of 1484.12.1-2002 Institute of Electrical and Electronic Engineers (IEEE) Standard for Learning Object Metadata (LOM), a widely accepted educational metadata standard used around the world.

The elements included in this subset of LOM are categorized as Mandatory (M) or Recommended (R). "Mandatory" means that the elements must be included in a learning object metadata record. "Recommended" elements should be strongly considered for use unless they do not apply to a particular learning object. **Refer to the table at the end of this section for the list of Mandatory and Recommended elements.**

All remaining elements are considered optional, and therefore outside of the scope of the Standard. This document includes all of the IEEE LOM elements for easy reference, but implementation guidelines and examples are provided only for the Mandatory and Recommended elements. Metadata implementers should refer to CanCore Guidelines Version 2.0 for implementation guidelines related to the optional elements.

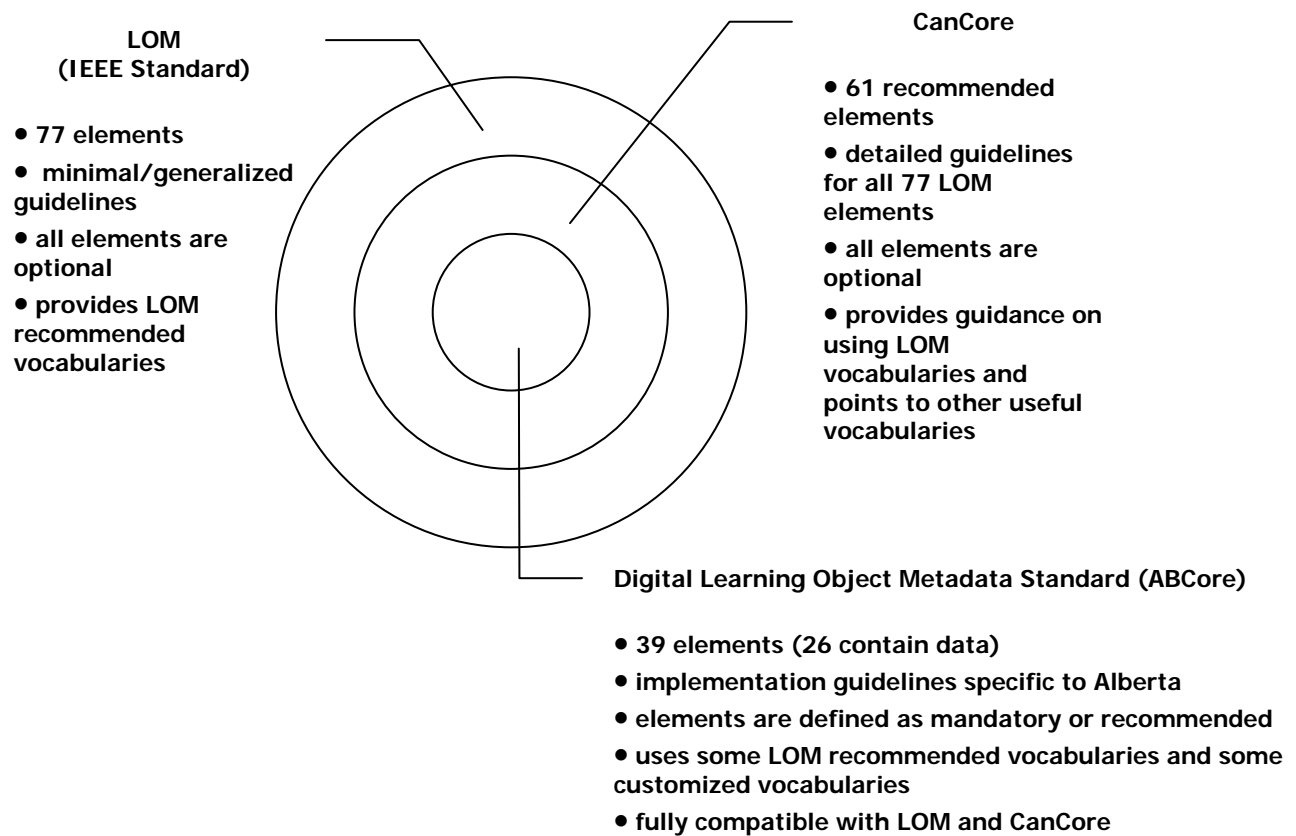
Background

The Standard is derived from the LOM Standard (IEEE 1484.12.1-2002) in conjunction with CanCore Guidelines. Essentially, the element set is a pared down list of LOM elements. The elements were selected due to their strong potential to support resource discovery and exchange. LOM designates all elements as optional, whereas this metadata element set includes mandatory and recommended elements.

CanCore offers a detailed interpretation of the LOM Standard, provides implementation guidelines for each element, and recommends certain LOM elements as being particularly useful for resource discovery and sharing. Each of the mandatory and recommended elements in the Standard is a CanCore-recommended element. CanCore Guidelines Version 2.0 is compatible with the implementation guidelines in this document and may be viewed as a more generalized companion document.

Both LOM and CanCore offer vocabulary recommendations for some of the LOM elements. In all but two cases, the Alberta guidelines follow these vocabulary recommendations. The exceptions are LOM element 5.2 (Educational Learning Resource Type) and LOM element 5.5 (Educational Intended End User Role).

ABCORE Relationship to LOM and CanCore



Mandatory and Recommended Element List

This table lists only the Mandatory and Recommended elements for Alberta. The shaded elements are headings that do not contain content.

LOM number	LOM element name	M = Mandatory R = Recommended
1	GENERAL	M
1.1	Identifier	M
1.1.1	• Catalog	M
1.1.2	• Entry	M
1.2	Title	M
1.3	Language	M
1.4	Description	M
1.5	Keyword	M
2	LIFE CYCLE	M
2.3	Contribute	M
2.3.1	• Role	M
2.3.2	• Entity	M
2.3.3	• Date	M
3	META-METADATA	M
3.1	Identifier	M
3.1.1	• Catalog	M
3.1.2	• Entry	M
3.2	Contribute	M
3.2.1	• Role	M
3.2.2	• Entity	M
3.2.3	• Date	M
3.3	Metadata Schema	M
4	TECHNICAL	M
4.1	Format	M
4.2	Size	M
4.3	Location	M
4.7	Duration	R
5	EDUCATIONAL	R
5.2	Learning Resource Type	R
5.5	Intended End User Role	R
6	RIGHTS	M
6.2	Copyright and Other Restrictions	M
6.3	Description	R
9	CLASSIFICATION	R
9.1	Purpose	R
9.2	Taxon Path	R
9.2.1	• Source	R
9.2.2	• Taxon	R
9.2.2.2	○ Entry	R

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Implementation Guidelines

Implementers are advised to consult the IEEE LOM Standard (IEEE 1484.12.1-2002) and CanCore Guidelines for a more in-depth explanation of the LOM elements, including recommendations and restrictions related to data types and the ordering and repeatability of elements.

LOM number	LOM element category	LOM element name	Explanation (from LOM) Refer to LOM Standard (IEEE 1484.12.1-2002) for further detail.	Content or Vocabulary Recommendations	Guidelines	Mandatory Recommended Optional
1	General		This category groups the general information that describes this learning object as a whole.			Mandatory
1.1		Identifier	A globally unique label that identifies this learning object.		<p>Example: Identifier</p> <ul style="list-style-type: none"> • Catalog: ABC Board of Education • Entry: fbb6703c-8252-43ec-a369-faed289a83c6 <p>Example: Identifier</p> <ul style="list-style-type: none"> • Catalog: URI • Entry: http://www.abc/whatsetheearthmadeof.smil 	Mandatory
1.1.1		<ul style="list-style-type: none"> • Catalog 	The name or designator of the identification or cataloging scheme for this entry.		Provide the name of the identification system used in the repository where the learning object is found. If no identification system name exists, consider using the name of the learning object repository or the name of the organization that has made the object available. If using this approach, attempt to name the organization as unambiguously as possible. It is also common practice within many individual repositories to use Uniform Resource Identifiers (URI) for the value of this element. Ideally, the value for this entry would be system supplied. See Examples in 1.1.	Mandatory

LOM number	LOM element category	LOM element name	Explanation (from LOM) Refer to LOM Standard (IEEE 1484.12.1-2002) for further detail.	Content or Vocabulary Recommendations	Guidelines	Mandatory <u>Recommended</u> <i>Optional</i>
1.1.2		<ul style="list-style-type: none"> Entry 	The value of the identifier within the identification or cataloging scheme that designates or identifies this learning object.		Provide the actual value of the unique identifier assigned to the learning object. This is often a Globally Unique Identifier (GUID) supplied by the system. It is also common practice within many individual repositories to use the Universal Resource Identifier (URI) or Uniform Resource Locator (URL) that provides access to the learning object. See Examples in 1.1.	Mandatory
1.2		Title	Name given to this learning object.		If no title exists, create a title that adequately, yet concisely, describes the resource. If the item belongs to a series, identify the series in parentheses following the title of the individual resource. Retain initial articles (A, An, The, Le, La, etc.). Capitalize principal words in the title. Articles, conjunctions, and prepositions are not typically capitalized unless they begin the title. Refer to CanCore Guidelines for more guidance on dealing with Titles. Multiple titles are not permitted by LOM. Examples: Title: Unlovables: Creepy, Crawly Creatures in Your Backyard Title: Student Activity Sheet: Dynamic Earth Mind Map Title: The Electric Field (Series: The Mechanical Universe...and Beyond)	Mandatory
1.3		Language	The primary human language or languages used within this learning object to communicate to the intended user.	3-letter language codes as defined by ISO 639-2	Language is formatted according to the 3-letter codes as defined by ISO 639-2. The 3-letter codes are in lower case. A list of codes is maintained at http://www.loc.gov/standards/iso639-2/langcodes.html Where alternative codes are listed, use the terminology code, which is listed second in the	Mandatory

LOM number	LOM element category	LOM element name	Explanation (from LOM) Refer to LOM Standard (IEEE 1484.12.1-2002) for further detail.	Content or Vocabulary Recommendations	Guidelines	Mandatory <u>Recommended</u> <i>Optional</i>
					referenced list. Examples: (1) English - Language: eng (2) French - Language: fra (<i>NOT fre</i>) (3) Ukrainian - Language: ukr (4) German - Language: deu (<i>NOT ger</i>)	
1.4		Description	A textual description of the content of this learning object.		Provide a textual description of the content and purpose of the resource by using relevant keywords to support searching. Ideally, the description should be approximately two to four sentences in length and should adhere to the following style recommendations: -Use complete sentences. -Include both the full and the abbreviated versions of terms that are commonly abbreviated (e.g. ELA and English language arts). -Keep related words together (i.e., use “electric fields and magnetic fields” instead of “electric and magnetic fields”) Example: Aerodynamics and flight are explored in this collection of videos, lessons, interactive activities, games, worksheets, and glossaries. Lesson topics include: Famous Aviators; Aviation Events; What is Air?; Lift and Bernoulli; Another Factor That Affects Lift; Forces Acting on an Airplane; Parts of an Airplane; Movements of an Airplane; Propulsion; Types of Airplanes; Parts of a Helicopter; Movements of a Helicopter; Types of Helicopters; Types of Gliders; Constructing Gliders; Glider Testing; The Air Show.	Mandatory

LOM number	LOM element category	LOM element name	Explanation (from LOM) Refer to LOM Standard (IEEE 1484.12.1-2002) for further detail.	Content or Vocabulary Recommendations	Guidelines	Mandatory <u>Recommended</u> <i>Optional</i>
1.5		Keyword	A keyword or phrase describing the topic of this learning object.		Provide one or more keywords or phrases that relate to the topic of the learning object. If multiple keywords are assigned, repeat the Keyword element for each. When assigning keywords, it is important to take into account how a particular system will handle them. For example, if the technical environment of the repository executes a keyword search against the words contained in the title, description, and keyword fields, indexers may not find it worthwhile to repeat keywords already found in the title and description. Also note that keywords placed in this element are typically not selected from a specific controlled vocabulary. (Controlled vocabulary terms are usually placed in the Classification element category.) Example: Keyword: Siamese cats	Mandatory
1.6		Coverage	The time, culture, geography or region to which this learning object applies.		<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
1.7		Structure	Underlying organizational structure of this learning object.	LOMv1.0 “atomic” “collection” “networked” “hierarchical” “linear”	<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
1.8		Aggregation Level	The functional granularity of this learning object.	LOMv1.0 “1” “2” “3” “4”	<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
2	Life Cycle		This category describes the history and current state of this learning object and			Mandatory

LOM number	LOM element category	LOM element name	Explanation (from LOM) Refer to LOM Standard (IEEE 1484.12.1-2002) for further detail.	Content or Vocabulary Recommendations	Guidelines	Mandatory <u>Recommended</u> <i>Optional</i>
			those entities that have affected this learning object during its evolution.			
2.1		Version	The edition of this learning object.		<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
2.2		Status	The completion status or condition of this learning object.	LOMv1.0 “draft” “final” “revised” “unavailable”	<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
2.3		Contribute	Those entities (i.e., people, organizations) that have contributed to the state of this learning object during its life cycle (e.g., creation, edits, publication).		Multiple sets of the Contribute elements may be used. Refer to CanCore Guidelines for guidance.	Mandatory

LOM number	LOM element category	LOM element name	Explanation (from LOM) Refer to LOM Standard (IEEE 1484.12.1-2002) for further detail.	Content or Vocabulary Recommendations	Guidelines	Mandatory <u>Recommended</u> <i>Optional</i>
2.3.1		<ul style="list-style-type: none"> • Role 	Kind of contribution.	LOMv1.0 “author” “publisher” “unknown” “initiator” “terminator” “validator” “editor” “graphical designer” “technical implementer” “content provider” “technical validator” “educational validator” “script writer” “instructional designer” “subject matter expert”	At minimum, it is mandatory to use the “publisher” role. Other LOM vocabulary roles, such as “author”, may also be used (see LOMv1.0 vocabulary list at left). Refer to CanCore Guidelines for instructions on using multiple sets of the Contribute group of sub-elements. Example: Role: publisher	Mandatory
2.3.2		<ul style="list-style-type: none"> • Entity 	The identification of and information about entities (i.e., people, organizations) contributing to this learning object.	vCard	When Role = publisher, provide the name of the organization responsible for making the resource available. If a person, rather than an organization, is responsible for making the resource available, provide the person’s name in this element. It is also acceptable to provide both the name of the organization and the name of the person. The LOM Standard requires that the vCard specification be used to format the information contained in Entity. The vCard specification has three mandatory elements: FN (formatted person’s name), N (structured person’s name), and VERSION. If it is necessary to record more than the family name and given name in the FN and N elements, consult www.imc.org/rfc2426 and CanCore Guidelines for the precise	Mandatory

LOM number	LOM element category	LOM element name	Explanation (from LOM) Refer to LOM Standard (IEEE 1484.12.1-2002) for further detail.	Content or Vocabulary Recommendations	Guidelines	Mandatory <u>Recommended</u> <i>Optional</i>
					<p>formatting rules.</p> <p>ORG is a non-mandatory vCard element that contains the name of the organization. The examples below show how the entity element information must be entered in order to comply with vCard. (Line returns should be included as in the examples, and there should be no extraneous whitespace.)</p> <p>Recently, changes have occurred with regard to common practice for formatting vCard when data is being provided for an organization name only (i.e. when an individual's name is not being provided for FN and N). Instead of providing the value "none" in the mandatory vCard elements FN and N, it is now recommended that the organization name be repeated in the FN, N, and ORG elements. Note that two semicolons must precede the organization name in the N element (to place it in the Additional Names component of N). Refer to www.imc.org/rfc2426 for the precise formatting rules for N, which is composed of these ordered components: Family Name;Given Name;Additional Names;Honorific Prefixes; Honorific Suffixes.</p> <p>Implementers should be advised that best practice for formatting vCard within a LOM record continues to evolve; therefore, the guidelines offered here are subject to change. (For more information about vCard, consult www.imc.org/rfc2426 or refer to CanCore Guidelines.)</p>	

LOM number	LOM element category	LOM element name	Explanation (from LOM) Refer to LOM Standard (IEEE 1484.12.1-2002) for further detail.	Content or Vocabulary Recommendations	Guidelines	Mandatory <u>Recommended</u> <i>Optional</i>
					<p>Examples: For an organization name only: Entity: <![CDATA[BEGIN:VCARD VERSION:3.0 FN:Alberta Education N:::Alberta Education ORG:Alberta Education END:VCARD]]> For a person's name only: Entity: <![CDATA[BEGIN:VCARD VERSION:3.0 FN:John Doe N:Doe;John END:VCARD]]> For a person's name and organization: Entity: <![CDATA[BEGIN:VCARD VERSION:3.0 FN:John Doe N:Doe;John ORG:Alberta Education END:VCARD]]></p>	
2.3.3		<ul style="list-style-type: none"> Date 	The date of the contribution.	LOM datatype: DateTime e.g.: 2004-01-30	When Role = publisher, provide the year the resource was published or created. If it is important to identify more than the year, follow the YYYY-MM-DD format. Example: Date: 2003	Mandatory
3	Meta-Metadata		This category describes this metadata record itself (rather than the learning object that this record describes).			Mandatory
3.1		Identifier	A globally unique label that identifies this metadata record.		<p>Example: Identifier</p> <ul style="list-style-type: none"> Catalog: ABLearnMeta Entry: 100100000006155 	Mandatory

LOM number	LOM element category	LOM element name	Explanation (from LOM) Refer to LOM Standard (IEEE 1484.12.1-2002) for further detail.	Content or Vocabulary Recommendations	Guidelines	Mandatory Recommended Optional
3.1.1		<ul style="list-style-type: none"> Catalog 	The name or designator of the identification or cataloging scheme for this entry.		Provide the name of the metadata identification system used in the repository where the metadata is stored. If no identification system name exists, consider using the name of the organization that is responsible for creating the metadata. If using this approach, attempt to name the organization as unambiguously as possible. Ideally, the name of the catalog would be system supplied. See Example in 3.1.	Mandatory
3.1.2		<ul style="list-style-type: none"> Entry 	The value of the identifier within the identification or cataloging scheme that designates or identifies this metadata record.		Provide the actual value of the unique identifier assigned to the metadata record. This is often a GUID supplied by the system. See Example in 3.1.	Mandatory
3.2		Contribute	Those entities (i.e., people or organizations) that have affected the state of this metadata instance during its life cycle (e.g., creation, validation).			Mandatory
3.2.1		<ul style="list-style-type: none"> Role 	Kind of contribution.	LOMv1.0 “creator” “validator”	At minimum, it is mandatory to use the role, “creator”. Example: Role: creator	Mandatory
3.2.2		<ul style="list-style-type: none"> Entity 	The identification of and information about entities (i.e., people, organizations) contributing to this metadata instance.	vCard	When Role = creator, provide the name of the organization responsible for creating the metadata record. If a person, rather than an organization is responsible for making the metadata available, provide the person’s name in this element. It is also acceptable to provide both the name of the organization and the name of the person. Refer to 2.3.2 for guidelines and examples of formatting vCard data.	Mandatory

LOM number	LOM element category	LOM element name	Explanation (from LOM) Refer to LOM Standard (IEEE 1484.12.1-2002) for further detail.	Content or Vocabulary Recommendations	Guidelines	Mandatory Recommended Optional
3.2.3		<ul style="list-style-type: none"> Date 	The date of the contribution.	LOM datatype: DateTime e.g.: 2004-01-30	When Role = creator, provide the date the metadata record was created, following the YYYY-MM-DD format. Example: Date: 2004-03-19	Mandatory
3.3		Metadata Schema	The name and version of the authoritative specification used to create this metadata instance.	LOMv1.0 and ABCorev1.0 (can also include any other application profile the record conforms to)	Provide "LOMv1.0" as the value of this element. Using another instance of the Metadata Schema element, provide "ABCCorev1.0" to indicate that the metadata record conforms to the Alberta application profile. It is also acceptable to repeat this element to identify other metadata schemas or application profiles that the metadata record conforms to. Example: Metadata Schema: LOMv1.0 Metadata Schema: ABCorev1.0	Mandatory
3.4		Language	Language of this metadata instance.	3-letter language codes as defined by ISO 639-2	<i>If using this optional element, refer to LOM and CanCore for guidelines, as well as the guidelines about language codes in 1.3.</i>	<i>Optional</i>
4	Technical		This category describes the technical requirements and characteristics of this learning object.			Mandatory
4.1		Format	Technical datatype(s) of (all the components of) this learning object. This data element shall be used to identify the software needed to access the learning object.	MIME types based on IANA registration (see RFC2048:1996) or "non-digital"	Provide the technical format(s) of the learning object, using the IANA MIME Media Types: http://www.iana.org/assignments/media-types/ Also, refer to CanCore Guidelines for further guidance. This element may be repeated in cases where a learning object is comprised of more than one technical format. Examples: Format: text/html	Mandatory

LOM number	LOM element category	LOM element name	Explanation (from LOM) Refer to LOM Standard (IEEE 1484.12.1-2002) for further detail.	Content or Vocabulary Recommendations	Guidelines	Mandatory <u>Recommended</u> <i>Optional</i>
					Format: image/tiff Format: application/x-shockwave-flash Format: video/quicktime	
4.2		Size	The size of the digital learning object in bytes.		Provide the uncompressed size of the resource in bytes. Enter 0 for streaming video. Examples: Size: 245825 Size: 0	Mandatory
4.3		Location	A string that is used to access this learning object. It may be a location (e.g., URL) or a method that resolves to a location (e.g., URI).		Provide the URL assigned to the resource so that it is accessible. Example: Location: http://www.learning.gov.ab.ca/lrb/resource/	Mandatory
4.4		Requirement	The technical capabilities necessary for using this learning object. If there are multiple requirements, then all are required, i.e., the logical connector is AND.		<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
4.4.1		<ul style="list-style-type: none"> • OrComposite 	Grouping of multiple requirements. The composite requirement is satisfied when one of the component requirements is satisfied, i.e., the logical connector is OR.		<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
4.4.1.1		<ul style="list-style-type: none"> <ul style="list-style-type: none"> ○ Type 	The technology required to use this learning object, e.g., hardware, software, network, etc.	LOMv1.0 “operating system” “browser”	<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>

LOM number	LOM element category	LOM element name	Explanation (from LOM) Refer to LOM Standard (IEEE 1484.12.1-2002) for further detail.	Content or Vocabulary Recommendations	Guidelines	Mandatory <u>Recommended</u> <i>Optional</i>
4.4.1.2		○ Name	Name of the required technology to use this learning object.	if Type= "operating system" then: "pc-dos" "ms-windows" "macos" "unix" "multi-os" "none" if Type= "browser" then: "any" "netscape" "communicator" "ms-internet explorer" "opera" "amaya"	<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
4.4.1.3		○ Minimum Version	Lowest possible version of the required technology to use this learning object.		<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
4.4.1.4		○ Maximum Version	Highest possible version of the required technology to use this learning object.		<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
4.5		Installation Remarks	Description of how to install this learning object.		<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
4.6		Other Platform Requirements	Information about other software and hardware requirements.		<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>

LOM number	LOM element category	LOM element name	Explanation (from LOM) Refer to LOM Standard (IEEE 1484.12.1-2002) for further detail.	Content or Vocabulary Recommendations	Guidelines	Mandatory <u>Recommended</u> <i>Optional</i>
4.7		Duration	Time a continuous learning object takes when played at intended speed.	LOM Duration Datatype e.g.: PT1H30M	Use this element for learning objects such as audio and video resources. As recommended by LOM, express the value of Duration according to the following format: PT[hH][nM][sS] where: h = number of hours, n = number of minutes, s = number of seconds. Refer to CanCore Guidelines for further instructions on the use of the Duration datatype and textual descriptions of duration. Examples: (1) for 11 minutes and 45 seconds Duration: PT11M45S (2) for 1 hour and 30 minutes Duration: PT1H30M	<u>Recommended</u> (when applicable)
5	Educational		This category describes the key educational or pedagogical characteristics of this learning object.			<u>Recommended</u>
5.1		Interactivity Type	Predominant mode of learning supported by this learning object.	LOMv1.0 “active” “expositive” “mixed”	<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
5.2		Learning Resource Type	Specific kind of learning object. The most dominant kind shall be first.	National Science Digital Library (NSDL) Learning Resource Type Vocabulary.	Select the most applicable term(s) from the NSDL Learning Resource Type Vocabulary. Refer to Appendix 2 for more information on this vocabulary. Examples: Learning Resource Type: Assessment Learning Resource Type: Instructor guide	<u>Recommended</u>
5.3		Interactivity Level	The degree of interactivity characterizing this learning object. Interactivity in this context refers to the degree to which the learner can influence the aspect or behavior of the learning	LOMv1.0 “very low” “low” “medium” “high” “very high”	<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>

LOM number	LOM element category	LOM element name	Explanation (from LOM) Refer to LOM Standard (IEEE 1484.12.1-2002) for further detail.	Content or Vocabulary Recommendations	Guidelines	Mandatory <u>Recommended</u> <i>Optional</i>
			object.			
5.4		Semantic Density	The degree of conciseness of a learning object.	LOMv1.0 “very low” “low” “medium” “high” “very high”	<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
5.5		Intended End User Role	Principal user(s) for which this learning object was designed, most dominant first.	LOMv1.0 “teacher” “author” “learner” “manager” and ABCOREUR: “parent”	If appropriate, select a term (or multiple terms) from the LOM vocabulary. When assigning the term “parent”, use the vocabulary source ABCOREUR. Example: Intended End User Role: learner	<u>Recommended</u>
5.6		Context	The principal environment within which the learning and use of this learning object is intended to take place.	LOMv1.0: “school” “higher education” “training” “other”	<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
5.7		Typical Age Range	Age of the typical intended user.		<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
5.8		Difficulty	How hard it is to work with or through this learning object for the typical intended target audience.	LOMv1.0 “very easy” “easy” “medium” “difficult” “very difficult”	<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
5.9		Typical Learning Time	Approximate or typical time it takes to work with or through this learning object for the typical intended target audience.	LOM Duration Datatype e.g.: PT1H30M	<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
5.10		Description	Comments on how this learning object is to be used.		<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
5.11		Language	The human language used	3-letter language codes	<i>If using this optional element, refer to LOM</i>	<i>Optional</i>

Guidelines: Digital Learning Object Metadata Standard
Technology Standards and Solutions
(Draft September 1, 2005)

LOM number	LOM element category	LOM element name	Explanation (from LOM) Refer to LOM Standard (IEEE 1484.12.1-2002) for further detail.	Content or Vocabulary Recommendations	Guidelines	Mandatory <u>Recommended</u> <i>Optional</i>
			by the typical intended user of this learning object.	as defined by ISO 639-2	<i>and CanCore for guidelines, as well as the guidelines for language codes in 1.3</i>	
6	Rights		This category describes the intellectual property rights and conditions of use for this learning object.			Mandatory
6.1		Cost	Whether the use of this learning object requires payment.	LOMv1.0 “yes” “no”	<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
6.2		Copyright and Other Restrictions	Whether copyright or other restrictions apply to the use of this learning object.	LOMv1.0 “yes” “no”	Select one of the two LOM vocabulary terms: yes; no. Example: Copyright and Other Restrictions: yes	Mandatory
6.3		Description	Comments on the conditions of use of this learning object.		Provide a textual description of the conditions of the use of the resource. It is also acceptable to provide a URL that links to a copyright and/or terms of use statement. If both a textual description and a URL are included, combine them in one instance of the element. (The LOM data model does not allow this element to be repeated.) Example: Description: © 2004 Alberta Learning	<u>Recommended</u> (Mandatory if 6.2 Copyright and Other Restrictions = yes)
7	Relation		This category defines the relationship between this learning object and other learning objects, if any.			<i>Optional</i>
7.1		Kind	Nature of the relationship between this learning object and the target learning object, identified by 7.2:Relation.Resource.	LOMv1.0: “ispartof” “haspart” “isversionof” “hasversion” “isformatof” “hasformat” “references” “isreferencedby”	<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>

LOM number	LOM element category	LOM element name	Explanation (from LOM) Refer to LOM Standard (IEEE 1484.12.1-2002) for further detail.	Content or Vocabulary Recommendations	Guidelines	Mandatory Recommended Optional
				“isbasedon” “isbasisfor” “requires” “isrequiredby”		
7.2		Resource	The target learning object that this relationship references.		<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
7.2.1		<ul style="list-style-type: none"> • Identifier 	A globally unique label that identifies the target learning object.		<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
7.2.1.1		<ul style="list-style-type: none"> ○ Catalog 	The name or designator of the identification or cataloging scheme for this entry.		<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
7.2.1.2		<ul style="list-style-type: none"> ○ Entry 	The value of the identifier within the identification or cataloging scheme that designates or identifies the target learning object.		<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
7.2.2		<ul style="list-style-type: none"> • Description 	Description of the target learning object.		<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
8	Annotation		This category provides comments on the educational use of this learning object, and information on when and by whom the comments were created. This category enables educators to share their assessments of learning objects, suggestions for use, etc.		Metadata implementers may find the Annotation element group useful to support peer review, instructor ratings, and usage statistics of educational objects. Such information is often considered valuable within communities of practice.	<i>Optional</i>
8.1		Entity	Entity (i.e., people, organization) that created this annotation.	vCard	<i>If using this optional element, format the data according to the vCard examples in 2.3.2. Refer to LOM and CanCore for additional guidelines.</i>	<i>Optional</i>

LOM number	LOM element category	LOM element name	Explanation (from LOM) Refer to LOM Standard (IEEE 1484.12.1-2002) for further detail.	Content or Vocabulary Recommendations	Guidelines	Mandatory <u>Recommended</u> <i>Optional</i>
8.2		Date	Date the annotation was created.	LOM datatype: DateTime e.g.: 2004-01-30	<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
8.3		Description	The content of this annotation.		<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
9	Classification		This category describes where this learning object falls within a particular classification system. To define multiple classifications, there may be multiple instances of this category.			<u>Recommended</u>

LOM number	LOM element category	LOM element name	Explanation (from LOM) Refer to LOM Standard (IEEE 1484.12.1-2002) for further detail.	Content or Vocabulary Recommendations	Guidelines	Mandatory <u>Recommended</u> <i>Optional</i>
9.1		Purpose	The purpose of classifying this learning object.	“discipline” “idea” “prerequisite” “educational objective” “accessibility restrictions” “educational level” “skill level” “security level” “competency”	<p>It is recommended that the learning object be classified according to its subject in order to enhance subject access to end users. Select the “idea” vocabulary term. The guidelines for the other classification elements below apply only when 9.1 Purpose = “idea”.</p> <p>Note: Other LOM classification purposes are optional, and it is advisable that implementers also consider using some of them as they may well add value for metadata end users. For example, the LearnAlberta.ca repository uses Purpose = “educational level” to assign grade level information. LearnAlberta.ca also uses Purpose = “educational objective” to record information such as the course, unit, and the learning outcomes associated with a learning object.</p> <p>Refer to CanCore Guidelines for more information.</p> <p>Also refer to Appendix 3.</p> <p>Example: Purpose: idea</p>	<u>Recommended</u>
9.2		Taxon Path	A taxonomic path in a specific classification system. Each succeeding level is a refinement in the		<p>Example: Taxon Path Source: LCSH Taxon:</p>	<u>Recommended</u>

LOM number	LOM element category	LOM element name	Explanation (from LOM) Refer to LOM Standard (IEEE 1484.12.1-2002) for further detail.	Content or Vocabulary Recommendations	Guidelines	Mandatory <u>Recommended</u> <i>Optional</i>
			definition of the preceding level.		Entry: Bacteria	
9.2.1		<ul style="list-style-type: none"> • Source 	The name of the classification system.		<p>When using Purpose = “idea”, it is recommended that a formal controlled vocabulary or classification system be used as the source for assigning terms and/or codes.</p> <p>Many libraries in Alberta use LCSH (Library of Congress Subject Headings http://authorities.loc.gov/), as does LearnAlberta.ca.</p> <p>Refer to CanCore Guidelines for more information.</p> <p>Also refer to Appendix 3.</p> <p>See example in 9.2.</p>	<u>Recommended</u>
9.2.2		<ul style="list-style-type: none"> • Taxon 	A particular term within a taxonomy. A taxon is a node that has a defined label or term. A taxon may also have an alphanumeric designation or identifier for standardized reference. Either or both the label and the entry may be used to designate a particular taxon. An ordered list of taxons creates a taxonomic path, i.e., “taxonomic stairway”: this is a path from a more general to more specific entry in a classification.		<p>See example in 9.2.</p> <p>Also refer to Appendix 3.</p>	<u>Recommended</u>

LOM number	LOM element category	LOM element name	Explanation (from LOM) Refer to LOM Standard (IEEE 1484.12.1-2002) for further detail.	Content or Vocabulary Recommendations	Guidelines	Mandatory <u>Recommended</u> <i>Optional</i>
9.2.2.1		○ Id	The identifier of the taxon, such as a number or letter combination provided by the source of the taxonomy.		This element may not be applicable, depending on the vocabulary source being used. For example, if using LCSH, the Id element is not used. <i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
9.2.2.2		○ Entry	The textual label of the taxon.	Refer to the Working Group Guidelines at right.	When using Purpose = “idea”, provide terms from the selected vocabulary that best classify the topic/subject of the learning object. Also refer to Appendix 3. In the example below, two subject headings are assigned from LCSH. They appear in two separate instances of the Taxon Path. Refer to CanCore for examples of multi-level Taxon Path entries. Example: Taxon Path Source: LCSH Taxon: Entry: Plant genetic engineering Taxon Path Source: LCSH Taxon: Entry: Plants--Disease and pest resistance	<u>Recommended</u>
9.3		Description	Description of the learning object relative to the stated 9.1:Classification.Purpose of this specific classification.		<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>
9.4		Keyword	Keywords and phrases descriptive of the learning object relative to the stated 9.1:Classification.Purpose of		<i>If using this optional element, refer to LOM and CanCore for guidelines.</i>	<i>Optional</i>

LOM number	LOM element category	LOM element name	Explanation (from LOM) Refer to LOM Standard (IEEE 1484.12.1-2002) for further detail.	Content or Vocabulary Recommendations	Guidelines	Mandatory <u>Recommended</u> <i>Optional</i>
			this specific classification.			

Appendix 1: Additional Resources

The following resources are required to fully describe all aspects of this Standard.

1484.12.1 IEEE Standard for Learning Object Metadata

The final draft version of this standard is available at:

http://ltsc.ieee.org/wg12/files/LOM_1484_12_1_v1_Final_Draft.pdf

The official version of the standard is available from IEEE:

<http://www.ieee.org/portal/site>

CanCore Guidelines Version 2.0

<http://www.cancore.ca/en/guidelines.html>

Codes for the Representation of Names of Languages (ISO 639-2)

<http://www.loc.gov/standards/iso639-2/langcodes.html>

IANA MIME Media Types

<http://www.iana.org/assignments/media-types/>

IMS AccessForAll Meta-data Specification

<http://www.imsglobal.org/accessibility/index.html>

vCard MIME Directory Profile (Network Working Group Request for Comments 2426)

www.imc.org/rfc2426

Appendix 2: Glossary of Terms

Application Profile: An application profile is an assemblage of metadata elements selected from one or more metadata schemas and combined in a compound schema. (Definition from *D-Lib Magazine* article, “Metadata Principles and Practicalities”). The ABCore application profile includes elements from a single metadata schema: 1484.12.1-2002 IEEE Standard for Learning Object Metadata (2002).

DateTime: DateTime is a LOM datatype used to represent a specific time. For example, 2002-10-31 is used to represent October 31, 2002. Refer to LOM IEEE 1484.12.1-2002 FINAL DRAFT STANDARD (Section 8) for a complete description of DateTime.

Duration: Duration is a LOM datatype used to format a time interval. For example, PT1H30M is used to represent a time period of one hour and thirty minutes. Refer to LOM IEEE 1484.12.1-2002 Draft Standard for Learning Object Metadata (Section 9) for a complete description of Duration.

Digital Learning Object: A collection of digital media assets that support a learning experience to address a curricular outcome for an identified audience.

LOM: Learning Object Metadata. LOM is a metadata schema designed to describe learning objects. The official name of this IEEE standard is 1484.12.1-2002 IEEE Standard for Learning Object Metadata 2002. The ABCore application profile is based on this standard.

Metadata: A classification schema that makes it possible to search for and locate digital files or resources stored in a database or repository. Each element describes a specific aspect of the learning object, such as title, language, format, and learning resource type.

Repository: A central place where data is stored and maintained. A repository can include multiple databases or files for distribution over a network.

Vocabulary: The content of elements with the Vocabulary datatype is drawn from a list of values or terms from a vocabulary. All elements with the Vocabulary datatype require that both the “Source” and the “Value” of the vocabulary term be identified

Appendix 3: Sample XML Record

This sample record is formatted according to IEEE P1484.12.3/D2 (Draft Standard for - Extensible Markup Language (XML) Schema Definition Language Binding for Learning Object Metadata). It should be considered draft until it can be verified against the forthcoming release of the official IEEE XML Binding for LOM.

```
<lom xmlns="http://ltsc.ieee.org/xsd/LOM" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://ltsc.ieee.org/xsd/LOM http://TO BE DETERMINED">
  <general>
    <identifier>
      <catalog>ABC Board of Education</catalog>
      <entry>2c7bb78c-6c28-4fdc-8702-74e133499115</entry>
    </identifier>
    <identifier>
      <catalog>URI</catalog>
      <entry>http://www.abc/solarsystems_sem_layersofts.smil</entry>
    </identifier>
    <title>
      <string language="eng">Layers of the Sun</string>
    </title>
    <language>eng</language>
    <description>
      <string language="eng">This video describes the structure of the sun including the inner core,
      photosphere, chromosphere, and corona. The formation of prominences is also explained.</string>
    </description>
    <keyword>
      <string language="eng">sun's core</string>
    </keyword>
  </general>
  <lifeCycle>
    <contribute>
      <role>
        <source>LOMv1.0</source>
        <value>publisher</value>
      </role>
      <entity><![CDATA[BEGIN:VCARD
VERSION:3.0
FN:National Geographic Society
N;;;National Geographic Society
ORG: National Geographic Society
END:VCARD]]></entity>
      <date>
        <dateTime>1998</dateTime>
      </date>
    </contribute>
  </lifeCycle>
  <metaMetadata>
    <identifier>
      <catalog>ABLearnMeta</catalog>
```

```

    <entry>1001000000008160</entry>
  </identifier>
  <contribute>
    <role>
      <source>LOMv1.0</source>
      <value>creator</value>
    </role>
    <entity><![CDATA[BEGIN:VCARD
VERSION:3.0
FN:Alberta Education
N:::Alberta Education
ORG: Alberta Education
END:VCARD]]></entity>
    <date>
      <dateTime>2004-07-09</dateTime>
    </date>
  </contribute>
  <metadataSchema>LOMv1.0</metadataSchema>
  <metadataSchema>ABCcorev1.0</metadataSchema>
</metaMetadata>
<technical>
  <format>video/quicktime</format>
  <size>0</size>
  <location>http://www.abc/solarsystems_sem_layersofts.smil</location>
  <duration>
    <duration>PT1M23S</duration>
  </duration>
</technical>
<educational>
  <learningResourceType>
    <source>NSDL Learning Resource Type Vocabulary</source>
    <value>Video</value>
  </learningResourceType>
  <intendedEndUserRole>
    <source>LOMv1.0</source>
    <value>learner</value>
  </intendedEndUserRole>
</educational>
<rights>
  <copyrightAndOtherRestrictions>
    <source>LOMv1.0</source>
    <value>yes</value>
  </copyrightAndOtherRestrictions>
  <description>
    <string language="eng">© 1998 National Geographic Society</string>
  </description>
</rights>
<classification>
  <purpose>
    <source>LOMv1.0</source>
    <value>idea</value>
  </purpose>
  <taxonPath>

```

```

<source>
  <string language="eng">LCSH</string>
</source>
<taxon>
  <entry>
    <string language="eng">Solar photosphere</string>
  </entry>
</taxon>
</taxonPath>
<taxonPath>
  <source>
    <string language="eng">LCSH</string>
  </source>
  <taxon>
    <entry>
      <string language="eng">Solar chromosphere</string>
    </entry>
  </taxon>
</taxonPath>
<taxonPath>
  <source>
    <string language="eng">LCSH</string>
  </source>
  <taxon>
    <entry>
      <string language="eng">Sun--Corona</string>
    </entry>
  </taxon>
</taxonPath>
<taxonPath>
  <source>
    <string language="eng">LCSH</string>
  </source>
  <taxon>
    <entry>
      <string language="eng">Sun--Prominences</string>
    </entry>
  </taxon>
</taxonPath>
</classification>
</lom>

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