LEARNING PROGRESSIONS FRAMEWORKS

Produced by:
University of Kentucky,
in partnership with the National Center State Collaborative (NCSC)
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Welcome to an overview of the National Center and State Collaborative' s work with learning progression frameworks.

MODULE ORGANIZATION

Welcome to this NCSC Learning Progressions Frameworks module.

All learning modules are organized in four sections:
• Plot the Course,
• Explore the Terrain,
• Check the Map, and
• Expand Your Horizons.

Each of the icons on the left is a progress indicator which will appear in the upper right hand corner of the screen. The indicator corresponds with the section in which you are working.

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The NCSC professional development courses each consist of one or more modules. To help the learner navigate in the courses, the modules have a uniform design and format. All learning modules follow four themes: plot the course, explore the terrain, check the map, and expand your horizons. In plot the course learners discover what is covered in the module, including their learning objectives and other steps they will follow while viewing the module. In explore the terrain, the learner will engage with the content and learn about the topic covered in the module. In check the map the learner has the opportunity to review and self-assess their understanding. Finally, expand your horizons offers ways in which the learner can explore the content further, or apply what they have learned. Theme Indicators appear on most slides to tell the user what type of content is contained in the slide.

GOALS OF THE MODULE

1. Gain basic knowledge about the NCSC work with Learning Progressions Frameworks (LPFs)

2. Know where the Learning Progressions fit in the schema

3. Know that NCSC's coding system for the Core Content Connectors (CCCs) is based on the LPFs and is referenced in the materials and resources provided by the project

The intended goals of this module are to gain basic knowledge of the Learning Progressions Frameworks, know where they fit into the NCSC resource materials, and know that the coding systems for the Core Content Connectors (CCC's) are based on the Learning Progressions Frameworks referenced in the materials and resources provided by the project.

INSTRUCTIONS FOR COMPLETING THE MODULE

- Review the NCSC Overview @ NCSCpartners.org and the NCSC wiki @wiki.ncscpartners.org

- Read or listen to this module

- Complete five self assessment items

To best understand references made to previously introduced terms and concepts, it is recommended that participants view the National Center and State Collaborative overview at NCSCpartners.org and the NCSC Wiki site which outline the framework and resources to support access to the Common Core State Standards for students with a significant cognitive disability…

RELATED CONCEPTS

Here are some concepts that will be discussed in this module. If you would like background on these concepts, click forward on the playbar. If you are familiar with the concepts and do not need additional background, click on the button labeled skip definitions.

- CCSS – Common Core State Standards or your state standards
- UDL – Universal Design for Learning
- CCC – Core Content Connectors

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- UDL – Universal Design for Learning
- CCC – Core Content Connectors

RELATED CONCEPTS - CCSS
COMMON CORE STATE STANDARDS

Your State has either developed their own grade level state standards or has adopted the Common Core State Standards to establish guidelines for learning in Math and English Language Arts from kindergarten through 12th grade.

Achieving the learning goals put forth in the standards will prepare students for college and career.

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We based our work in the modules on the CCSS and the College and Career Readiness Standards. You can apply the same process with your state standards.

Your State has either developed their own grade level standards or has adopted the Common Core State Standards to establish guidelines for learning in Math and English Language Arts from kindergarten through 12th grade. These standards are based on the **College and Career Readiness Standards.**

RELATED CONCEPTS - UDL
UNIVERSAL DESIGN FOR LEARNING

Universal Design for Learning (UDL) is a set of principles that guide development of curriculum.

- Multiple Means of Engagement
- Multiple Means of Representation
- Multiple Means of Action and Expression

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Universal Design for Learning (UDL) is a set of principles that guide development of curriculum. When implemented, UDL provides opportunities for learning to all individuals by utilizing the following:

- Multiple Means of Engagement to provide options to self-regulate, develop reflective skills and sustain interest. Promoting motivational techniques, fostering collaborative learning, providing feedback and opportunities to participate in class-wide activities, and using incentives to encourage effort are all examples of multiple means of engagement.
- Multiple Means of Representation focusing on big ideas, themes, and patterns to provide options for comprehension. Customizing the display of information, using auditory methods and other alternatives to visual presentation for conveying content, using multimedia presentations, clarifying symbols, vocabulary, and structures are all examples of multiples means of representation.
- Multiple Means of Action and Expression to provide options for demonstrating understanding and strategizing. Providing multimedia and other mediums to students for their work, providing tools and strategies for conveying learned information, scaffolding or graduated levels of support for instruction and practice, and optimizing access to tools and assistive technology are all examples of multiple means of action and expression.

RELATED CONCEPTS - CCCs
**CORE CONTENT CONNECTORS**

The Core Content Connectors (CCCs) identify

the _most salient_ grade-level, core academic content in ELA and Mathematics found in both the Common Core State Standards and the Learning Progressions Frameworks.

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The Core Content Connectors (CCC's) identify the _most salient_ grade-level, core academic content in ELA and Mathematics found in both the Common Core State Standards and the Learning Progressions Frameworks and can be found in your state standards.

Using the LPFs, NCSC identified the "big ideas" from Common Core State Standards needed to make progress through the grades.

These "big ideas" were then broken down into more frequent benchmarks called CCCs that provide a pathway to the grade level standards - not extended standards.

CCCs are the basis for the assessment, but not the starting point for instruction.
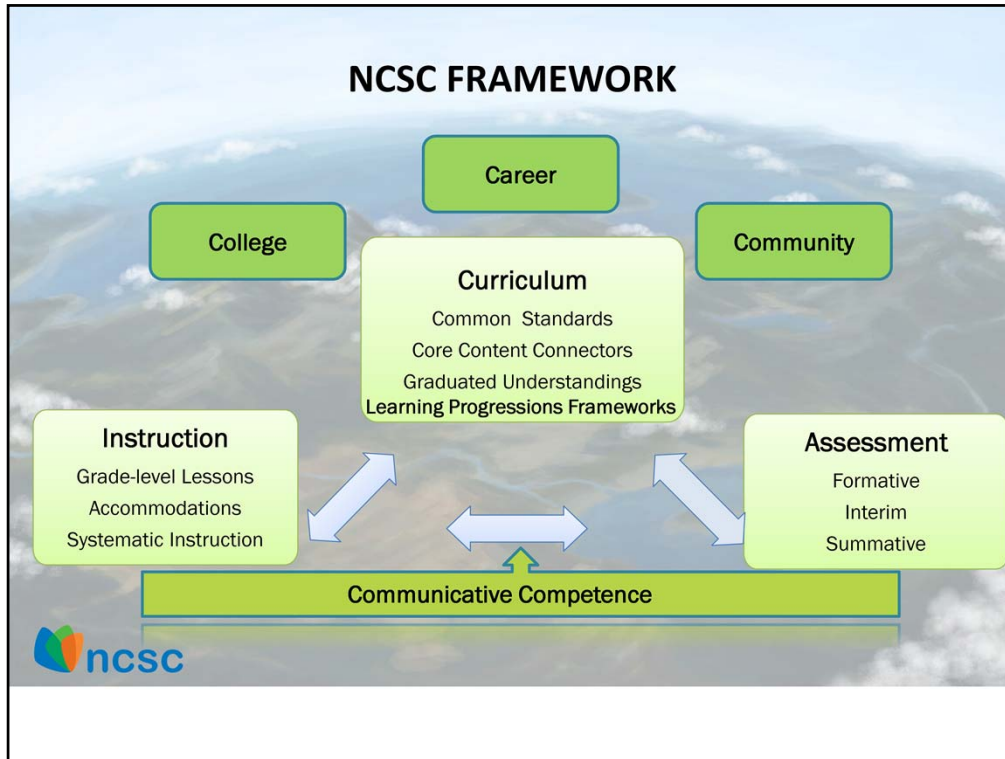
For NCSC's approach to access to the CCSS for students with significant cognitive disabilities, the curriculum, instruction and assessment framework was introduced, noting communicative competency as the base for access, all to support college, career and community readiness.

The curriculum component specifies what students will be taught and learn, and includes the Common Core State Standards, Core Content Connectors (or CCC's), and Graduated Understandings. An additional curriculum component not yet introduced is the learning progressions frameworks.

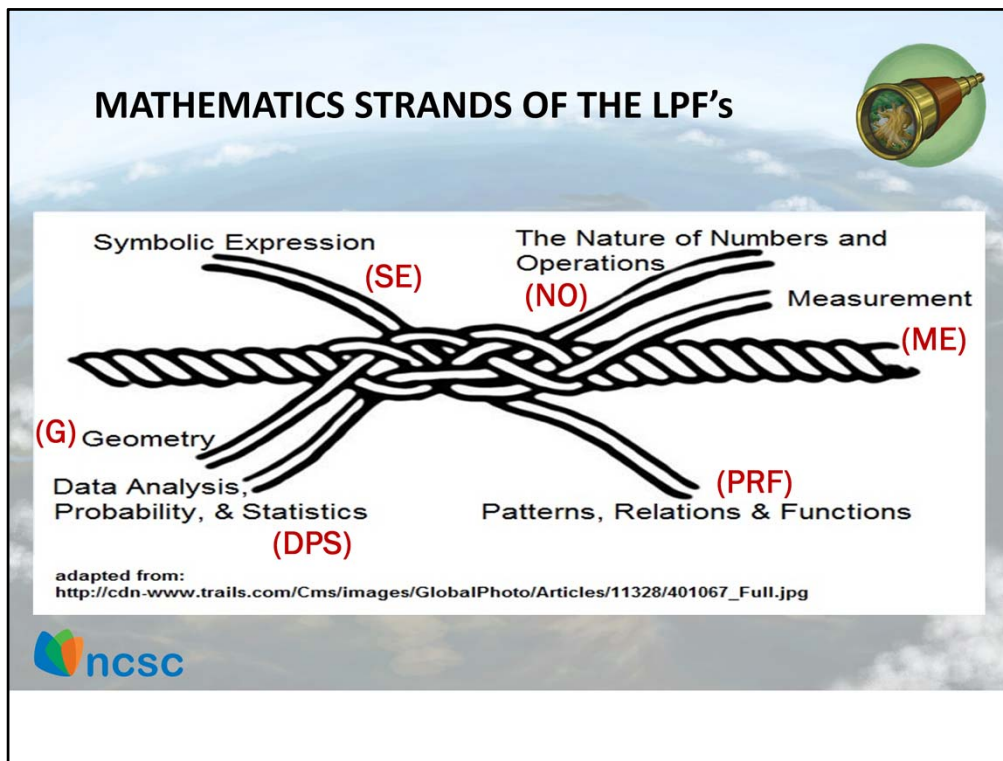**LEARNING PROGRESSIONS FRAMEWORKS (LPFs)**

- Define research-based pathways for learning;
- Have clear binding threads that articulate the essential core concepts and processes of a discipline (sometimes called the 'big ideas' of the discipline);
- Articulate movement toward increased understanding (meaning deeper, broader, more sophisticated understanding).

Hess, Karin K., (December 2010). *Learning Progressions Frameworks Designed for Use with the Common Core State Standards in English Language Arts & Literacy K-12.*

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Let's begin by addressing what learning progressions are.

- The Learning Progressions Frameworks, or LPFs, present a broad description of the essential content and general sequencing for student learning and skill development (Hess, 2010).

- The LPFs are a hypothesized pathway that typical peers may take, and are meant to inform what typical peers will be working on grade by grade. In the past, we have struggled to understand how to choose content grade by grade to ensure inclusion of students with the most significant cognitive disabilities in grade AND age appropriate content, even though they may not have built all the skills in a previous grade.

- The LPFs give us the educational logic to help move these students along with their peers in a logical, educationally sound way.

- The LPFs contain learning targets and progress indicators that are referenced in the NCSC Curriculum and Instruction materials.

  - Learning targets (general/broad performance descriptors) are defined by grade spans, K-4, 5-8 and high school.

  - The related specific skills and concepts are called the progress indicators (PIs).

- The Curriculum and Instructional materials were developed to promote student engagement in the CCSS while following the learning progressions.

MATHEMATICS STRANDS OF THE LPF's

Symbolic Expression (SE)

The Nature of Numbers and Operations (NO)

Measurement (ME)

(G) Geometry

Data Analysis, Probability, & Statistics (DPS)

(PRF) Patterns, Relations & Functions

adapted from:
http://cdn-www.trails.com/Cms/images/GlobalPhoto/Articles/11328/401067_Full.jpg

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National content experts and researchers in mathematics were asked to identify specific content strands that represented a way to organize essential learning for all students, K-12. The strands provide a framework for discussing the knowledge, skills, and abilities that constitute mathematical proficiency.
6 major strands were identified for the Learning Progressions Frameworks in mathematics:
Symbolic Expression, represented by the abbreviation (SE) -
The Nature of Numbers and Operations (NO) -
Measurement (ME) -
Patterns, Relations & Functions (PRF) -
Geometry (GM) -
Data Analysis, Probability, & Statistics (DPS) -

It is not the intent that skills/concepts from a particular strand be taught in isolation in a linear sequence, but rather be integrated among strands, such as in a problem solving situation where students are demonstrating their understanding of measurement concepts while applying their knowledge of numbers and operations and using symbolic expression. In other words, the LPFs should be thought of as a general map for learning and not a single route to a destination.
We will look at how to read the learning progressions through the strand of Patterns, Relations, and Functions (PRF).
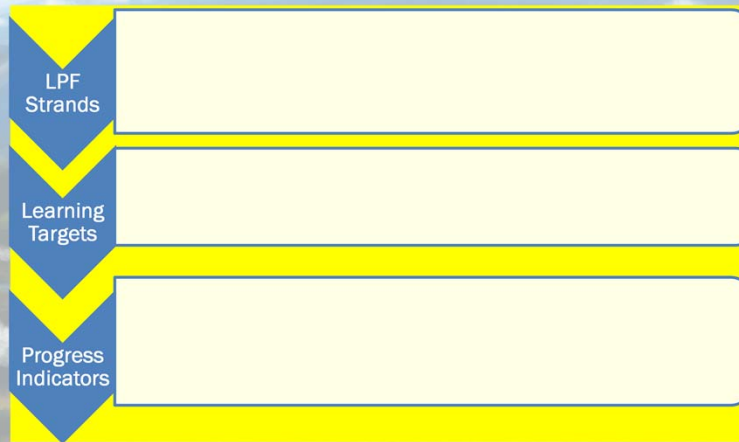
Let's examine **the three components of the Learning Progressions Frameworks –** 'LPF strands,' (or Big Ideas), the 'learning targets,' and the 'progress indicators**.'**

The Learning Progressions Frameworks begins with the strand. The strand includes a description of its enduring understanding, or big idea, across all grades, K-12. This statement describes the learning that should endure over the long term and resides at the heart of the discipline.

COMPONENTS OF THE
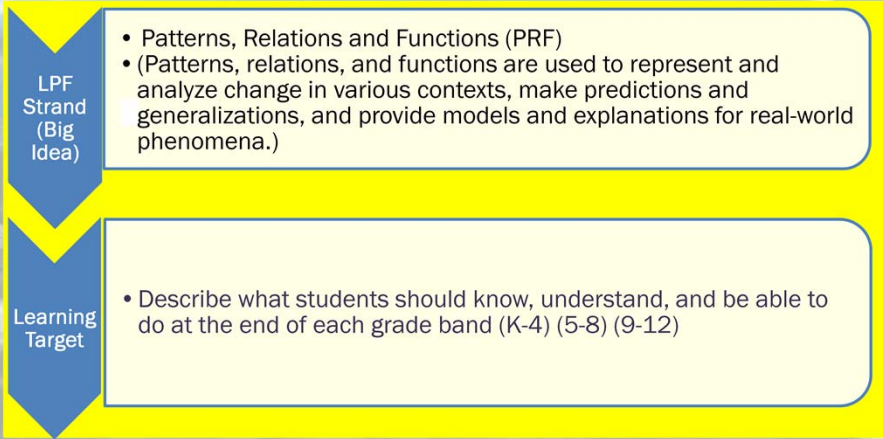LEARNING PROGRESSIONS FRAMEWORKS

LPF Strand
(Big Idea)

• Patterns, Relations and Functions (PRF)

(Patterns, relations, and functions are used to represent and analyze change in various contexts, make predictions and generalizations, and provide models and explanations for real-world phenomena.)

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For example, each component of the Patterns, Relations and Functions strand will relate to the enduring understanding, or big idea, that *Patterns, relations, and functions are used to represent and analyze change in various contexts, make predictions and generalizations, and provide models and explanations for real-world phenomena.*

COMPONENTS OF THE LEARNING PROGRESSIONS FRAMEWORKS

LPF Strand (Big Idea)
- Patterns, Relations and Functions (PRF)
- (Patterns, relations, and functions are used to represent and analyze change in various contexts, make predictions and generalizations, and provide models and explanations for real-world phenomena.)

Learning Target
- Describe what students should know, understand, and be able to do at the end of each grade band (K-4) (5-8) (9-12)

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The next set of components in the Learning Progressions Frameworks is the learning targets. Learning targets break down the K -12 big ideas to more specific descriptions of what students should know and be able to do by the end of specified grade bands – K-4, 5-8, 9-12.

LEARNING TARGETS

Describe what students should know, understand, and be able to do at the end of each grade band (K-4) (5-8) (9-12)

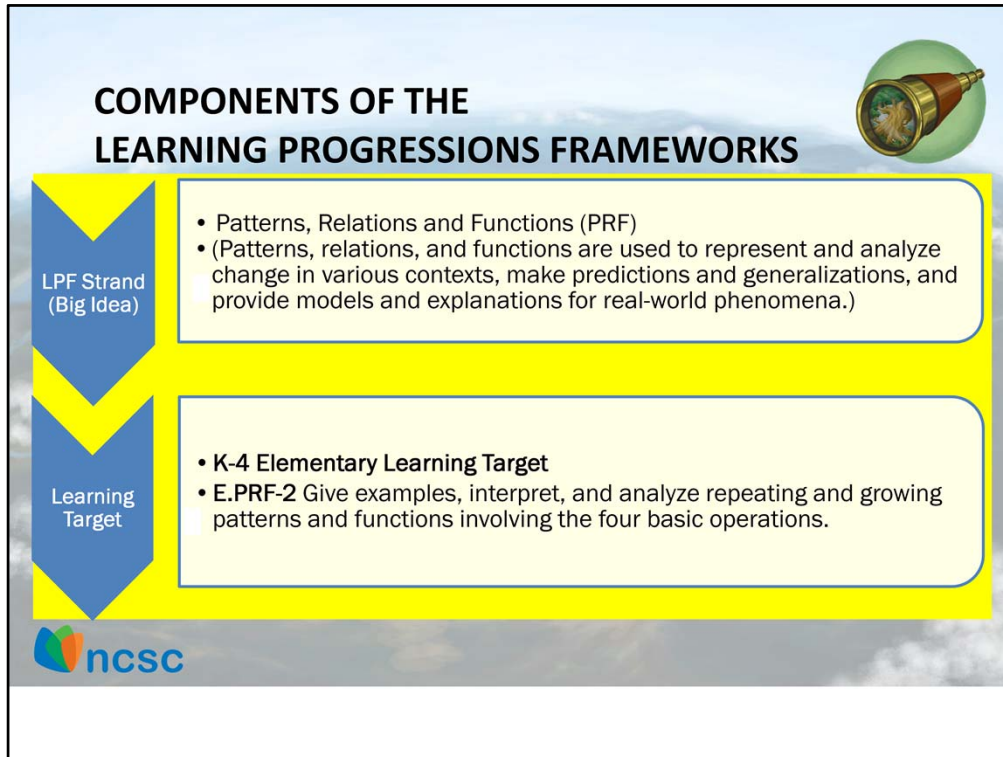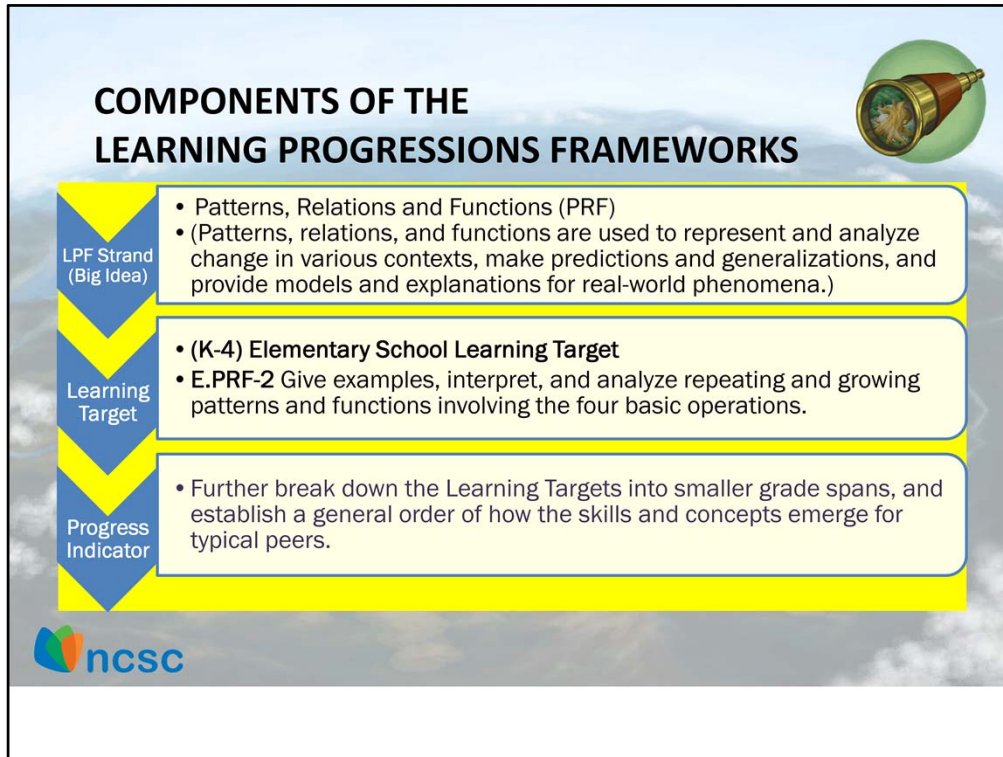| (K-4) Elementary School Learning Targets	(5-8) Middle School Learning Targets	(9-12) High School Learning Targets
E.PRF-2 Give examples, interpret, and analyze repeating and growing patterns and functions involving the four basic operations.	M.PRF-2 Give examples, interpret, and analyze a variety of mathematical patterns, relations, and explicit and recursive functions.	H.PRF-2 Use trends and analyze a variety of mathematical patterns, relations, and explicit and recursive functions.

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The **learning targets for the strand of Patterns Relations and Functions show how conceptual understanding** in the **strand deepens and broadens across a student's school career.** In this case, students at the elementary level are expected to 'Give examples, interpret, and analyze repeating and growing patterns and functions involving the four basic operations of mathematics. By the end of middle school, students 'Give examples, interpret, and analyze a variety of mathematical patterns, relations, and explicit and recursive functions.' Finally, by the end of high school, and to be college and career ready, students 'Use trends and analyze a variety of mathematical patterns, relations, and explicit and recursive functions.'

COMPONENTS OF THE
LEARNING PROGRESSIONS FRAMEWORKS

LPF Strand
(Big Idea)

- Patterns, Relations and Functions (PRF)
- (Patterns, relations, and functions are used to represent and analyze change in various contexts, make predictions and generalizations, and provide models and explanations for real-world phenomena.)

Learning
Target

- K-4 Elementary Learning Target
- E.PRF-2 Give examples, interpret, and analyze repeating and growing patterns and functions involving the four basic operations.

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Continuing with our example in the LPF strand of Patterns Relations and Functions, and using the K-4 elementary learning target of 'Give examples, interpret, and analyze repeating and growing patterns and functions involving the four basic operations', you can see how the learning target begins to build toward the strand's big idea, or enduring understanding.

The next set of components in the Learning Progressions Frameworks is the progress indicators. The Progress indicators further break down the big idea and learning targets into more specific descriptions of what students should know and be able to do by the end of shorter, specific grade spans within a grade band. Progress Indicators use research synthesis to establish a general order of how the skills and concepts emerge for typical peers.

PROGRESS INDICATORS (PI's)

(K-4) Elementary School Learning Targets	(5-8) Middle School Learning Targets	(9-12) High School Learning Targets
E.PRF-2 Give examples, interpret, and analyze repeating and growing patterns and functions involving the four basic operations.	M.PRF-2 Give examples, interpret, and analyze a variety of mathematical patterns, relations, and explicit and recursive functions.	H.PRF-2 Use trends and analyze a variety of mathematical patterns, relations, and explicit and recursive functions.
Finer grain size K-2 3-4	Finer grain size 5-6 7-8	Finer grain size 9-10 11-12

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While the learning targets specify what students should know and be able to do at the end of elementary, middle and high school, the progress indicators do the same, but at a finer grain size. At the elementary level, progress indicators identify the specific skills and concepts that build toward performance of the learning target and are organized in grade spans K-2 and 3-4. The middle school progress indicators are organized in grade spans 5-6 and 7-8. Finally, the grades 9-10 and 11-12 progress indicators develop the skills and concepts necessary to achieve the high school learning target.

PROGRESS INDICATORS

ESTABLISH A GENERAL ORDER OF HOW THE SKILLS AND CONCEPTS EMERGE FOR TYPICAL PEERS.

(K-4) Elementary School Learning Target				
E.PRF-2 Give examples, interpret, and analyze repeating and growing patterns and functions involving the four basic operations.				
K-2 Progress Indicators			3-4 Progress Indicators	
E.PRF.2a recognizing, describing, and extending simple repeating (ABAB) and growing (A+1, A+2, A+3) patterns	**E.PRF.2b** creating and explaining repeating and growing patterns using objects or numbers	**E.PRF.2c** extending and analyzing simple numeric patterns with rules that involve addition and subtraction	**E.PRF.2d** representing and analyzing patterns and rules (e.g. doubling, adding 3) using words, tables, graphs, and models	**E.PRF.2e** extending, translating, and analyzing numeric patterns and their rules using addition, subtraction, multiplication, and division

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Using the Patterns, Relations and Functions elementary learning target example, let's r**eview the progress indicators for grade clusters K-2 and 3-4. Notice** that the progress indicators are presented in a general order of how the skills and concepts emerge for most students, and, **how the skills and concepts deepen and broaden to build toward achievement of the elementary learning target.**

Spotlight progressions.

Learning Progressions help us, as teachers, to see the skills that come before and after in a learning sequence. This can be very helpful in analyzing student learning to identify what is missing or needs to be strengthened and/or supported, and is also helpful when planning instruction across multiple grades within a classroom.
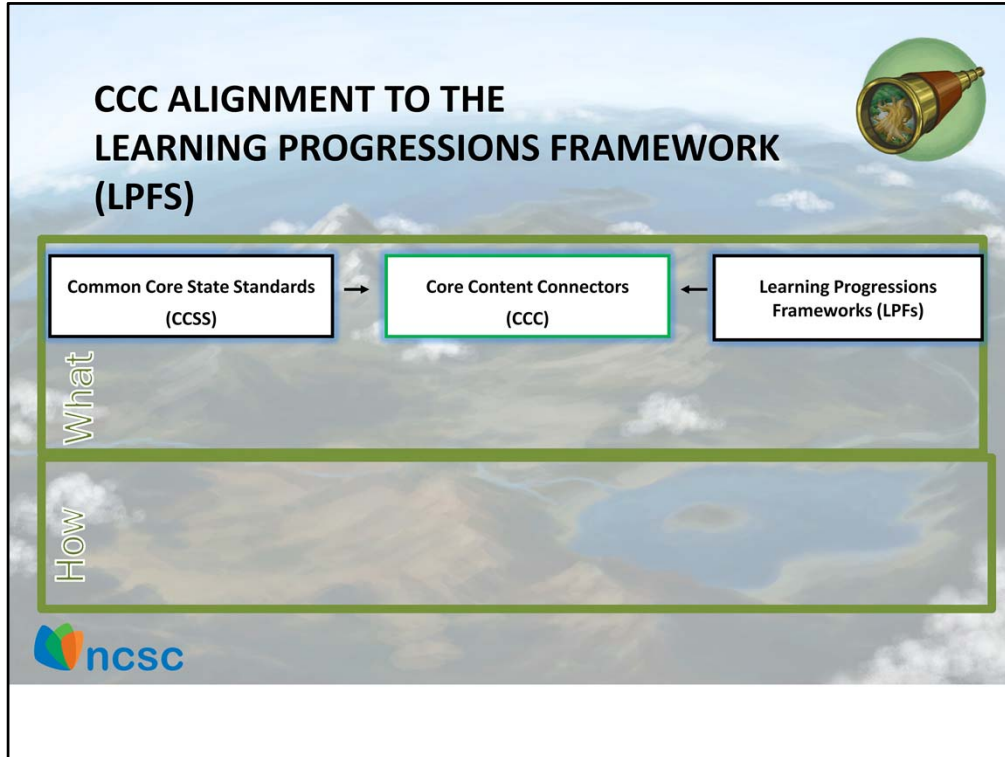
CONNECTION of the Learning Progressions Frameworks to the CCCs

LPF Strand (Big Idea)	• Patterns, Relations and Functions (PRF)
Learning Target	• (K-4) Elementary School Learning Target • E.PRF-2 Give examples, interpret, and analyze repeating and growing patterns and functions involving the four basic operations.
Progress Indicator	• E.PRF.2d representing and analyzing patterns and rules (e.g. doubling, adding 3) using words, tables, graphs, and models

CCC	• 3.PRF.2d1 Identify multiplication patterns in a real word setting
CCC	• 3.PRF.2d2 Apply properties of operations as strategies to multiply and divide
CCC	• 4.PRF.2d3 Generate a pattern when given a rule and word problem

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The Core Content Connectors (CCCs), which have been aligned to the Common Core State Standards, are dually aligned to the Learning Progressions Frameworks (LPFs) and specify grade level learning that leads to mastery of the Progress Indicators. The CCCs cannot simply be taught as isolated skills out of context. Skills and concepts must be built during instruction and practiced in multiple contexts to truly promote the use and generalization of mathematical concepts. Using the LPFs as a guide helps to identify how the CCCs are pulled together to allow for the development of schemas that deepen and broaden conceptual understanding.

As noted, the Core Content Connectors are dually aligned to the Common Core State Standards and Learning Progressions Frameworks.

(Core Content Connectors should be emphasized, then advance slide)

ADVANTAGE OF DUAL ALIGNMENT

Aligning with the Common Core

- Promotes access to grade level content standards
- Fosters instruction of common core standards for students with SCD

Aligning with Learning Progressions Frameworks

- Promotes teaching towards defined learning outcomes
- Pinpoints *the starting point* to plan instruction that build to the grade level concept for students with SCD

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Alignment to the common core promotes access to grade level content and fosters instruction of the Common Core State Standards for students with significant cognitive disabilities. Alignment to the Learning Progressions Frameworks, on the other hand, promotes teaching toward defined learning outcomes, pinpoints the starting point for planning instruction, and promotes sequential instruction of the big ideas and concepts across grades and grade bands.

RECOGNIZE THAT NCSC'S CODING SYSTEM FOR THE CCCS IS BASED ON THE LPFs AND IS REFERENCED IN THE NCSC MATERIALS AND RESOURCES

CCSS:	3.OA.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.*	
CCC:	3.PRF.2d1	Identify multiplication patterns in a real word setting
Strand: Patterns, Relations, and Functions	**Family:** Describing and Extending Patterns	

Progress Indicator: *E.PRF.2d representing and analyzing patterns and rules (e.g. doubling, adding 3) using words, tables, graphs, and models*

Essential Understandings	Concrete Understandings: • Recognize/identify an AB pattern as a pattern that has the same pattern over and over and never changing using colors, shapes, symbols or objects	Representation: • Match a pattern using symbols or objects to represent a provided growing multiplication pattern in a real word setting • Recognize patterns and use words to describe the patterns they see. • Understand concepts and vocabulary: growing pattern, multiplication, level, increasing/increases, decreasing/decreases, objects or shapes

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The NCSC coding system for the Core Content Connectors is based on the reference system for the Learning Progressions Frameworks. For example, the Element Cards reference the Core Content Connector using the NCSC coding system and the Progress Indicators to which it is related. The CCC will replace the E for Elementary with 3 and then add a reference digit to the end of the LPF reference. The LPF reference in this example is E.PRF.2d and the CCC reference is 3.PRF.2d1.

NATIONAL CENTER AND STATE COLLABORATIVE

GOAL

Ensure that students with the most significant cognitive disabilities achieve increasingly higher academic outcomes and leave high school ready for post-secondary options

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NCSC has worked to facilitate the use of the Common Core State Standards and Learning Progressions Frameworks by providing connections between the two, in order to ensure that students with the most significant cognitive disabilities achieve increasingly higher academic outcomes and leave high school ready for post-secondary options.

The Learning Progressions Frameworks, or LPFs, present a broad description of the essential content and general sequencing for student learning and skill development (Hess, 2010).

The LPFs contain learning targets and progress indicators that are referenced in the NCSC Curriculum and Instruction materials.

- Learning targets (general/broad performance descriptors) are defined by grade spans, K-4, 5-8 and high school.
- The related specific skills and concepts are called the progress indicators (PIs).

The Curriculum and Instructional materials were developed to help promote practices that help students engage in the CCSS while following the Learning Progressions.

MATHEMATICS: LEARNING PROGRESSIONS FRAMEWORK MODULE

This concludes the Learning Progressions Frameworks module.

Review the resources in the next section.

Claim your badge through the link at the end of the presentation.

It is suggested but not required that you complete all modules in the Mathematics course.

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This concludes the Learning Progressions Frameworks Module.

Review the resources in the next section.

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It is suggested but not required that you complete all modules in the Mathematics course.

NEXT STEPS

What to do after the quiz?

For more information, review the **Learning Progressions Frameworks Designed for Use with the Common Core State Standards in Mathematics K-12**. (Hess, Karin K., (Ed.) December 2010)

http://www.nciea.org/publications/Math_LPF_KH11.pdf

Go on to the next module – Graduated Understandings in mathematics

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For a better understanding of the Learning Progressions Frameworks, please review the document "Designed for Use with the Common Core State Standards in Mathematics K-12" on the website listed.

For more information on the Curriculum and Instructional materials developed through the NCSC grant, please continue with additional modules.

REFERENCES

http://www.corestandards.org/

Designed for Use with the Common Core State Standards in Mathematics K-12. (Hess, Karin K., (Ed.) December 2010)
http://www.nciea.org/publications/Math_LPF_KH11.pdf

wiki.ncscpartners.org

http://www.cast.org/udl/

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Please refer to the resources listed here for further information.