PLTW Computer Science Principles

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FETC Firehose

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PROJECT LEAD THE WAY PLTW

Elementary School
Middle School
High School
Inspiring, Engaging, and Empowering K-12 Students
Computer Science
Engineering
Biomedical Science

A computer science experience with a specific grade band in mind.

PLTW Launch (K-5) taps into students' exploratory nature, engages them in learning that feels like play helping them understand how computer science relates to the world around them.

PLTW Gateway (6-8) focuses on the positive impact of the application of computer science to other disciplines, fundamental for students as they define their career path opportunities and plans.

PLTW Computer Science (9-12) offers the opportunity for students to explore increasingly complex computational challenges and solve open-ended problems like professionals will do.

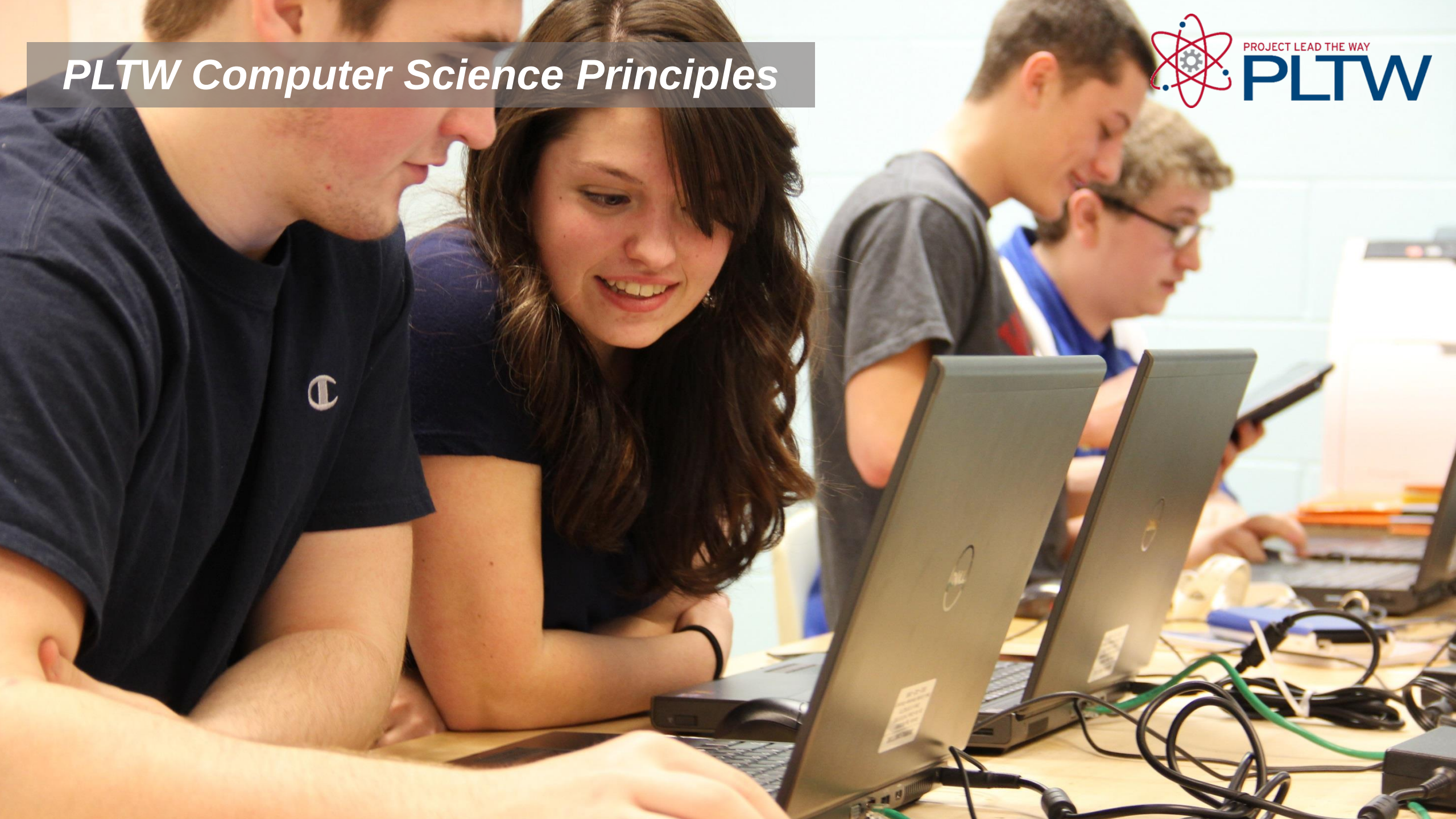
PLTW Computer Science (9-12)

PLTW provides a unique opportunity for students to connect learning across disciplines and industries. Students deepen their computational thinking knowledge and skills as they advance through our four year-long course offering.

- Computer Science Essentials
- Computer Science Principles
- Computer Science A
- Cybersecurity(*)

(*) *Available Fall 2018*

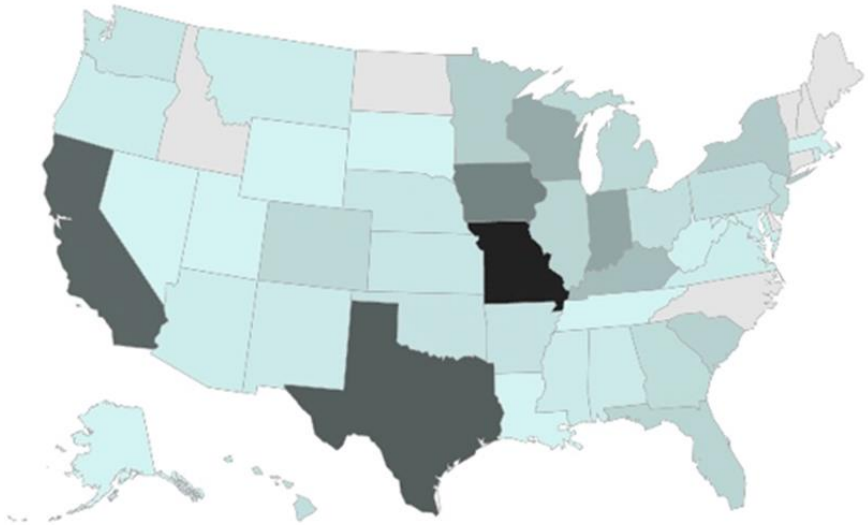
PLTW Computer Science Principles



PLTW Computer Science Principles

Empowers students to grow from consumers to creators of technology

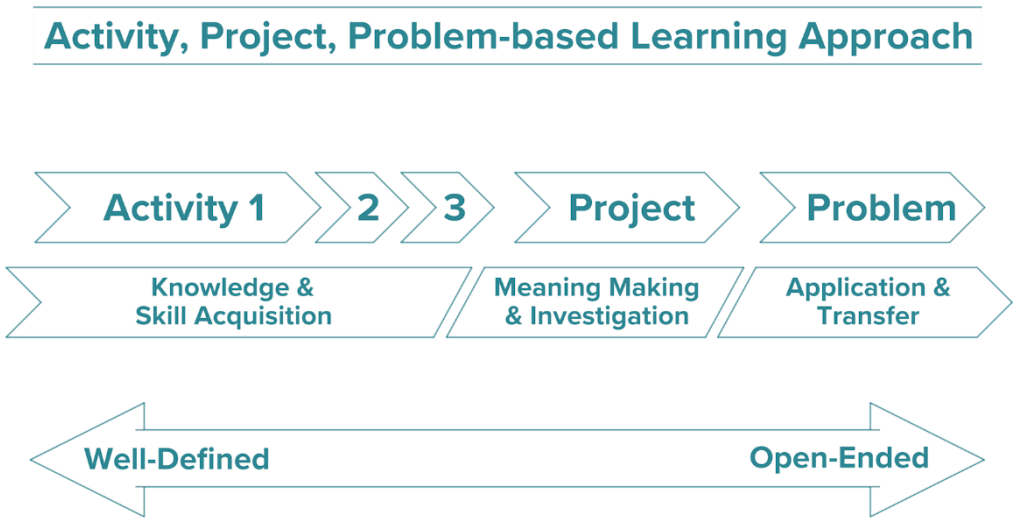
- Builds on our proven activity-, project-, problem-based learning approach
- Develops computational thinking
- Generates excitement about career paths that utilize computing
- Introduces professional tools that foster creativity and collaboration



PLTW is recognized by the College Board as an endorsed provider of curriculum and professional development for AP® Computer Science Principles (AP CSP).

Activity-, Project-, Problem-based Learning Approach
Learning in context

- A problem frames each lesson



Opportunities to Create	Opportunities to Explore
• Create a Scratch Game or Story • Design an App • Design an Image Algorithm • Design a Data-Driven Website • Investigate with Data • Modify a Simulation	• Digital Property and Forensics • Human Computer Interaction • Security and Liberty • Big Data and Parallel Processing • Computing Impacts All Fields

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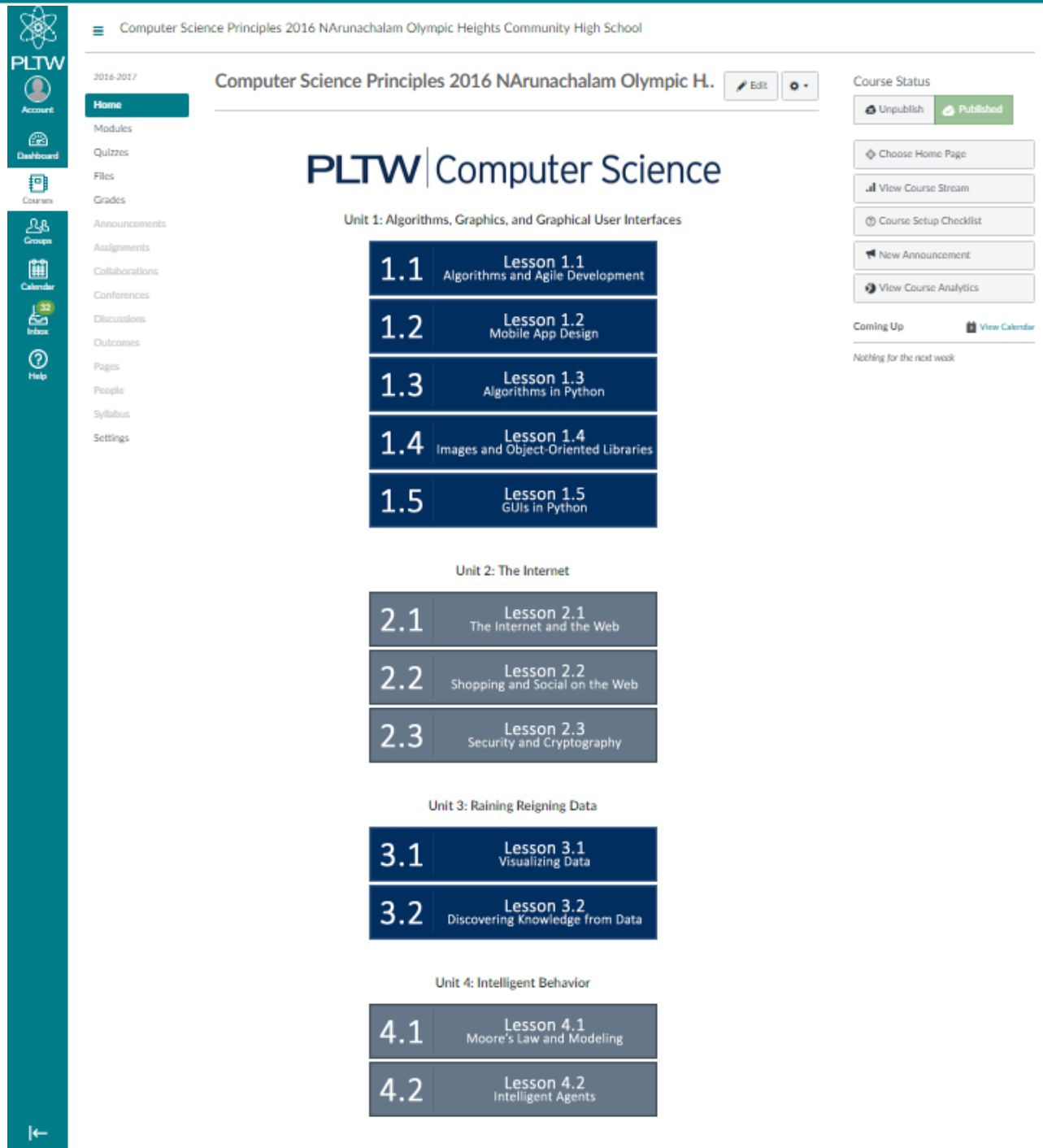
- PLTW provides ready-to-use, activity-, project-, problem-based curricula.
- Course includes comprehensive teacher plans, cohesive student and teacher materials, and access to PLTW's full-service support team.
- PLTW Computer Science Principals is structured into 12 lessons grouped in 4 units.

Download Course Outline



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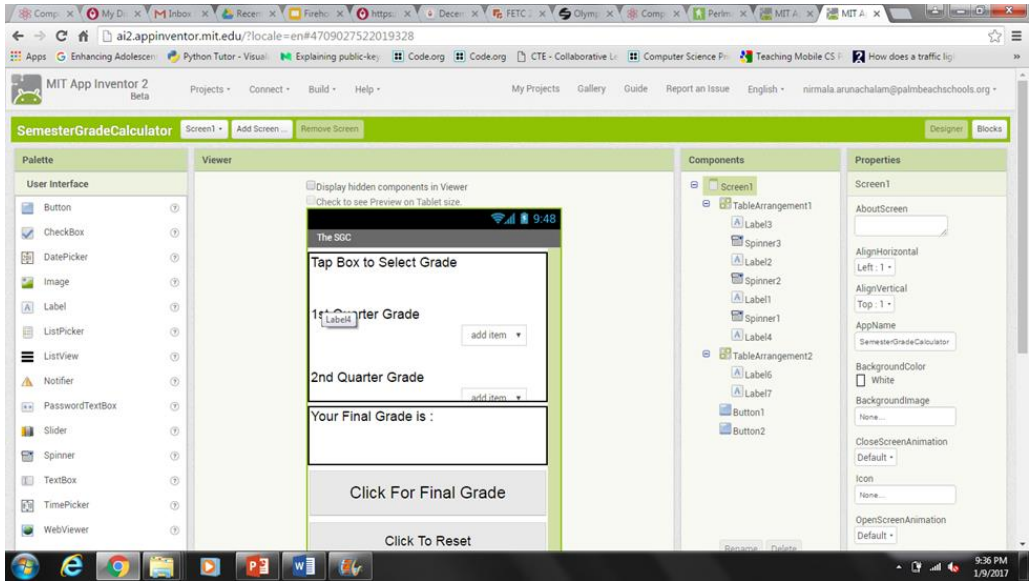
Opportunities to Create and Explore

UECT LEAD THE WAY
PLTW
TD
GS
SJ
JJ
EMERGENCY
DISCONNECT
Writing the target

Semester Grade Calculator. This was done using App Inventor. Shown below are the user interface setup, and the programming blocks.



Programming to create an interactive game with Python®

1.3.8.py

```
1  import random
2
3  def goguess():
4      print "Guess a number between 1 and 20"
5
6      num = random.randint(1,20)
7      guess = int(raw_input('Guess'   ))
8      print num
9      guesses = 0
10     while guess!=num:
11         if guess < num:
12             print 'Too low... try again'
13             guess = int(raw_input('Guess'   ))
14             guesses+=1
15         else:
16             print 'Too High... try again'
17             guess = int(raw_input('Guess'   ))
18             guesses+=1
19     print ('You are done in',guesses, 'guesses!')
```

Python

```
Welcome to Canopy's interactive data-analysis environment!
 with pylab-backend set to: qt
Type '?' for more information.

In [1]: %run "C:\Users\1084061\1.3.8.py"

In [2]: goguess()
Guess a number between 1 and 20

Guess2
12
Too low... try again

Guess12
('You are done in', 1, 'guesses!')

In [3]:
```

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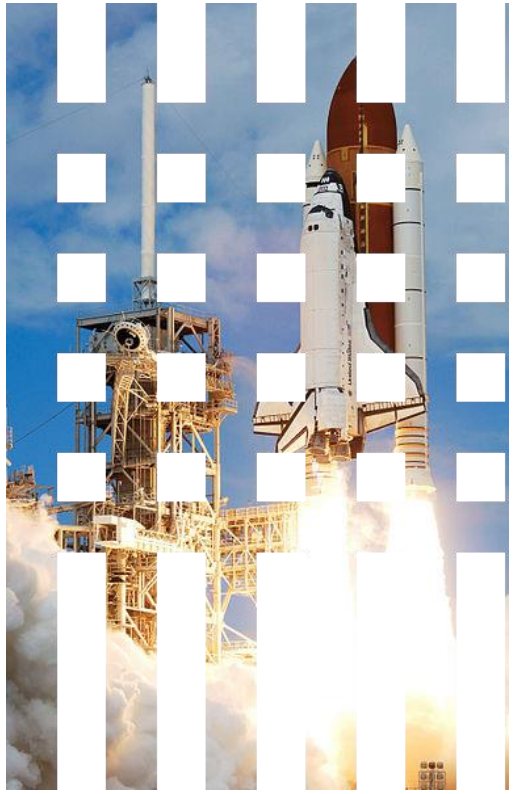
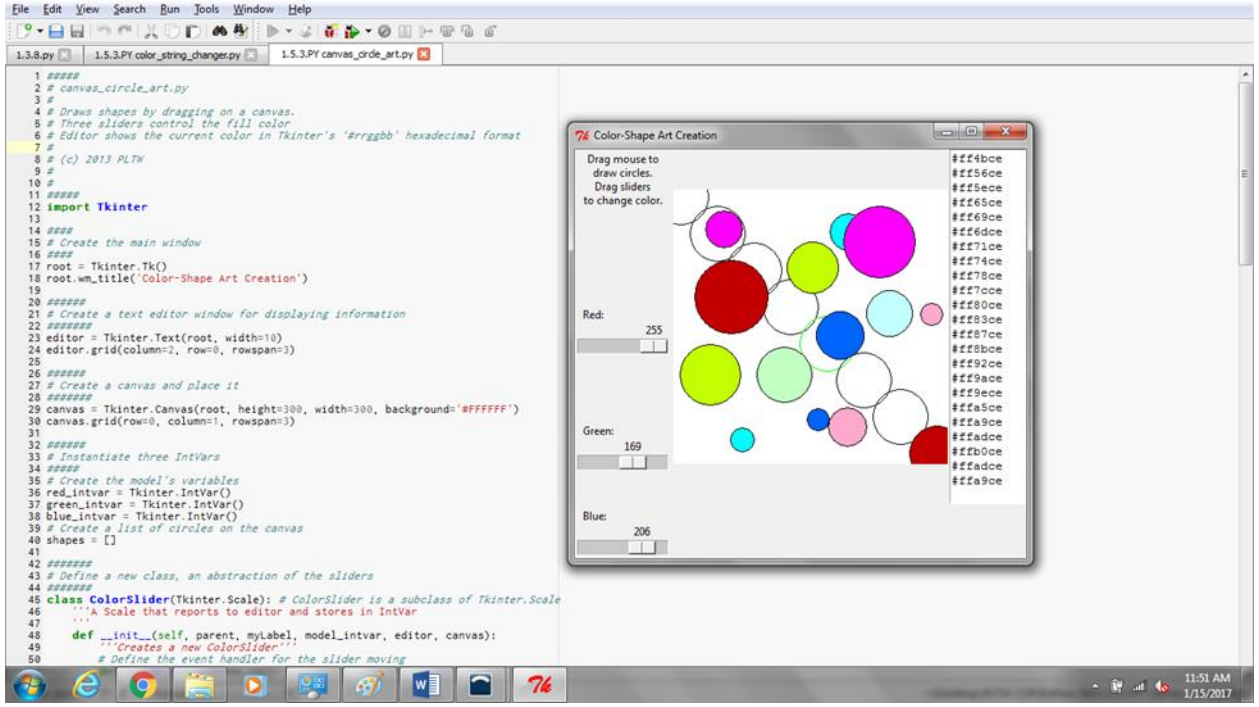
Python: Modifying images to give user defined effects





Using Python to create widgets using the Tkinter library

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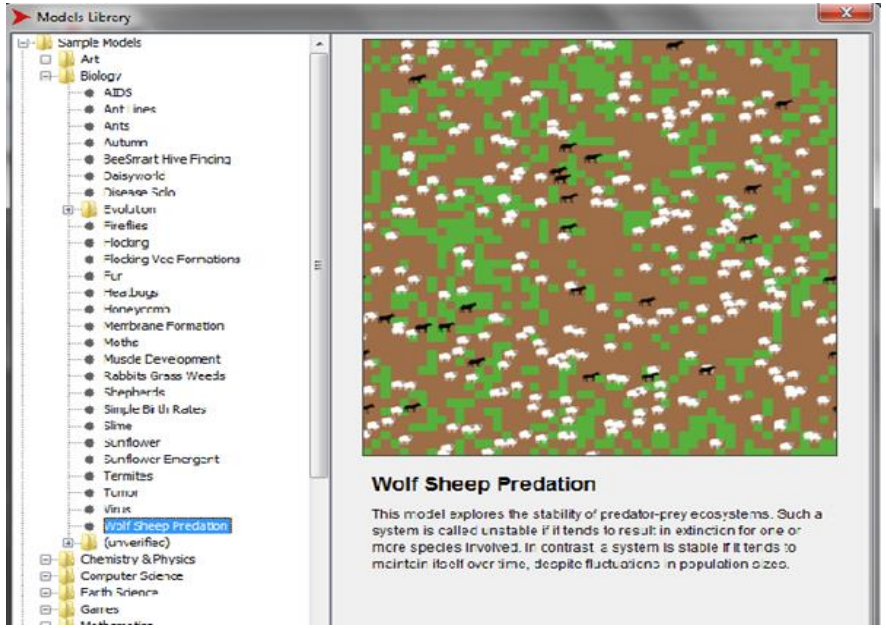
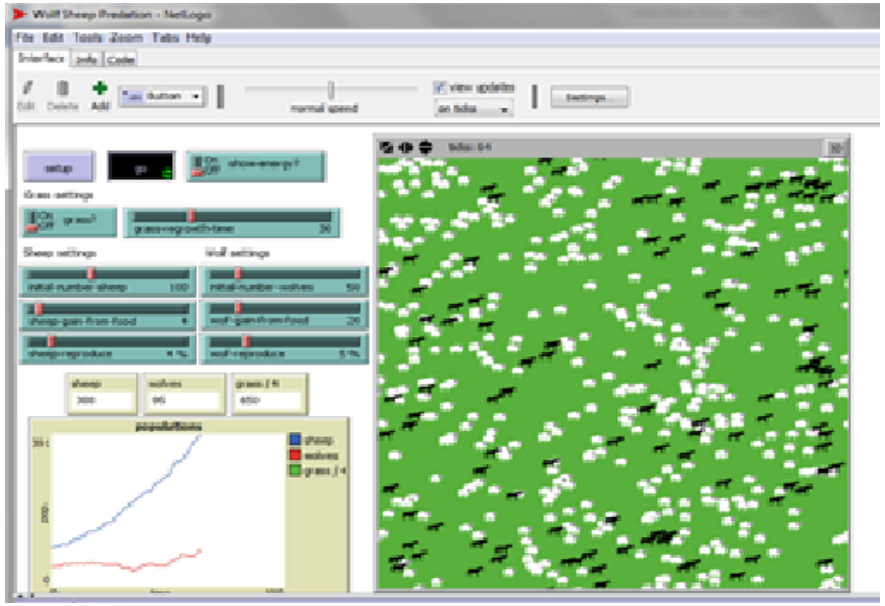
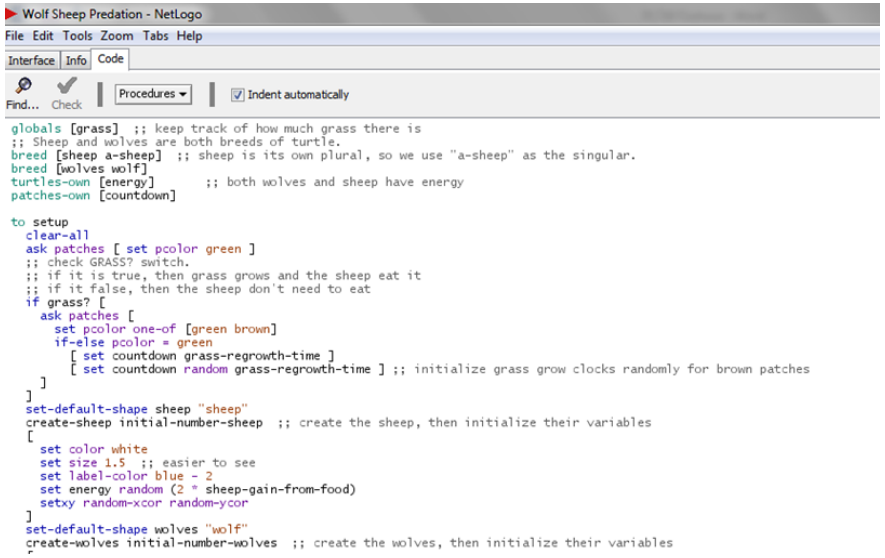
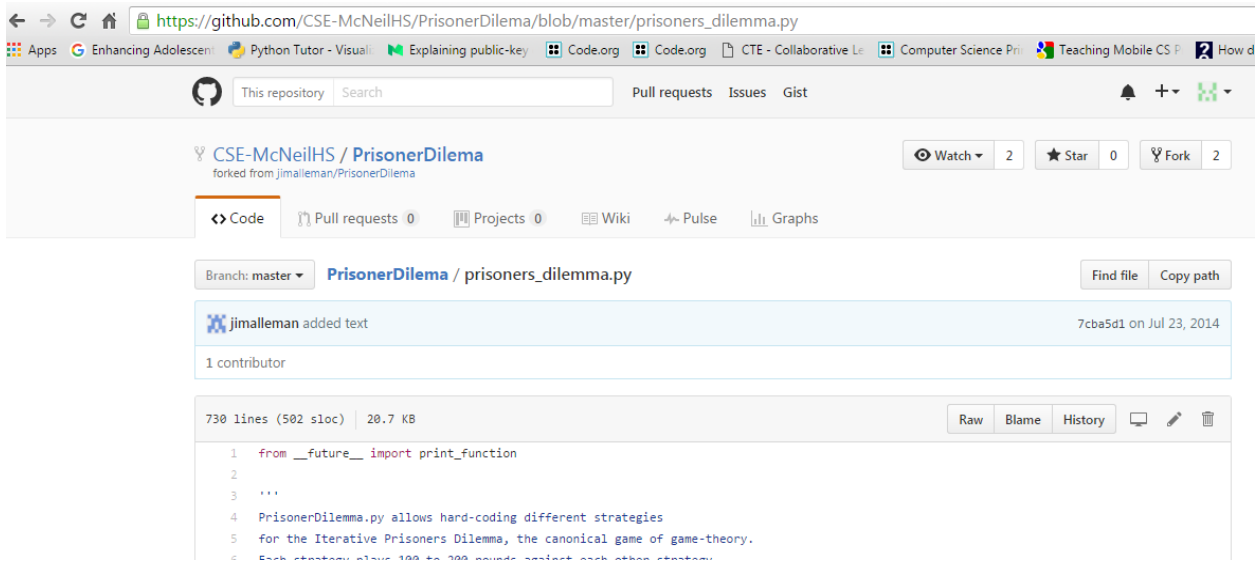
Agent Modeling Library – NetLogo







Prisoner's Dilemma using GitHub



The actual Python code

world_map.py | ciphers_Nimmi.py | *untitled-1

```
1  from __future__ import print_function
2
3  '''
4  PrisonerDilemma.py allows hard-coding different strategies
5  for the Iterative Prisoners Dilemma, the canonical game of game-theory.
6  Each strategy plays 100 to 200 rounds against each other strategy.
7  The results of all previous rounds within a 100-200 round stretch are known
8  to both players.
9  play_tournament() executes the tournament and stores output in tournament.txt
10 Players should each code their strategies in their assigned section of code.
11 Aggregated results are stored in tournament.txt
12 Unpublished work (c)2013 Project Lead The Way
13 CSE Project 1.3.5 Collaborating on a Project
14 Draft, Do Not Distribute
15 Version 8/23/2013
16 '''
17
18 import random
19 def play_round(player1, player2, history1, history2, score1, score2):
20     '''
21     Calls the get_action() function which will get the characters
22     'c' or 'b' for collude or betray for each player.
23     The history is provided in a string, e.g. 'ccb' indicates the player
24     colluded in the first two rounds and betrayed in the most recent round.
25     Returns a 4-tuple with updated histories and scores
26     (history1, history2, score1, score2)
27     '''
28
29     RELEASE = 0 # (R) when both players collude
30     TREAT = 100 # (T) when you betray your partner
31     SEVERE_PUNISHMENT = -500 # (S) when your partner betrays you
32     PUNISHMENT = -250 # (P) when both players betray each other
33     # Keep T > R > P > S to be a Prisoner's Dilemma
34     # Keep 2R > T + S to be an Iterative Prisoner's Dilemma
35
36     #Get the two players' actions and remember them.
37     action1 = get_action(player1, history1, history2, score1, score2)
```

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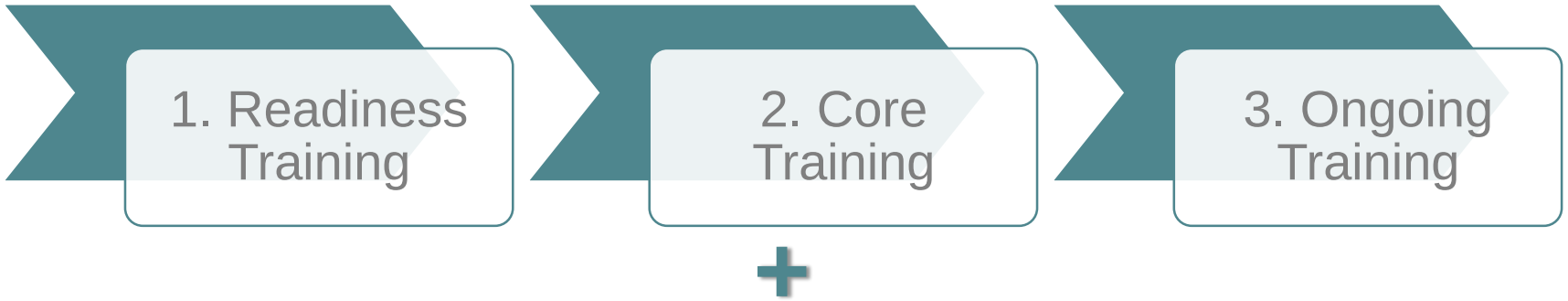
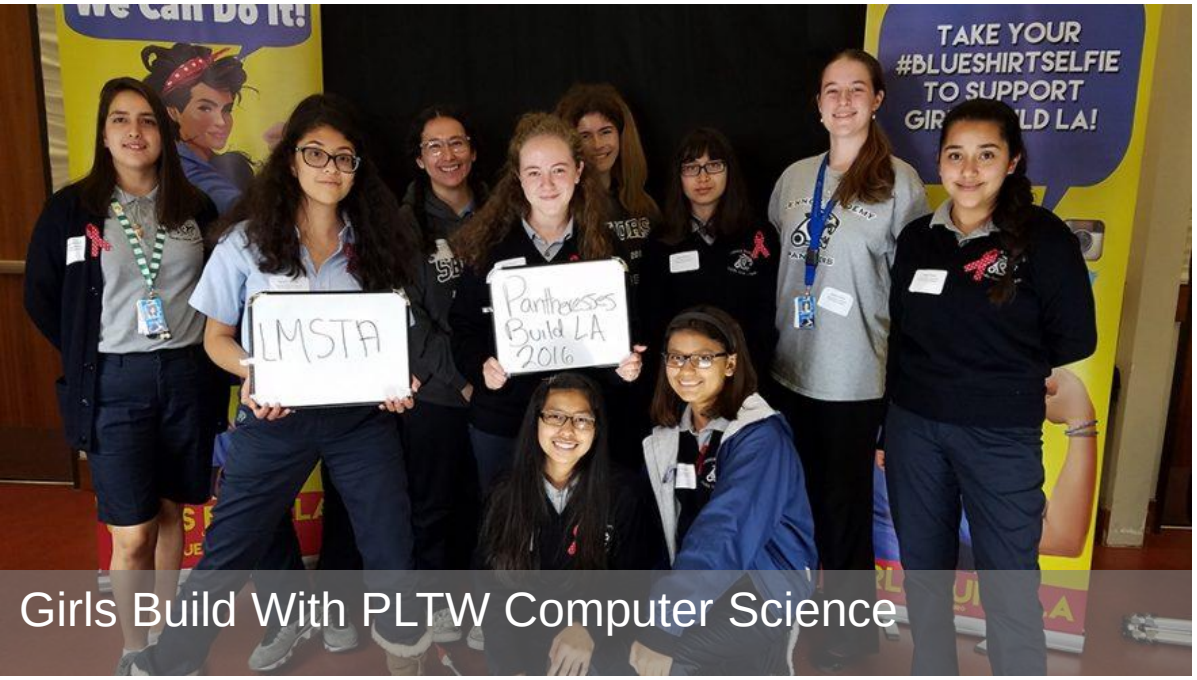
Preparing Teachers to Transform the Classroom Experience

Preparing Educators and Instilling Confidence

- PLTW Professional Development offers dynamic, research-validated learning experiences for educators through powerful and flexible instructional support:
  - tailored to individual needs,
  - live instruction,
  - on-demand resources, and
  - an ongoing professional community.



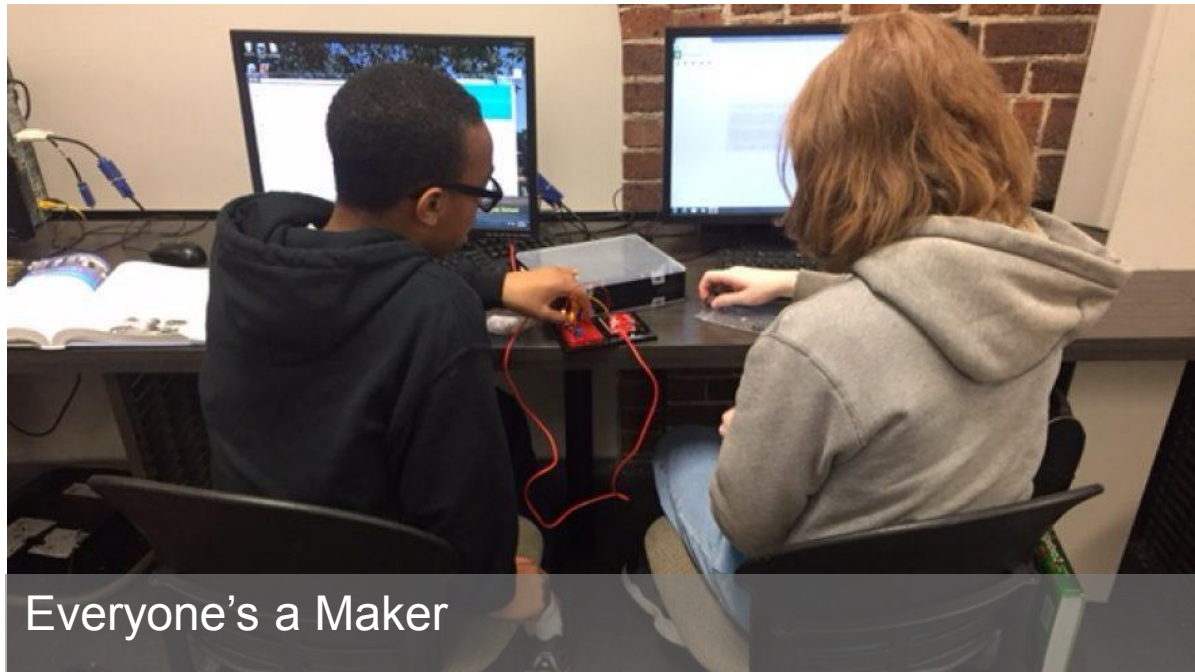
Through our online PLCs, teachers can connect and share experiences and expertise with fellow educators from across the nation who are teaching CSP.



Girls Build With PLTW Computer Science

The Impact of Computer Science Principles

Creating Solutions Through Purposeful Programming



Everyone’s a Maker

Let’s Continue the Conversation

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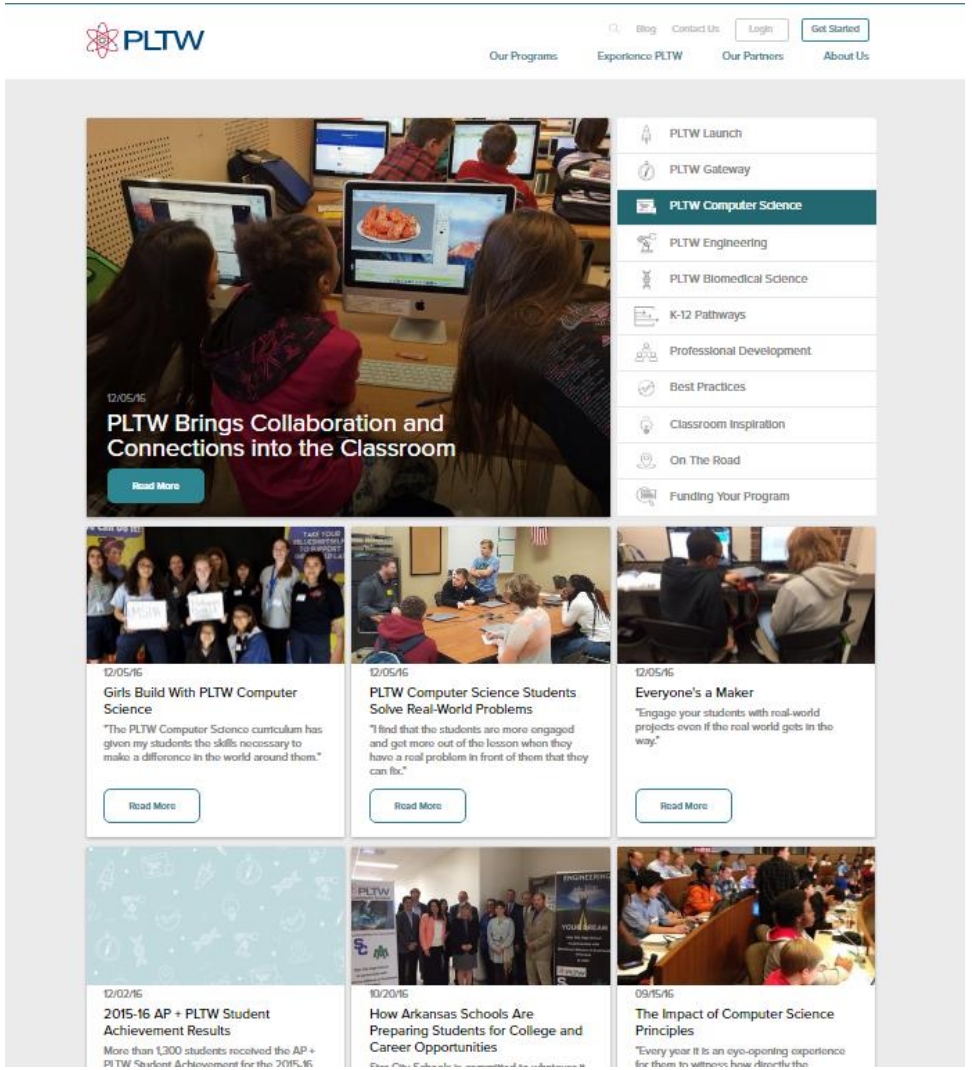

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