Computer Science in the Classroom

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Objectives

- Clarify CAPE legislation

- Examine computer science standards

- Describe the role of computer science standards in the classroom

- Demonstrate the integration of computer science while teaching science content

CAPE Digital Tools Certificates

CAPE Digital Tools Certificates

"The Legislature intends that by July 1, 2018, on a annual basis, at least 75 percent of public middle school grades students earn at least one CAPE Digital Tools certificate." s. 1003.4203 (3)(c)

Visit the annual CAPE Enrollment and Performance Report (2015-2016, p. 27) to see how many CAPE Digital Tools Certificates were earned by your school district in 2015-2016. View all reports at:

http://www.fldoe.org/academics/career-adult-edu/research-evaluation/cape-annual-enrollment.stml

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Statewide Goal for Digital Tools Attainment

- **How is the Digital Tools attainment goal in statute interpreted?**

- For the 2017-18 year and beyond, it is the expectation that 75 percent of middle grades students will earn a CAPE digital tool certificate each year.

- Percent would be calculated as follows:

<u># of 6-8 grade students who earned a CAPE digital tool certificate in 2017-18</u>

Total number of 6-8 grade students in 2017-18

CAPE Digital Tool Certificates

- 2017-18 CAPE Industry Certification Funding List includes 15 CAPE Digital Tool Certificates, which is the maximum allowed in statute is posted at: http://www.fldoe.org/academics/career-adult-edu/cape-secondary

Contacts

- Program Questions
  - General email industrycertification@fldoe.org
  - Tara Goodman Tara.Goodman@fldoe.org   850-245 9001

- Data Reporting
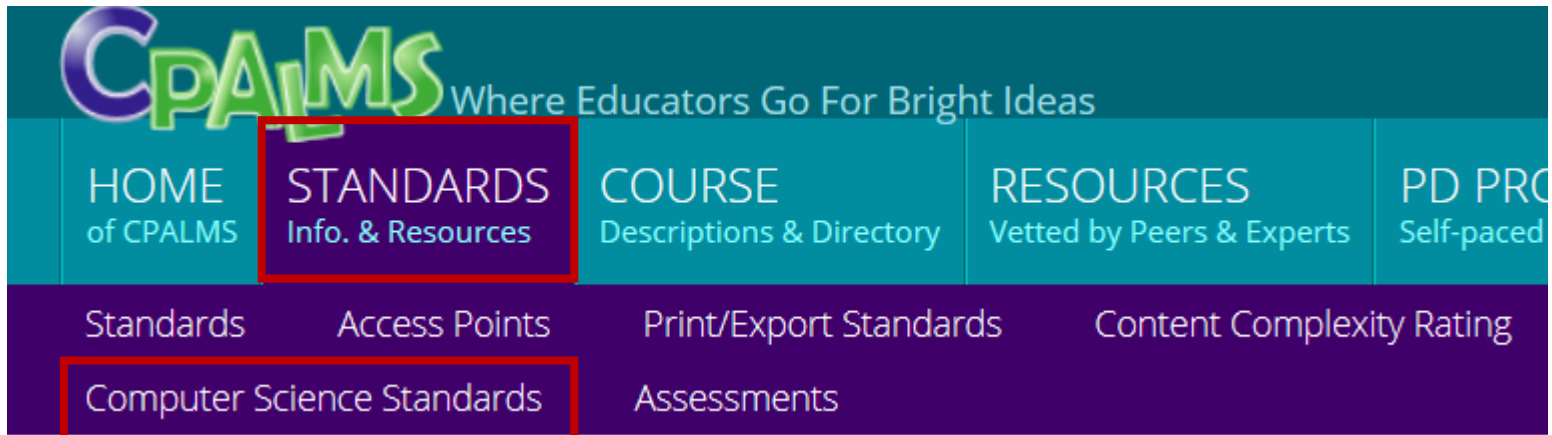 - Tsung Lin Tsung-Yuan.Lin@fldoe.org   850-245-9074

Computer Science Standards and Courses

What is Computer Science?

Computer science is the study of computing technology and algorithmic processes, including the principles of problem solving, the development of software, hardware and information systems, and their impact on society.

Computer Science Standards

- Adopted 2016

- Added Computer Science body of knowledge

- Added four big ideas to science

- Can be found on CPALMS

Coding Scheme

Four Big Ideas

1. Communication and Collaboration
2. Communication Systems and Computing
3. Computer Practices and Programming
4. Personal, Community, Global, and Ethical Impact

Communication and Collaboration

- CS-CC
  - SC.CS-CC.1: Communication and collaboration

Communication Systems and Computing

- CS-CS
  - SC.CS-CS.1: Modeling and Simulations
  - SC.CS-CS.2: Problem solving and Algorithms
  - SC.CS-CS.3: Digital tools
  - SC.CS-CS.4: Hardware and software
  - SC.CS-CS.5: Network systems
  - SC.CS-CS.6: Human – Computer interactions and Artificial Intelligence

Computer Practices and Programming

- CS-CP
  - SC.CS-CP.1: Data Analysis
  - SC.CS-CP.2: Computer Programming Basics
  - SC.CS-CP.3: Programming Applications

  - Standards link to mathematical practices and nature of science standards.

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Personal, Community, Global, and Ethical Impact

- CS-PC
  - SC.CS-PC.1: Responsible use of technology and information
  - SC.CS-PC.2: The impact of computing resources on local and global society
  - SC.CS-PC.3: Evaluation of digital information resources
  - SC.CS-PC.4: Security, privacy, information sharing, ownership, licensure and copyright

Elementary Courses with CS Standards

- STEM Lab Kindergarten

- STEM Lab Grade 1

- STEM Lab Grade 2

- STEM Lab Grade 3

- STEM Lab Grade 4

- STEM Lab Grade 5

- Introduction to Computer Science 1

- Introduction to Computer Science 2

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Example Unit

Standards – Science and Mathematics

- **SC.4.E.5.2:** Describe the changes in the observable shape of the moon over the course of about a month.

- **SC.4.N.3.1:** Explain that models can be three dimensional, two dimensional, an explanation in your mind, or a computer model.

- **MAFS.4.G.1.2:** Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.

- **MAFS.4.NBT.1.2:** Read and write multi-digit numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

- **MAFS.K12.MP.4.1:** Model with mathematics.

Standards – Computer Science

- **SC.35.CS-CS.2.3:** Explain the process of arranging or sorting information into useful order as well as the purpose for doing so.

- **SC.35.CS-CS.2.6:** Write an algorithm to solve a grade-level appropriate problem (e.g., move a character through a maze, instruct a character to draw a specific shape, have a character start, repeat or end activity as required or upon a specific event), individually or collaboratively.

- **SC.35.CS-CP.2.2:** Create, test, and modify a program in a graphical environment (e.g., block-based visual programming language), individually and collaboratively.

- **SC.35.CS-CS.1.2:** Describe how models and simulations can be used to solve real-world issues in science and engineering.

Focus of Unit

- Phases of the moon

- Creating a flowchart

- Coding a simulation in Scratch based on the phases of the moon

Lesson #1 - Moon Phase Unit

This is lesson 1 of 3 in the Moon Phase Unit. This lesson introduces students to the eight Moon phases and their names in a counter-clockwise sequential order starting with the New Moon as phase 1....
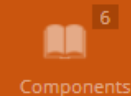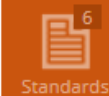
Primary Resource Type: Lesson Plan
Subject(s): Mathematics, Science
Grade Level(s): 4
Intended Audience: Educators
Collection: FCR-STEMLearn Computer Science

More Information

6 Standards   6 Components

Moon Phase Unit

- Activity 1
  - Watch video
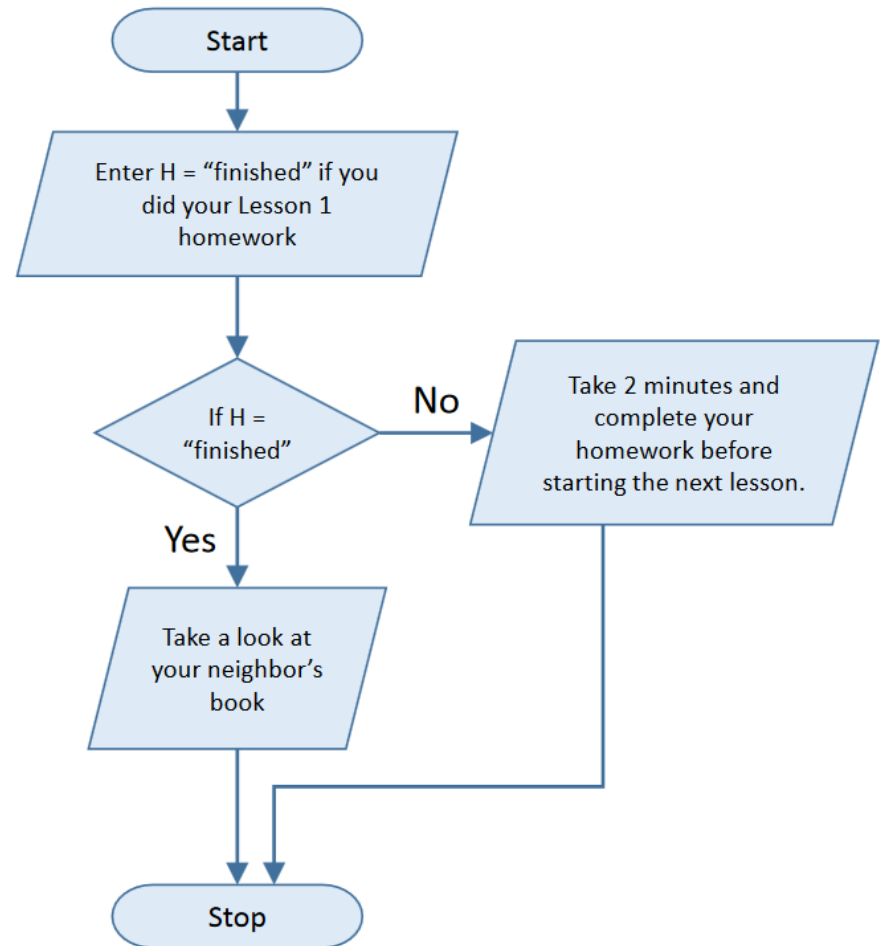 - Complete Phases of the Moon

Discuss Key Points

- Turn to a partner and discuss the following:
    - What is meant by the terms Waxing and Waning?
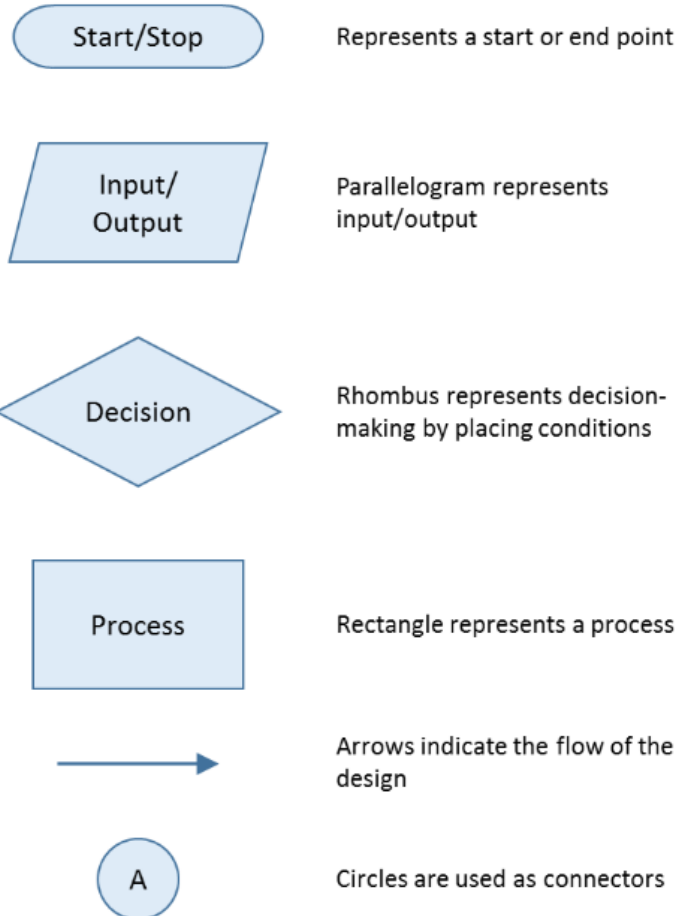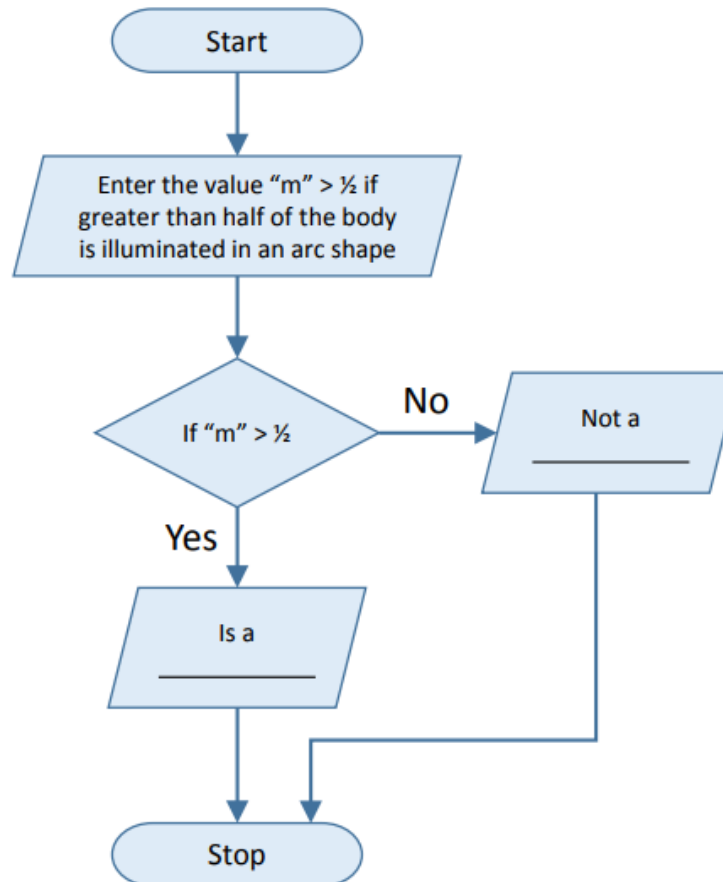   - Define the terms Crescent and Gibbous.

MOON PHASES

| WEEK 1 | WEEK 2 | WEEK 3 | WEEK 4 | WEEK 5 |

NEW   1/4   FULL   3/4   NEW

WAXING ----------------------->   WANING ----------------------->
CRESCENT   GIBBOUS   GIBBOUS   CRESCENT

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Flowchart

- Pictorial representation to make decisions on a topic.

Flowchart Symbols

Symbol	Description
Start/Stop	Represents a start or end point
Input/Output	Parallelogram represents input/output
Decision	Rhombus represents decision-making by placing conditions
Process	Rectangle represents a process
→	Arrows indicate the flow of the design
A	Circles are used as connectors

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Example Flowchart
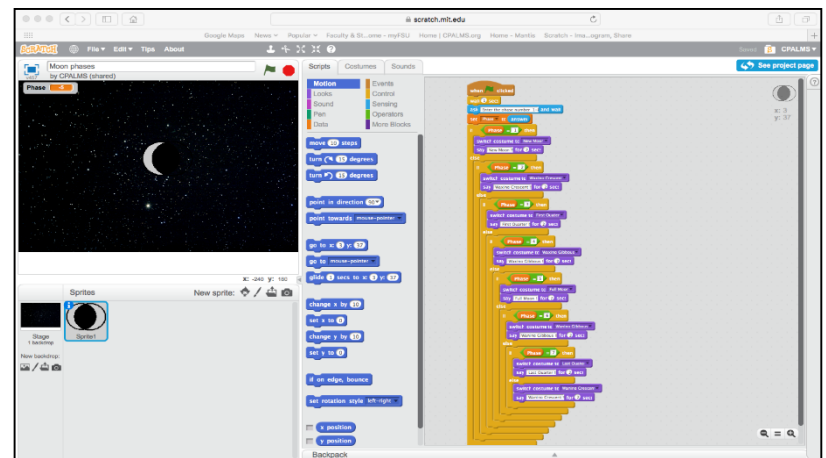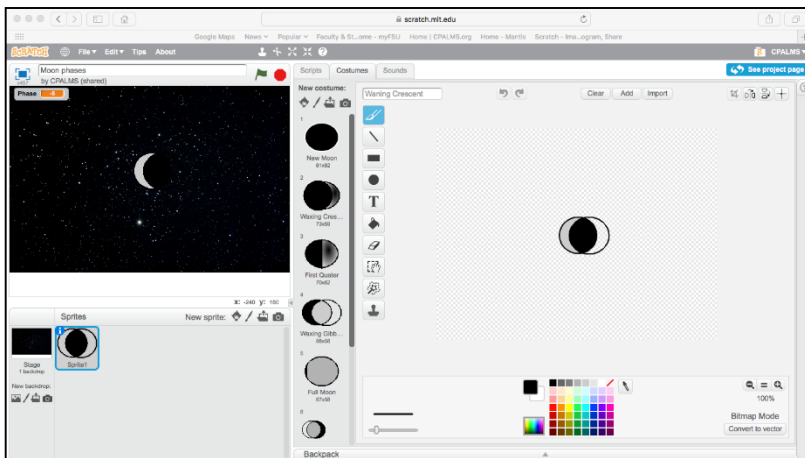
Phases of the Moon Flowchart
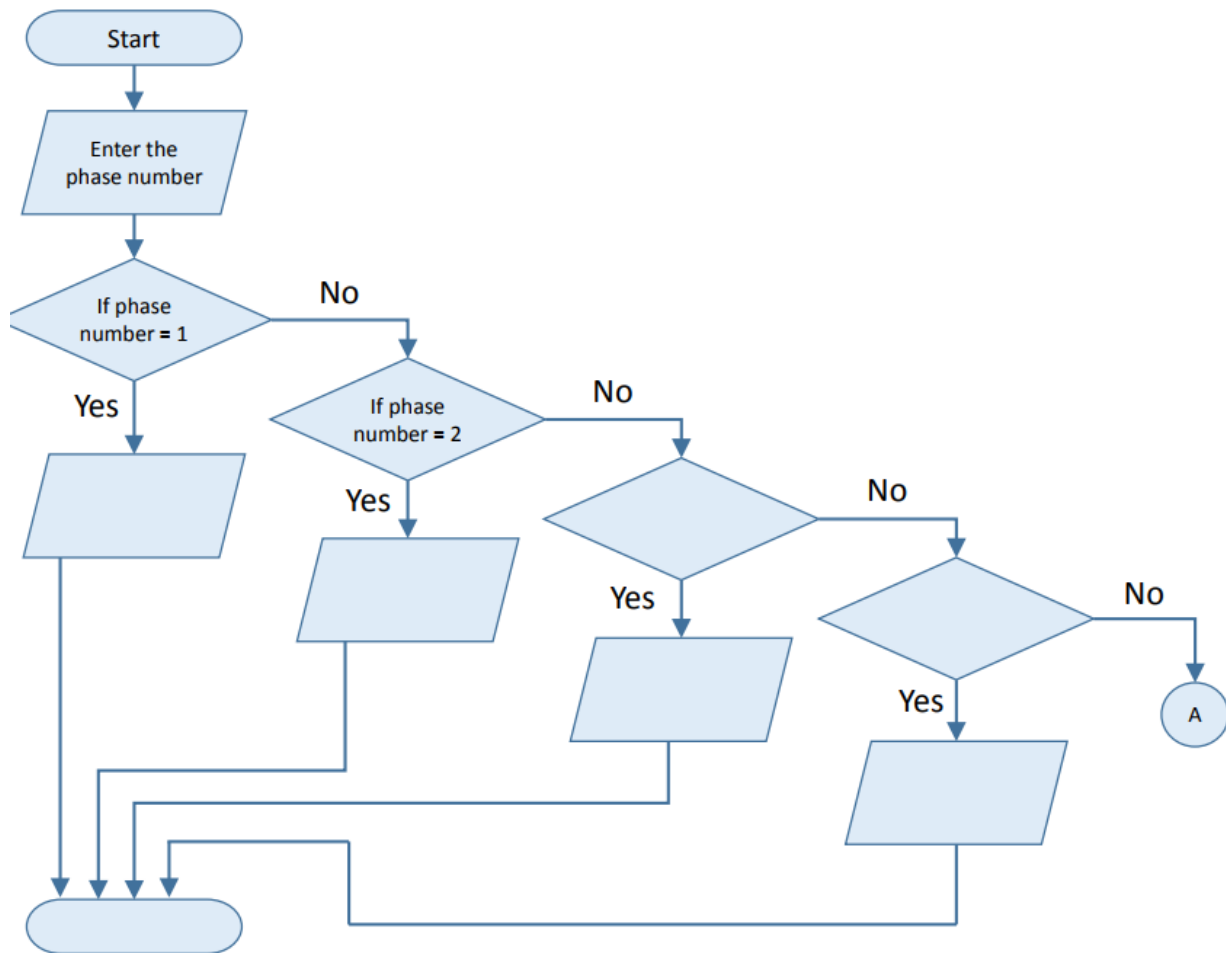
Follow-Up

- How might flowcharts be used in the classroom?

Scratch – Costumes and Final Version

- Students create costumes using Scratch based on the moon phases. https://scratch.mit.edu/

- Students use block programming to code a computer to change the picture and name of the moon phase when the user inputs information.
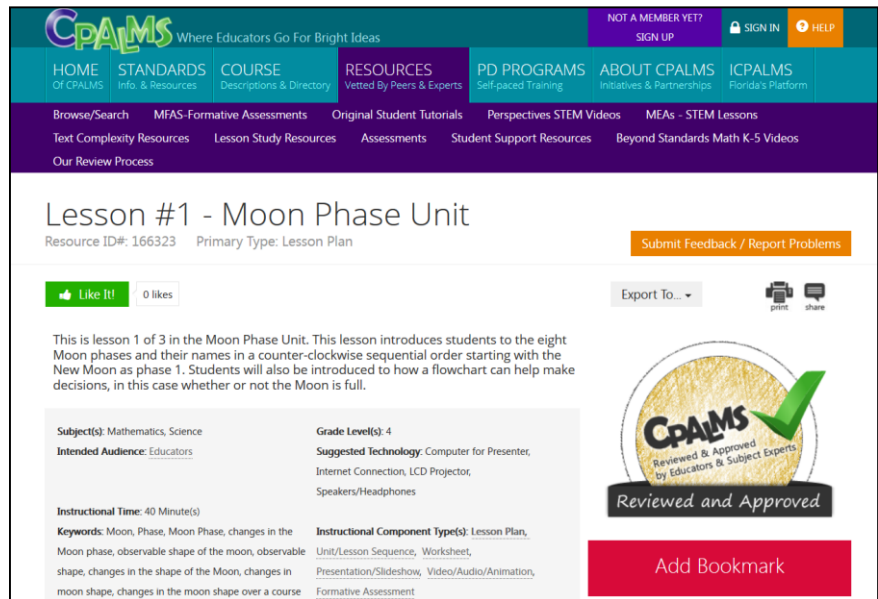
Additional Considerations

Integration and Collaboration

- Unit includes essay prompt for students.
  - Can be incorporated into language arts time
- STEM Special Area
  - Computer science and coding concepts taught

Unit on CPALMS

- Resources
  - Moon Phase Unit

- Additional Units
  - Grades 4-8
  - 26 lessons in 7 Units
  - http://code.cpalms.org

Trainings

- The CPALMS team is available to provide training in the following areas:
    - - K-5 geometry (K-5)
    - - integrated math and science in MS (6-8)
    - - integration of computer science with math and science (4-8)
    - - integration of engineering using model eliciting activities (K-12)
    - - earth systems and climate (6-12)
    - - physical science (6-8)
    - - cell biology (9-12)
    - - diversity and ecology (6-12)
    - - CPALMS related PD programs (K-12)
    - - mystemkits.com related PD programs (K-12)
- Additional and custom PD topics are available.
- For more information and to schedule one at your district, please contact training@cpalms.org.

New Certification System

Launches November 20, 2017

Educators

- New online accounts
- Online renewal via school districts
- Document upload and viewing

Districts

- Common applications
- Improved record keeping
- Quick information retrieval

For more information, please visit:
http://www.fldoe.org/teaching/certification/versa.stml

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Survey

- Help us improve our professional development.

- Please go to goo.gl/bVCEEY and complete the survey.

Date of presentation: 11/14/2017 or 11/15/2017

Time of session: PM

Presenter: Katrina Figgett

Contact Information

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