Using OASIS DITA learning maps to model learning pathways through US K-12 education standards

For presentation at OSCON, Portland, Oregon
July 19, 2012

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Agenda

- DITA background
- Using DITA maps to model pathways through US Common Core standards
- Bare metal examples and demos
- Summary

- Backup material
DITA background
What Is DITA?

- An OASIS standard: for designing, authoring, and publishing modular information
- A markup language: with **topics** for content, **maps** for collecting and publishing content, **metadata attributes** and **taxonomy scheme maps** for describing and classifying content
- A specialization architecture: for creating new types of topics, maps, and metadata, with inheritance of existing designs and processing
- Supported by an open-source toolkit, a wide range of products, and an active community of users

IBM donated DITA to the OASIS standards organization in March of 2004, where it is now managed by the [OASIS DITA Technical Committee](https://dita.oasis-open.org/).
Who uses DITA?

- Source: Public case studies for 250 companies, published on ditawriters.com.
DITA example – maps, topics, metadata

```
<task id="installstorage">
  <title>Installing a hard drive</title>
  <taskbody>
    <steps>
      <step><cmd>Unscrew the cover.</cmd>
      <stepresult>The drive...</stepresult>
      ...<step><cmd>Insert the drive...</cmd>
      <info>If you feel resistance...</info>
      ...<step>
    </steps>
  </taskbody>
</task>
```

Presentation-agnostic XML can be output as a web page, a PDF, or an interactive wizard.

Metadata included in topics and maps simplifies search.
DITA taxonomy scheme maps support metadata management and content classification

- A DITA taxonomy scheme map defines a set of subjects, which can then be used to classify and drive assembly of content in maps and topics.

- Subjects in this scheme map... can classify the steps in this learning map to a Weather forecasting career.
DITA 1.2 “Learning and Training” Specialization

• Developed by OASIS DITA subcommittee, chaired by John Hunt of IBM
  • Participants from major IT companies, US Dept. of Defense, educational publishers, consultants, tools vendors
  • Approved in December 2010 as part of the DITA 1.2 specification

• Provides a general design for structured authoring and delivery of learning and training content with specialized maps, topics, and metadata

• Follows DITA principles and best practices for:
  • Separating presentation from content
  • Separating content from context
  • Enabling single-sourcing, reuse, and repurposing of content
Learning content design, creation, and delivery through DITA specialization

1. **Learning map**
   Organizes DITA topics as learning objects and groups

2. **Learning topics**
   Supports learning plans, overviews, learning content, summaries, and assessments

3. **DITA taxonomy for education stds & learning metadata**

4. **Build maps**
   Organize learning objects into lessons and courses and manage linking relationships and sequencing

5. **Specialized processing**
   Generates learning deliverables

- Courseware & e-learning
  - PDFs
  - ILTs
  - SCORMs
  - IMS CC’s
  - Web sites

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The DITA Learning map domain

- Organizes content according to consistent patterns and best practices for structured learning design
- Can be sequenced and scoped according to specific learning objectives and outcomes
- Can be grouped to describe learning pathways at any level of detail
- Each point on the path can be described and classified according to educational objectives, standards, and other available metadata
Using DITA maps to model pathways through US Common Core standards
Some learning pathways through math and science to various goals

**Math...**
- Algebra
- Analysis
- Banking
- Budgeting
- Geometry
- Integrals
- Numbers
- Probability
- ....

**Science...**
- Astronomy
- Cells
- Classification
- Earth
- Genetics
- Geology
- Gravity
- Life
- Matter
- Meteorology
- Nuclear Physics
- ....

**Goals / Outcomes**
- Basic HS Diploma
- Medical Career
- Business & Accounting
- Astronaut
- Weather forecasting

These are a small sub-set of the possible subjects and topics in a typical HS curriculum.

And these are a small sub-set of the possible goals and outcomes students may seek.
The pathway to a High School Diploma...

**Math...**
- Algebra
- Analysis
- Banking
- Budgeting
- Geometry
- Integrals
- Numbers
- Probability
- ....

**Science...**
- Astronomy
- Cells
- Classification
- Earth
- Genetics
- Geology
- Gravity
- Life
- Matter
- Meteorology
- Nuclear Physics
- ....

**Goals / Outcomes**
- HS Diploma
- Medical Career
- Business & Accounting
- Astronaut
- Weather forecasting
The pathway to a Medical Career...

**Math...**
- Algebra
- Analysis
- Banking
- Budgeting
- Geometry
- Integrals
- Numbers
- Probability
- ....

**Science...**
- Astronomy
- Cells
- Classification
- Earth
- Genetics
- Geology
- Gravity
- Life
- Matter
- Meteorology
- Nuclear Physics
- ....

**Goals / Outcomes**

- Basic HS Diploma
- Medical Career
- Business & Accounting
- Astronaut
- Weather forecasting
The pathway to Business & Accounting...

Math...
- Algebra
- Analysis
  - Banking
  - Budgeting
- Geometry
- Integrals
- Numbers
- Probability
- ....

Science...
- Astronomy
- Cells
  - Classification
- Earth
- Genetics
- Geology
- Gravity
- Life
- Matter
- Meteorology
- Nuclear Physics
- ....

Goals / Outcomes

- Basic HS Diploma
- Medical Career
- Business & Accounting
- Astronaut
- Weather forecasting
The pathway to an Astronaut...

Math...
- Algebra
- Analysis
- Banking
- Budgeting
- Geometry
- Integrals
- Numbers
- Probability
- ....

Science...
- Astronomy
- Cells
- Classification
- Earth
- Genetics
- Geology
- Gravity
- Life
- Matter
- Meteorology
- Nuclear Physics
- ....

Goals / Outcomes
- Basic HS Diploma
- Medical Career
- Business & Accounting
- Astronaut
- Weather forecasting
The pathway to Weather Forecasting...

Math...
- Algebra
- Analysis
- Banking
- Budgeting
- Geometry
- Integrals
- Numbers
- Probability
- ....

Science...
- Astronomy
- Cells
- Classification
- Earth
- Genetics
- Geology
- Gravity
- Life
- Matter
- Meteorology
- Nuclear Physics
- ....

Goals / Outcomes
- Basic HS Diploma
- Medical Career
- Business & Accounting
- Astronaut
- Weather Forecasting
What can DITA maps, topics, and metadata do here?

- **DITA taxonomy scheme maps** organize the subject areas, topics, and objectives (such as US CC, Georgia GPS, Gwinnett County AKS, and so forth) and grade-level progressions.

- **DITA learning maps** model the path through subjects to specific goals and outcomes, track progress, and model the scope and sequence of curriculum and lesson plans.

In addition:

- **DITA topics** may provide additional detail and text about individual learning objectives.

- **DITA learning topics** may provide the actual source content of those lessons and other instructional material.

- **DITA metadata** for additional levels of detail.
Bare metal examples
DITA taxonomy scheme maps organize educational objectives

- XML taxonomy for grades, subjects, topics, strands, objectives, and so forth
- Subject tables correlate standards by grade and State and local alignments

```xml
<subjectdef keys="S11436B2"
    navtitle="1. With prompting and support, ask and answer questions about key details in a text."
/>
<subjectdef keys="S11436B3"
    navtitle="2. With prompting and support, retell familiar stories, including key details."
/>

<subjectdef keys="Grade" type="Grade" navtitle="Grade">
    <subjectdef keys="GL_K" type="Grade" navtitle="K"/>
    <subjectdef keys="GL_1" type="Grade" navtitle="1"/>
    <subjectdef keys="GL_2" type="Grade" navtitle="2"/>
    <subjectdef keys="GL_3" type="Grade" navtitle="3"/>
    ...
</subjectdef>

<subjectdef keys="english"
    navtitle="Common Core State Standards for English Language Arts">
    <subjectdef keys="S11436A5" navtitle="Reading Standards for Literature">
        <subjectdef keys="S11436AE" navtitle="Key Ideas and Details">
        ...
    </subjectdef>
</subjectdef>
```
A DITA subjectdef taxonomy for US Common Core Math

- Data and keys transformed to DITA scheme from source RDF downloaded from the Academic Standards Network website at http://asn.jesandco.org/resources/ASNJurisdiction.

```xml
<subjectScheme>
  <title>Common Core State Standards for Mathematics</title>
  <subjectdef keys="math" navtitle="Common Core State Standards for Mathematics">
    <subjectdef keys="S2366905" navtitle="Standards for Mathematical Practice">
      <subjectdef keys="S2366906" navtitle="1. Make sense of problems and persevere in solving them."
    <subjectdef keys="S2366907" navtitle="2. Reason abstractly and quantitatively."
    <subjectdef keys="S2366908" navtitle="3. Construct viable arguments and critique the reasoning of others."
    <subjectdef keys="S2366909" navtitle="4. Model with mathematics."
    <subjectdef keys="S2366910" navtitle="5. Use appropriate tools strategically."
    <subjectdef keys="S2366911" navtitle="6. Attend to precision."
    <subjectdef keys="S2366912" navtitle="7. Look for and make use of structure."
    <subjectdef keys="S2366913" navtitle="8. Look for and express regularity in repeated reasoning."
  </subjectdef>

  ...
</subjectScheme>
```
A subjectRelTable associates the keyref for each Common Core objective with the Grade, Subject, Strand, Indicators, and so forth.

- Data and keys transformed to DITA scheme from source RDF downloaded from the Academic Standards Network website at http://asn.jesandco.org/resources/ASNJurisdiction.

```
<Objective>
  <subjectRole type="US_CC">
    <subjectdef type="US_CC" keyref="S114353D"
      navtitle="1. Verify experimentally the properties of rotations..."/>
  </subjectRole>
</Objective>

<Grade>
  <subjectRole type="Grade">
    <subjectdef type="Grade" keyref="GL_8" navtitle="8"/>
  </subjectRole>
</Grade>

<Subject>
  <subjectRole type="Subject">
    <subjectdef type="Subject" keyref="math" navtitle="math"/>
  </subjectRole>
</Subject>

<Topic>
  <subjectRole type="Topic">
    <subjectdef type="Topic" keyref="S114340D" navtitle="Geometry"/>
  </subjectRole>
</Topic>

<Strand>
  <subjectRole type="Strand">
    <subjectdef type="Strand" keyref="S114353C"
      navtitle="Understand congruence and similarity..."/>
  </subjectRole>
</Strand>

<Indicators>
  <subjectRole type="Indicators">
    <subjectdef type="Indicators" keyref="S2373207"
      navtitle="a. Lines are taken to lines, and line segments..."/>
    <subjectdef type="Indicators" keyref="S2373208"
      navtitle="b. Angles are taken to angles of the same measure."/>
  </subjectRole>
</Indicators>
```
A DITA learning map can lay out the learning pathway to an educational goal or career objective

- DITA topicsubject classification domain elements associate entries in a learning map by keyref to subject keys defined in an education standards scheme.
- This sample DITA learning map lays out the Math and Science topics in a learning pathway for Weather Forecasting, using subjectref's to subjects defined in the scheme map for these subject standards.

```xml
<map title="Learning Pathway for Weather Forecasting">
  <learningGroup id="weather_forecasting" navtitle="Weather Forecasting">
    <topicsubject keyref="Mathematics" type="Subject" navtitle="Mathematics">
      <subjectref keyref="Analysis" type="Topic" navtitle="Analysis"/>
      <subjectref keyref="Geometry" type="Topic" navtitle="Geometry"/>
      <subjectref keyref="Probability" type="Topic" navtitle="Probability"/>
    </topicsubject>
    <topicsubject keyref="Science" type="Subject" navtitle="Science">
      <subjectref keyref="Astronomy" type="Topic" navtitle="Astronomy"/>
      <subjectref keyref="Earth" type="Topic" navtitle="Earth"/>
      <subjectref keyref="Meteorology" type="Topic" navtitle="Meteorology"/>
    </topicsubject>
  </learningGroup>
</map>
```
Samples

- Sample DITA scheme maps for US Common Core Math and English
  - Transformed from RDF source downloaded from the Academic Standards Network website at http://asn.jesandco.org/resources/ASNJurisdiction.

- Sample XSLT processing of the scheme maps to DITA output topics using queries and groups
  - Grade-by-grade progression through objectives for all of the topics
  - Grade-by-grade progression through a specific slices of topics and strands
  - Within-grade progression through the topics and strands for that grade

- Publishing the results with the DITA Open Toolkit
  - Sample PDF, ePub, and HTML
    - ePub support from DITA for Publishers toolkit plugin (see resources)
  - Can directly extend to support JSON, other XML variants, etc.
Common Core standards for English as DITA taxonomy scheme map

SubjectScheme

Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects

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OASIS DITA 1.2 subjectScheme taxonomy design for
US Common Core Standards for English Language Arts and Literacy in
History/Social Studies, Science, and Technical Subjects.

Data and keys transformed to DITA scheme from source RDF downloaded from the Academic Standards

I. DITA Scheme map design for this learning standards data

First, define a taxonomy of subjectdef keys for the subjects and grades in the US CC.
From the jesandco RDF, these are obtained by tracing down the
dcterms:subject/@rdf:resource entries.

In this subject taxonomy, the top-level is the overall subject, in this case "english",
the first child is a topic or strand within that subject,
the second child is a numbered standard,
and the third child, if provided, is a lettered indicator of that standard.
subjectdef and keys for Grades

US Common Core taxonomy begins here

- Subjectdef [ keys="Grade" type="Grade" navtitle="Grade" ]
  - Subjectdef [ keys="GL_K" type="Grade" navtitle="K" ]
  - Subjectdef [ keys="GL_1" type="Grade" navtitle="1" ]
  - Subjectdef [ keys="GL_2" type="Grade" navtitle="2" ]
  - Subjectdef [ keys="GL_3" type="Grade" navtitle="3" ]
  - Subjectdef [ keys="GL_4" type="Grade" navtitle="4" ]
  - Subjectdef [ keys="GL_5" type="Grade" navtitle="5" ]
  - Subjectdef [ keys="GL_6" type="Grade" navtitle="6" ]
  - Subjectdef [ keys="GL_7" type="Grade" navtitle="7" ]
  - Subjectdef [ keys="GL_8" type="Grade" navtitle="8" ]
  - Subjectdef [ keys="GL_9" type="Grade" navtitle="9" ]
  - Subjectdef [ keys="GL_10" type="Grade" navtitle="10" ]
  - Subjectdef [ keys="GL_11" type="Grade" navtitle="11" ]
  - Subjectdef [ keys="GL_12" type="Grade" navtitle="12" ]
Start of the taxonomy of subjects in the standard, leaving out grade groups

Subjectdef [ keys="english" navtitle="Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects" ]

Subjectdef [ keys="S114372D" navtitle="College and Career Readiness Anchor Standards for Reading" ]

Subjectdef [ keys="S1143769" navtitle="Key Ideas and Details" ]

Subjectdef [ keys="S114376D" navtitle="1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text." ]

Subjectdef [ keys="S114376E" navtitle="2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas." ]

Subjectdef [ keys="S114376F" navtitle="3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text." ]

Subjectdef [ keys="S114376A" navtitle="Craft and Structure" ]

Subjectdef [ keys="S1143770" navtitle="4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone." ]

Subjectdef [ keys="S1143771" navtitle="5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole." ]
Topics and specific objectives in the Anchor standards for Reading

- Demonstrate understanding of the organization and basic features of print.
  - Follow words from left to right, top to bottom, and page by page.
  - Recognize that spoken words are represented in written language by specific sequences of letters.
  - Understand that words are separated by spaces in print.
  - Recognize and name all upper- and lowercase letters of the alphabet.

- Demonstrate understanding of the organization and basic features of print.
  - Recognize the distinguishing features of a sentence (e.g., first word, capitalization, ending punctuation).
subjectRelTable breaks out correlations for specific objectives with grade, subject, topic, strand, and indicators (if any)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjectdef [ type=&quot;US_CC&quot; keyref=&quot;S114376D&quot; navtitle=&quot;1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.&quot; ]</td>
<td>Subjectdef [ type=&quot;Grade&quot; keyref=&quot;GL_K&quot; navtitle=&quot;K&quot; ]</td>
<td>Subjectdef [ type=&quot;Subject&quot; keyref=&quot;english&quot; navtitle=&quot;english&quot; ]</td>
<td>Subjectdef [ type=&quot;Topic&quot; keyref=&quot;S114372D&quot; navtitle=&quot;College and Career Readiness Anchor Standards for Reading&quot; ]</td>
<td>Subjectdef [ type=&quot;Strand&quot; keyref=&quot;S1143769&quot; navtitle=&quot;Key Ideas and Details&quot; ]</td>
<td></td>
</tr>
</tbody>
</table>
A reltable row for a grade 11 objective with some indicators

<table>
<thead>
<tr>
<th>Subjectdef</th>
<th>Subjectdef</th>
<th>Subjectdef</th>
<th>Subjectdef</th>
<th>Subjectdef</th>
</tr>
</thead>
<tbody>
<tr>
<td>type=&quot;US_CC&quot; keyref=&quot;S2365468&quot; navtitle=&quot;5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.&quot;</td>
<td>type=&quot;US_CC&quot; keyref=&quot;S2365467&quot; navtitle=&quot;6. Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.&quot;</td>
<td>type=&quot;US_CC&quot; keyref=&quot;S2365466&quot; navtitle=&quot;7. Analyze figures of speech (e.g., metaphor, analogy) in context and analyze their role in the text.&quot;</td>
<td>type=&quot;US_CC&quot; keyref=&quot;S2365465&quot; navtitle=&quot;8. Analyze figures of speech (e.g., metaphor, analogy) in context and analyze their role in the text.&quot;</td>
<td>type=&quot;US_CC&quot; keyref=&quot;S2365464&quot; navtitle=&quot;9. Analyze figures of speech (e.g., metaphor, analogy) in context and analyze their role in the text.&quot;</td>
</tr>
<tr>
<td>type=&quot;Grade&quot; keyref=&quot;GL_11&quot; navtitle=&quot;11&quot;</td>
<td>type=&quot;Grade&quot; keyref=&quot;GL_12&quot; navtitle=&quot;12&quot;</td>
<td>type=&quot;Grade&quot; keyref=&quot;GL_11&quot; navtitle=&quot;11&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>type=&quot;Subject&quot; keyref=&quot;english&quot; navtitle=&quot;english&quot;</td>
<td>type=&quot;Subject&quot; keyref=&quot;english&quot; navtitle=&quot;english&quot;</td>
<td>type=&quot;Subject&quot; keyref=&quot;english&quot; navtitle=&quot;english&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>type=&quot;Strand&quot; keyref=&quot;S11437EB&quot; navtitle=&quot;Vocabulary Acquisition and Use&quot;</td>
<td>type=&quot;Strand&quot; keyref=&quot;S11437EB&quot; navtitle=&quot;Vocabulary Acquisition and Use&quot;</td>
<td>type=&quot;Strand&quot; keyref=&quot;S11437EB&quot; navtitle=&quot;Vocabulary Acquisition and Use&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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1a) ePub of full K-12 Common Core English standards, grouped by Grade, Subject, Topic, Strand, Objective

US Common Core Standards

Grade: K 1 2 3 4 5 6 7 8 9 10 11 12 (GL_K GL_1 GL_2 GL_3 GL_4 GL_5 GL_6 GL_7 GL_8 GL_9 GL_10 GL_11 GL_12)

Topic: College and Career Readiness Anchor Standards for Reading (S114372D)

Strand: Key Ideas and Details (S1143769)

- 1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. (S114376D)
- 2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas. (S114376E)
- 3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text. (S114376F)

Strand: Craft and Structure (S114376A)

- 4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone. (S1143770)
- 5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole. (S1143771)
- 6. Assess how point of view or purpose shapes the content and style of a text. (S1143772)
Grade: 5 (GL_5)

Topic: Reading Standards for Literature (S11436A6)

- **Strand: Key Ideas and Details (S11436AE)**
  - 1. Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (S11436C1)
  - 2. Determine a theme of a story, drama, or poem from details in the text, including how characters in a story or drama respond to challenges or how the speaker in a poem reflects upon a topic; summarize the text. (S11436C2)
  - 3. Compare and contrast two or more characters, settings, or events in a story or drama, drawing on specific details in the text (e.g., how characters interact). (S11436C3)

- **Strand: Craft and Structure (S11436AF)**
  - 4. Determine the meaning of words and phrases as they are used in a text, including figurative language such as metaphors, similes, idioms, and, by the end of the year, analyze how an author uses them to emphasize certain ideas or create a particular tone. (S11436D4)
  - 5. Explain how a series of chapters, scenes, or stanzas fits together to provide the overall structure of a particular story, drama, or poem. (S11436D4)
  - 6. Describe how a narrator’s or speaker’s points of view influence how events are described. (S11436D5)

- **Strand: Integration of Knowledge and Ideas (S11436B0)**
  - 7. Analyze how visual and multimedia elements contribute to the meaning, tone, or beauty of a text (e.g., graphic novel, multimedia presentation of fiction, folklore, myth, poem). (S11436E1)
  - 9. Compare and contrast stories in the same genre (e.g., mysteries and adventure stories) on their approaches to similar themes and topics. (S11436E2)

- **Strand: Range of Reading and Level of Text Complexity (S11436B1)**
  - 10. By the end of the year, read and comprehend literature, including stories, dramas, and poetry, at the high end of the grades 4—5 text complexity band independently and proficiently. (S11436B3)

Topic: Reading Standards for Informational Text (S11436A6)

- **Strand: Key Ideas and Details (S11436E9)**
  - 1. Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (S11436FC)
  - 2. Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text. (S11436DF)
  - 3. Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text. (S11436FE)

- **Strand: Craft and Structure (S11436EA)**
  - 4. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area. (S114370E)
Grade: 3 (GI_3)

Topic: Reading Standards for Literature (S11436A5)

Strand: Key Ideas and Details (S11436AE)

- 1. Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (S11436BB)
- 2. Recount stories, including fables, folktale, and myths from diverse cultures, determine the central message, lesson, or moral and explain how it is conveyed through key details in the text. (S11436BC)
- 3. Describe characters in a story (e.g., their traits, motivations, or feelings) and explain how their actions contribute to the sequence of events. (S11436BD)

Strand: Craft and Structure (S11436AF)

- 4. Determine the meaning of words and phrases as they are used in a text, distinguishing literal from nonliteral language. (S11436CD)
- 5. Refer to parts of stories, dramas, and poems when writing or speaking about a text, using terms such as chapter, scene, and stanza; describe how each successive part builds on earlier sections. (S11436CE)
- 6. Distinguish their own point of view from that of the narrator or those of the characters. (S11436CF)

Strand: Integration of Knowledge and Ideas (S11436B0)

- 7. Explain how specific aspects of a text’s illustrations contribute to what is conveyed by the words in a story (e.g., create mood, emphasize aspects of a character or setting). (S11436DD)
- 9. Compare and contrast the themes, settings, and plots of stories written by the same author about the same or similar characters (e.g., in books from a series). (S11436DE)

Strand: Range of Reading and Level of Text Complexity (S11436B1)
2a) Grades K-12 progression through a specific Topic – query by Topic S11436A6, group by Grade and Strand

US Common Core Standards

Grade: K (GL_K) for Topic: Reading Standards for Informational Text (S11436A6)

Strand: Key Ideas and Details (S11436E9)

- (S11436ED), 1. With prompting and support, ask and answer questions about key details in a text.
- (S11436EE), 2. With prompting and support, identify the main topic and retell key details of a text.
- (S11436EF), 3. With prompting and support, describe the connection between two individuals, events, ideas, or pieces of information in a text.

Strand: Craft and Structure (S11436EA)

- (S11436FF), 4. With prompting and support, ask and answer questions about unknown words in a text.
- (S1143700), 5. Identify the front cover, back cover, and title page of a book.
- (S1143701), 6. Name the author and illustrator of a text and define the role of each in presenting the ideas or information in a text.

Strand: Integration of Knowledge and Ideas (S11436EB)

- (S1143711), 7. With prompting and support, describe the relationship between illustrations and the text in which they appear (e.g., what person, place, thing, or idea in the text an illustration depicts).
- (S1143712), 8. With prompting and support, identify the reasons an author gives to support points in a text.
- (S1143713), 9. With prompting and support, identify basic similarities in and differences between two texts on the same topic (e.g., in illustrations, descriptions, or procedures).

Strand: Range of Reading and Level of Text Complexity (S11436EC)

- (S1143723), 10. Actively engage in group reading activities with purpose and understanding.
2b) Grade 7 objectives for Reading Standards for Informational Text

**Strand: Integration of Knowledge and Ideas (S11436EB)**

- (S11437C4), 7. Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.
- (S11437C5), 8. Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not.
- (S11437C6), 9. Compare and contrast one author’s presentation of events with that of another (e.g., a memoir written by and a biography on the same person).

**Strand: Range of Reading and Level of Text Complexity (S11436EC)**

- (S11437D3), 10. By the end of the year, read and comprehend literary nonfiction in the grades 6—8 text complexity band proficiently, with scaffolding as needed at the high end of the range.

**Grade: 7 (GL 7) for Topic: Reading Standards for Informational Text (S11436A6)**

**Strand: Key Ideas and Details (S11436E9)**

- (S11437A9), 1. Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
- (S11437AA), 2. Determine two or more central ideas in a text and analyze their development over the course of the text; provide an objective summary of the text.
- (S11437AB), 3. Analyze the interactions between individuals, events, and ideas in a text (e.g., how ideas influence individual events or, how individuals influence ideas or events).

**Strand: Craft and Structure (S11436EA)**

- (S11437B8), 4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.
- (S11437B9), 5. Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to the development of the ideas.
2c) and Grade 12...

Grade: 11 12 (GL_11 GL_12) for Topic: Reading Standards for Informational Text (S11436A6)

Strand: Key Ideas and Details (S11436E9)
- (S11437B2), 1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.
- (S11437B3), 2. Determine two or more central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to provide a complex analysis; provide an objective summary of the text.
- (S11437B4), 3. Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or events interact and develop over the course of the text.

Strand: Craft and Structure (S11436EA)
- (S11437C1), 4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text (e.g., how Madison defines faction in Federalist No. 10).
- (S11437C2), 5. Analyze and evaluate the effectiveness of the structure an author uses in his or her exposition or argument, including whether the structure makes points clear, convincing, and engaging.
- (S11437C3), 6. Determine an author's point of view or purpose in a text in which the rhetoric is particularly effective, analyzing how style and content contribute to the power, persuasiveness, or beauty of the text.

Strand: Integration of Knowledge and Ideas (S11436EB)
- (S11437D0), 7. Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.
- (S11437D1), 8. Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning (e.g., in U.S. Supreme Court majority opinions and dissents) and the premises, purposes, and arguments in works of public advocacy (e.g., The Federalist, presidential addresses).
3a) Narrow to just the Key Ideas and Details strand – query by S11436E9, group by Grade and CC Objective

US Common Core Standards

Grade: K (GL_K) for Strand: Key Ideas and Details (S11436E9)

- (S11436ED), 1. With prompting and support, ask and answer questions about key details in a text.
- (S11436EE), 2. With prompting and support, identify the main topic and retell key details of a text.
- (S11436EF), 3. With prompting and support, describe the connection between two individuals, events, ideas, or pieces of information in a text.

Grade: 1 (GL_1) for Strand: Key Ideas and Details (S11436E9)

- (S11436F0), 1. Ask and answer questions about key details in a text.
- (S11436F1), 2. Identify the main topic and retell key details of a text.
- (S11436F2), 3. Describe the connection between two individuals, events, ideas, or pieces of information in a text.

Grade: 2 (GL_2) for Strand: Key Ideas and Details (S11436E9)

- (S11436F3), 1. Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.
- (S11436F4), 2. Identify the main topic of a multiparagraph text as well as the focus of specific paragraphs within the text.
- (S11436F5), 3. Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.

Grade: 3 (GL_3) for Strand: Key Ideas and Details (S11436E9)

- (S11436F6), 1. Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
3b) Key Ideas and Details Strand – Grades 7-10

Grade: 7 (GL_7) for Strand: Key Ideas and Details (S11436E9)

- (S11437A9), 1. Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
- (S11437AA), 2. Determine two or more central ideas in a text and analyze their development over the course of the text; provide an objective summary of the text.
- (S11437AB), 3. Analyze the interactions between individuals, events, and ideas in a text (e.g., how ideas influence individuals or events, or how individuals influence ideas or events).

Grade: 8 (GL_8) for Strand: Key Ideas and Details (S11436E9)

- (S11437AC), 1. Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.
- (S11437AD), 2. Determine a central idea of a text and analyze its development over the course of the text, including its relationship to supporting ideas; provide an objective summary of the text.
- (S11437AE), 3. Analyze how a text makes connections among and distinctions between individuals, ideas, or events (e.g., through comparisons, analogies, or categories).

Grade: 9 10 (GL_9 GL_10) for Strand: Key Ideas and Details (S11436E9)

- (S11437AF), 1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
- (S11437BO), 2. Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.
- (S11437B1), 3. Analyze how the author unfolds an analysis or series of ideas or events, including the order in which the points are made, how they are introduced and developed, and the connections that are drawn between them.
4a) Just the Topics and Strands for Grade 4 – query by GL_4, group by Topic and Strand

US Common Core Standards

**Topic: College and Career Readiness Anchor Standards for Reading (S114372D) for Grade: 4**

- Strand: Craft and Structure (S114376A)
- Strand: Integration of Knowledge and Ideas (S114376B)
- Strand: Key Ideas and Details (S1143769)
- Strand: Range of Reading and Level of Text Complexity (S114376C)

**Topic: Reading Standards for Literature (S11436A5) for Grade: 4**

- Strand: Craft and Structure (S11436AF)
- Strand: Integration of Knowledge and Ideas (S11436B0)
- Strand: Key Ideas and Details (S11436AE)
- Strand: Range of Reading and Level of Text Complexity (S11436B1)

**Topic: Reading Standards for Informational Text (S11436A6) for Grade: 4**

- Strand: Craft and Structure (S11436EA)
- Strand: Integration of Knowledge and Ideas (S11436EB)
- Strand: Key Ideas and Details (S11436E9)
- Strand: Range of Reading and Level of Text Complexity (S11436EC)

**Topic: Reading Standards: Foundational Skills (S11436A7) for Grade: 4**

- Strand: Fluency (S114372C)
- Strand: Phonics and Word Recognition (S114372B)

**Topic: College and Career Readiness Anchor Standards for Writing (S1143768) for Grade: 4**

- Strand: Production and Distribution of Writing (S11438C1)
4b) Some more Topics and Strands for Grade 4

- Strand: Range of Writing (S11438C3)
- Strand: Research to Build and Present Knowledge (S11438C2)
- Strand: Text Types and Purposes (S11438C0)

**Topic: Writing Standards (S11436A8) for Grade: 4**

- Strand: Production and Distribution of Writing (S1143937)
- Strand: Range of Writing (S1143939)
- Strand: Research to Build and Present Knowledge (S1143938)
- Strand: Text Types and Purposes (S1143936)

**Topic: College and Career Readiness Anchor Standards for Speaking and Listening (S114372F) for Grade: 4**

- Strand: Comprehension and Collaboration (S11437D7)
- Strand: Presentation of Knowledge and Ideas (S11437D8)

**Topic: Speaking and Listening Standards (S11436A9) for Grade: 4**

- Strand: Comprehension and Collaboration (S11438D0)
- Strand: Presentation of Knowledge and Ideas (S11438D1)

**Topic: College and Career Readiness Anchor Standards for Language (S1143730) for Grade: 4**

- Strand: Conventions of Standard English (S11437DF)
- Strand: Knowledge of Language (S11437E0)
- Strand: Vocabulary Acquisition and Use (S11437E1)

**Topic: Language Standards (S11436AA) for Grade: 4**

- Strand: Conventions of Standard English (S11437E9)
- Strand: Knowledge of Language (S11437EA)
Summary: What does DITA bring to standards-based education content management and delivery?

- **Taxonomy scheme maps** provide a semantic schema to describe learning objectives, such as the Common Core standards for math and literacy.

- **Taxonomy scheme maps** manage the alignment of standards and supporting content with educational metadata, such as the Learning Resource Metadata Initiative (LRMI), and other education data, such as CEDS or SIF.

- **Learning maps** manage the scope and sequence of objectives that describe a path to a specific educational outcome or the steps for a specific intervention.

- **Personal learning maps** represent and track progress along learning paths for individual students.

- **A content and assembly standard** for curriculum, lesson, and unit plans aligned with standards and education metadata.

- **An integration standard** for publisher and locally-produced instructional content.
DITA and the evolution of learning standards and content delivery

How DITA adds to the story...

- Provides a standard XML taxonomy for the management of education standards
- Correlates standards to curriculum plans and learning pathways
- Enables the "GPS" coordinates for tracking school and student progress against plans
- Provides the XML model for authoring and delivering a learning course and its modules
Resources

- **OASIS DITA Technical Committee**
  - DITA 1.2 spec: [http://docs.oasis-open.org/dita/v1.2/spec/DITA1.2-spec.html](http://docs.oasis-open.org/dita/v1.2/spec/DITA1.2-spec.html)

- **DITA Open Toolkit**

- **DITA for Publishers plugin to DITA OT (for ePub and other outputs)**

- **Academic Standards Network**
  - Home page: [http://asn.jesandco.org/resources/ASNJurisdiction](http://asn.jesandco.org/resources/ASNJurisdiction)
  - RDF for Common Core State Standards: [http://asn.jesandco.org/resources/ASNJurisdiction/CCSS](http://asn.jesandco.org/resources/ASNJurisdiction/CCSS)
Discussion
Backup
OASIS 1.2 Learning and Training Content types

**Learning topic types**
- Learning Plan
- Learning Overview
- Learning Content
- Learning Summary
- Learning Assessment

**Learning map domain**
- Structures topic references into learning objects and groups
- Makes learning content available for use in any DITA map

**Learning interactions domain**
- Open question
- True/false
- Single select
- Multiple select
- Matching
- Sequencing
- Hotspot

**Learning metadata domain**
- Makes IEEE LOM metadata available for use in learning topic prologs and map domain topicmeta
Using DITA to align data and content across multiple boundaries

- **DITA learning maps model and sequence interventions**
  - Intervention plans
    - Work flow steps
    - References to supporting Lesson plans

- **DITA learning maps model and sequence personal learning plans**
  - Learning pathways
    - Work flow steps
    - References to supporting Lesson plans

- **DITA learning maps and topic templates for lesson plans and curriculum designs**
  - Lesson plans
    - Per grade, subject, objective
  - Unit plans
    - Group lesson plans
  - Curriculum calendar
    - Sequence Lesson & Unit plans

- **DITA taxonomy maps for education stds**
  - Key-based integration and alignment across multiple standards

- **Learning Registry Index**
  - Standards-aligned content / resources

- **Instructional content**
  - Publisher content
    - Aligned to standards
  - Local teacher content
    - Aligned to standards

- **Student information, assessment, and other data**
  - Student demographics, enrollment, achievement
  - Assessment items and test banks
  - Organizational, staff, and other related data
DITA enables chunking and tagging of content by educational objective and assembling it for multi-channel content delivery.

1. Content sources
   - AAA Textbook
   - BBB Textbook
   - Other Content*

2. Chunk and store as individual objects targeting one or more standards

3. Assemble for multi-channel delivery
   - LMS – SCORM, CC
   - HTML / Web
   - Instructor PDF
   - Student Guide PDF
   - Mobile

*Includes local teacher content
Summary: DITA benefits for end clients – teachers, students, and curriculum designers

- For end clients - teachers, students, curriculum designers, DITA brings these benefits:
  - Easy management and alignment of content and objectives against local, state, and US standards
  - Enables search and retrieval of standards and related content by grade, subject, and other criteria
  - Connects curriculum plans with available content that address specific objectives
  - Provides semantic templates for lesson plans and supporting content
  - Structures lesson and unit plans by standard objectives and sequences them on Curriculum calendars
  - Integrates with and adds instructional context to digital media
Summary: DITA benefits for educational publishers

- For educational publishers, DITA brings these benefits:
  - Enables chunking and tagging of content by educational objective and assembling it for multi-channel content delivery
  - Supports alignment and integration of content across both multiple publishers and locally-created teacher materials
  - Enables multi-channel publishing to web, PDF, ePub, IMS Common Cartridge, SCORM, LMS, all of which can be specialized from a common base
  - Lowers cost of content development
  - Makes investment in content more secure
  - Reduces dependence on the particular technology platform
  - Can grow as DITA grows
For LMS providers and vendors, DITA brings these benefits:

- Fills in the content “black box” for packaging and deployment of instructional content with IMS Common Cartridge and SCORM
- Provides the XML content model and semantic templates for lessons plans, learning courses, and modules
- Enables exchange and integration of content from multiple publishers and local sources
- Supports sequencing of content for use in intervention plans
- Easily extensible through specialization to support specific content types and meet integration, and publishing needs
- Supports strong taxonomy and metadata management against education standards
DITA in the market summary

- OASIS DITA Technical Committee is the largest at OASIS:
  - 127 members from 39 companies, including Adobe, Microsoft, Oracle, PTC, SAP, US DoD
  - High participation because of many subcommittees, such as pharma, manufacturing, learning and training
  - Recent DITA 1.2 vote level 2\textsuperscript{nd} largest in OASIS history

- DITA annointed as “holy grail of XML content reuse” at its introduction as an OASIS standard in 2004.

- DITA supported by an open toolkit and by a wide range of commercial tools for authoring, translation, content management, migration, and publishing

- Major IT companies use DITA for authoring and delivery of learning and training content, including IBM, SAP, Cisco; in addition Kaplan and American College have public case studies for use of DITA for instructional content.

- Gilbane, Gartner, Forrester, and CMSWatch among recent analysts with focus on business value of DITA for content creation, publishing, and translation.
DITA specialization

- DITA provides an XML-based “specialization” architecture for creating new elements and attributes as direct extensions of existing elements and attributes, all working from a common base.

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<th>General map</th>
<th>Map specialized for learning objects</th>
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**The DITA class attribute of each element declares the specialization ancestry:**

```xml
<!ATTLIST learningObject classCDATA "+ map/topicref learningmap-d/learningObject ">
```
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